SERVICING & STORMWATER MANAGEMENT REPORT 273-275 RUSS BRADLEY ROAD

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1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry (MP) has been retained by Trevor Watkins to prepare this Servicing and Stormwater Management Report in support of the Site Plan Control process for the proposed self storage facility, located on Russ Bradley Road within the City of Ottawa.

The main purpose of this report is to present a servicing design for the development in accordance with the recommendations and guidelines provided by the City of Ottawa (City), the Mississippi Conservation Authority (MVCA) and the Ministry of the Environment, Conservation and Parks (MECP). This report will address the water, sanitary and storm sewer servicing for the development, ensuring that existing and available services will adequately service the proposed development.

This report should be read in conjunction with the following drawings:

- CCO-22-1643-01, C101 – Site Grading, Drainage, Erosion & Sediment Control Plan
- CCO-22-1643-01, C102 – Site Servicing Plan
- CCO-22-1643-01, PRE – Pre-Development Drainage Area Plan
- CCO-22-1643-01, PRE – Post-Development Drainage Area Plan

1.2 Site Description

The property is located at Russ Bradley Road within Ward 5. It is described as Plan 4R33191, Part of Lot 13, Concession 3 (Huntley), Geographic Township of Carp, City of Ottawa. The land in question covers approximately 2.43 ha and is located at the south corner of Carp Road and Russ Bradley Road.

See Site Location Plan in Appendix 'A' for more details.

The existing site is currently undeveloped with two gravel entrances from Russ Bradley Road. There are no sanitary, storm or water services on site however there is one fire hydrant in the right of way to the west of the site along Russ Bradley Road.

The proposed development consists of eleven storage buildings and one office/storage building. Parking and drive aisles will be provided throughout the site along with landscaping around the site perimeter. One existing site access will be maintained along Russ Bradley Road and one existing site access will be removed.

2.0 BACKROUND STUDIES

Background studies that have been completed for the proposed site include a topographical survey, geotechnical report and a hydrogeological investigation and terrain analysis.

Design drawings of the existing services on Russ Bradley Road were reviewed in order to determine accurate servicing and stormwater management schemes for the site.

A Sketch to Illustrate Topography of the site (22-2317) was completed by Mcintosh Perry Surveying Inc. (MPSI) and the Site Plan (SP-A01) was prepared by Deimling (latest dated December 16th, 2022).

The following reports have previously been completed and are available under separate cover:

- Geotechnical Report completed by Mcintosh Perry, dated December 23rd, 2022
- Hydrogeological Assessment & Terrain Analysis completed by Mcintosh Perry, dated December 23rd, 2022, Revised September 28, 2023
- Carp River Watershed/Subwatershed Study completed by Robinson Consultants, dated December 2004 (Report #00056)
- Novatech Hydraulic Network Analysis (R-2013-172) dated November 2014

3.0 PRE-CONSULTATION SUMMARY

A pre-consultation meeting was conducted on June 3, 2021 regarding the proposed site. Specific design parameters to be incorporated within this design include the following:

- Control 5 and 100-year post-development flows to the 5 and 100-year pre-development flows, respectively, with a combined C value to a maximum of 0.50.
- Provide 300mm freeboard from the 100-year storage elevation.
- Quality control is required to be provided for the site (80% TSS Removal).
- Infiltration as per sub-watershed study for the Carp Road Corridor.

The notes from the City of Ottawa can be found in Appendix 'B'.

4.0 WATERMAIN

4.1 Existing Watermain

There is an existing private 300mm diameter PVC watermain within Russ Bradley Road, owned and operated as part of a common element of the adjacent condominium corporation. The existing watermain is intended for exclusive use for the purposes of fire protection and not intended for internal servicing or domestic drinking water supply. There is an existing hydrant directly adjacent to the existing site entrance along Russ Bradley Road.

4.2 Proposed Watermain

A new well has been drilled adjacent to the parking lot north of building A to provide the proposed development with domestic water supply.

For the purposes of this report, the anticipated water demands have been assumed to be directly related to the anticipated sewage flow demands for the development. Based on the approved septic system design (File # 24-039), the calculated sewage flow demand was found to be 950 L/day. The proposed well and pump shall be sized so that it is capable of producing enough water to meet both the volume and flow rate requirements for the facility based on the OBC and applicable Ontario Well Regulations.

Fire protection is proposed to be provided by a remote fire protection system comprised of dry hydrants and a 150 mm diameter private watermain. The remote fire protection system will include three dry hydrants adjacent to the proposed storage buildings, and one dry hydrant located within the site entrance and adjacent to the existing hydrant within the ROW which will be used as the main connection for the Fire Department.

The proposed system will remain empty under normal circumstances. In the event of a fire, a temporary above grade connection between the proposed and existing hydrant will be used to charge the 150 mm diameter watermain, providing fire flow to three hydrants located within the site. As discussed within the Novatech Hydraulic Network Analysis (R-2013-172), Ottawa Fire Services can supplement additional fire flow with the use of rural fire shuttle capabilities.

The Fire Underwriters Survey 2020 (FUS) method was utilized to determine the required fire flow for the site. The buildings will be constructed from non-combustible materials, but in lieu of adequate fire ratings, the 'C' factor (type of construction) for the FUS calculation was assumed to be 1.0 (Ordinary Construction) to remain conservative.

Based on coordination with the architect, vertical firewalls with 2-hour fire resistance ratings will be used to subdivide the buildings into fire compartments with a total floor area ('A' value) no greater than 253 m^2. Fire compartments that have three exposure risks will be limited to a maximum total floor area of 191 m^2. Based on the reduced building footprints, it was determined that each building will have a required fire flow of 3,000 L/min (50 L/s) for a duration of 1.25 hours. The detailed calculations for the FUS and can be found in Appendix 'C'.

Although the building will be serviced via a drilled well and pump system as described above, water demands based on light industrial usage are provided below for informational purposes only. The water demands have been calculated based on the Ottawa Design Guidelines – Water Distribution (ODGWD) manual and can be found in Appendix 'C'.

Table 1: Water Demands

Design Criteria	Value
Site Area	2.43 ha
Light Industrial	28,000 L/ha/day
Average Day Demand (ODGWD)	0.98 (L/s)
Maximum Daily Demand (ODGWD)	1.47 (L/s)
Peak Hourly Demand (ODGWD)	2.65 (L/s)
Daily Volume Demand Based on Septic System Design & OBC	950 (L/day)
FUS Fire Flow Requirement	50.0 (L/s)

In order to satisfy the required fire flow of 3,000 L/min for a duration of 1.25 hours, the total volume of water required to service the site was calculated to be approximately 225,000 L of water.

As per the Novatech Hydraulic Network Analysis (R-2013-172) dated November 2014, the existing private network has accounted for approximately 63.08 L/s for 30 minutes of fire protection through the network, resulting in a total available fire flow of 113,544 L. It was further noted within the Novatech Hydraulic Analysis that additional fire flow can be supplemented by rural fire shuttle capabilities.

Based on discussion between McIntosh Perry and Ottawa Fire Services, it was noted that the City utilizes a Fire Underwriters Survey Accredited Superior Tanker Shuttle Service. Accreditation requires testing and documentation that demonstrates the shuttle service can continuously provide water supplies in excess of the minimum required for hydranted municipal-type water supplies. As a result of these requirements and as recognized in the FUS guidelines, the Accredited Superior Tanker Shuttle Service is recognized as an equivalency to hydrant protection.

The Superior Tanker Shuttle service is described as being capable of supplying a commercial fire flow rate of up to 400 GPM (1514.16 L/min) and therefore may provide up to approximately 113,562 L to achieve a total required fire flow of 226,952 L.

As seen in Table 2, below, the combined fire flow from the existing private hydrant and Accredited Superior Tanker Shuttle Service will be sufficient to meet fire flow requirements.

Table 2: Fire Protection Confirmation

Parameter	Required Fire Flow Duration	Required Fire Flow	Fire Flow Provided by City Shuttle	Fire Flow Provided Private Watermain	Total Fire Flow Available
Flow	1.25 hr	3,000 L/min	1514 L/min	3,782 L/min	3,028 L/min
Volume		225,000 L	113,562 L	113,472 L	225,952 L

To confirm the adequacy of fire flow to protect the proposed development, fire hydrants within 150 m of the proposed buildings were analysed per City of Ottawa ISTB 2018-02 Appendix I Table 1. The results are demonstrated below. It is noted that the existing hydrant located in the ROW has not been accounted for as it may initially be used to charge the proposed watermain, meaning it wouldn't immediately be available for fire fighting uses. Based on the vertical firewall locations provided by Deimling Architecture & Interior Design, it was determined that each fire compartment will be within 75m of at least one hydrant, with an additional hydrant located less than 150m away in an unobstructed path of travel.

Table 3: Fire Protection Confirmation

Building	Fire Flow Demand (L/min.)	Fire Hydrant(s) within 75m (Assumed Class B)	Fire Hydrant(s) within 150m (Assumed Class B)	Combined Fire Flow Per ISTB 2018-02
273-275 Russ Bradley Road	3,000 L/min	1 Private @ 1,900L/min	1 Private @ 1,500 L/min	3,400 L/min

5.0 SANITARY DESIGN

5.1 Existing Sanitary Sewer

There is no existing sanitary sewer within Russ Bradley Road. The subject site is currently undeveloped and contains no sanitary infrastructure.

5.2 Proposed Sanitary Sewer

The subject site is a proposed self storage with a small office. A new septic bed located north of the proposed office building will be installed and sized to accommodate the development. Refer to the approved septic design permit (File #24-039), completed by McIntosh Perry (under separate cover) for full details on the proposed septic system. These plans are being submitted to the Ottawa Septic System Office (OSSO) for the required permits and approvals. Sewage design flow was calculated based on the number of fixtures and unit counts, and was determined to be 950 L/day.

In summary, the system has been designed using a class 4 – BMEC partially raised area leaching bed, in combination with an Eljen GSF treatment unit system to treat up to the anticipated 950 L/day of effluent. The septic tank is proposed to hold a minimum of 3600L and include a Poly LOK effluent filter, which will be used in combination with a 900L balance pump chamber complete with a time dosed control panel.

Private Sewage Systems

- Approval for on-site septic treatment will be governed by the OBC as it is understood that the Daily Design Flow for the proposed office will be less than 10,000 litres per day.
- Septic systems will be constructed with all appropriate setbacks, treatment units and stipulations as per applicable Ontario Regulations.

For further design information pertaining to the on-site sewage system, please refer to the septic permit included in Appendix ‘D”.

6.0 PROPOSED STORMWATER MANAGEMENT

6.1 Design Criteria and Methodology

Stormwater management for the proposed site will be maintained through positive drainage away from the proposed buildings and directed to a proposed storage and infiltration area. Both parking lot and roof runoff will be directed to the proposed storage and infiltration area located along the northeast property line before being conveyed to the existing roadside ditch via a proposed enhanced swale. The emergency overland flow route for the proposed site will also be directed northeast toward the existing roadside ditch. Quantity and quality controls for the storm runoff for both the pre & post development conditions are further detailed below. Stormwater Best Management Practices (SWM BMP's) will be implemented at the "Lot level", "Conveyance" and "End of Pipe" locations. These concepts will be explained further in Section 6.6.

In summary, the following design criteria have been employed in developing the stormwater management design for the site as directed by the MVCA and City:

Quality Control

- The site has been designed to achieve 80% total suspended solids removal as per the MVCA.

Quantity Control

- Post-development flow 5/100-year is be restricted to match the 5/100-year pre-development flows respectively, with a maximum pre-development C value of 0.50.

6.2 Runoff Calculations

Runoff calculations presented in this report are derived using the Rational Method, given as:

$$Q = 2.78CIA$$

Where:
- Q = Flow (L/sec)
- C = Runoff coefficient
- I = Rainfall intensity in mm/hr (City of Ottawa IDF curves)
- A = Drainage area in hectares

It is recognized that the Rational Method tends to overestimate runoff rates. As a result, the conservative calculation of runoff ensures that any SWM facility sized using this method is expected to function as intended.

The following coefficients were used to develop an average C for each area:

Roofs/Concrete/Asphalt	0.90
Gravel	0.60
Undeveloped and Grass	0.20

As per the City of Ottawa - Sewer Design Guidelines, the 5-year balanced 'C' value must be increased by 25% for a 100-year storm event to a maximum of 1.0.

As per direction from the MVCA, the time of concentration (Tc) used for pre- and post-development flows shall be calculated and no less than 10 minutes.

6.3 Pre-Development Drainage

The subject property currently surface drains to the northwest. The existing site drainage limits are demonstrated on the Pre-Development Drainage Area Plan. The time of concentration was calculated to be 15 minutes. A summary of the Pre-Development Runoff Calculations can be found below.

Table 4: Pre-Development Runoff Summary

Drainage Area	Area (ha)	Runoff Coefficient (5/100-Year)	Time of Concentration (min)	5-year Peak Flow (L/s)	100-year Peak Flow (L/s)
A1	2.425	0.21/0.27	15	119.04	254.44
Total	2.425			119.04	254.44

See CCO-22-1643-01 - PRE in Appendix 'E' and Appendix 'G' for calculations.

6.4 Post-Development Drainage

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan. See CCO-22-1643-01 - POST in Appendix 'F' of this report for more details. The time of concentration was calculated to be 15 minutes for area B2, whereas 10 minutes was used for area B1 to remain conservative. A summary of the Post-Development Runoff Calculations can be found below.

Table 5: Post-Development Runoff Summary

Drainage Area	Area (ha)	Runoff Coefficient (5/100-Year)	Tc (min)	5-Year Peak Flow (L/s)	100-Year Peak Flow (L/s)
B1	1.453	0.64/0.76	10	268.17	547.38
B2A	0.697	0.40/0.48	15	64.85	132.56
B2B	0.115	0.50/0.60	15	13.28	27.11
B2C	0.161	0.63/0.75	15	23.27	47.30
Total	2.425			369.58	754.35

See Appendix 'G' for calculations. Runoff for area B1 will be restricted prior to outlet to the enhanced swale northwest of the infiltration and storage area. The flow will be controlled by a 150mm diameter culvert outlet and a 0.80m wide earth weir. Area B1 will be over-controlled to account for the unrestricted flow leaving the site from Area B2.

Runoff from area B2 will be directed off-site without restriction. Area B2B will be collected by the proposed enhanced swale northwest of the storage and infiltration area, and area B2C will be collected by the proposed swale northwest of the septic area.

Quantity and quality controls will be further detailed in Sections 6.5 and 6.6.

6.5 Quantity Control

The 5 -and 100-year post-development runoff for this site has been restricted to match the 5- and 100-year pre-development flow rate with a maximum combined C value of 0.50. (See Appendix 'B' for pre-consultation notes). These values create the following allowable release rate and required storage volumes for the site.

Table 6: Allowable Release Rate Summary

Drainage Area	Area (ha)	Runoff Coefficient (5yr/100yr)	Required Restricted Flow 5-Year (L/s)	Required Restricted Flow 100-Year (L/s)
A1	2.425	0.21/0.27	119.04	254.44

See Appendix 'G' for calculations.

Reducing site flows will be achieved through the use of flow restrictions which will create the need for on-site storage. Runoff from drainage areas will be restricted as shown in the table below.

Table 7: Post-Development Restricted Runoff Summary

Drainage Area	Post Development Unrestricted Flow (L/s)		Post Development Restricted Flow (L/s)	
	5-Year	100-Year	5-Year	100-Year
B1	268.17	547.38	11.97	47.46
B2A	64.85	132.56	64.85	132.56
B2B	13.28	27.11	13.28	27.11
B2C	23.27	47.30	23.27	47.30
Total	369.58	754.35	113.38	254.43

See Appendix 'G' for calculations.

Runoff from Area B1 will be captured and restricted in a depressed storage area. A weir and pipe combination will be used to restrict flow from Area B1 to the allowable release rate.

In the event that there is a rainfall which exceeds the 100-year storm event or there is a blockage within the storm sewer system, stored runoff will overtop the berm at an elevation of 114.56, providing 300mm of freeboard to the highest water storage level. Runoff will outlet to the existing municipal ditch NW of the site in an emergency situation. A storage summary can be found in Table 8, below.

Table 8: Storage Summary

Drainage Area	Depth of Ponding (m)	Storage Required (m^3)	Storage Available (m^3)	Depth of Ponding (m)	Storage Required (m^3)	Storage Available (m^3)
	5-Year			100-Year		
B1	0.24	274.69	290.78	0.36	446.55	459.40

The depressed storage area will have a maximum release rate of 47.46 L/s and provide up to 446.55 m^3 of storage during the 100-year event. The storage water level during the 100-year event will be 114.26, corresponding to a ponding depth of 0.36m. The maximum release rate during the 5-year event will be 11.97 L/s. The storage water level will be 114.14 during the 5-year event, corresponding to a ponding depth of 0.24m.

See Appendix 'G' for calculations.

6.6 Quality Control

6.6.1 Design Criteria & Methodology

The development of this lot will employ Best Management Practices (BMP's) wherever possible. The intent of implementing stormwater BMP's is to ensure that water quality and quantity concerns are addressed at all stages of development. Lot level BMP's typically include temporary retention of the parking lot runoff, minimizing ground slopes and maximizing landscaped areas. Some of these BMP's cannot be provided for this site due to site constraints and development requirements.

A treatment train approach is proposed to provide quality control for the site. Collected runoff will be directed towards a proposed storage and infiltration area located along the northeast property line. Pre-treatment will be provided by the grassed side slopes of the storage and infiltration area, which will act as a vegetated filter strip and provide a level of TSS removal for runoff entering the storage and infiltration area.

Settlement of suspended solids will create the need for maintenance over the lifetime of the SWM facility. Maintenance should be completed when sediment begins to significantly impact infiltration rates or the health of the vegetated medium. Maintenance will consist of removal of accumulated sediment, and reestablishment of the grass if required.

Flow leaving the proposed infiltration area will be directed to an enhanced grassed swale. The enhanced grassed swale will have a variant cross-slope and a drainage conveyance slope of 0.5% to slow down the stormwater which creates an opportunity for infiltration and removal of total suspended solids. TSS removal will occur through settlement of suspended solids and filtration through the vegetated medium.

Removal of suspended solids within the enhanced swale will create the need for maintenance over the lifetime of the swale. It is suggested that the grassed swale be visually evaluated bi-monthly and following significant storm events. Maintenance should be completed when sediment begins to impact drainage patterns within

the swale or the health of the vegetated medium. Maintenance will consist of removal of accumulated sediment, and reestablishment of the vegetated medium if required.

Flow not collected within the proposed enhanced swales will be directed to vegetated areas with low slopes and tall grass which will encourage filtration and provide a level of TSS removal prior to leaving the site.

Table 9 provides the criteria and proposed conditions the enhanced grassed swale will be subjected to.

Table 9: Enhanced Grassed Swale Requirements

No.	Design Element	Design Guidance	Proposed Works
1	Drainage Areas	Less than 2 hectares	Each swale receives flows from less than 2 hectares of drainage area.
2	Soils Type	Soil percolation rate should be greater than 15mm/hr	Extended detention has been provided to allow for additional opportunity for infiltration.
3	Water Table Depth	The seasonally high-water depth should be greater than 1m below the bottom of the enhanced swales	Long term GWT monitoring was completed and confirmed a minimum of 300mm separation is provided between the bottom of the SWM facility and the GWT, as recommended by the Ottawa Low Impact Development Technical Guidance Report.
4	Bedrock Depth	The depth to bedrock should be greater than 1m below the bottom of the enhanced swales	As per the Geotechnical Report, bedrock is greater than 1m below enhanced grass swale.
5	Cross-Section	Bottom width: >0.75m Side slopes: 2.5:1 (Typical) Maximum Depth of Flow: <0.5m (Typical) Channel Slope: <4%	Bottom width: 0.75 - 1.0m Side slopes: 3:1 Max Depth of Flow: <0.5m Channel Slope: 0.50%
6	Flow Velocity	Convey the peak flow from a 4 hour 25mm Chicago storm with a velocity <0.5m/s	Channel slopes will be limited to 0.5% and the resultant flow velocity will be less the 0.5 m/s.
7	Swale Length	>5m	The swale is greater than 5m in length.
8	Permanent Check Dams	To promote infiltration of stormwater and the settling of pollutants, permanent check dams can be constructed at intervals along the swale systems	The outlet functions as a check dam. An additional rock flow check dam has been added upstream of the dry retention area to demonstrate quality storage requirements as per Table 3.2.
9	Major System Events	Grassed swales must be evaluated under major system and minor system events to ensure that swales can convey these storms effectively	Swales have been designed to convey all flows up to 100-Yr events effectively. Major storm events are anticipated to crest the banks and spill to the adjacent ROW ditch. Detailed calculations are provided in the Appendix.

6.6.2 *Total Suspended Solids Removal*

From Section 3.2.2 of the MECP Stormwater Management Planning and Design Manual, a base level of water quality was determined using the site area, imperviousness, and the proposed retention volume. Based on Table 3.2 of the of the manual, the proposed storage and infiltration area will be able to achieve a minimum ***60% TSS removal*** given the proposed stormwater retention volume of ***446.55 m3*** during a 100-year storm. TSS removal will be achieved by filtration through the grassed surface, and particle settlement within the storage and infiltration area. It should be noted that ***60% TSS removal*** is based on a dry pond with continuous flow, whereas this development will have intermittent flow during rain events only, thus the actual TSS removal rate will be increased. Removal efficiency will be further increased as the outlet invert has been placed 10cm above the bottom of the infiltration area, allowing an extended opportunity for settlement of suspended solids.

As noted in the Credit Valley Conservation Authority Low Impact Development Stormwater Management Planning and Design Guide, a median ***76% TSS Removal*** has been determined for enhanced grassed swales based on available performance studies.

A quality control summary is included in ***Table 10***, below, with notes following.

Table 10: Total Suspended Solids Removal per Drainage Area

A	B	C	D	E	F	G	H
Drainage Area	**Total Area (m^2)**	**Hardscaped Area (m^2)**	**TSS Removal (Hardscape)**	**Factor of Safety Applied**	**Grassed Area (m^2)**	**TSS Removal (Grass)**	**Composite TSS Removal** *[(CD)+(FG)]/B*
B1	14,530	12,606	[1]90.4%	1.0	1,924	*100%*	92%
B2A	6,970	2,637	[2]10%	2.0	4,328	*100%*	66%
B2B	1,150	675	[3]50.7%	1.5	472	*100%*	71%
B2C	1,6610	1,352	[4]38%	2.0	253	*100%*	48%
Total	24,250	-	-	-	-	-	[5]**80%**

Table Notes

[1]As noted above, runoff from hardscaped surfaces within area ***B1*** will achieve ***60%*** TSS removal within the storage and infiltration area as per MECP guidelines. There will be an additional ***76%*** TSS removal within the enhanced grass swale based on CVCA/TRCA guidelines, for a total of [60% + (40% * 76%)] = ***90.40%*** TSS removal.

[2]Runoff from hardscaped surfaces within ***B2A*** will be directed towards grassed areas which will act as vegetated filter strips. While the CVCA/TRCA LID guidelines indicate ***20-40%*** *TSS* removal for vegetated filter strips, a factor of safety of 2 has been applied based on site conditions, resulting in an estimated TSS removal of ***10%.***

[3]Runoff from hardscaped surfaces within B2B will be collected by the enhanced swale located northwest of the storage and infiltration area. As runoff from this area will have a shortened flow path through the enhanced swale, a factor of safety of 1.5 has been applied to the enhanced swale removal efficiency of 76%, resulting in an estimated TSS removal of 50.7%.

[4]Runoff from hardscaped surfaces within B2C will be directed towards a swale located northwest of the septic area. As the dimensions of this swale fall within the lower end of the recommendations provided by the CVCA/TRCA & MECP guidelines, a factor of safety of 2 has been applied to the enhanced swale removal efficiency of 76%, resulting in an estimated TSS removal of 38.0%

[5]As runoff from grassed areas is generally considered clean and not requiring quality treatment, a baseline water quality of 100% has been applied for the purpose of calculating average TSS removal. As seen in Table 8, based on the weighted average of each drainage area, 80% TSS removal will be achieved for the site.

6.6.3 Infiltration

In addition to providing quality control for stormwater runoff, the proposed development is within the Carp Road Corridor Community Design Plan which identifies the subject property as a high groundwater recharge area. The Carp River Watershed/Subwatershed Study sets a target for high groundwater recharge areas of 262 mm/year of infiltration.

In order to meet the required infiltration target, an infiltration area has been designed for the site as per the Ottawa Low Impact Development Technical Guidance Report, and the Credit Valley Conservation Authority (CVC) and Toronto Region Conservation's (TRCA) Low Impact Development Stormwater Management Planning and Design Guide (2010). Storm runoff from the site will be directed to the infiltration area.

The infiltration area will be constructed along the northeast end of the site. The infiltration area will have a flat bottom with a bottom width varying from 4m to approximately 8.6m. The proposed grading modifications in the infiltration area are intended to be founded on native soils, and native or imported topsoil for landscaping, at an elevation of 113.90, which is approximately 0.38m above the seasonally high groundwater elevation of 113.53. Based on long term groundwater monitoring results included in Appendix H of the Hydrogeological Assessment, separation from the groundwater table will increase outside of the spring season. Existing elevations at the bottom of the proposed infiltration area vary from approximately 113.60 to 114.70. Native soils are only proposed to be removed in areas where the proposed grades are lower than existing. It is not proposed to remove and replace any native soils others. Non-native material is not intended to replace any native material in the infiltration area, other than topsoil as required for landscaping purposes. Any grade raise requirements will be achieved using native soils.

Due to site constraints such as poor hydraulic conductivity and high groundwater levels, the design has incorporated recommendations from the Ottawa Low Impact Development Technical Guidance Report. As per the recommendations within Section 3.5.2, approximately 113.19 m^3 of storage will be provided below the outlet invert to allow an extended opportunity for runoff to infiltrate. Side slopes of 3H:1V are proposed to provide as much hydraulic head as possible over the infiltration practice. As per section 3.5.3, long term

groundwater monitoring has been completed to demonstrate that high groundwater conditions will primarily be limited to the spring season.

Design criteria from the Credit Valley Conservation Authority (CVC) and Toronto Region Conservation's (TRCA) Low Impact Development Stormwater Management Planning and Design Guide (2010) and Ottawa Low Impact Development Technical Guidance Report are noted in the following table:

Table 11: Infiltration Area – CVC/ TRCA & Ottawa LID Requirements & Recommendations

No.	Design Element	Criteria	Proposed Works
1	Water Table Depth	CVCA/ TRCA Guidelines: The seasonally high water depth should be greater than 1m below the bottom of the soakaway pit	The site has been raised to provide as much clearance as feasible above the groundwater table.
		Ottawa LID Guidelines (Recommendation 4): Provide continuous groundwater monitoring to assess if poor infiltration conditions may be limited to a single season.	Groundwater monitoring results included within the Hydrogeological Assessment indicate that high groundwater conditions are primarily limited to the spring season.
2	Depth to Bedrock	CVCA/ TRCA Guidelines: The depth to bedrock should be greater than 1m below the bottom of the soakaway pit	Depth of bedrock is greater than 1m below the bottom of the infiltration area.
		Ottawa LID Guidelines (Recommendation 2): Additional investigations are required where 1m separation from the bottom of the LID area to bedrock cannot be achieved.	
3	Soils	CVCA/ TRCA Guidelines: Soil percolation rate should be greater than 15mm/hr	The infiltration area has been designed to promote infiltration in soils with poor percolation rates.
		Ottawa LID Guidelines: To encourage infiltration in soils with low hydraulic conductivity, it is recommended to maintain a hydraulic head over the point at which hydraulic conductivity slows to negligible levels. This is achieved by allowing water to remain within the storage reservoir below the outlet and increasing side slope to bottom ratios.	The bottom of the storage area has been designed to be 10cm below the outlet, providing up to 113.19 m^3 of storage and extending the opportunity for infiltration. 3H:1V side slopes are proposed to provide additional hydraulic head.
5	Location	CVCA/ TRCA Guidelines: >4m from buildings	Infiltration Area is >4m from all buildings.
		Ottawa LID Guidelines: >4m from Buildings	

An infiltration rate of 2.5 mm/hr has been utilized in the infiltration calculations. This rate was derived from the October 2022 infiltration testing completed within the proposed storage and infiltration area. A factor of safety of 8.5 was applied to the lowest measured infiltration rate of 21.18 mm/hr to apply a conservative estimate. See Appendix 'G' of the Hydrogeological Assessment for October 2022 infiltration testing results.

To promote infiltration, the storage area outlet is designed to be 0.10m above the bottom of the infiltration area. Based on the infiltration requirement of 262 mm/year and the site area of 2.425 ha, it has been determined that 7mm of rainfall from area B1 will need to be infiltrated per 5mm<x<25mm event, of which 51 are expected to happen per year. To provide storage for 7mm of rainfall from area B1, a storage volume of 101.71 m^3 will be required below the outlet. The proposed SWM facility will provide 113.19 m^3 of storage below the outlet, exceeding this requirement. The drawdown time, based on the resulting 0.83 L/s infiltration rate and the required storage volume of 101.71 m^3, is anticipated to be 1.42 days, whereas there will be on average 7.1 days between events. Refer to Appendix 'G' for detailed calculations.

6.6.4 Carp Road Ditch Review

As requested by the City of Ottawa Development Review staff, the existing drainage ditch along the southwest side of Carp Road (between Russ Bradley Road to approximately 1.2km northwest) was reviewed as part of this submission to visually assess the overall condition of the ditch and its resultant capacity. At the time of inspection, it was noted that the ditch was adequately conveying water from the subject site and surrounding areas with minimal to no apparent blockages. Pictures and comments are provided in Appendix H. The City requested that the following criteria be reviewed:

- Capacity
    - The depth of the subject ditch varies between approximately 1.5m to up to 3.0m from the paved shoulder on Carp Road, while the width remained relatively consistent between the shoulder and property limits. Based on the fairly large cross-sectional area, there does not appear to be any major concern regarding the capacity of the ditch during large events or seasonal runoff.
- Design Load
    - For the purposes of this investigation only a high level review of the ditch was completed, and the total drainage area captured by this ditch was unknown as it was not provided by the City. Based on the large cross-sectional area and gradient of the ditch, it is anticipated that it is capable of conveying large volumes of water towards the Carp River.
- Changes in Grade
    - Carp Road and its adjacent drainage ditches follow a fairly consistent gradient to the northwest towards a large box culvert crossing Carp Road, located approximately 1.2km northwest of Russ Bradley Road with minimal to no areas of backups or surcharging. During the time of inspection, it was noted that the fairly consistent gradient of the ditch allowed for adequate conveyance of stormwater, with visible flow downstream.
- Crossings
    - Several driveways for farm access cross the subject ditch, all of which utilize large diameter CSP culverts to allow the conveyance of stormwater towards the northwest. The culverts appear

to be in fair to good shape with minimal rusting or material defects above the water level (the condition of the bottom portions of the culverts were not inspected due to the poor visibility below the water level).

- Any blocked crossings
    - All culvert crossings throughout the 1.2km section of the ditch appeared to be relatively clear and free of major debris and/or sediment buildup. It was noted that a few of the culvert ends were not long enough to extend past the toe of slope and therefore there was some buildup of earth and rocks adjacent to the ends, but this did not impact the capacity of the culvert. It is recommended the City conduct regular inspections and maintenance on the ROW culverts to ensure adequate conveyance downstream.
- Flooding history
    - McIntosh Perry has not been made aware of any flooding issues or concerns within the subject ditch, and has not witnessed any flooding to date. Based on the size and gradient of the ditch it is assumed that flooding in the area is unlikely unless one or more of the culvert crossings are blocked by debris or sediment buildup. It is recommended that the City conduct regular inspections and maintenance on the ditch to ensure flooding does not occur.
- Condition (overgrown with weeds, sloughing of sides, etc.)
    - Overall, the ditch was in good condition as a majority of the ditch was relatively clear of debris and/or sediment buildup and allowed for adequate conveyance of water at the time of inspection. There were several areas noted with some minor overgrowth of weeds and trees, and minor buildup of garbage and debris, however these were not significant enough to impact the capacity of the ditch at the time of inspection. There were several areas of noticeable washout and sloughing of the gravel shoulder along the embankment of the roadway and so, it is recommended that the City conduct regular inspections and maintenance on the ditch including ditch cleaning, reshaping of the embankments and general regrading as required.

7.0 EROSION AND SEDIMENT CONTROL

7.1 Temporary Measures

Before construction begins, temporary silt fence, straw bale or rock flow check dams will be installed at all natural runoff outlets from the property. It is crucial that these controls be maintained throughout construction and inspection of sediment and erosion control will be facilitated by the Contractor or Contract Administration staff throughout the construction period.

Silt fences will be installed where shown on the final engineering plans, specifically along the downstream property limits. The Contractor, at their discretion or at the instruction of the City, Conservation Authority or the Contract Administrator shall increase the quantity of sediment and erosion controls on-site to ensure that the site is operating as intended and no additional sediment finds its way off site. The rock flow, straw bale & silt fence check dams and barriers shall be inspected weekly and after rainfall events. Care shall be taken to properly remove sediment from the fences and check dams as required. Removal of silt fences without prior removal of the sediments shall not be permitted.

Although not anticipated, work through winter months shall be closely monitored for erosion along sloped areas. Should erosion be noted, the Contractor shall be alerted and shall take all necessary steps to rectify the situation. Should the Contractor's efforts fail at remediating the eroded areas, the Contractor shall contact the City and/or Conservation Authority to review the site conditions and determine the appropriate course of action. As the ground begins to thaw, the Contractor shall place silt fencing at all required locations as soon as ground conditions warrant. Please see the Site Grading, Drainage and Sediment & Erosion Control Plan for additional details regarding the temporary measures to be installed and their appropriate OPSD references.

7.2 Permanent Measures

Rip-rap will be placed at all locations that have the potential for concentrated flow. It is crucial that the Contractor ensure that the geotextile is keyed in properly to ensure runoff does not undermine the rip rapped area. Additional rip-rap is to be placed at erosion prone locations as identified by the Contractor / Contract Administrator / City or Conservation Authority.

It is expected that the Contractor will promptly ensure that all disturbed areas receive topsoil and seed/sod and that grass be established as soon as possible. Any areas of excess fill shall be removed or levelled as soon as possible and must be located a sufficient distance from any watercourse to ensure that no sediment is washed out into the watercourse. As the vegetation growth within the site provides a key component to the control of sediment for the site, it must be properly maintained once established. Once the construction is complete, it will be up to the landowner to maintain the vegetation and ensure that the vegetation is not overgrown or impeded by foreign objects.

8.0 SUMMARY

- New self-storage buildings are proposed to be constructed at 273-275 Russ Bradley Road;
- A new drilled well will service the proposed office building for domestic cold water;
- A new remote hydrant system within the property limits will service the site for fire protection and will be adjacent to the privately owned watermain within the City's ROW. There three proposed private hydrants to supply fire flow throughout the site;
- A new septic system will be installed to service the site;
- The majority of the site will sheet flow to a depressed storage and infiltration area before being restricted at the outlet;
- Storage for the 5- through 100-year storm events will be provided within the depressed storage area;
- Infiltration will be promoted by raising the storage area outlet 0.10m above the bottom of the infiltration area; and
- An enhanced grass swale will be constructed to promote infiltration and removal of total suspended solids.

9.0 RECOMMENDATION

Based on the information presented in this report, we recommend that City of Ottawa approve this Servicing and Stormwater Management Report in support of the proposed development at 273-275 Russ Bradley Road.

This report is respectfully being submitted for approval.

Regards,

McIntosh Perry Consulting Engineers Ltd.

Francis Valenti, EIT.
Engineering Intern, Land Development
E: f.valenti@mcintoshperry.com

James Hewson, P.Eng.
Project Engineer, Land Development
E: j.hewson@mcintoshperry.com

10.0 STATEMENT OF LIMITATIONS

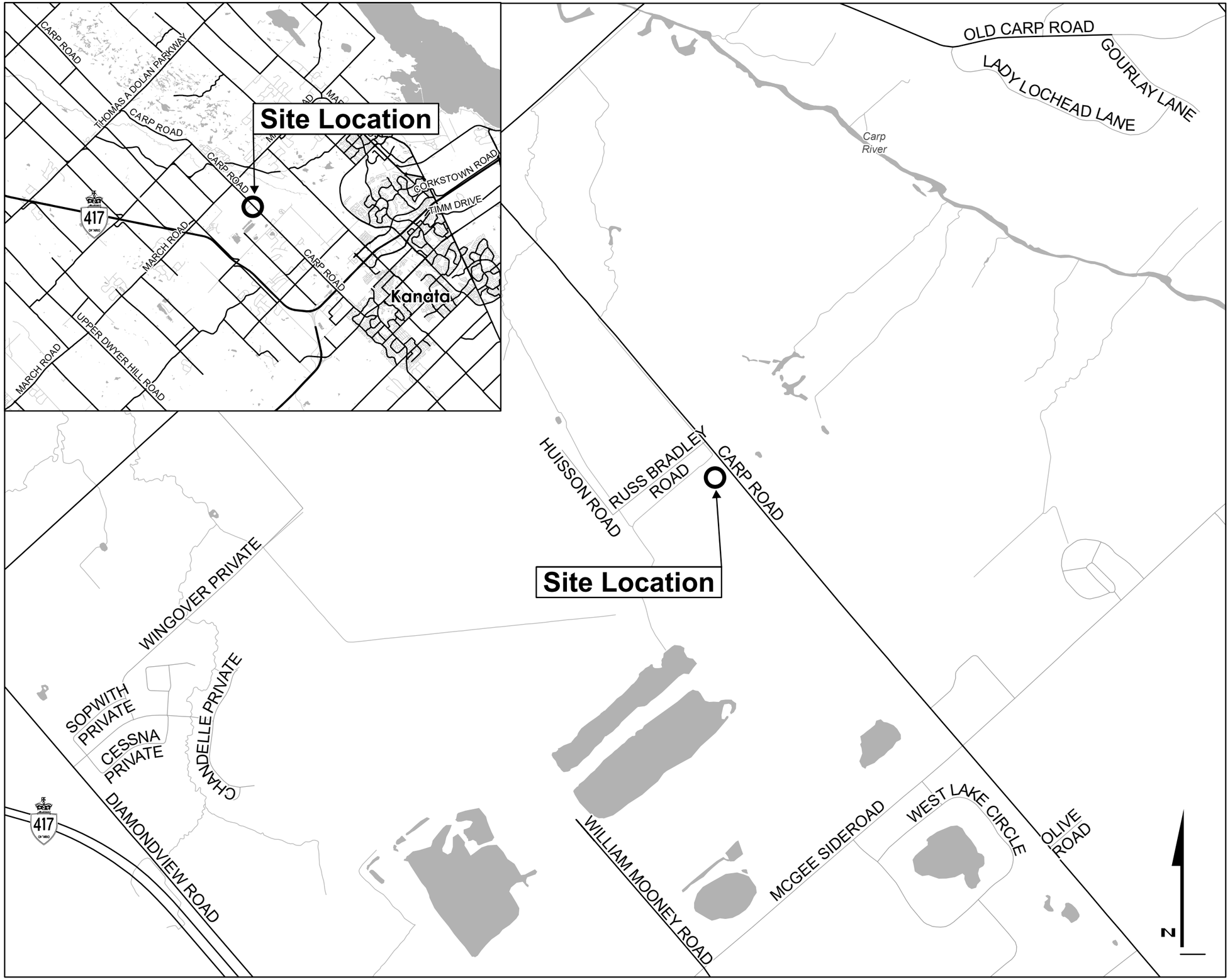
This report was produced for the exclusive use of Trevor Watkins. The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry of the Environment, Conservation and Parks, City of Ottawa and local approval agencies. McIntosh Perry reviewed the site information and background documents listed in Section 2.0 of this report. While the previous data was reviewed by McIntosh Perry and site visits were performed, no field verification/measures of any information were conducted.

Any use of this review by a third party, or any reliance on decisions made based on it, without a reliance report is the responsibility of such third parties. McIntosh Perry accepts no responsibility for damages, if any, suffered by any third party as a result of decisions or actions made based on this review.

The findings, conclusions and/or recommendations of this report are only valid as of the date of this report. No assurance is made regarding any changes in conditions subsequent to this date. If additional information is discovered or becomes available at a future date, McIntosh Perry should be requested to re-evaluate the conclusions presented in this report, and provide amendments, if required.

APPENDIX A
KEY PLAN

McINTOSH PERRY



LEGEND

SiteLocation

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2022.

0 250 500 1,000

Metres

Scale 1:15,000

CLIENT: TREVOR WATKINS

PROJECT: 1500 THOMAS ARGUE ROAD EIS

TITLE: KEY MAP

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

PROJECT NO:CCO-22-2620		FIGURE:
Date	Jul., 15, 2022	1
GIS	MG	
Checked By	EP	

APPENDIX B
BACKGROUND DOCUMENTS

McINTOSH PERRY

Site Plan Pre-consultation

Meeting Date: June 3, 2021

1500 Thomas Argue Road

Applicant: Trevor Watkins **Consultant:**N/A

Ward 5 **Councillor** Eli El-Chantiry

Proposal Summary: The applicant proposes to build in phases and operate a fully automated indoor/outdoor self-storage facility.

Attendees:
Trevor Watkins, Applicant/Owner
Harry Alvey, Project Manager, PIEDD, City of Ottawa
Seana Turkington, Planner, PIEDD, City of Ottawa
Mark Gordon, Planner, PIEDD, City of Ottawa
Sean Harrigan, Planner, PIEDD, City of Ottawa
Sami Rehman, Environmental Planner, PIEDD, City of Ottawa
Alexandra Labuda, Planning Assistant, PIEDD, City of Ottawa
Erica Ogden, Environmental Planner, MVCA

Comments and Meeting Notes

Proposal Details

- Proposed site plan control application to construct a fully automated indoor/outdoor self-storage facility for vehicles, boats, recreational vehicles, and other personal items. The outdoor storage will also include a section for a boat lift/dock inventory. The property will be fenced with chain-link and barbed wire for increased security. There will also be an electronic vehicle control gate and the property will have 24-hour video security. The buildings will not be heated and will be sized to eliminate the need for fire suppression. No staff are expected to be on site. Access will be provided off Russ Bradley Road.

Technical Comments - City Staff

Planning (Provided by Seana Turkington)
Official Plan and Zoning By-law

- As per Schedule A of the Official Plan, the site is designated 'Carp Airport' and is Zoned 'Air Transportation Facility Zone' (T1B) as per the City's Zoning By-law.

3.10.2 – Carp Airport

- The Carp Airport is designated on Schedule A with the intent of providing airport facilities that serve the general aviation needs in Ottawa.
- The land uses permitted in the designation are aviation and other land uses associated with an airport including an aerospace business park and an accessory residential fly-in community consistent with the Carp Airport master land use and servicing plan.
- The purpose of the T1-Air Transportation Facility Zone is to:
  1. permit air transportation facilities and aviation-related uses in areas designated as **Ottawa Macdonald-Cartier International Airport** and **Carp Airport** in the Official Plan, and
  2. permit a range of employment uses and airport-related commercial and industrial uses at the Ottawa Macdonald-Cartier International Airport.

Air Transportation Facility Zone (T1B)

- The following uses are permitted in the general T1 Zone: airport and related facilities, light industrial uses, parking garage, parking lot, truck transport terminal, warehouse.

- In the T1B Subzone, the following uses are also permitted: convenience store, heavy equipment and vehicle sales (rental and servicing), hotel, instructional facility, office, one dwelling unit for a caretaker or security guard, park, personal service business, place of assembly, post secondary educational institution, research and development centre, restaurant (full service), restaurant (take-out), retail store (limited to a factory outlet store), service and repair shop, storage yard.

In the T1B Subzone, the provisions of the table below apply:

Zoning Mechanisms	**Zone Provisions**
Minimum setback from a lot line for a dwelling unit (m)	12
Minimum setback from a lot line for an accessory building (m)	12
Minimum setback for buildings other than a dwelling unit or an accessory building	(i) Rear Yard 7.5 (ii) Front Yard 12 (iii) Corner Side Yard 12 (iv) Interior Side Yard 4.5
Maximum lot coverage (%)	50
Minimum Distance Between Buildings on the same lot (m)	10
Minimum Landscaped Buffer abutting Carp Road, an RR zone or any other non-industrial or non-transportation zone (m)	10
Minimum setback for a gasoline pump island or storage tank from an RR zone (m)	150

Site Plan

- The final site plan must show parking, storage, and fire routes as well as watercourse setbacks (regulated under Section 69 of the Zoning By-law). For additional information on preparing studies and plans, please click on the following hyperlink: Guide to Preparing Studies and Plans.
- Landscaping should be provided on site, in accordance with the Carp Road Community Design Plan (to act as a screening measure) and also to provide some vegetation on site. It is recommended that vegetation on site be species native to the Ottawa area. Take a look at: https://ottawa.ca/en/living-ottawa/environment-conservation-and-climate/wildlife-and-plants/plants

Parking

- As per the City's Zoning by-law, isles to reach self-storage units are not permitted to be used as parking spaces. The applicant should refer to the layout of other self-storage centres in the city to see the site operation and determine the site configuration required. Parking requirements are detailed in Part 4 of the Zoning By-law.
- The drive aisle proposed on site must also meet the Private Approach By-law: https://ottawa.ca/en/living-ottawa/laws-licences-and-permits/laws/law-z/private-approach-law-no-2003-447

Carp Road Corridor Rural Employment Area

- The Carp Road Corridor Rural Employment Area plays an important role in the development and well-being of the local economy. The diversity and the ability to attract a range of traditional and high technology industries

as well as environmental services, some value-added processing, wood and metal fabrication and commercial uses has been one of the strengths of the Corridor. The vision for this area is contained in the Carp Road Corridor Community Design Plan. New development applications will conform to the policies in the approved community design plan.

- The community design plan for the Carp Road Corridor shall provide direction to the Zoning By-law for future land uses. [Amendment #180, November 8, 2017]
- The subject property falls within the Carp Road Corridor Community Design Plan, which provides and action plan for future development in the corridor. It considers land use, environmental protection, and servicing, visual appearance and land use compatibility amongst other strategies for achieving community objectives.
- The CDP provides design guidelines for industrial and business parks (see section 7.3). Please identify how these guidelines have been met in your planning rationale and site plan.
    - Locate parking at the rear or side of buildings. Where this is not possible and parking is required at the front or side of the building a greater setback from the property line should be required to permit planting to mitigate the effects of the parking area (e.g. parking screened from view).
    - Locate storage and service areas at the rear of buildings except on sites where the property backs onto Carp Road or the main entry road.
    - Preserve as many trees as possible on the site. Compensate for removal of existing trees by extensive planting in the open space corridor, entry features “gateways” and on-site landscape areas. Plant trees along the corridor – an informal mix of trees and shrubs is preferable, with more coniferous than deciduous species.
    - Provide landscaping at the front of buildings. Use landscaping, decorative fences to screen unsightly uses.
    - Create entry feature (“gateways”) for new subdivisions/parks. This should include a sign and landscaping with the name of the development and the park occupants and enhanced lighting for visibility at night.
    - Provide for turning lanes where warranted.

Development Submission & Additional Info

- This site is within the Carp Airport subdivision. For further information on the subdivision as a whole, as well as any pertinent agreements, please speak with the Owner of the subdivision.
- Prior to submitting a site plan control application, the applicant should speak with the ward Councillor about the proposal and contact Building Code Services. Development Charges associated with Building Permits may also apply.
- It is advised that the applicant contact the Carp Airport Authority.
- Given the studies and plans this proposal will require, it is recommended that a Consultant for Engineering and Planning be hired.
- Please note that a draft of the New Official Plan was released publicly in November 2020. The New Official Plan is scheduled to go to Council this Fall for a decision. If a formal application is submitted, depending on timing, the policy regime may change. If a formal application is submitted prior to September 2021, the required planning rationale should speak to compliance with policies in the New Official Plan.

Engineering (Provided by Harry Alvey)

- The applicant will need to provide SWM management for this site. Given that this is a commercial site, it will probably need an ECA for the SWM. The MECP is taking approximately 9 to 11 months to process these permits. Design is to be based on Post- to Pre- storm events. If the airport will allow a SWM Pond the SWM ponds are required to have 300mm freeboard above the 100-yr storage elevation. If an OGS is proposed for Quality Control a ETV Protocol is required.
- SWM discharge is required to have an enhanced level of water quality of 80% TSS removal.
- There is a stormwater course which provide stormwater runoff from the airport to the Carp river located along the south side of Russ Bradley Rd. that should have capacity for the SWM discharge from your site. This should be confirmed by your engineer at time of engineering submission. The water course(s) must be

maintained at or better then the current level of flow & service. In addition, this might be fish habitat. It is suggested you contact MVCA regarding any proposed work with these water courses.

- The applicant should contact Allen Even at OFD regarding fire protection requirements and possible need for storage tanks for fire fighting.
- The applicant should contact the Carp Airport Authority regarding any flight operations restrictions on the site.
- If in the future it is decided to create an onsite office space, then a Hydro-G will be required prior to a building permit. Note: there are a number of issues with the ground water quality in the area.
- Please provide 'flattened' *.pdf versions of documents that include no 'comments' or 'edits' and represent what final printed version will look like.
- Contacts for the following are: OFD: Allan Evans, P.Eng Fire Services engineer - allen.evans@ottawa.ca

Environmental Planning (Provided by Sami Rehman)

- The proposal triggers an Environmental Impact Statement (EIS), which should cover the following:
    a. Potential significant wildlife habitat, as part of the natural heritage system (OP 2.4.2)
    b. Potential significant habitat for threatened or endangered species (OP 4.7.4)
    c. The appropriate setbacks from the watercourse (OP 4.7.3)
    d. Potential impacts of short and long-term outdoor vehicle and machinery storage on the natural features, and surface and groundwater features
    e. Opportunities for energy conservation and shading with the site's design and landscaping (OP 4.9)
- Further details of the EIS requirement can be found in OP section 4.7.8 or the EIS guidelines: https://documents.ottawa.ca/sites/documents/files/documents/eis_guidelines2015_en.pdf
- Furthermore, the subject property has been identified as a high recharge area according to the Carp Road Community Design Plan. As such, the environmental policies of the CDP require a groundwater impact study to be completed. https://documents.ottawa.ca/sites/documents/files/documents/con021202.pdf
- A tree conservation report (TCR) will also be required for this submission (OP 4.7.2). The City encourages as much tree retention as possible and tree compensation for trees removed. The TCR can be combined with the EIS to avoid duplications. Further details of the TCR requirements can be found in the TCR guidelines. https://ottawa.ca/en/living-ottawa/laws-licences-and-permits/laws/law-z/tree-protection-law-no-2020-340#schedule-tree-conservation-report-guidelines
- I would also encourage the applicant to consult with the MVCA to determine if any permits or approvals are required under their regulations.

Conservation Authority (MCVA)

Environmental Planning (Provided by Erica Ogden)

- The watercourse on the property is regulated by the Mississippi Valley Conservation Authority (MVCA) under Ontario Regulation 153/06, *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*. Under Ontario Regulation 153/06, written permission is required from the MVCA prior to the initiation of development (which includes construction, site grading and the placement or removal of fill) within an area regulated by the Conservation Authority as well as straightening, changing, diverting or interfering in any way with the existing channel or the shoreline of a watercourse.
- MVCA has issued a permit (W19/283, expiry February 5, 2022) for the watercourse realignment along Russ Bradley Road. With the permit a development setback was established from the realigned watercourse. The crossing location for access to Russ Bradley Road was also established. Should any further alteration to the watercourse be required (e.g. culvert installation, stormwater outlet), an additional permit from the Conservation Authority would be required.
- The development setbacks from the watercourse must be met and the plantings required through the watercourse realignment maintained.
- A stormwater management report will be required with the site plan submission:
    - The water quality requirement is a enhanced level of protection, 80 % total suspended solids removal

- The property is within the Carp River Watershed Subwatershed Study area which has annual infiltration targets as outlined below. Existing infiltration rates on site should be assessed and maintained post development.
    - High groundwater recharge area 262mm/year infiltration

Application Submission Information

Application Type**: Site Plan Control, (type of application to be confirmed prior application submission)**

For more information on the Official Plan designation, please visit: https://ottawa.ca/en/city-hall/planning-and-development/official-plan-and-master-plans/official-plan/volume-1-official-plan/section-3-designations-and-land-use#3-7-5-rural-employment-area

For more information and related Zoning By-law provisions, please visit: https://ottawa.ca/en/zoning-law-no-2008-250/zoning-law-2008-250-consolidation#pdf-version

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

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

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

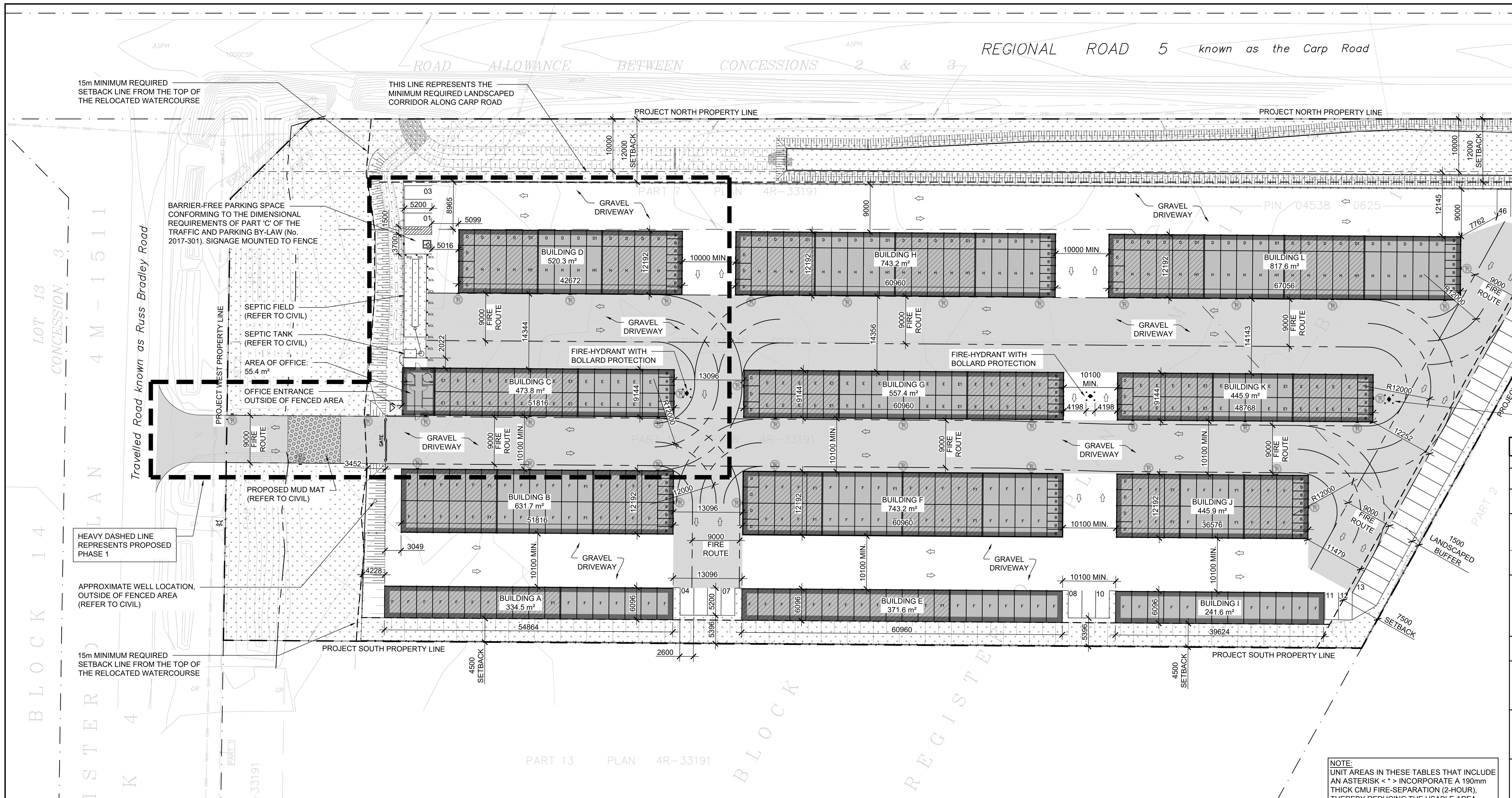
Application Submission Requirements

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

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

All plans and drawings must be produced on A1-sized paper and folded to 21.6 cm x 27.9 cm (8½"x 11").

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



NOTE:
1. ALL BUILDINGS, EXCEPT FOR BUILDING 'I', HAVE BEEN SUBDIVIDED WITH 2-HOUR FIRE-SEPARATIONS TO LIMIT THE COMPARTMENTALIZED AREAS TO NO GREATER THAN 253m².
2. FURTHER TO THE ABOVE, THE COMPARTMENTS OF BUILDINGS 'C' AND 'G' WHICH FACE EACH OTHER ARE LIMITED TO NO GREATER THAN 191m², AS WELL AS THE COMPARTMENTS OF BUILDINGS 'G' AND 'K' WHICH FACE EACH OTHER.
3. COMPARTMENTS HAVE BEEN DEPICTED ON THE DRAWING WITH EVERY 2ND COMPARTMENT HAVING A DIAGONAL HATCH PER BELOW:

NOTE:
UNIT AREAS IN THESE TABLES THAT INCLUDE AN ASTERISK < * > INCORPORATE A 190mm THICK CMU FIRE-SEPARATION (2-HOUR), THEREBY REDUCING THE USABLE AREA WITHIN THE UNITS. AREAS SHOWN INCLUDE THE FLOOR AREA OF THE CMU WALL.

COMPOSITION OF STORAGE UNITS

BY UNIT TYPE

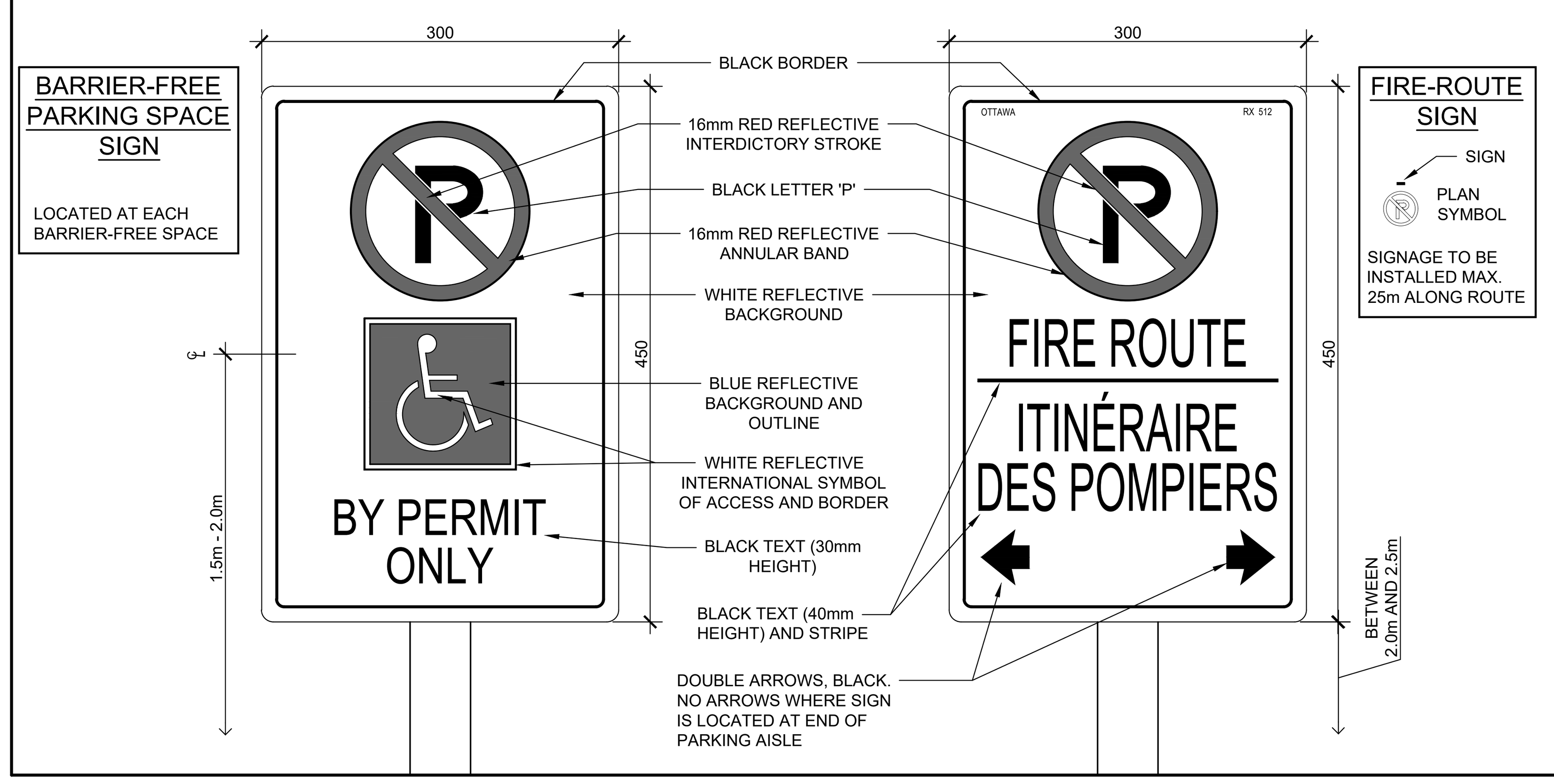
UNIT TYPE	# UNITS	AREA PER UNIT (m²)	TOTAL UNIT AREA (m²)
'B'	66	4.65	306.9
'D'	68	9.29	706.0
'D1'	8	9.29*	
'E'	82	13.90	1278.8
'E1'	10	13.90*	
'F'	123	18.58	2582.6
'F1'	16	18.58*	
'H'	42	27.87	1393.5
'H1'	8	27.87*	
		TOTAL	6267.8

COMPOSITION OF STORAGE UNITS

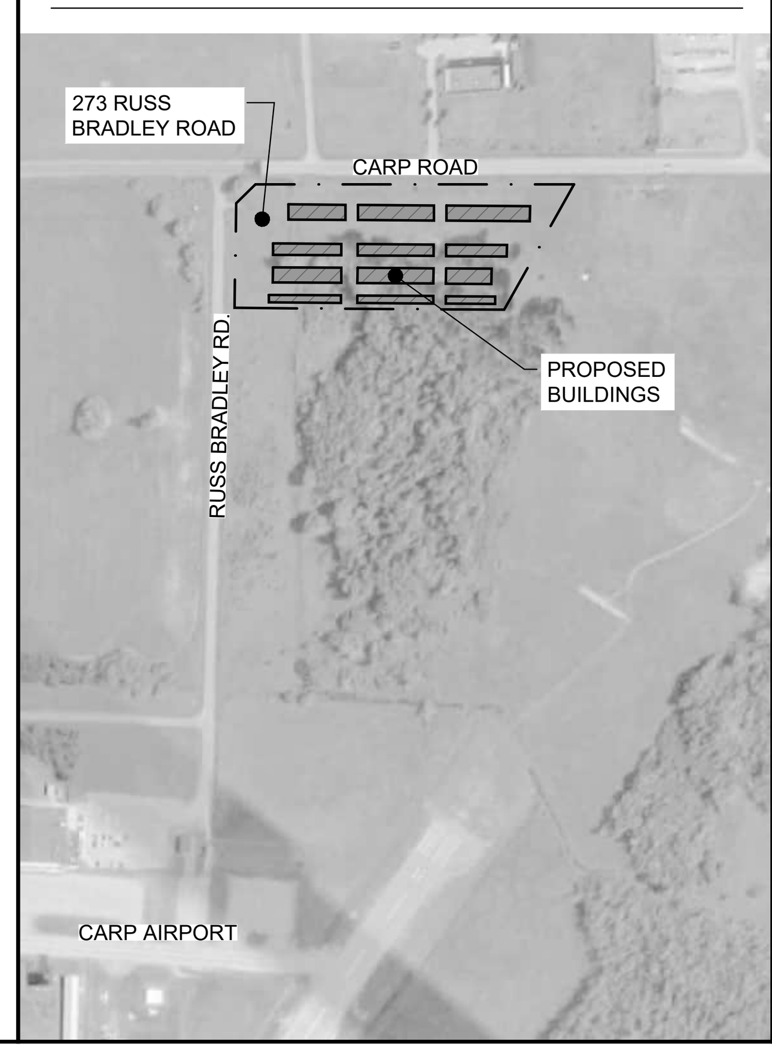
BY BUILDING

BUILDING	UNIT TYPE	# UNITS	AREA PER UNIT (m²)	TOTAL BUILDING AREA (m²)
A	'F'	17	18.58	334.4
	'F1'	1	18.58*	
B	'B'	8	4.65	631.7
	'F'	28	18.58	
	'F1'	4	18.58*	
C	'E'	26	13.90	
	'E1'	2	13.90*	
D	'B'	8	4.65	520.3
	'D'	14	9.29	
	'D1'	2	9.29*	
	'H'	10	27.87	
	'H1'	2	27.87*	
E	'F'	19	18.58	371.6
	'F1'	1	18.58*	
F	'B'	8	4.65	743.2
	'D'	4	9.29	
	'F'	30	18.58	
	'F1'	6	18.58*	
G	'B'	6	4.65	557.4
	'D'	3	9.29	
	'E'	32	13.90	
	'E1'	4	13.90*	
H	'B'	8	4.65	743.2
	'D'	19	9.29	
	'D1'	3	9.29*	
	'H'	15	27.87	
	'H1'	3	27.87*	
I	'F'	13	18.58	241.6
J	'B'	8	4.65	445.9
	'D'	4	9.29	
	'F'	16	18.58	
	'F1'	4	18.58*	
K	'B'	6	4.65	445.9
	'D'	3	9.29	
	'E'	24	13.90	
	'E1'	4	13.90*	
L	'B'	8	4.65	817.6
	'D'	21	9.29	
	'D1'	3	9.29*	
	'H'	17	27.87	
	'H1'	3	27.87*	
			TOTAL	6325.6

VERTICAL PARKING LOT SIGNAGE (POST OR WALL MOUNTED)



LOCATION KEY



ZONING INFORMATION

PER THE CITY OF OTTAWA ZONING BY-LAW 2008-250 CONSOLIDATION

LEGAL DESCRIPTION:
PORTIONS OF PARCEL 04538-0625, PARCEL 04538-0924 AND ABUTTING LANDS
PARTS 6 THROUGH 11, PLAN 4R-33191 BEING PART OF BLOCKS 15 AND 16,
REGISTERED PLAN 4M-1511, CITY OF OTTAWA

PROPOSAL:
NEW GROSS 6,326 m² [68,093 ft²] SINGLE STOREY SELF STORAGE UNITS OVER 12 BUILDINGS. AN OFFICE, UTILITIES ROOM, AND WASHROOMS WILL BE PROVIDED IN THE BUILDING NEAREST THE MAIN DRIVEWAY ACCESS.

ZONING:

DESIGNATION: (T1B) AIR TRANSPORTATION FACILITY SUBZONE (PART 12)

ZONING PROVISIONS (PER TABLES 207 & 208):
- LOT AREA (MIN.) = NO MINIMUM
  ACTUAL LOT AREA = 24,247 m²
- LOT FRONTAGE (MIN.) = NO MINIMUM
  ACTUAL FRONTAGE = 99.1 m
- SETBACKS (MIN.):
  - FRONT = 12.0 m
  - CORNER SIDE = 12.0 m
  - INTERIOR SIDE = 4.5 m
  - REAR = 7.5 m
- MINIMUM SETBACK FROM WATERCOURSE:
  - 15.0 m FROM THE TOP OF BANK, PER SCHEDULE H OF SUBDIVISION AGREEMENT
- MINIMUM LANDSCAPED BUFFER ABUTTING CARP ROAD = 10.0 m
- MIN. % OF PARKING PROVIDED AS LANDSCAPED AREA = 15% MIN.
  - REQUIRED: = 93.15 m²
  - ACTUAL: = 6,140.4 m²
- LOT COVERAGE = 50% MAX.
  ACTUAL LOT COVERAGE = 26.1 %
- MAX. BUILDING HEIGHT:
  DETERMINED BY TRANSPORT CANADA

LOADING REQUIREMENTS:
(PER TABLE 113A UNDER PART 4)

BASED ON THE GROSS FLOOR AREA OF THE BUILDING, A MINIMUM OF 1 STANDARD PLUS 1 OVERSIZED LOADING SPACES ARE REQUIRED.

PARKING:
(PER TABLE 101 UNDER PART 4)

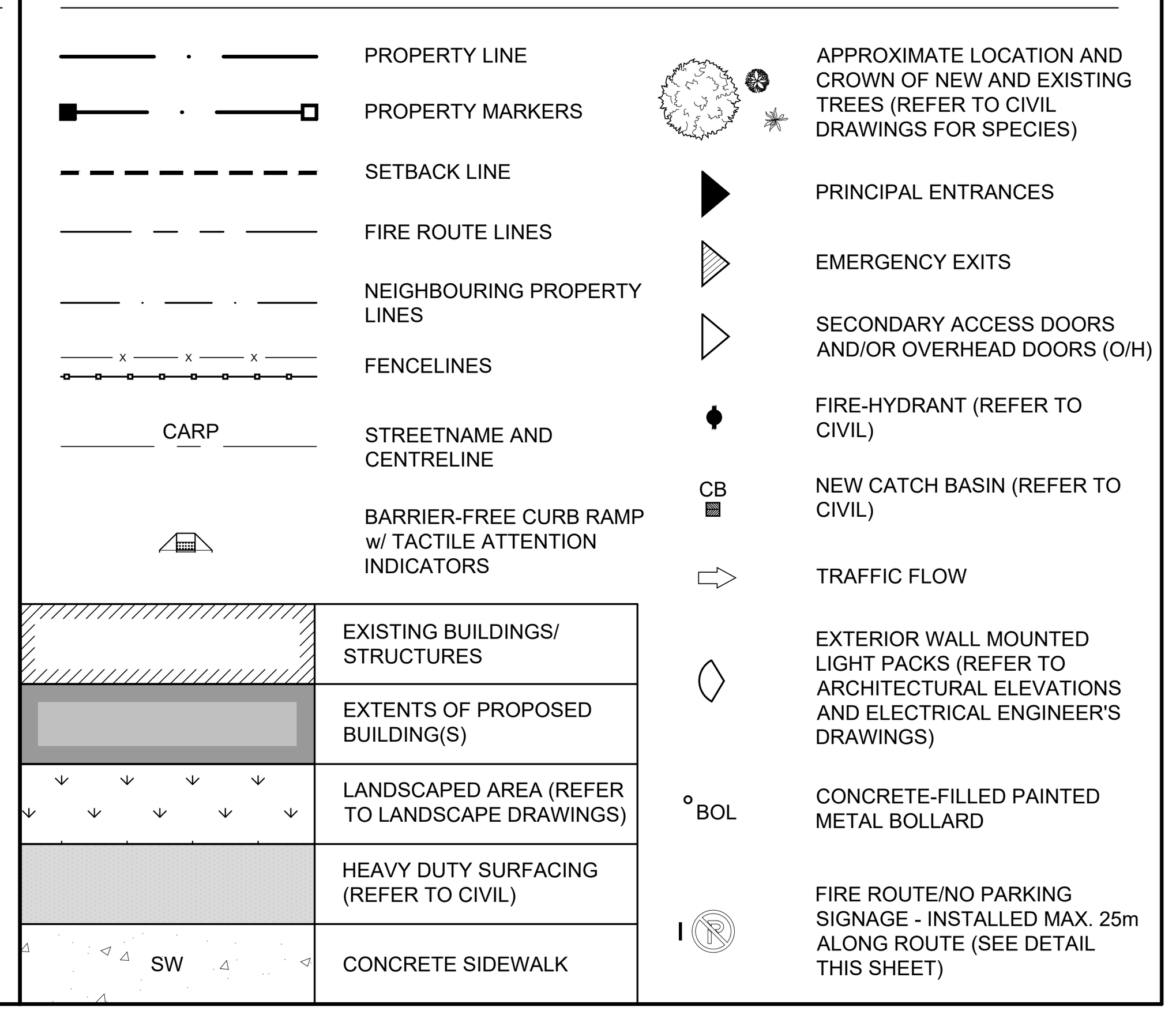
ROW N95 - WAREHOUSE REQUIRES 0.8 PARKING SPACES PER 100m² OF GROSS FLOOR AREA FOR THE FIRST 5,000 m², AFTER-WHICH 0.4 PARKING SPACES ARE REQUIRED PER 100m² BEYOND 5,000m² OF GROSS FLOOR AREA. PARKING SPACES UNDER THIS SECTION RECOGNIZE ONLY THOSE WHICH ARE WITHIN THE PROPERTY BOUNDARY.

REQUIRED: 46 SPACES
PROVIDED: 46 SPACES

BARRIER-FREE PARKING:
(PER SECTION 111 UNDER PART C OF BY-LAW No. 2017-301)

RESERVED BARRIER-FREE PARKING SPACES:
REQUIRED: 1 SPACES
PROVIDED: 1 SPACES

SITE PLAN LEGEND



01 SP-A01 PROPOSED SITE PLAN
SCALE: 1:500

DEIMLING
ARCHITECTURE & INTERIOR DESIGN

THIS SITE PLAN HAS BEEN BASED ON THE SURVEYOR'S TOPOGRAPHY SKETCH PREPARED BY MCINTOSH PERRY SURVEYING INC., DATED OCTOBER 26th, 2021.

Revisions

No.	By	Description	Date
08	JF	ISSUED FOR SITE PLAN CONTROL RESPONSE 02	15 APR 2024
07	JF	ISSUED FOR REVIEW	03 APR 2024
06	JF	ISSUED FOR SITE PLAN CONTROL RESPONSE 01	04 OCT 2023
05	JF	ISSUED FOR SITE PLAN CONTROL	16 DEC 2022
04	JF	ISSUED FOR COORDINATION	13 DEC 2022
03	JF	ISSUED FOR COORDINATION	27 SEP 2022
02	JF	ISSUED FOR REVIEW	17 JUN 2022
01	JF	ISSUED FOR CLIENT REVIEW	11 JAN 2022

True North | Project North

Project
SELF STORAGE
SITE PLAN CONTROL

273 & 275 RUSS BRADLEY RD., CARP, ON

Drawing
PROPOSED SITE PLAN

Scale: AS NOTED
Drawn: J.F.
Checked: J.F. / C.D.
Stamp: ONTARIO ASSOCIATION OF ARCHITECTS — CHRISTOPHER LEE DEIMLING LICENCE 6238

Project No.: 21-170
Date: DECEMBER 2021
Drawing No.: SP-A01

D07-12-22-0187

WEST CAPITAL AIRPARK
(Carp Airport)
1500 Thomas Argue Road
City of Ottawa

HYDRAULIC NETWORK ANALYSIS

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

November 2011
Revised: May 28, 2013
Revised: September 26, 2013
Revised: November 5, 2014
Novatech File: 102085
Ref: R-2014-172

NOVATECH
Engineers, Planners & Landscape Architects

November 5, 2014

City of Ottawa
Planning & Growth Management Department
110 Laurier Avenue West
4th Floor Infrastructure Approvals Division
Ottawa, ON K1P 1J1

Attention: Kevin Hall, C.E.T., Project Manager

Dear Sir:

Re: West Capital Airpark
Hydraulic Network Analysis
Novatech File No.: 102085
City of Ottawa File No.: D07-16-10-0016

Please find enclosed four (4) copies of the report entitled, "West Capital Airpark - Hydraulic Network Analysis" revised November 2014. This report has been revised with additional Modelling Scenarios 6 & 7 to confirm adequate capacity of standalone Phase 1 Residential Hydraulic Network.

If you have any questions, please contact the undersigned.

Yours truly,

NOVATECH

Carl Sciuk, P. Eng.
Senior Project Manager

cc: City of Ottawa – Fire Services
West Capital Developments

M:\2014\102085\DATA\REPORTS\WATER DISTRIBUTION\OCTOBER 2014\20141105-HYDRAULIC NETWORK ANALYSIS.DOC

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DRAWINGS

Overall Watermain Layout Plan	102085-WMOL, revision 8
Plan & Profile Drawings Carp Road	102085-P65 to 102085-P68, all revision 6
Watermain Details Plan	102085-D7, revision 6
Water Storage Facility Process (Schematic)	102085-W1, revision 3
Water Storage Facility Pump Room (Sections)	102085-W1.1, revision 3

1.0 INTRODUCTION

The proposed West Capital Airpark is located approximately 2km south of the Village of Carp as shown on **Figure 1** (Key Plan). A private communal water distribution network is proposed which will be connected to the existing Village of Carp municipal water distribution network. The proposed private communal water distribution network will form part of a common elements condominium that will be established for this development. The common elements condominium will own, operate and maintain the water system which will service a mixture of single family homes, townhomes, communal hangers and Aerospace Business Park as shown on **Figure 2** (Land Use Plan).

The subdivision has been draft approved. Draft conditions are included in **Appendix A** for reference.

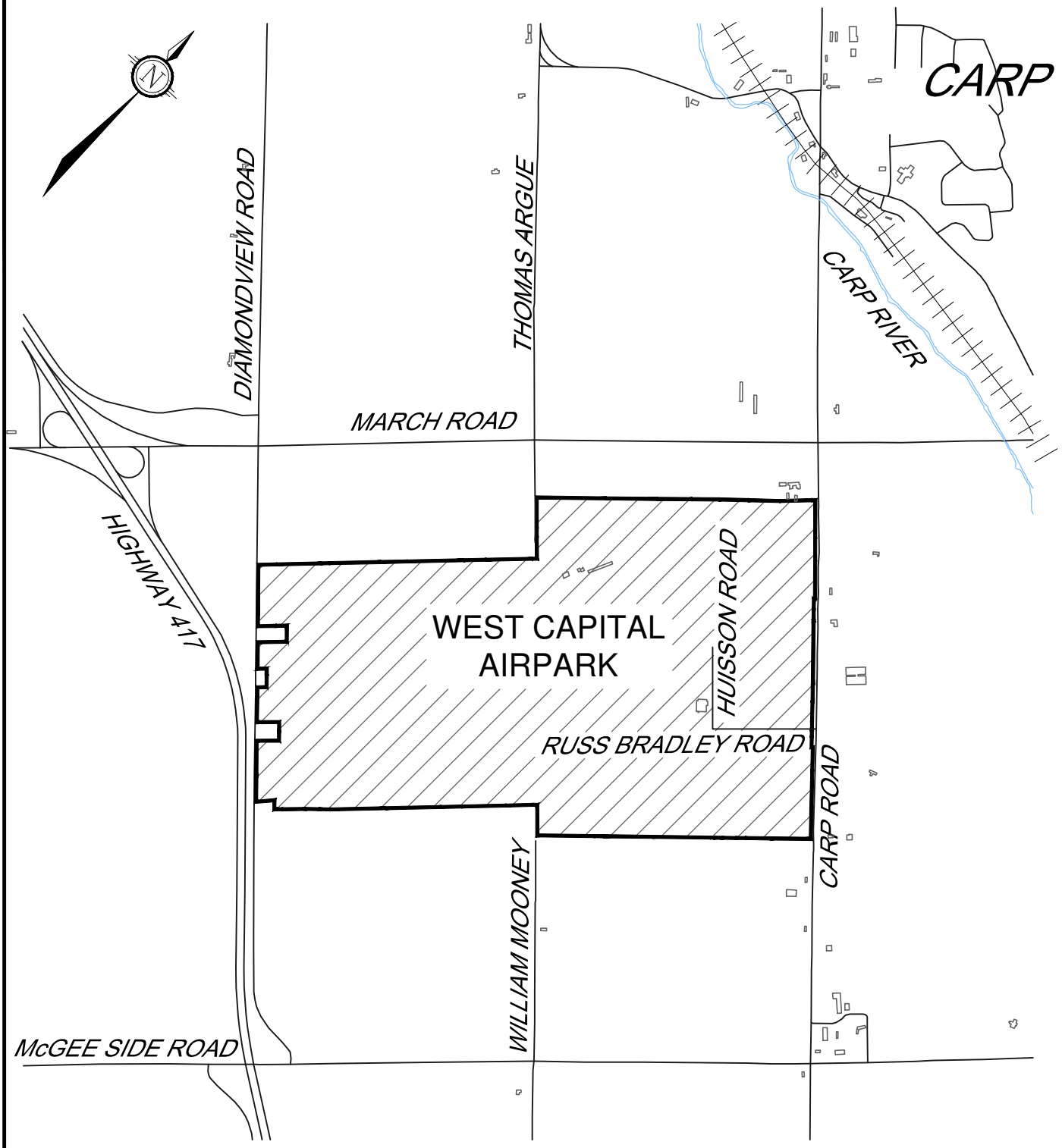
The proposed private communal water distribution includes a feeder main from Carp, a water storage facility and water distribution network. The existing Village of Carp distribution system will supply the water storage facility with maximum day demand. The City of Ottawa has committed to supplying Phase 1 Maximum Day water demand to the West Capital Airpark by utilizing existing reserve capacity. The City of Ottawa has stated that future phase water supply requirements will be provided by expanding reserve capacity through upgrades of the existing water supply system as per the Village of Carp Class Environmental Assessment (May 2008).

The proposed West Capital Airpark Water Storage Facility will monitor water quality parameters and boost chlorine levels if required to ensure drinking water is potable prior to local distribution. Domestic peak hour water requirements and fire flow will be provided to the Airpark via the water storage facility. This report has been produced to provide the basis for detailed design of the proposed private communal water distribution network, and addresses questions received from the City of Ottawa.

2.0 BACKGROUND

The West Capital Airpark completed an Environmental Assessment Report[1] for the proposed project in 2007 which determined that water supply from the Village of Carp was the preferred alternative. Subsequently, the Carp Environmental Assessment[2] for water upgrades within Carp incorporated the maximum day allocation of 1.46ML/day for the airport. The City has agreed that a Phase 1 maximum day allocation of 0.52ML/d will be provided to the airport without triggering any upgrades within Carp. The water supply beyond Phase 1 maximum day allocation will require upgrades of the Carp water supply system, as described in the Carp EA. The maximum day allocation for Phase 1 has not increased, but the mix of development has been modified as follows:

[1] Carp Airport Water & Sanitary Alternatives Evaluation Report, Novatech, April 2007
[2] Village of Carp Class EA for Water and Wastewater Infrastructure Upgrade/Expansion, Stantec, May 2008



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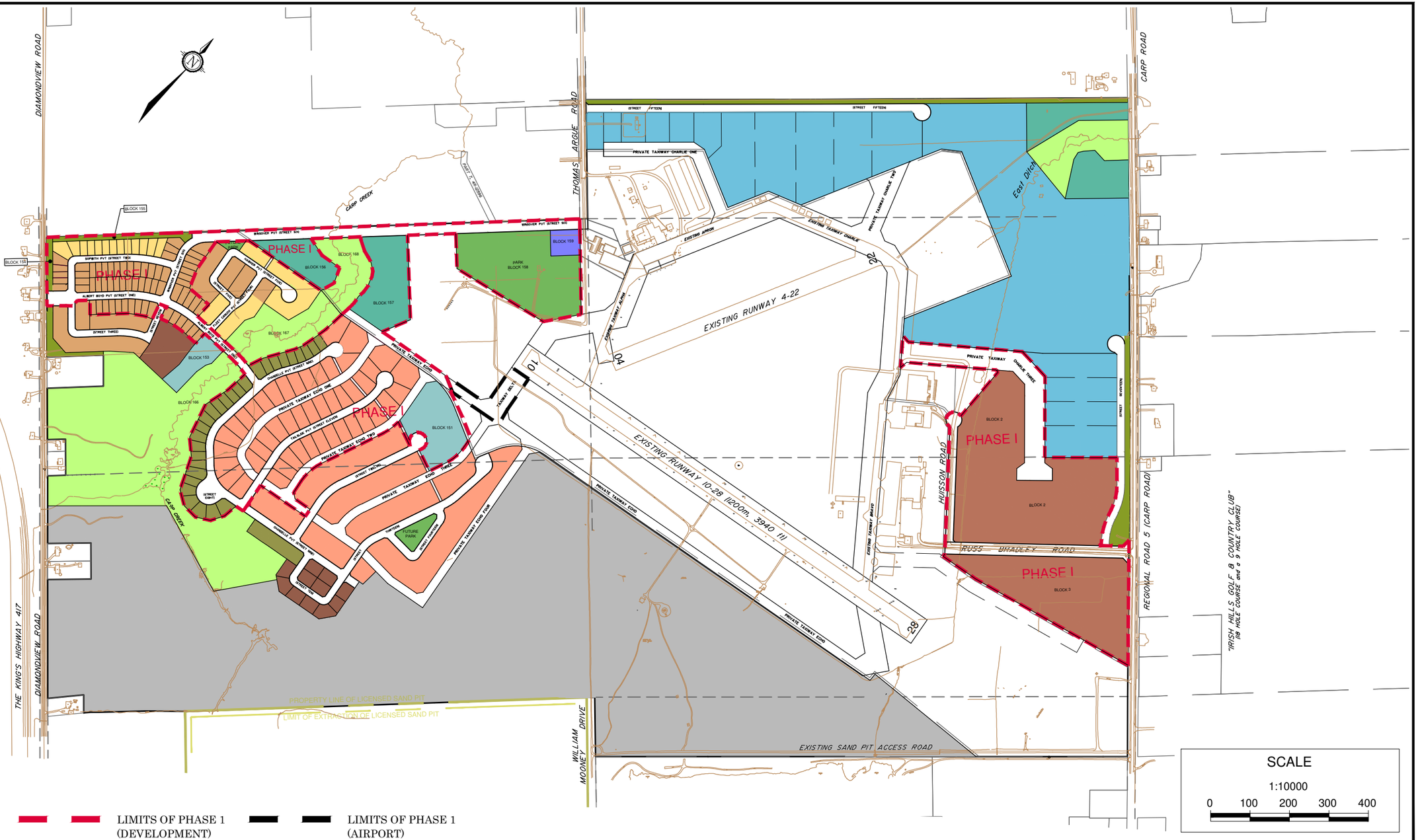
Website www.novatech-eng.com

CITY OF OTTAWA

WEST CAPITAL AIRPARK

KEY PLAN

NOV 2014 102085 FIGURE 1



LEGEND

- LIMITS OF PHASE 1 (DEVELOPMENT)
- LIMITS OF PHASE 1 (AIRPORT)
- SINGLES 50' (15.2m) WIDE PHASE 1 LOTS: 64
- SINGLES 60' (18.3m) WIDE PHASE 1 LOTS: 13
- SINGLES 70' (21.3m) WIDE PHASE 1 LOTS: 28
- HANGAR ESTATE LOTS 30m PHASE 1 LOTS: 46
- TOWN HOMES (9.0m WIDTH) PHASE 1 UNITS: 0
- AEROSPACE BUSINESS PARK - PHASE 1
- AEROSPACE BUSINESS PARK - FUTURE PHASE
- COMMUNAL HANGARS / CLUBHOUSE
- SWM FACILITY AREA
- CORE AIRPORT AREA
- ADDITIONAL LANDS OWNED BY WEST CAPITAL DEVELOPMENTS
- OPEN SPACE (TO BE DEDICATED TO CITY)
- PARKLAND (TO BE DEDICATED TO CITY)
- LANDSCAPE BUFFER

PHASE 1 LOTS / UNITS: 151

TOTAL LOTS / UNITS: 329

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WEST CAPITAL AIRPARK

LAND USE PLAN

NOV 2014 102085 FIGURE 2

Original Initial Phase	Revised Initial Phase
110 Residential Units	151 Residential Units
200,000ft^2 serviced business park	0 ft^2 serviced business park [private wells]
Max Day = 0.52ML/day	Max Day = 0.47ML/day

The water distribution network will be a private, condominium owned communal system under the jurisdiction of the SDWA. Correspondence to the City[3] (October 28, 2011 and March 8, 2012) summarizing the design standards being used and the responsibility for review is included in **Appendix B**.

3.0 DOMESTIC WATER SUPPLY

The West Capital Airpark will be proactive in water conservation measures and anticipate that maximum day water demand will be considerably less than City of Ottawa Design Guidelines demand estimates. However, the City of Ottawa Design Guidelines have been used in this EPANET analysis in order to conservatively validate the operation of the water distribution network. **Table 1** indicates the phased demand.

The City of Ottawa has stated that the water supply in the private distribution network must be deemed non potable until it is tested for residuals at the water storage facility. The watermain from Carp will fill reservoirs at the water storage facility prior to distribution to any potable water users.

A 150mm watermain will supply potable water from the water storage facility back to the business park area. The 150mm watermain will be constructed in Phase 1, but not commissioned until later phases when the business park is developed. The area serviced by this 150mm watermain is indicated on **the** Overall Watermain Layout Plan **(102085-WMOL**) and **Table 1**.

[3] Novatech letter dated October 28, 2011, Appendix B
[3] Novatech memo dated March 8, 2012, Appendix B

TABLE 1:
PHASED WATER DEMAND

Proposed Use	Phase 1	Future	Ultimate	
Residential				
Single Units	151	138	289	
Capita/Single Unit	3.4	3.4	3.4	
Townhome Units	0	41	41	
Capita/Townhome Unit	2.7	2.7	2.7	
Population	510	580	1090	
Average Flow/Capita	350 L/d	350 L/d	350 L/d	
Average Day Flow	179,690 L/d	202,965 L/d	382,655 L/d	
Maximum Day Flow	449,225 L/d	507,413 L/d	956,638 L/d	*2.5 x Avg Day*
Peak Hour Flow	11.4 L/s	12.9 L/s	24.4 L/s	*2.2 x Max Day*
Non Residential				
Community Center		11,615 L/d	11,615 L/d	
Communal Hanger	900 L/d		900 L/d	
City Park	1,200 L/d		1,200 L/d	
Sewage Treat. Plant	200 L/d		200 L/d	
Average Day Flow	2,300 L/d	11,615 L/d	13,915 L/d	
Maximum Day Flow	3,450 L/d	17,423 L/d	20,873 L/d	*1.5 x Avg Day*
Peak Hour Flow	0.1 L/s	0.4 L/s	0.4 L/s	*1.8 x Max Day*
Business Park				
Cumulative Land Area		18.6 Ha	18.6 Ha	
Building Floor Area		800,000 sq.ft	800,000 sq.ft	
Average Flow/ha		35,000 L/d	35,000 L/d	
Average Day Flow		651,000 L/d	651,000 L/d	
Max Day Flow		976,500 L/d	976,500 L/d	*1.5 x Avg Day*
Peak Hour Flow		20.3 L/s	20.3 L/s	*1.8 x Max Day*
Total Average Flow	189,990 L/d	865,580 L/d	1,047,570 L/d	
Total Max Day Flow	452,675 L/d	1,501,335 L/d	1,954,010 L/d	
Total Max Day Flow	5.2 L/s	17.4 L/s	22.6 L/s	
Total Max Day + Fire	68.3 L/s	80.5 L/s	85.7 L/s	*Fire Flow=63.08L/s*
Total Peak Hour	11.5 L/s	33.6 L/s	45.1 L/s	

4.0 FIRE FLOWS

Novatech met with the City of Ottawa Fire Services on April 20, 2011[4] to discuss the West Capital Airport fire protection requirements. Fire flow will be provided to the residential area, service business park and unserviced business park. Novatech presented the concept plan and discussed the tradeoffs between higher fire flows and water quality due to the extensive water distribution network compared with modest water demand. The City of Ottawa Fire Services reviewed the site plan and suggested the following:

1) A fire flow of 63.08L/s for 30 minutes was acceptable for all areas of the development. This reflects the standard for rural fire fighting in the area and the city can supplement flows with rural fire shuttle capabilities.
2) All fire hydrants should be fully charged so that when fire fighters arrive they can hook up and start fighting the fire without the need to open valves etc. This necessitates a backflow preventer chamber for unserviced Business Park area because there is no domestic consumption and lines may stagnate.
3) Fire hydrants are not required on hanger lot taxiways.

The occupancy and nature of buildings within the business park is unknown at this time. Should a future occupancy require additional fire fighting capability, it can be provided by installation of onsite fire tanks and dry hydrants by the future occupant.

5.0 HYDRAULIC MODELLING

EPANET 2.0 was used to model the hydraulic network using the following design parameters:

System Requirements:

- Maximum Pressure Unserviced 690 Kpa (100 psi)
- Maximum Pressure Serviced Areas 552 Kpa (80psi)
- Minimum Pressure 275 Kpa (40 psi)
- Minimum Pressure (fire) 140 Kpa (20 psi)

Friction Factors:

Watermain Size		C-Factor
100/150	mm diameter	100
200/250	mm diameter	110
300	mm diameter	120

Water Supply Pressure

Peak Hour total hydraulic head is 156m at corner of Rivington St. and Carp Road[5]. Actual pressure under lower flows will be between 161m & 156m, however 156m was modelled as a conservative assumption. (No high pressure condition will exist with 161m pressure supply).

[4] Email dated April 20, 2011, Appendix B
[5] Email from City of Ottawa, Appendix B

5.1 EPANET Modelling Scenarios

5.1.1 Water Storage Facility Reservoir Filling

The existing Village of Carp Water Distribution Network will provide the potable water to fill the reservoir at the West Capital Airpark Water Storage Facility. The watermain from Carp to the reservoir needs to be capable of supplying maximum day flow for the all phases of the development. The distribution network from Carp to the storage facility was modelled at various flow rates in order to develop a system curve and validate that the reservoir can be filled at maximum day demand rate. Refer to Plan & Profile Drawings Carp Road **(102085-65 to 102085-68)** for location of watermain along Carp Road.

5.1.2 Maximum Day Plus Fire Flow to Residential

The West Capital Airpark Water Storage Facility will supply, peak hour, maximum day domestic demand and fire flow to the downstream residential area. Maximum day plus fire was determined to be the critical criteria for watermain sizing. The distribution network from the water storage facility to the residential area was modelled with Phase 2 maximum day demand plus fire flow [63.1L/s] at various nodes to validate the sizing of the distribution network.

5.1.3 Fire Flow to Business Park

The water distribution network between Carp and the water storage facility will provide fire flow to Business Park area. During a fire, the water pressure in the Business Park area upstream of the water storage facility will drop. The water storage facility will detect this pressure drop, close the reservoir fill valve and provide fire flows as required. The furthest hydrant in the Business Park area was modelled to validate capability of the water storage facility to meet fire demands [63.1L/s].

5.1.4 Peak Hour Flow to Residential and Business Park Area.

The water supply from Carp will be deemed non potable until tested at the water storage facility. The residential area and northern Business Park area domestic demand will therefore need to be supplied from the water storage facility. A 150mm watermain between the water storage facility and the northern Business Park area will be required to convey potable water. The 150mm watermain will only need to convey domestic demand and therefore will be sized to meet peak hour flows. Peak hour flows were modelled to determine the required watermain sizing and assist with pump selection criteria.

5.1.5 Phase 1 Water Age

The water distribution network was modelled simulating demand during the early stages of the Airpark to determine water age throughout the distribution network. Water age simulations were performed separately for:

a) Water supply from Carp to the storage facility. Water supply from Carp to the facility was be modelled for various flow rates to approximate the age of potable water as it enters the water storage facility. The water storage facility will test, rechlorinate and recirculate potable water within the storage facility if necessary prior to distribution.

b) Water supply from the storage facility to Phase 1 residential area. Early stages of Phase 1 were modelled to approximate minimum flow rates which will be required to maintain water quality.

5.1.6 Residential Phase 1 - Peak Hour

The water distribution network was modelled simulating demand during Phase 1 of the Airpark to determine if Phase 1 piping alone has adequate capacity to deliver peak hour flows.

5.1.7 Residential Phase 1 - Maximum Day plus Fire

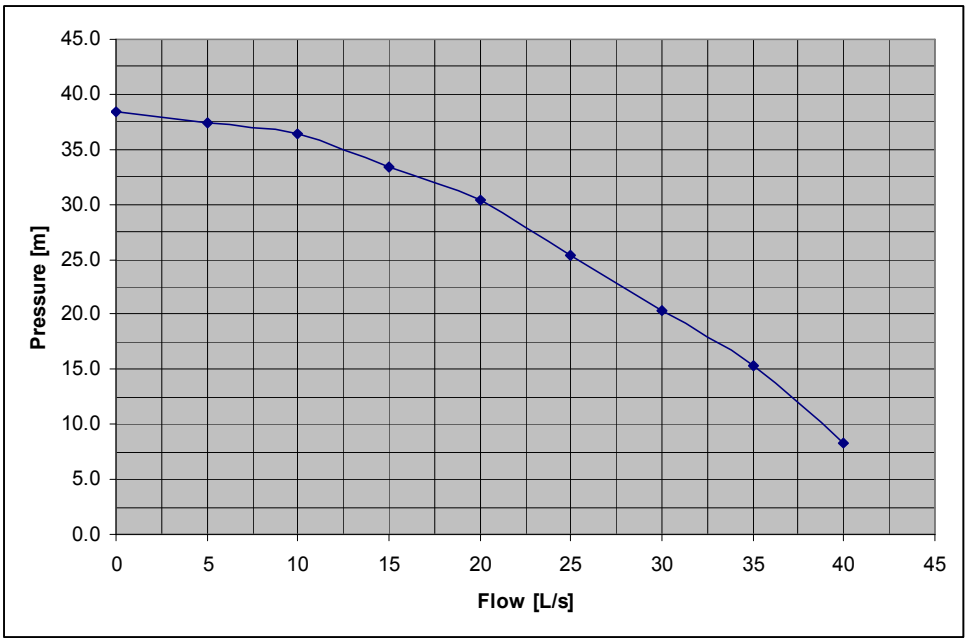
The water distribution network was modelled simulating fire flow when only Phase 1 infrastructure is in place to determine if there is adequate fire flow capacity within Phase 1.

5.2 Results

5.2.1 Water Storage Reservoir Filling

A 200mm watermain is required on Carp Road to allow the storage reservoir to be filled at a maximum day flow rate of 22.6L/s while maintaining a minimum pressure of 27.5m in the distribution system. Ultimately, the reservoir can be filled at a rate of up to 35L/s with a minimum pressure of 14m. **Figure 3** shows the results of EPANET simulations for various fill rates and resultant residual pressure.

FIGURE 3:
RESERVOIR FILL RATE vs RESIDUAL PRESSURE



5.2.2 Maximum Day + Fire Flow

Watermain sizes downstream of the water storage facility were developed through several iterations with fire demand simulated at different node locations throughout the residential area. The following summarizes the results of these modelling iterations:

- A 300mm Watermain is required to convey fire flows from the water storage facility to the residential distribution grid.
- Watermains conveying fire flows within residential area are 200/150mm diameter.
- 50mm watermains are adequate at cul de sacs which do not convey fire flows.
- The HGL at water pump station needs to be 159m to provide the required fire flow

The Overall Watermain Layout Plan, 102085-WMOL, reflects the required watermain sizing. Details of the EPANET modelling run results can be found in **Appendix C**.

5.2.3 Fire Flow to Business Park Area

The proposed 300mm watermain network will be adequate to provide 63.09L/s to the Business Park area. Modelling results can be found in **Appendix C**.

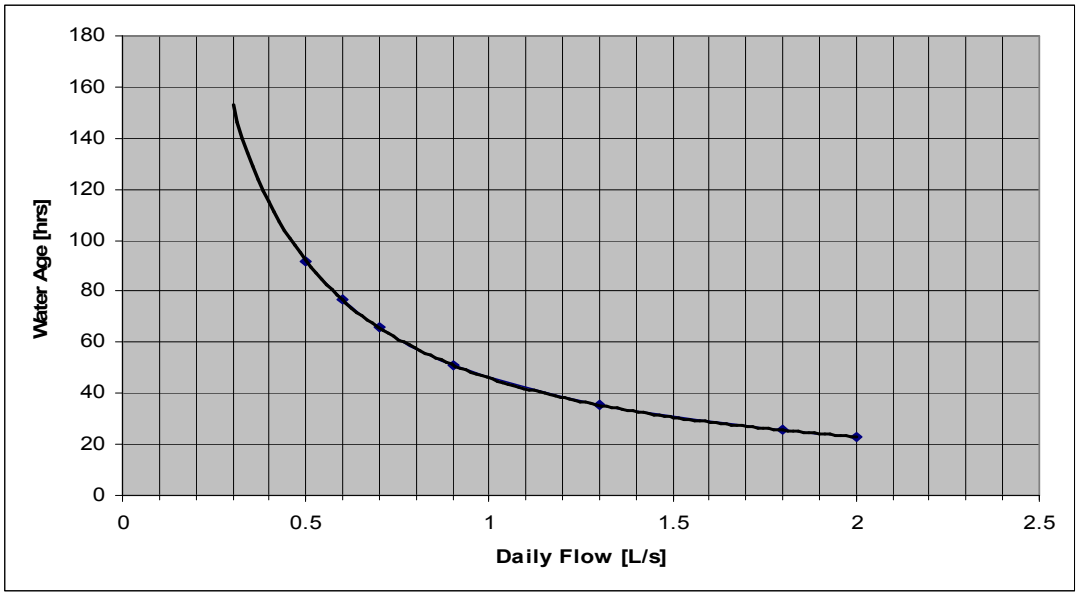
5.2.4 Peak Hour Flow to Residential and Business Park Area

Table A-5 from **Appendix C** shows the calculated peak hour pressures at each node. The maximum pressure difference in serviced areas is 4.62psi [Nodes KK & UU]. The pump station will need to operate between a HGL of 148m & 165m. This translates to a pump head of approximately 36m [peak hour flow with 3m tank head] and 53m [zero flow with 9m tank head]. The private system can therefore operate within requirements specified in Section 5.0 and no pressure reducing valves (PRV) will be required.

5.2.5 Phase 1 Water Age

a) **Figure 4** shows the results of modelling water age in the watermain from the meter chamber in Carp to the storage facility during various average day flow demands. A minimum daily consumption of ~0.3L/s is estimated to be required in order to meet a target age of 7 days [168hours]. This translates to the average consumption of 22 homes. Once the water supply reaches the water storage facility, it will be tested for turbidity and chlorine levels and chlorine levels will be elevated if required.

FIGURE 4:
WATERMAIN AGE vs FLOW



b) The modelling results indicate that some water flushing will be required at remote sections of the water distribution network in the early stages of Phase 1. The flushing rate required will depend on the number of homes in service, but when 20 homes are in service [1,1666L/day/home] a bleed rate of 0.1L/s [8.6m^3/day] will be required to keep water age below 4 days. A bleed rate of approximately 0.3L/s will be required if consumption per home is 540L/day. The actual flushing rate is expected to be lower than 0.1L/s should a water age of up to 7 days be acceptable. The water bleeding will be installed near Node Z and will consist of a external flushing unit with air gap to sanitary drain. The bleed rate can be tested at any time by inserting a 1L container in the flowpath and recording the amount of time it takes to fill. Please refer to **Appendix C** for EPANET modelling details.

5.2.6 Residential Phase 1 - Peak Hour

Table A-7 from **Appendix C** shows the calculated peak hour pressures at each node. The minimum pressure in serviced areas is above 40psi.

5.2.7 Residential Phase 1 - Maximum Day plus Fire

Table A-8 from **Appendix C** shows the calculated maximum day plus fire pressures at each node. The minimum pressure in serviced are above 20psi.

5.3 Water Storage Facility

The proposed water storage facility will include two at grade reservoirs, water quality monitoring, chlorine boosting station and high lift pumps as indicated on Water Storage Facility Process drawing **(102085-W1)**. The proposed water reservoir will be phased with Reservoir #1 commissioned in Phase 1 and Reservoir #2, which will be commissioned when maximum day demands exceed 446m^3/day. High lift pumps will be sized to meet peak hour and fire flow demands. Drawings of the water storage facility and typical above grade tank are included in this report.

Table 2 shows the required storage volumes based on a fire flow of 63.08L/s for 30minutes and M.O.E. criteria:

TABLE 2:

WATER STORAGE REQUIREMENTS

Item	Phase 1		Total All Phases	
Fire Flow	63.09	L/s	63.09	L/s
Fire Duration	0.5	Hrs	0.5	Hrs
Fire Storage	113,562	L	113,562	L
Equalization Storage[25%MaxDay]	108,075	L	360,700	L
Emergency Storage = 25% x [Fire Storage + Max Day storage]	55,409	L	118,566	L
Total Storage	277,046	L	592,828	L

6.0 METER CHAMBER AT CARP

The transition from City of Ottawa watermain to private communal distribution network will occur just downstream of the isolation valve near the connection point in Carp as shown on Drawings **102085-P65** and **102085-D7**. The metering chamber will include a flow meter and backflow preventer to protect the City of Ottawa distribution network from any potential downstream contamination. The proposed meter and backflow preventers are sized for maximum day demand. The City of Ottawa flow meter, will include an above grade remote panel to allow downloading of meter readings. The meter chamber includes a bypass which allows circumvention of the flow meter and is normally closed. Details of the proposed meter, backflow preventer and metering chamber can be found in the water distribution drawings **(102085-W1, 102085-W1.1)** and product data sheets **(Appendix D)** included in this report.

7.0 CONCLUSIONS

The proposed private communal water distribution infrastructure for the West Capital Airpark has been designed to meet domestic demand and fire flow conditions. The private communal water distribution system will form part of a common elements condominium that will be established for this development. The common elements condominium will own, operate and maintain the water system. The meter chamber near the connection point at Carp will monitor water consumption for billing purposes. All downstream components will be operated and maintained by common elements condominium. The proposed private communal water distribution infrastructure includes:

- A meter chamber and backflow preventer at the connection point in Carp to meter water usage.
- A 200mm private communal watermain from existing distribution network at Carp Road and Rivington Street running along the shoulder of Carp Road.
- A private communal Water Storage Facility with rechlorination and high lift pumping, and two at grade Storage Reservoirs.
- A private communal watermain network to service residential and Business Park areas.
- A private communal water flushing station located at Phase 1 residential area to ensure water quality during early stage of the development when there may be low potable water consumption.
- Phase 1 infrastructure is adequate to meet peak hour and fire flow requirements with no further infrastructure in place.

Prepared by:

NOVATECH

Carl Sciuk, P. Eng.
Senior Project Manager

APPENDIX C
WATERMAIN CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CCO-22-1643-01 - 273-275 Russ Bradley - Water Demands

Project:	273-275 Russ Bradley
Project No.:	CCO-22-1643-01
Designed By:	FV
Checked By:	JH
Date:	May 2, 2024
Site Area:	2.43 gross ha

For Information only

Industrial - Light 24247 m2

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	280	L/c/d
Industrial - Light	35,000	L/gross ha/d
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m² /d
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Park with no Hook-Ups	340	L/(space/d)
Trailer Park with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d

AVERAGE DAILY DEMAND	Residential	0.00	L/s
	Commercial/ Industrial/ Institutional	0.98	L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	9.5	x avg. day	L/c/d
Industrial	1.5	x avg. day	L/gross ha/d
Commercial	1.5	x avg. day	L/gross ha/d
Institutional	1.5	x avg. day	L/gross ha/d

MAXIMUM DAILY DEMAND	Residential	0.00	L/s
	Commercial/ Industrial/ Institutional	1.47	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	14.3	x avg. day	L/c/d
Industrial	1.8	x max. day	L/gross ha/d
Commercial	1.8	x max. day	L/gross ha/d
Institutional	1.8	x max. day	L/gross ha/d

MAXIMUM HOUR DEMAND	Residential	0.00	L/s
	Commercial/ Industrial/ Institutional	2.65	L/s

WATER DEMAND DESIGN FLOWS PER UNIT COUNT
CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

AVERAGE DAILY DEMAND	0.98	L/s
MAXIMUM DAILY DEMAND	1.47	L/s
MAXIMUM HOUR DEMAND	2.65	L/s

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info@mcintoshperry.com | www.mcintoshperry.com

McINTOSH PERRY

CCO-22-1643-01 - 273-275 Russ Bradley - Fire Underwriters Survey -Building F

Project:	273-275 Russ Bradley
Project No.:	CCO-22-1643-01
Designed By:	FV
Checked By:	JH
Date:	May 2, 2024

From the Fire Underwriters Survey (2020)

From Part II – Guide for Determination of Required Fire Flow Copyright I.S.O.:
City of Ottawa Technical Bulletin ISTB-2018-02 Applied Where Applicable

A. BASE REQUIREMENT (Rounded to the nearest 1000 L/min)

F = 220 x C x √A Where: F = Required fire flow in liters per minute
C = Coefficient related to the type of construction.
A = The total floor area in square meters (including all storey's, but excluding basements at least 50 percent below grade) in the building being considered.

Construction Type Ordinary Construction

C	1	A	743.2 m^2	
	Total Floor Area (per the 2020 FUS Page 20 - Total Effective Area)		186.0 m^2	* Total floor area based on fire separation
Calculated Fire Flow			3,000.4 L/min	
			3,000.0 L/min	

B. REDUCTION FOR OCCUPANCY TYPE (No Rounding)

From Page 24 of the Fire Underwriters Survey:

Combustible	0%
Fire Flow	3,000.0 L/min

C. REDUCTION FOR SPRINKLER TYPE (No Rounding)

Non-Sprinklered	0%
Reduction	0.0 L/min

D. INCREASE FOR EXPOSURE (No Rounding)

	Separation Distance (m)	Cons.of Exposed Wall	Length Exposed Adjacent Wall (m)	Height (Stories)	Length-Height Factor		
Exposure 1	10.1 to 20	Ordinary - Mass Timber (Unprotected)	15.24	1	15.2	5%	
Exposure 2	Over 30 m	Ordinary - Mass Timber (Unprotected)	0	0	0.0	0%	Vertical Firewall
Exposure 3	10.1 to 20	Ordinary - Mass Timber (Unprotected)	15.24	1	15.2	5%	
Exposure 4	10.1 to 20	Ordinary - Mass Timber (Unprotected)	12.19	1	12.2	5%	
					% Increase*	15%	

Increase*	450.0 L/min

E. Total Fire Flow (Rounded to the Nearest 1000 L/min)

Fire Flow	3,450.0 L/min
Fire Flow Required**	3,000.0 L/min

* In accordance with Part II, Section 4, the Increase for separation distance is not to exceed 75%
** In accordance with Section 4 the Fire flow is not to exceed 45,000 L/min or be less than 2,000 L/min

115 Walgreen Road, R.R.3. Carp, ON K0A 1L0 | T. 613-836-2184 | F. 613-836-3742
info@mcintoshperry.com | www.mcintoshperry.com

APPENDIX D
SANITARY CALCULATIONS

McINTOSH PERRY

NON-RESIDENTIAL

☒ Commercial

☐ Industrial

☐ Institutional

PO Box 599, 3889 Rideau Valley Drive, Manotick, Ontario K4M 1A5

T (613) 692-3571 ext 4 F (613) 692-1507 septic@rvca.ca info@rvca.ca www.rvca.ca

Rideau Valley Conservation Authority

SEPTIC OFFICE

SEPTIC FILE #

24-039

OTTAWA

SEPTIC PACKAGE
IMPORTANT INFORMATION - PLEASE READ

Attached is your Septic Sewage Permit package. A **minimum of two (2) inspections are required** before your proposed Septic system can be approved for use (additional inspections may be required for clay soils/bedrock and/or re-inspections).

- All inspections must be requested by writing/email.
- It is the responsibility of the Homeowner/Installer to provide a copy of the Part 8 permit to the plan examiner at client service/building department.
- All construction documents must be received prior to issuing the Certificate of Completion.

Special Note

- A permit is valid for **12 months** from the original date of issuance noted in the "permit date".
- If lapsed, it **may be renewed only once** for a period of 12 months *from the date of expiry*.
- No person shall make a material change or cause a material change to be made to a plan, specification, document, or other information based on which the permit was issued without notifying / filing detail with and obtaining the authorization of the Chief Building Official. (Building Code Act 1992, c23, s.8 (12))

Septic Sewage System Permit Construction/Inspection Requirements

If you submit early, and an inspector arrives before you are finished, you could be subject to a $200.00 re-inspection fee.

1. **Subgrade/Scarification/Clay Soils/Bedrock (if stated on permit)** – In Clay soils/Bedrock, a site preparation inspection is required. The total contact area must be properly prepared. Scarification must be done under dry conditions prior to importing leaching bed fill.
2. **Installation Inspection – 2nd inspection**

When the septic system is substantially completed (i.e. before the final fill is placed over the septic tank and leaching bed system) an Installation inspection is always required. Prior to any inspection request, the following documents are **mandatory and must** be submitted;

- As-built components page and As-built drawings
- Engineers Letter – if the system is engineered
- Weigh bill
- Grain Size Analysis
- Maintenance Agreement
- ESA Permit number
- Schedule 2 – Installer information

3. **Final Grading Inspection – 3rd Inspection**

When construction of the Septic System is complete, a final grading inspection is required. Before a Certificate of Completion can be issued, the following is **mandatory and must** be completed:

- The leaching bed and Septic tank must be covered with sand fill, topsoil and graded accordingly
- All conditions of the Septic permit & comments on the installation inspection report must be met
- The depth of cover & material type must be identified by inspection pipes or holes placed over trenches at four (4) corners of the bed
- The four (4) corners of the bed must be stake.

Application for a Permit to Construct or Demolish

This form is authorized under subsection 8(1.1) of the *Building Code Act, 1992*

For use by Principal Authority

Application number: R.V.C.A. RECEIVED FEB - 5 2024	Permit number (if different): SEPTIC FILE # 24-039
Date received:	Roll number:

Application submitted to: OTTAWA SEPTIC SYSTEM OFFICE (OTTAWA)

(Name of municipality, upper-tier municipality, board of health or conservation authority)

A. Project information

Building number, street name	Unit number	Lot/con.
273 & 275 Russ Bradley Road		

Municipality	Postal code	Plan number/other description
Carp	K0A 1L0	

Project value est. $	Area of work (m^2)

B. Purpose of application

New construction | Addition to an existing building | Alteration/repair | Demolition | Conditional Permit

Proposed use of building	Current use of building
Storage Facility	Undeveloped

Description of proposed work

Proposed installation of Class 4 Eljen GSF system

C. Applicant

Applicant is: Owner or (Authorized agent of owner)

Last name	First name	Corporation or partnership
Armstrong	Fraser	Egis Canada (formerly McIntosh Perry)

Street address	Unit number	Lot/con.
1329 Gardiners Road	1	

Municipality	Postal code	Province	E-mail
Kingston	K7P 0L8	ON	f.armstrong@mcintoshperry.com

Telephone number	Fax	Cell number
(343) 344 2663	( )	(343) 363 1458

D. Owner (if different from applicant)

Last name	First name	Corporation or partnership
Watkins	Trevor	2852569 Ontario Inc.

Street address	Unit number	Lot/con.
971 Melrose Road		

Municipality	Postal code	Province	E-mail
Shannonville	K0K 3A0	ON	

Telephone number	Fax	Cell number
(613) 885 4959	( )	( )

E. Builder (optional)

Last name	First name	Corporation or partnership (if applicable)	
Street address		Unit number	Lot/con.
Municipality	Postal code	Province	E-mail
Telephone number ( )	Fax ( )	Cell number ( )	

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24-039
OTTAWA

F. Tarion Warranty Corporation (Ontario New Home Warranty Program)

i. Is proposed construction for a new home as defined in the *Ontario New Home Warranties Plan Act*? If no, go to section G.	Yes	No X
ii. Is registration required under the *Ontario New Home Warranties Plan Act*?	Yes	No X

iii. If yes to (ii) provide registration number(s): _____

G. Required Schedules

i) Attach Schedule 1 for each individual who reviews and takes responsibility for design activities.

ii) Attach Schedule 2 where application is to construct on-site, install or repair a sewage system.

H. Completeness and compliance with applicable law

i) This application meets all the requirements of clauses 1.3.1.3 (5) (a) to (d) of Division C of the Building Code (the application is made in the correct form and by the owner or authorized agent, all applicable fields have been completed on the application and required schedules, and all required schedules are submitted).	Yes X	No
Payment has been made of all fees that are required, under the applicable by-law, resolution or regulation made under clause 7(1)(c) of the *Building Code Act, 1992*, to be paid when the application is made.	Yes X	No
ii) This application is accompanied by the plans and specifications prescribed by the applicable by-law, resolution or regulation made under clause 7(1)(b) of the *Building Code Act, 1992*.	Yes X	No
iii) This application is accompanied by the information and documents prescribed by the applicable by-law, resolution or regulation made under clause 7(1)(b) of the *Building Code Act, 1992* which enable the chief building official to determine whether the proposed building, construction or demolition will contravene any applicable law.	Yes X	No
iv) The proposed building, construction or demolition will not contravene any applicable law.	Yes X	No

I. Declaration of applicant

I Fraser Armstrong, P.Eng. declare that:
(print name)

1. The information contained in this application, attached schedules, attached plans and specifications, and other attached documentation is true to the best of my knowledge.
2. If the owner is a corporation or partnership, I have the authority to bind the corporation or partnership.

Date 24.01.24 Signature of applicant

Personal information contained in this form and schedules is collected under the **authority of subsection 8(1.1) of the *Building Code Act, 1992*, and** will be used in the administration and enforcement of the *Building Code Act, 1992*. Questions about the collection of personal information may be addressed to: a) the Chief Building Official of the municipality or upper-tier municipality to which this application is being made, or, b) the inspector having the powers and duties of a chief building official in relation to sewage systems or plumbing for an upper-tier municipality, board of health or conservation authority to whom this application is made, or, c) Director, Building and Development Branch, Ministry of Municipal Affairs and Housing 777 Bay St., 2nd Floor. Toronto, M5G 2E5 (416) 585-6666.

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FEB - 5 2024

Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

A. Project Information

Building number, street name			Unit no.	Lot/con.
273 & 275 Russ Bradley Road				
Municipality: Carp	Postal code: K0A 1L0	Plan number/ other description		

SEPTIC FILE # 24-039

B. Individual who reviews and takes responsibility for design activities

Name		Firm	
Fraser Armstrong, P.Eng.		Egis Canada (formerly McIntosh Perry)	OTTAWA
Street address: 1329 Gardiners Road		Unit no.: 1	Lot/con.
Municipality: Kingston	Postal code: K7P 0L8	Province: ON	E-mail: f.armstrong@mcintoshperry.com
Telephone number: (343)344 2663	Fax number: ( )		Cell number: (343) 363 1458

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1. of Division C]

House	HVAC – House	Building Structural
Small Buildings	Building Services	Plumbing – House
Large Buildings	Detection, Lighting and Power	Plumbing – All Buildings
Complex Buildings	Fire Protection	On-site Sewage Systems

Description of designer's work

D. Declaration of Designer

I Fraser Armstrong, P.Eng. declare that (choose one as appropriate):
(print name)

I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4.of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: _____

Firm BCIN: _____

I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Division C, of the Building Code.

Individual BCIN: _____

Basis for exemption from registration: _____

The design work is exempt from the registration and qualification requirements of the Building Code.

Basis for exemption from registration and qualification: P.Eng. PEO # 90497686

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. I have submitted this application with the knowledge and consent of the firm.

Date 24.01.24 Signature of Designer

NOTE:

1. For the purposes of this form, "individual" means the "person" referred to in Clause 3.2.4.7(1) (c).of Division C, Article 3.2.5.1. of Division C, and all other persons who are exempt from qualification under Subsections 3.2.4. and 3.2.5. of Division C.
2. Schedule 1 is not required to be completed by a holder of a license, temporary license, or a certificate of practice, issued by the Ontario Association of Architects. Schedule 1 is also not required to be completed by a holder of a license to practise, a limited license to practise, or a certificate of authorization, issued by the Association of Professional Engineers of Ontario.

Schedule 2: Sewage System Installer Information

A. Project Information

Building number, street name			Unit number	Lot/con.
273 & 275 Russ Bradley Road				
Municipality	**Postal code**	**Plan number/ other description**		
Carp	K0A 1L0			

B. Sewage system installer

Is the installer of the sewage system engaged in the business of constructing on-site, installing, repairing, servicing, cleaning or emptying sewage systems, in accordance with Building Code Article 3.3.1.1, Division C?

Yes (Continue to Section C) No (Continue to Section E) X Installer unknown at time of application (Continue to Section E)

C. Registered installer information (where answer to B is "Yes")

Name			BCIN	
Street address			Unit number	Lot/con.
Municipality	Postal code	Province	E-mail	
Telephone number ( )	Fax ( )		Cell number ( )	

D. Qualified supervisor information (where answer to section B is "Yes")

Name of qualified supervisor(s)	Building Code Identification Number (BCIN)

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E. Declaration of Applicant:

I Fraser Armstrong, P.Eng. declare that:
(print name)

I am the applicant for the permit to construct the sewage system. If the installer is unknown at time of application, I shall submit a new Schedule 2 prior to construction when the installer is known;

OR

I am the holder of the permit to construct the sewage system, and am submitting a new Schedule 2, now that the installer is known.

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. If the owner is a corporation or partnership, I have the authority to bind the corporation or partnership.

Date 24.01.24 Signature of applicant

Ottawa Septic System Office | Bureau des systèmes septiques d'Ottawa

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Do Not Complete
Permit # _____
Revision # _____
Date _____

SEPTIC FILE # 24-039 OTTAWA

Schedule 4
Proposed Services
Complete Sections 1 thru 7

1. **Engineered**
- ☐ Yes
- ☒ No

2. **Water supply**
- ☐ Proposed
- ☒ Existing

3. **Type of work proposed**
- ☒ New Installation
- ☐ Replacement
- ☐ Alteration

4. **Type of Well**
- ☐ Dug/bored/Sandpoint well
- ☒ Drilled well
- ☐ Municipal
- ☐ Other

5. **Residential** Sewage Design Flow Info.
Bedrooms _____
House (floor area) _____ **m²**
People _____
Total Fixture Units _____ **(Schedule 8)**
Residential Flow _____ **L/day**

6. Sewage Design Flow **Other Occupancies**
Design Flow 950 L/day
Detailed sewage flow calculations:
see attached email correspondence with OSSO dated April 11, 2022

7. **Type of System**
- ☒ Treatment Unit Eljen GSF System
- ☐ Class 2 – Leaching Pit
- ☐ Class 3 – Cesspool
- ☐ Class 4 – Shallow Buried Trench

- ☐ Class 4 – Trench **(Schedule 9)**
  - ☐ Fully raised
  - ☐ Partially raised
  - ☐ In-ground
- ☐ Class 4 – Filter Media **(Schedule 10)**
  - ☐ Fully raised
  - ☐ Partially raised
  - ☐ In-ground
- ☒ Class 4 – BMEC Area Bed **(Schedule 11)**
  - ☐ Fully raised
  - ☒ Partially raised
  - ☐ In-ground
- ☐ Class 4 – "Type A" Dispersal **(Schedule 13)**
  - ☐ Fully raised
  - ☐ Partially raised
  - ☐ In-ground
- ☐ Class 4 – "Type B" Dispersal **(Schedule 14)**
  - ☐ Fully raised
  - ☐ Partially raised
  - ☐ In-ground
- ☐ Class 5 – Holding Tank (9000L min)
- ☐ Tank/TreatmentUnit/PumpChamber ONLY
- ☐ Effluent Filter/Risers ONLY

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24-039
OTTAWA

Do Not Complete
Permit No
Revision No
Date

Schedule 5
Sewage System Details

Type of System: Class 4 - BMEC Eljen combined treatment/leaching bed system (Schedule 4)

Septic/Holding Tank Size: 3600 Litres Make: Boyd Brothers 3600 L

Septic Tank Effluent Filter Make: Poly LOK Model: PL-122

Treatment Unit – Make & Model: Eljen GSF A42 Modules

Number of Units: 10 Other:

Refer to Typical Drawing # CCO 221643 SSD-01, 02, 03 Pump(s) required 1

Mantle Information: Pump Rate max 100 L/15min

Native or imported =15m in N/A direction(s) **Note:** Alarm required for all pumping systems

Slope subgrade 1 % slope

west direction(s)

Site to be Scarified (If clay) YES / NO

Clay Seal Required (If bedrock) YES / NO

☐ **Trench**

Distribution Pipe Length _____ m

Loading Area _____ m²

Type of Chamber _____

Length of Chamber _____ m

☐ **Dispersal Bed**

☒ **BMEC** ☐ **Type A** ☐ **Type B**

Stone _____ m²

Sand 47.5 m²

Pipe _____ m²

Linear Loading _____ L/m²

☐ **Shallow Buried Trench**

Pipe Length _____ m

☐ **Filter Media Bed**

Stone _____ m²

Extended Base _____ m²

Pipe _____ m

Weight of Filter Media _____ Kg

Loading Area _____ m

☐ **Tank/Treatment Unit/Pump Chamber Replacement** ONLY

☐ **Effluent Filter & Riser** ONLY

Construction Notes:

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Permit # SEPTIC FILE #
Revision # 24 0 3 9
Date
OTTAWA

Schedule 6
Soil and Water Table Information
(Minimum depth of test pit: 2 metres)

Name of Applicant/Agent: Egis
Date: 22.11.24 Time:
Applicant/Agent Signature:

Inspector:
Date: Time:
Inspector Signature:

TP-1

EG (113.0.)

	Soil Description	T
.25 m	Topsoil	
.5m		20 min/cm
	Silty Sand w/ trace clay	
1.0 m	GWT 1.0 m	
	End of Test Pit	
	No Refusal	
1.5m		
2.0 m		

EG (……..)

	Soil Description	
.5m		
1.0 m		
1.5m		
2.0 m		

TP-2

EG (113.0.)

	Soil Description	T
.25 m	Topsoil	
.5m		20 min/cm
	silty sand w/ trace clay	
1.0 m		
1.5m	GWT 1.5 m	
2.0 m	End of Test Pit	
	No Refusal	

EG (……..)

	Soil Description	T
.5m		
1.0 m		
1.5m		
2.0 m		

LEGEND

BR = Bedrock
GWT = Ground water table
HGWT = High ground water table
M = metres
EG = Existing grade
T = percolation rate

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Do Not Complete
Permit # _____
Revision # _____
Date _____

Scale: 1Block = _____

Schedule 7
Layout Section

N

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24-039
OTTAWA

SEE ATTACHED PLANS
CCO 22-1643
SSD 02, 02 & 03

○Dug Well ●Drilled Well ▲Neighbouring Homes ◊Benchmark ---Tile Drainage —Property Line

Elevations (metric only)
B.M. 113.33 m

B.M.Description Top of hydrant spindle , refer to attached Topo drawing 22-2317-CARP & Russ Bradley RD-1

Exact Location Hydrant on east side of Russ Bradley approx. 85 m south of Carp Rd.

Min. of 5 elevations in proposed system area (in X pattern)

X_1 _____ X_2 _____
X_3 _____ X_4 _____
X_5 _____ X_6 (toe) _____
X_7 X_8

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SEPTIC FILE #
Do Not Complete
Permit # 24 0 3 9
Revision #
Date OTTAWA

Schedule 8
Fixture unit count

Fixtures	# Existing	+	# Proposed	X	unit count	=	Fixture Count
Bathroom Bathroom group (**toilet, sink and tub or shower**) installed in the **same** room		+		X	6	=	
Bathtub with/without overhead shower		+		X	1.5	=	
Shower stall		+		X	1.5	=	
Wash basin (**SINK**) (1½inch trap)		+	2	X	1.5	=	3
Watercloset (**TOILET**) tank operated		+	2	X	4	=	8
Bidet		+		X	1	=	
Kitchen Dishwasher		+		X	1	=	
Sink with/without garbage grinder(s), domestic and other small type single, double or 2 single with a common trap		+		X	1.5	=	
Other Domestic washing machine		+		X	1.5	=	
Combination sink and laundry tray single or double (Installed on 1½ trap)		+		X	1.5	=	

***Total:** 11

***Insert the TOTAL in section 5 of Schedule 4** (0.Reg 151/13 Table 7.4.9.3)

1. **Sump pumps and floor drains are not to be connected to the sewage system.** Connection of such fixtures to a sewage system may lead to a hydraulic failure of the said system. The above mentioned fixtures should be discharged separately to an approved Class 2 (leaching pit) sewage system.
2. Where laundry waste is not more than 20% of the total daily design sanitary sewage flow, it may discharge to a sewage system (Part 8, OBC, 8.1.3.1(2)).

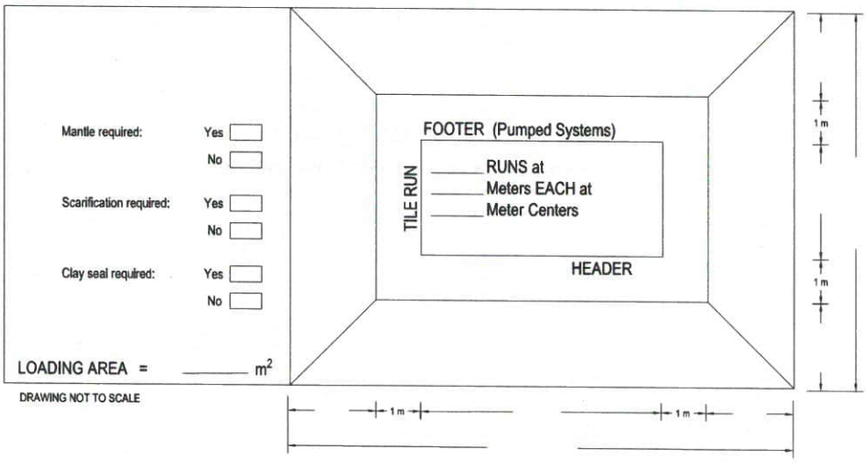
24.01.24

Agent/Owner signature **Date**

SEPTIC FILE #
24 - 039
OTTAWA

Do Not Complete
Permit # _____
Revision # _____
Date _____

Plan View



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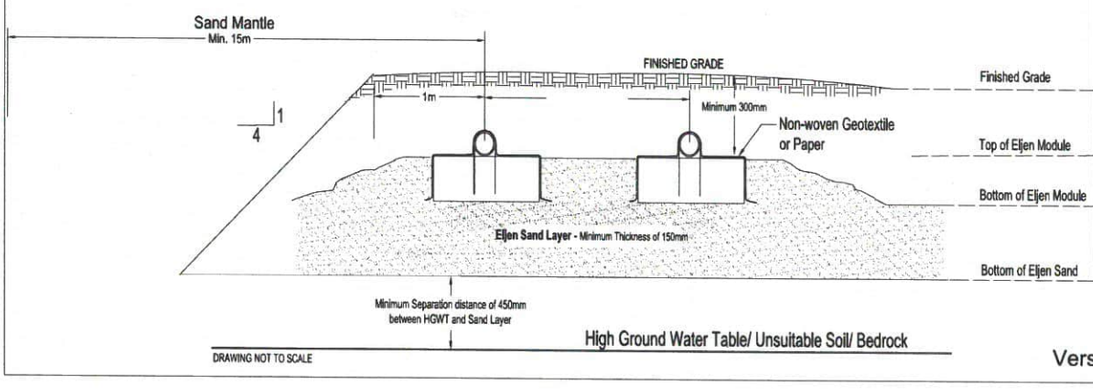
TYPICAL DRAWING C

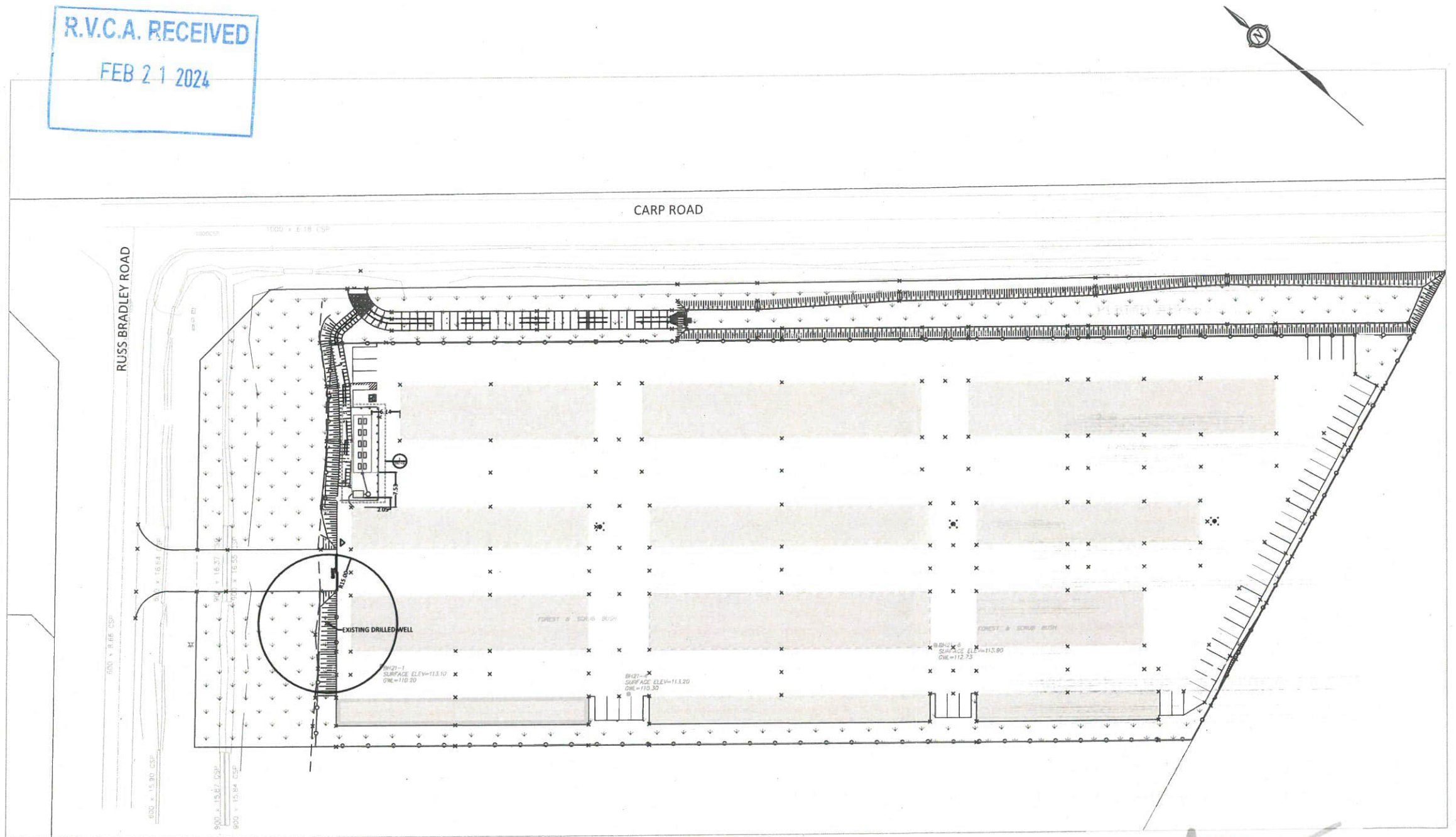
BURIED OR RAISED BED - BMEC ELJEN System

SEE DRAWINGS CCO 22-1643 SSD 02 & SSD 03

Cross-Section Profile



Proposed Installation Grades	Approved Installation Grades	Existing Grade



Feb 28/24

LICENSED PROFESSIONAL ENGINEER
G. F. ARMSTRONG
24.02.21
PROVINCE OF ONTARIO

Legend:

Septic Bed Location

1 / SP-01 — Detail Number & Name / Sheet Number & Scale

REV	COMMENTS	AA.BB.CC
REV	COMMENTS	AA.BB.CC
2	REVISED PER OSSO COMMENTS	24.02.21
1	PERMIT APPLICATION	24.01.31
REV	COMMENTS	DATE

McINTOSH PERRY
1-1329 Gardiners Road, Kingston, ON K7P 0L8
Tel: 613-542-3788 Fax: 613-542-7583
www.mcintoshperry.com

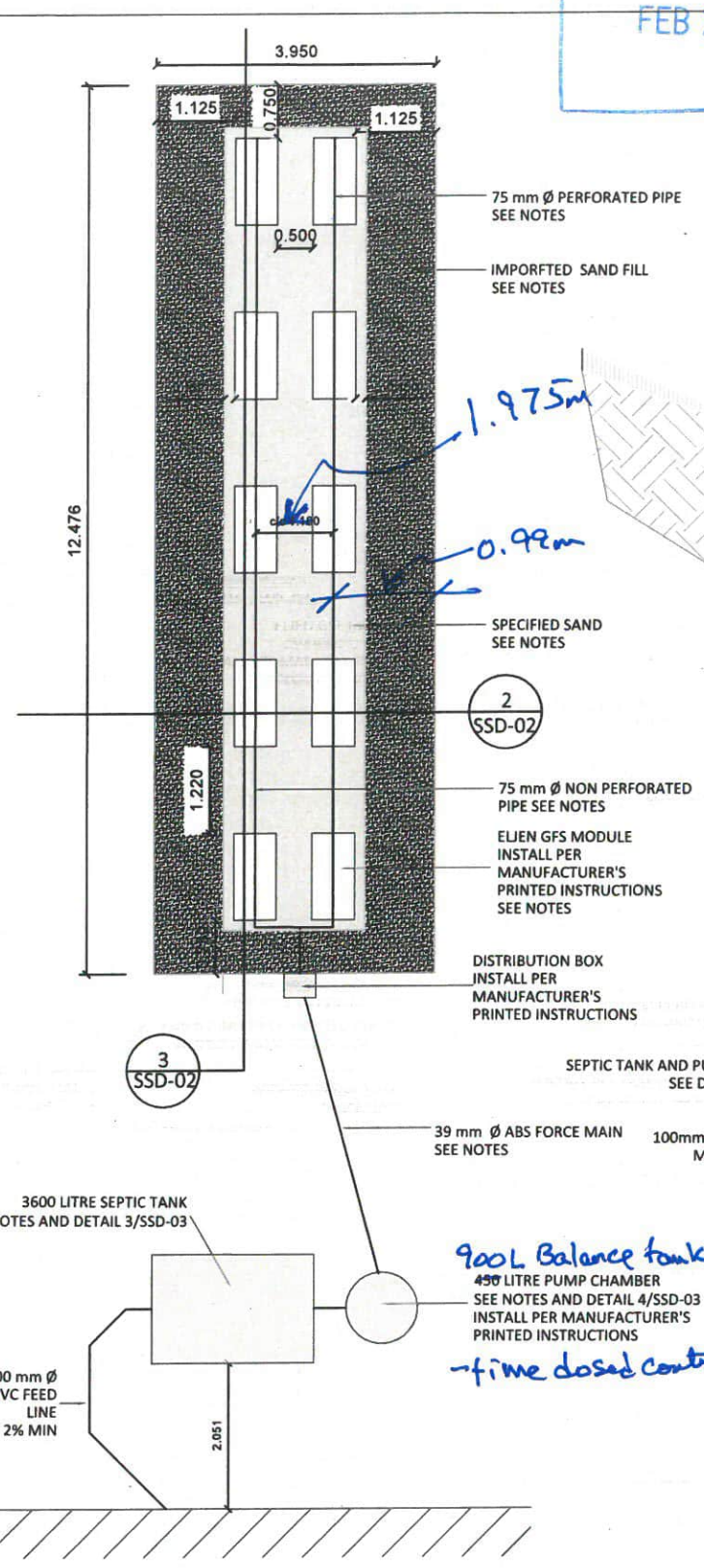
Client:
2852569 ONTARIO iNC.
971 Melrose Road, Shannonville, ON
K0K 3A0

Project:
Warehouse / Storage Facility
273&275 Russ Bradley Rd.

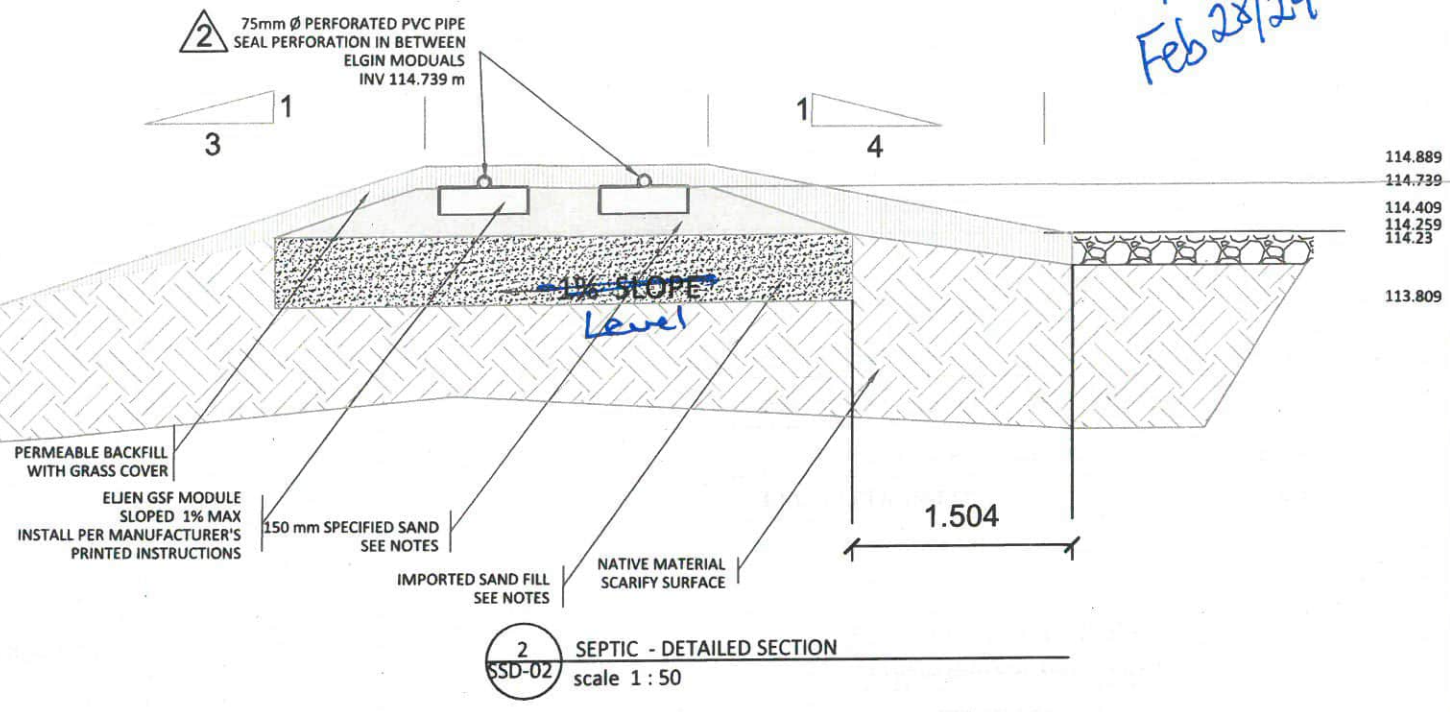
Drawing Title:
Septic - Site Layout Plan

Scale:	1 : 1000	Project Number:	CCO 22-1643
Drawn by:	JFA/GFA		
Checked By:	PL	Drawing Number:	SSD-01
Designed By:	GFA		
Date:	Jan 31, 2024		

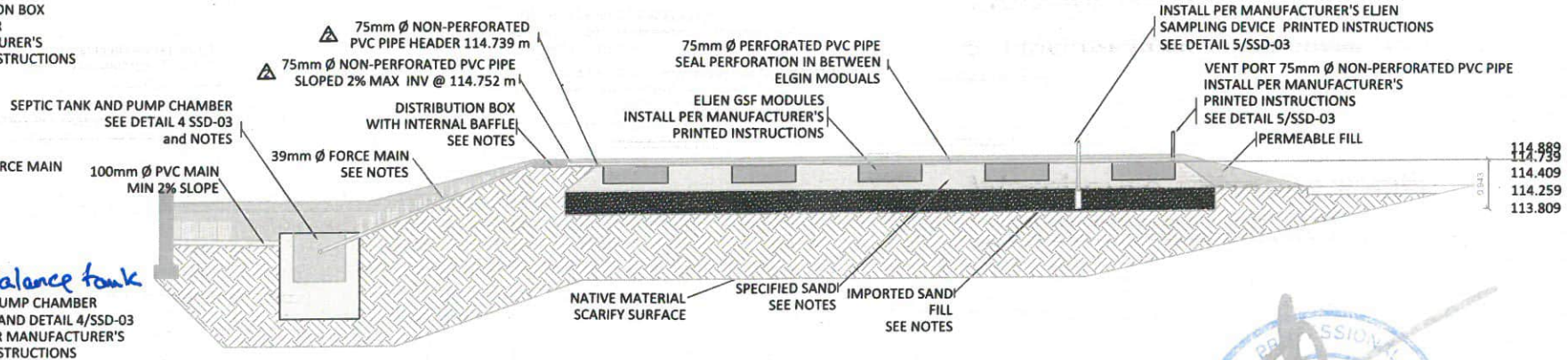
Feb 28/24



1 SP-02 SEPTIC - DETAILED PLAN LAYOUT
scale 1 : 100



2 SSD-02 SEPTIC - DETAILED SECTION
scale 1 : 50



3 SSD-02 SEPTIC - DETAILED SECTION
scale 1 : 125

24.02.21

Legend:

1 / SP-01 — Detail Number & Name / Sheet Number & Scale

REV	COMMENTS	AA.BB.CC
REV	COMMENTS	AA.BB.CC
2	REVISED PER OSSO COMMENTS	24.02.21
1	PERMIT APPLICATION	24.01.31
REV	COMMENTS	DATE

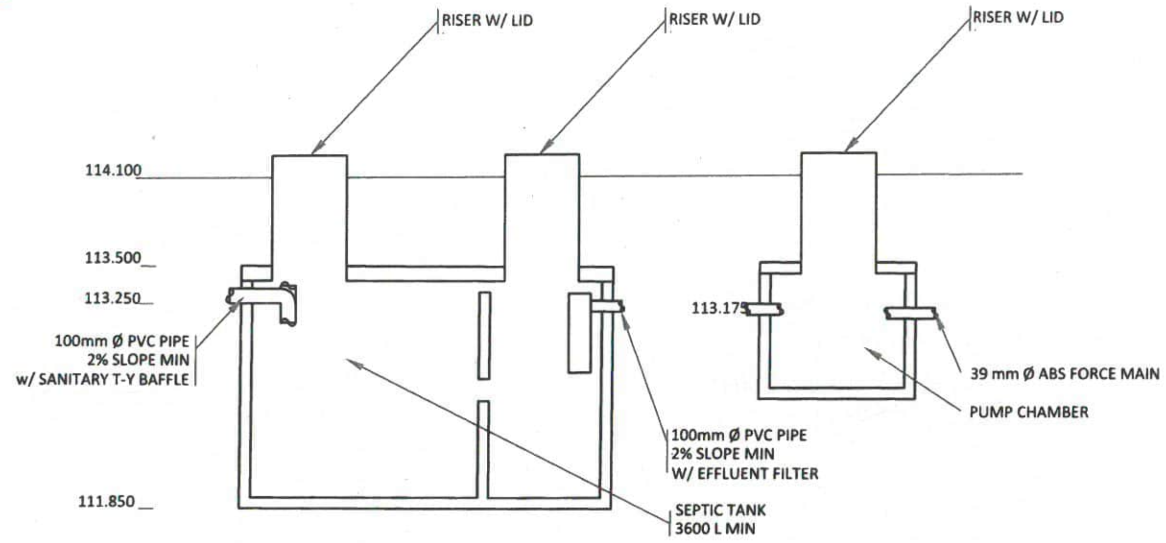
McINTOSH PERRY
1-1329 Gardiners Road, Kingston, ON K7P 0L8
Tel: 613-542-3788 Fax: 613-542-7583
www.mcintoshperry.com

Client:
2852569 Ontario Inc.
971 Melrose Road, Shannonville, ON
K0K 3A0

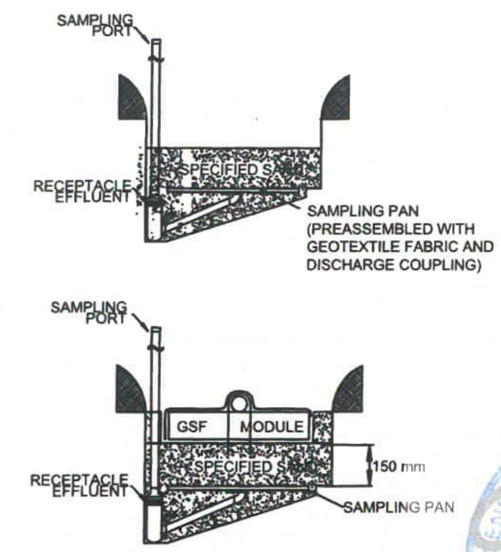
Project:
Warehouse / Storage Facility
273 & 275 Russ Bradley Rd.

Drawing Title:
SEPTIC
DETAIL PLAN and SECTIONS

Scale:	AS SHOWN	Project Number:	CCO 22-1643
Drawn by:	JFA/GFA		
Checked By:	PL	Drawing Number:	SSD-02
Designed By:	GFA		
Date:	Jan 31, 2024		



4 SSD-03 SEPTIC - SEPTIC TANK & PUMP CHAMBER
scale 1 : 50



5 SSD-03 SEPTIC - SAMPLING UNIT
nts

Legend:

1 SP-01 — Detail Number & Name / Sheet Number & Scale

REV	COMMENTS	AA.BB.CC
REV	COMMENTS	AA.BB.CC
2	REVISED PER OSSO COMMENTS	24.02.21
1	PERMIT APPLICATION	24.01.31
REV	COMMENTS	DATE

McINTOSH PERRY
1-1329 Gardiners Road, Kingston, ON K7P 0L8
Tel: 613-542-3788 Fax: 613-542-7583
www.mcintoshperry.com

Client:
2852569 Ontario Inc.
971 Melrose Road, Shannonville, ON
K0K 3A0

Project:
Warehouse/Storage Facility
273 & 275 Russ Bradley Rd.

Drawing Title:
Septic
Details and Notes

Scale: As Shown
Drawn by: JFA/GFA
Checked By: PL
Designed By: GFA
Date: Jan 31 2024

Project Number: CCO 22-1643

Drawing Number: SSD-03

NOTES

GENERAL

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER APPLICABLE CONTRACT DRAWINGS AND PERMITS.
2. ORIGINAL TOPOGRAPHY, GROUND ELEVATION AND EXISTING FEATURES ARE ALL APPROXIMATE AND BASED ON AVAILABLE INFORMATION FROM OTHERS, AS WELL AS AERIAL PHOTOGRAPHS/INFORMATION FROM EXISTING LAND OWNER AND ARE PROVIDED FOR INFORMATION PURPOSES ONLY AND IMPLY NO GUARANTEE OF ACCURACY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL INFORMATION OBTAINED FROM THEM PRIOR TO CONSTRUCTION.
3. CONTRACTOR TO CONFIRM AT ONSET OF CONSTRUCTION THAT THE SOIL GROUNDWATER CONDITIONS IN THE PROPOSED LEACHING BED IS CONSISTENT WITH THE SOIL DESCRIBED IN THE TEST HOLE LOGS (I.E. SILTY SAND, TRACE CLAY, WITH ESTIMATED T-TIME, 8 < T < 20 min/cm).
4. CONTRACTOR SHALL PROVIDE ALL LABOUR, EQUIPMENT AND MATERIALS FOR THE INSTALLATION OF THE CLASS IV TREATMENT SYSTEM INCLUDING TANKS, PIPING, EXCAVATION, TILE BED, FILL, MANTLE, TOPSOIL AND SEED AND MUCH AS SHOWN.
5. CONTRACTOR TO SUPPLY SHOP DRAWINGS/SPECIFICATIONS FOR SEPTIC SYSTEM COMPONENTS FOR ENGINEER'S APPROVAL PRIOR TO ON-SITE DELIVERY OF COMPONENTS.
6. ALL WORK SHALL CONFORM TO SECTION 8 OF THE ONTARIO BUILDING CODE (2012).
7. ALL SUPPLY LINES, FORCE MAIN AND DISTRIBUTION LINE SHALL BE OUTFITTED WITH 14 GAUGE TW SOLID COPPER TRACER WIRE
8. SEPTIC SYSTEM DESIGNED TO ACCOMMODATE FLOW OF 950 L/DAY. FLOW BASED ON EMAIL CORRESPONDENCE WITH OSSO DATED MARCH 28, 2022.
9. DESIGN CRITERIA
   DESIGN FLOW 950 L/DAY
   SEPTIC TANK 3Q = 2850 L (USE 3600 L TANK)
   NATIVE T TIME 20 min/cm (Silty Sand)
   MIN MODULES REQ 950/95 L EACH = 10 MODULES
   MIN ABSORPTION BED AREA (950*20)/400 = 47.5m2

SEPTIC TANK

10. 3600 L SEPTIC TANK CONFORMING TO CAN/CSA-BA66-MO5 OUTFITTED WITH SEPTIC TANK FILTER. BOYD BROTHERS OR APPROVED EQUAL.
11. SEPTIC TANK FILTER MEETING NSF/ANSI 46 SIZED TO FILTER PARTICLE OF 1.6mm WITH A MINIMUM CONTACT AREA OF 550 cm².
12. SEPTIC TANK TO BE EQUIPPED WITH COVERS TO BE EXTENDED TO SURFACE OR TO NO LESS THAN 300mm BELOW FINISHED GRADE. RISERS TO BE USED WHERE REQUIRED.
13. ENSURE MAXIMUM BURIAL DEPTH LISTED BY TANK MANUFACTURER IS NOT EXCEEDED.
14. CONTRACTOR TO ENSURE SEPTIC TANKS BE LOCATED A MINIMUM OF 15m FROM ANY DRILLED WELL

DISTRIBUTION BOX

15. DISTRIBUTION BOX IS INTENDED TO REDUCE FORCE OF FLOW FROM PUMP CHAMBER PRIOR TO ENTERING ELJEN DISTRIBUTION MODULES.

PUMP CHAMBER

16. PUMP CHAMBER CONFORMING TO CAN/CSA-BA66-MO5, PUMP CHAMBER MINIMUM CAPACITY 450 L.
17. ENSURE MAXIMUM BURIAL DEPTH LISTED BY TANK MANUFACTURER IS NOT EXCEEDED.
18. SECONDARY FLOAT CONNECTED TO AUDIBLE AND VISUAL ALARM.

PUMP

19. MAXIMUM 10 LITRE PER DOSE PER EACH ELJEN GSF A42 MODULE. ADJUST THE PUMP FLOW TO ACHIEVE MAXIMUM DOSE OR LESS.

ABS FORCE MAIN

20. FORCE MAIN TO EITHER BE FREE DRAINING BACK TO PUMP CHAMBER OR FROST PROTECTED AS PER CITY OF OTTAWA STANDARD W22.

PVC PIPING

21. PVC HEADER SHALL BE NON-PERFORATED
22. PVC DISTRIBUTION SHALL BE PERFORATED AT EACH ELJEN UNIT. ORIENT PERFORATIONS PER ELJEN INSTALLATION INSTRUCTIONS.
23. PVC DISTRIBUTION BETWEEN ELJEN UNITS SHALL BE NON-PERFORATED PER ELJEN INSTALLATION INSTRUCTIONS.

MATERIALS

SPECIFIED SAND - MEETING ASTM C33

SIEVE SIZE	PERCENT PASSING
3/8	100
No. 4	95 - 100
No. 8	80 - 100
No. 16	50 - 65
No. 30	25 - 60
No. 50	5 - 30
No. 100	< 10
No. 200	< 5

IMPORTED SAND FILL: PER OBC 8.7.7.1.(4).(a) (i.e., 6 min/ cm <= T time <= 10 min/cm, with no more than 5% fines passing 200 sieve)

DISTRIBUTION - ELJENA42 GSF CONFIGURED AS DETAILED IN LAYOUT PLAN

SEPTIC TANK - BOYD BROTHERS 3600 L OR EQUIVALENT

PUMP CHAMBER - BOYD BROTHERS 450 L OR EQUIVALENT

EFFLUENT FILTER - PL-122 BY POLY LOK OR EQUIVALENT

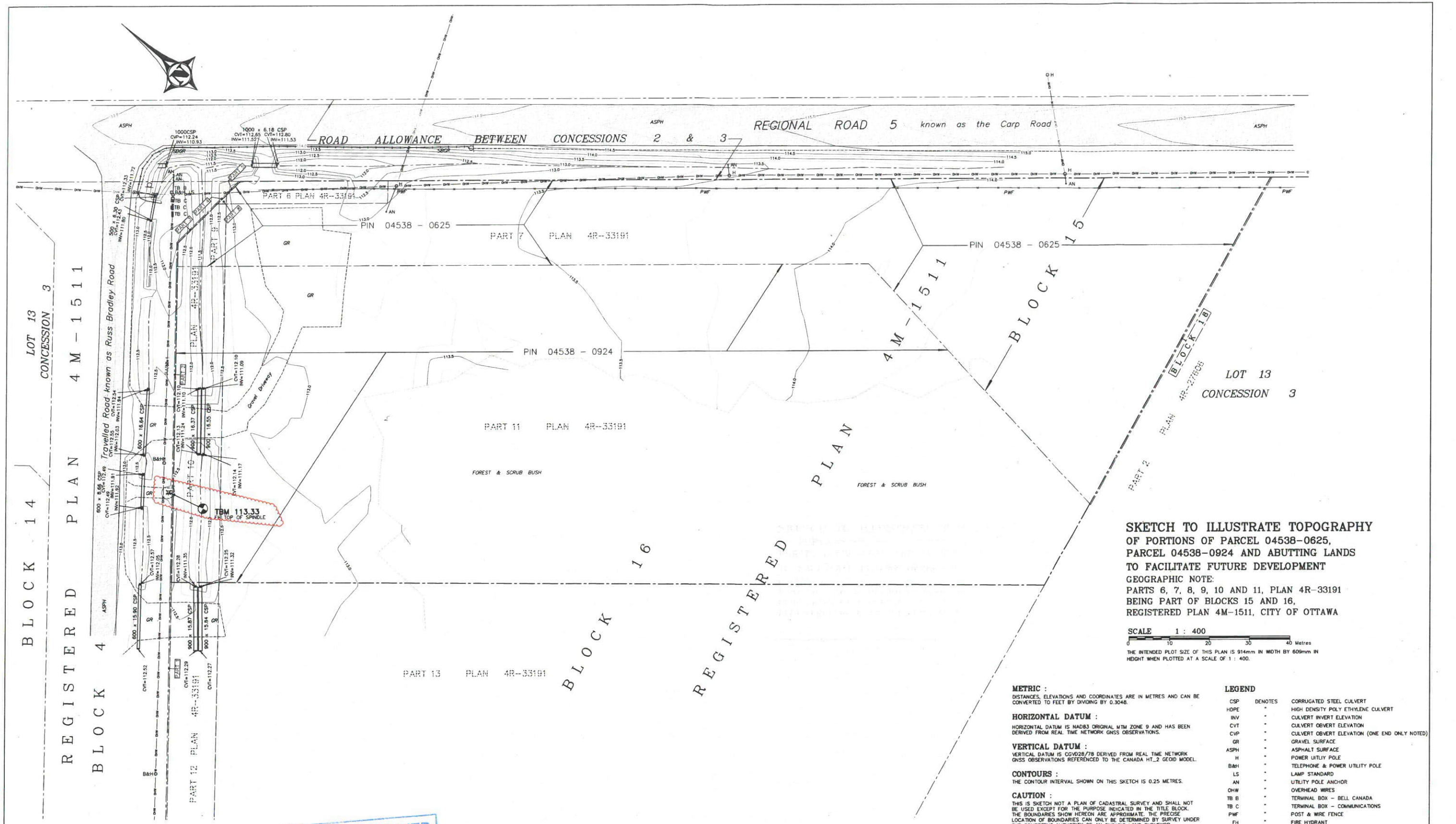
FORCE MAIN - ABS 39MM Ø OUTFITTED WITH 14 GAUGE TW SOLID COPPER TRACER WIREA42 GFS

HEADER FEED LINE - 75 MM Ø SCH 40 NON-PERFORATED OUTFITTED WITH 14 GAUGE TW SOLID COPPER TRACER WIRE

PUMP - GOULDS EP05 SERIES MODEL 3871 W/FLOAT SWITCH OR APPROVED EQUIVALENT

ALARM - SJE TANK ALERT TAXT OR APPROVED EQUIVALENT

CONTROL PANEL - SJE EZ SERIES SIMPLE TIME OR APPROVED EQUIVALENT



SKETCH TO ILLUSTRATE TOPOGRAPHY
OF PORTIONS OF PARCEL 04538-0625, PARCEL 04538-0924 AND ABUTTING LANDS TO FACILITATE FUTURE DEVELOPMENT

GEOGRAPHIC NOTE:
PARTS 6, 7, 8, 9, 10 AND 11, PLAN 4R-33191
BEING PART OF BLOCKS 15 AND 16,
REGISTERED PLAN 4M-1511, CITY OF OTTAWA

SCALE 1 : 400

0 10 20 30 40 Metres

THE INTENDED PLOT SIZE OF THIS PLAN IS 914mm IN WIDTH BY 609mm IN HEIGHT WHEN PLOTTED AT A SCALE OF 1 : 400.

METRIC :
DISTANCES, ELEVATIONS AND COORDINATES ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

HORIZONTAL DATUM :
HORIZONTAL DATUM IS NAD83 ORIGINAL MTM ZONE 9 AND HAS BEEN DERIVED FROM REAL TIME NETWORK GNSS OBSERVATIONS.

VERTICAL DATUM :
VERTICAL DATUM IS CGVD28/78 DERIVED FROM REAL TIME NETWORK GNSS OBSERVATIONS REFERENCED TO THE CANADA HT_2 GEOID MODEL.

CONTOURS :
THE CONTOUR INTERVAL SHOWN ON THIS SKETCH IS 0.25 METRES.

CAUTION :
THIS IS SKETCH NOT A PLAN OF CADASTRAL SURVEY AND SHALL NOT BE USED EXCEPT FOR THE PURPOSE INDICATED IN THE TITLE BLOCK. THE BOUNDARIES SHOW HEREON ARE APPROXIMATE. THE PRECISE LOCATION OF BOUNDARIES CAN ONLY BE DETERMINED BY SURVEY UNDER THE COMPETENT AUTHORITY OF AN ONTARIO LAND SURVEYOR.

THIS SKETCH DEPICTS VISIBLE, ABOVE GROUND TOPOGRAPHIC FEATURES ONLY. UNDERGROUND UTILITIES AND SERVICES HAVE NOT BEEN INCLUDED IN THE SCOPE OF WORK.

OWNERSHIP :
2852569 ONTARIO INC. IS CURRENTLY THE REGISTERED OWNER OF PIN 04538-0625.

2852569 ONTARIO INC. IS CURRENTLY THE REGISTERED OWNER OF PIN 04538-0924.

SURVEY DATE :
DATA COLLECTION ON SITE WAS COMPLETED OCTOBER 26, 2021 BY McINTOSH PERRY SURVEYING INC..

LEGEND

CSP	DENOTES	CORRUGATED STEEL CULVERT
HDPE	"	HIGH DENSITY POLY ETHYLENE CULVERT
INV	"	CULVERT INVERT ELEVATION
CVT	"	CULVERT OBVERT ELEVATION
CVP	"	CULVERT OBVERT ELEVATION (ONE END ONLY NOTED)
GR	"	GRAVEL SURFACE
ASPH	"	ASPHALT SURFACE
H	"	POWER UTILITY POLE
B&H	"	TELEPHONE & POWER UTILITY POLE
LS	"	LAMP STANDARD
AN	"	UTILITY POLE ANCHOR
OHW	"	OVERHEAD WIRES
TB B	"	TERMINAL BOX - BELL CANADA
TB C	"	TERMINAL BOX - COMMUNICATIONS
PWF	"	POST & WIRE FENCE
FH	"	FIRE HYDRANT
TBM	"	TEMPORARY BENCHMARK
⌂	"	ROAD OR PROPERTY ADDRESS SIGN

JOB No. 22-2317 | DRAWING 22-2317-CARP & RUSS BRADLEY RD-1

PREPARED FOR: MPCE

McINTOSH PERRY
SURVEYING INC.
3240 Drummond Con. 5A, R.R. #7, Perth, ON K7H 3C9
Tel: 613-267-6524 Fax: 613-267-7992
www.mcintoshperry.com

EXAMINED: JG | CAD: PC

SEPTIC FILE #
24 - 039
OTTAWA

METRIC
DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.

DATE 2020/10/19

JOHN H. GUTRI, O.L.S.

PLAN 4R-33191
RECEIVED AND DEPOSITED
DATE OCT. 20 2020
Angela Ward
REPRESENTATIVE FOR LAND REGISTRAR FOR THE LAND TITLES DIVISION OF OTTAWA – CARLETON (N° 4)

SCHEDULE

PART	BLOCK	PLAN	PIN
1	PART OF 16	4M-1511	PART OF 04538-0626
2			
3	ALL OF 15		ALL OF 04538-0624
4			
5			ALL OF 04538-0625
6			
7			
8			
9	PART OF 16		ALL OF 04538-0627
10			
11			
12			
13			
14			
15			
16			PART OF 04538-0626

PARTS 4, 5, 6 & 8 – SUBJECT TO EASEMENT HU10450
PARTS 1, 2, & 16 – COMPRISE ALL OF PIN 04538-0626
PARTS 1 & 2 AND 10 TO 16 (INCLUSIVE) COMPRISE ALL OF BLOCK 16

PLAN OF SURVEY OF
BLOCKS 15 AND 16
REGISTERED PLAN 4M-1511
CITY OF OTTAWA

SCALE 1 : 1000
0 10 20 50 100 metres

FAIRHALL, MOFFATT & WOODLAND LIMITED
ONTARIO LAND SURVEYORS

NOTES

1. BEARINGS ARE GRID DERIVED FROM HORIZONTAL CONTROL MONUMENT 01919791224 (E 343594.675, N 5020109.913) AND FROM OBSERVED REFERENCE POINT 9006 BY REAL TIME NETWORK OBSERVATIONS AND ARE REFERRED TO THE CENTRAL MERIDIAN 76°30'W LONGITUDE, MTM, ZONE 9 (NAD83 ORIGINAL)

2. DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999905.

COORDINATES WERE DERIVED FROM SPECIFIED CONTROL POINT SCP 01919791224 AND FROM REAL TIME NETWORK OBSERVATIONS (SMARTNET) ON OBSERVED REFERENCE POINT 9006.

COORDINATES HAVE BEEN DETERMINED TO AN URBAN ACCURACY IN ACCORDANCE WITH SECTION 14(2) OF O.REG 216/10.

POINT ID	NORTHING	EASTING
9006	5021175.42	342662.96
203	5020412.80	343323.01
23	5020352.99	343375.11
01919791224	5020109.91	343594.67

COORDINATES CANNOT IN THEMSELVES BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

LEGEND

- □ – SURVEY MONUMENT SET
- ■ – SURVEY MONUMENT FOUND
- CP – CONCRETE PIN
- SIB – STANDARD IRON BAR
- SSIB – SHORT STANDARD IRON BAR
- IB – IRON BAR
- (S) – SET
- (M) – MEASURED
- (P) – PLAN 4R-27606
- (P1) – PLAN 4R-27919
- (WIT) – WITNESS
- (JDB) – J. D. BARNES, O.L.S.
- (671) – F. H. GOOCH, O.L.S.
- (857) – FAIRHALL, MOFFATT & WOODLAND LIMITED, O.L.S.
- PIN – PROPERTY IDENTIFIER NUMBER
- ▲ – PROJECT CONTROL MONUMENT
- ORP – OBSERVED REFERENCE POINT
- SCP – SPECIFIED CONTROL POINT

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEY'S ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.

2. THE SURVEY WAS COMPLETED ON SEPTEMBER 23, 2020.

2020/10/19
DATE

JOHN H. GUTRI
ONTARIO LAND SURVEYOR

Fairhall Moffatt & Woodland LIMITED
ONTARIO LAND SURVEYORS
OTTAWA
Surveying and Land Information Services
100-600 TERRY FOX DRIVE, KANATA, ONTARIO K2L 4B6
TEL: (613) 591-2580 FAX: (613) 591-1485
www.fmw.on.ca

JOB No. P21600
E343063, N5020467
REFERENCE No. 2 – 4M-1511
S:\JOBS\P21600\Novatech Sept 28, 2018/rp_1511-a.dwg (dj) Oct. 1/20

R.V.C.A. RECEIVED
FEB - 5 2024

SEPTIC FILE #
24-039
OTTAWA

Rideau Valley Conservation Authority

Permit
Part 8 – Sewage System
Ontario Building Code

Do Not Complete
Permit No 24-039
Revision No
Date
Related Application

A copy of this permit must be posted on the property at all time during construction. OBC, Division C — Part 1, Section 1.3.2.1

This permit verifies that the on-site sewage system was reviewed and approved for construction under the *Ontario Building Code* and *O.Reg. 323/12* as amended by *O.Reg. 151/13.*

Inspected & Recommended by: JASON HUTTON
Owner: 2852569 Ontario Inc.
Inspection Date & Time: Civic:
Weather:
Address: 273 Russ Bradley Rd
Legal:
In the former Township/City of West Carleton - Huntley

Design Flow for Commercial / Institutional / Industrial (as per Table 8.2.1.3.B)

Q: 950 L/day

septic tank 3600 L
effluent filter YES
pump rate time dosed over 24 hrs L/15 MIN
treatment unit Eljen GSF A42
number of units 10

weigh bills for Eljen Sand	■ yes	❒ no
grain size analysis required	■ yes	❒ no
site to be scarified	■ yes	❒ no
clay seal inspection	❒ yes	■ no
mantle required	❒ yes	■ no
sub-grade inspection	■ yes	❒ no

ELEVATION ☐ In Ground ☐ Partially Raised ☒ Fully Raised

TYPE OF SYSTEM

❒ **Trench**
○ **Pipe and Stone** or ○ **Chambers**
type of chamber
loading area m^2
total trench length m
trench configuration

■ **Dispersal Bed**
◉ BMEC ○ Type A ○ Type B
stone - m^2
sand 47.5 m^2
pipe 2 rows of 10 Eljen
weight of sand - kg

❒ **Shallow Buried Trench**
pipe length m
orifice spacing m

❒ **Filter Media Bed**
stone m^2
extended base m^2
pipe
weight of filter media kg
loading area m^2

❒ **Class 5 Holding Tank**

❒ **Septic Tank Only**

Manager, Septic System Approvals: Terry Davidson
Permit Date: February 28, 2024
Comments: 1. Subgrade inspection required prior to placing sand

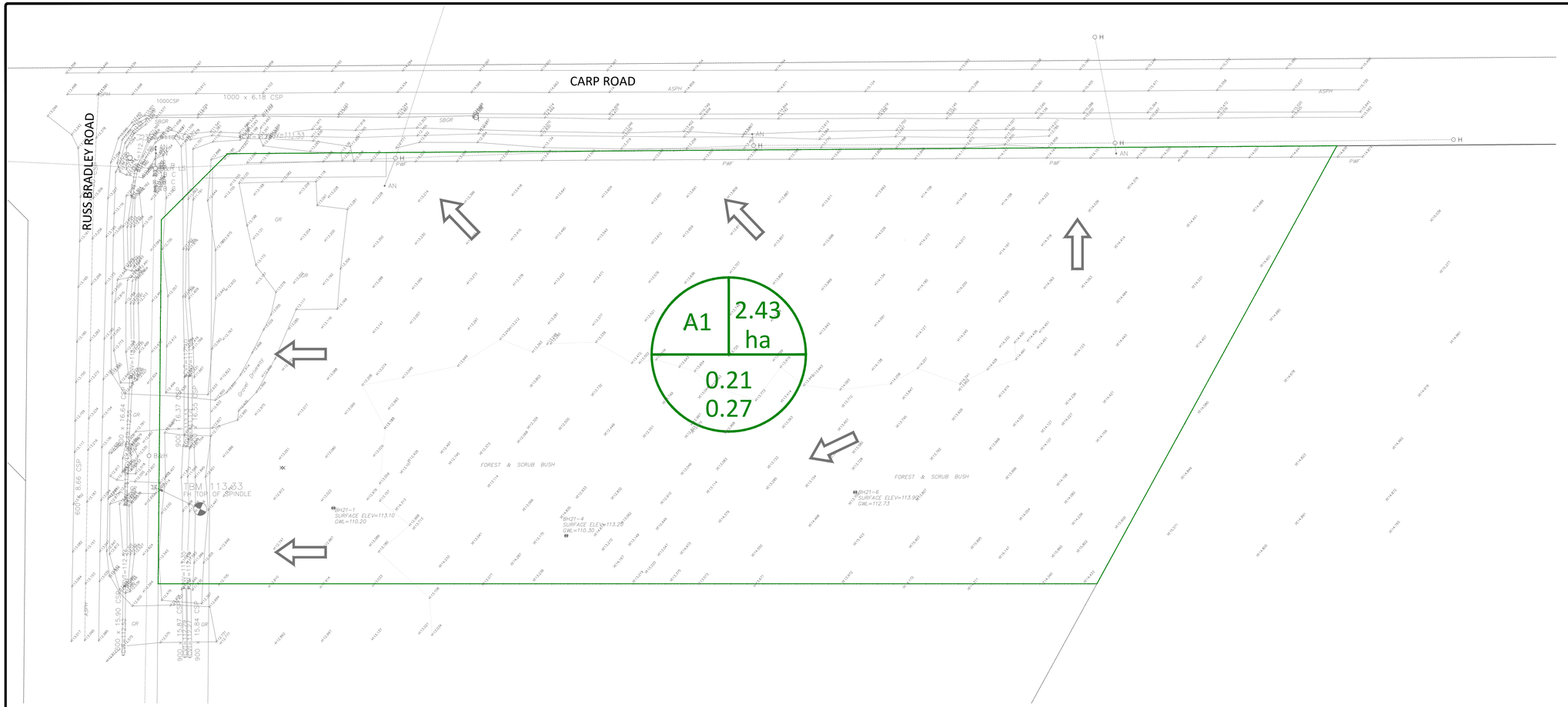
■ maintenance/pumping required ❒ ESA permit # required ❒ engineer to verify ❒ subgrade ❒ squirt height
❒ Class 5 Holding Tank approval only valid for three years from date of issue

Manager, Septic System Approvals:
Revision Date:
Comments:

NOTE: For further details, refer to corresponding application.

APPENDIX E
PRE-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY



LOCATION PLAN

LEGEND

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revisions	Date
2	ISSUED FOR REVIEW	OCT. 03, 2023
1	ISSUED FOR REVIEW	DEC. 23, 2022

Check and verify all dimensions before proceeding with the work — Do not scale drawings

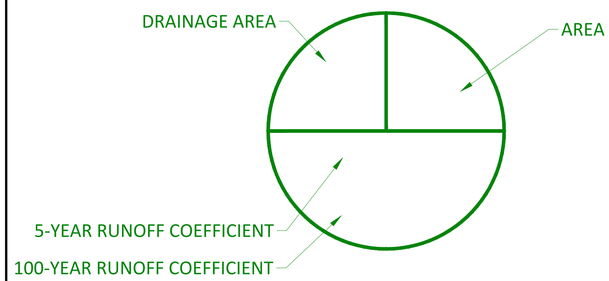
SCALE 1 : 500

0 10 20 30 40 50 Metres

GENERAL NOTES

1. THE ORIGINAL TOPOGRAPHY, GROUND ELEVATION AND SURVEY DATA SHOWN ARE SUPPLIED FOR INFORMATION PURPOSES ONLY, AND IMPLY NO GUARANTEE OF ACCURACY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.
2. THIS PLAN IS NOT A CADASTRAL SURVEY SHOWING LEGAL PROPERTY BOUNDARIES AND EASEMENTS. THE PROPERTY BOUNDARIES SHOWN HEREON HAVE BEEN DERIVED INFORMATION SUPPLIED BY (OR SHOWN ON) MCINTOSH PERRY SURVEYING INC. JOB # 22-2317 AND CANNOT BE RELIED UPON TO BE ACCURATE OR COMPLETE. THE PRECISE LOCATION OF THE CURRENT PROPERTY BOUNDARIES AND EASEMENTS CAN ONLY BE DETERMINED BY AN UP-TO-DATE LAND TITLES SEARCH AND A SUBSEQUENT CADASTRAL SURVEY PERFORMED AND CERTIFIED BY AN ONTARIO LAND SURVEYOR.
3. THE CONTRACTOR IS TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OR TOWNSHIP BEFORE COMMENCING CONSTRUCTION.
4. THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT.
5. THE CONTRACTOR IS TO DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME ALL RESPONSIBILITY FOR EXISTING UTILITIES WHETHER OR NOT SHOWN ON THESE DRAWINGS. IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
6. RESTORE ALL TRENCHES AND SURFACES OF PUBLIC ROAD ALLOWANCES TO CONDITION EQUAL OR BETTER THAN ORIGINAL CONDITION AND TO THE SATISFACTION OF THE CITY OR TOWNSHIP AUTHORITIES.
7. EXCAVATE AND DISPOSE OF ALL DELETERIOUS MATERIAL, SUCH AS ASPHALT, CURBING, EXISTING STOCKPILES, GRANULAR MATERIALS AND DEBRIS OFF SITE.
8. TOPSOIL TO BE STRIPPED AND REMOVED OFF SITE. CLEAN FILL TO BE PLACED IN FILL AREAS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
9. ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD, INCLUDING THE SUPPLY, INSTALLATION, AND REMOVAL OF ALL NECESSARY SIGNAGE, DELINEATORS, MARKERS AND BARRIERS.
11. DO NOT ALTER GRADING OF THE SITE WITHOUT PRIOR APPROVAL OF THE CITY OR TOWNSHIP.
12. ALL ROADWAY, PARKING LOT, AND GRADING WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH CITY OR TOWNSHIP STANDARDS AND SPECIFICATIONS. THE CONTRACTOR IS TO PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING.
13. CONTACT THE CITY OR TOWNSHIP FOR INSPECTION OF ROUGH GRADING OF PARKING LOTS, ROADWAYS AND LANDSCAPED AREAS PRIOR TO PLACEMENT OF ASPHALT AND TOPSOIL. ALL DEFICIENCIES NOTED SHALL BE RECTIFIED TO THE CITY OR TOWNSHIP SATISFACTION PRIOR TO PLACEMENT OF ANY ASPHALT, TOPSOIL, SEED & MULCH AND/OR SOD.
14. ALL DIMENSIONS AND INVERTS MUST BE VERIFIED PRIOR TO CONSTRUCTION, IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
15. ELECTRICAL, GAS, TELEPHONE AND TELEVISION SERVICE LOCATIONS ARE SUBJECT TO THE INDIVIDUAL AGENCY:
    - ELECTRICAL SERVICE - HYDRO OTTAWA,
    - GAS SERVICE - ENBRIDGE,
    - TELEPHONE SERVICE - BELL CANADA,
    - TELEVISION SERVICE - ROGERS.
17. INSTALLATION TO BE IN ACCORDANCE WITH CURRENT CODES AND STANDARDS OF APPROVAL AGENCIES HYDRO OTTAWA, BELL AND THE CITY OR TOWNSHIP.
18. ALL PROPOSED CURB SHALL BE CONCRETE BARRIER CURB UNLESS SPECIFIED.
19. ALL EXISTING REDUNDANT PRIVATE APPROACHES FRONTING THIS DEVELOPMENT MUST BE REMOVED TO THE SATISFACTION OF THE CITY OR TOWNSHIP.

LEGEND:



McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A 1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

Stamp:

Client:
TREVOR WATKINS
273 & 275 RUSS BRADLEY ROAD
CARP, ON K0A 1L0

Project:
WAREHOUSE/STORAGE FACILITY
273 & 275 RUSS BRADLEY ROAD
CARP ON

Drawing Title:
PRE-DEVELOPMENT DRAINAGE AREA PLAN

Scale: 1:500	Project Number: CCO-22-1643-01
Drawn By: NV	
Checked By: BC	Drawing Number: PRE
Designed By: NV	

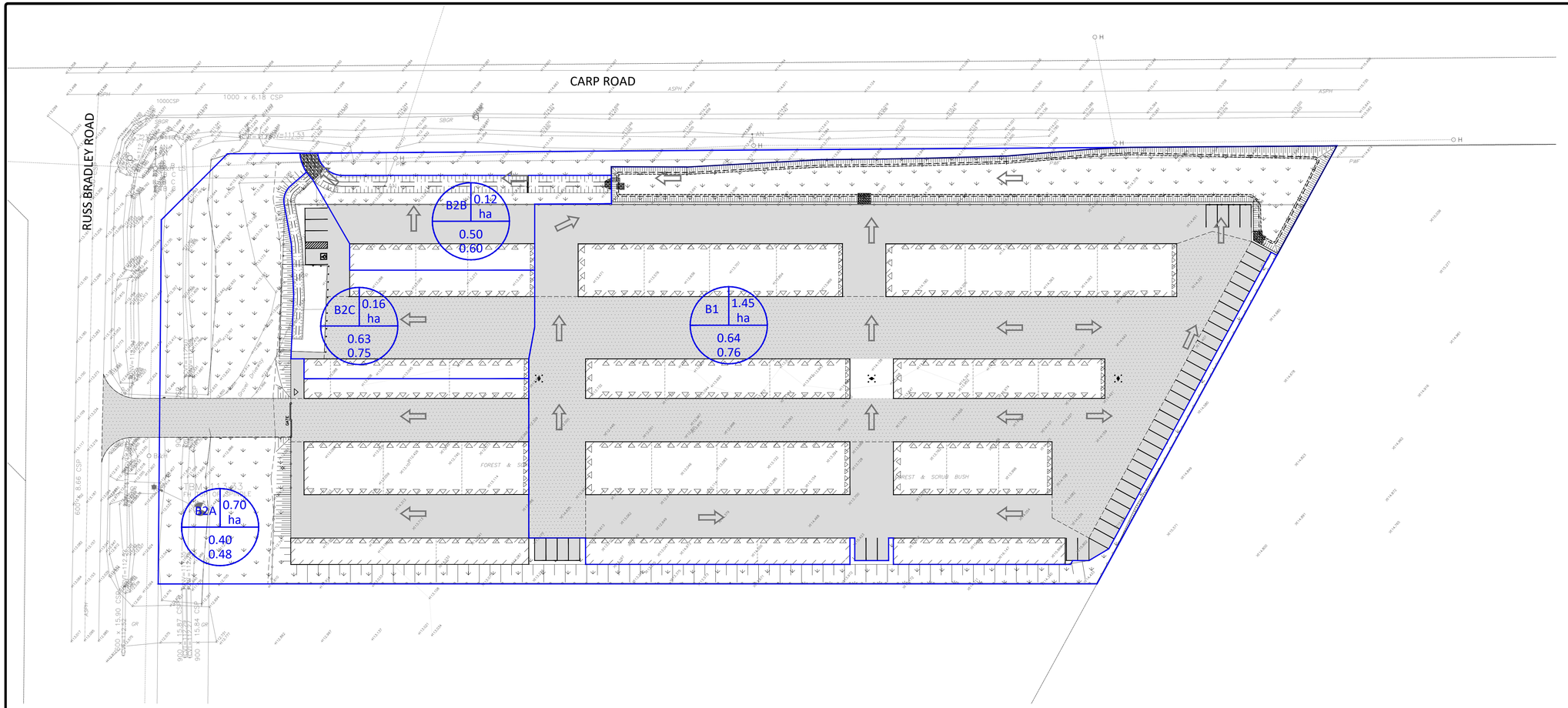
D07-12-22-0187

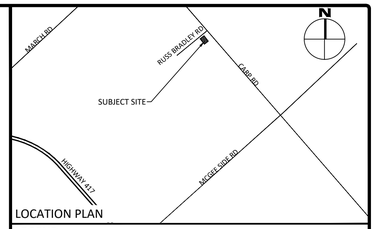
#XXXXX

FILENAME: I:\Ottawa\01 Project - Proposals\2022 Jobs\CCO\CCO-22-1643-01 Trevor Watkins SPC 1900 Thomas Argue\12 - Drawings\CCO-22-1643-01_PRESENTATION.dwg
LAST SAVED: Tuesday, October 03, 2023 LAST SAVED BY: I.Valenti
LAST PLOTTED: Tuesday, October 03, 2023 3:18 PM EDT

APPENDIX F
POST-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY





LOCATION PLAN

LEGEND

GENERAL NOTES

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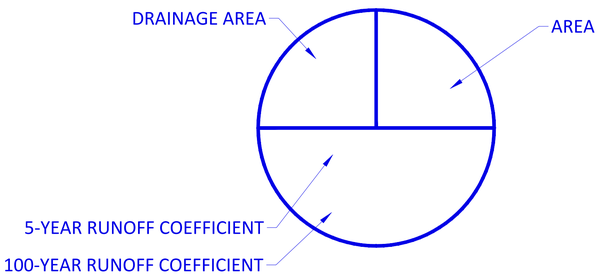
5. THE CONTRACTOR IS TO DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME ALL RESPONSIBILITY FOR EXISTING UTILITIES WHETHER OR NOT SHOWN ON THESE DRAWINGS. IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
6. RESTORE ALL TRENCHES AND SURFACES OF PUBLIC ROAD ALLOWANCES TO CONDITION EQUAL OR BETTER THAN ORIGINAL CONDITION AND TO THE SATISFACTION OF THE CITY.
7. EXCAVATE AND DISPOSE OF ALL DELETERIOUS MATERIAL, SUCH AS ASPHALT, CURBING, EXISTING STOCKPILES, GRANULAR MATERIALS AND DEBRIS OFF SITE.
8. TOPSOIL TO BE STRIPPED AND REMOVED OFF SITE. CLEAN FILL TO BE PLACED IN FILL AREAS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
9. ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD, INCLUDING THE SUPPLY, INSTALLATION, AND REMOVAL OF ALL NECESSARY SIGNAGE, DELINEATORS, MARKERS AND BARRIERS.
11. DO NOT ALTER GRADING OF THE SITE WITHOUT PRIOR APPROVAL OF THE CITY.
12. ALL ROADWAY, PARKING LOT, AND GRADING WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH CITY STANDARDS AND SPECIFICATIONS. THE CONTRACTOR IS TO PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING.
13. CONTACT THE CITY FOR INSPECTION OF ROUGH GRADING OF PARKING LOTS, ROADWAYS AND LANDSCAPED AREAS PRIOR TO PLACEMENT OF ASPHALT AND TOPSOIL. ALL DEFICIENCIES NOTED SHALL BE RECTIFIED TO THE CITY SATISFACTION PRIOR TO PLACEMENT OF ANY ASPHALT, TOPSOIL, SEED & MULCH AND/OR SOD.
14. ALL DIMENSIONS AND INVERTS MUST BE VERIFIED PRIOR TO CONSTRUCTION, IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
15. ELECTRICAL, GAS, TELEPHONE AND TELEVISION SERVICE LOCATIONS ARE SUBJECT TO THE INDIVIDUAL AGENCY:
    - ELECTRICAL SERVICE - HYDRO OTTAWA,
    - GAS SERVICE - ENBRIDGE,
    - TELEPHONE SERVICE - BELL CANADA,
    - TELEVISION SERVICE - ROGERS.
17. INSTALLATION TO BE IN ACCORDANCE WITH CURRENT CODES AND STANDARDS OF APPROVAL AGENCIES HYDRO OTTAWA, BELL AND THE CITY.
18. ALL PROPOSED CURB SHALL BE CONCRETE BARRIER CURB UNLESS SPECIFIED.
19. ALL EXISTING REDUNDANT PRIVATE APPROACHES FRONTING THIS DEVELOPMENT MUST BE REMOVED TO THE SATISFACTION OF THE CITY.
20. SNOW TO BE REMOVED FROM SITE AS ON-SITE SNOW STORAGE IS NOT PERMITTED.

LEGEND:



FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revisions	Date
3	ISSUED FOR REVIEW	MAY 03, 2024
2	ISSUED FOR REVIEW	OCT. 03, 2023
1	ISSUED FOR REVIEW	DEC. 23, 2022

Check and verify all dimensions before proceeding with the work — Do not scale drawings

SCALE 1 : 500
0 10 20 30 40 50 Metres

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A 1L0
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Stamp:

Client:
TREVOR WATKINS
273 & 275 RUSS BRADLEY ROAD
CARP, ON K0A 1L0

Project:
WAREHOUSE/STORAGE FACILITY
273 & 275 RUSS BRADLEY ROAD
CARP ON

Drawing Title:
POST-DEVELOPMENT DRAINAGE AREA PLAN

Scale: 1:500	Project Number: CCO-22-1643-01
Drawn By: FV	
Checked By: JH	Drawing Number: POST
Designed By: NV	

D07-12-22-0187
#XXXXX

FILENAME: I:\Ottawa\01 Project - Proposals\2022 Jobs\CCO\CCO-22-1643-01 Trevor Watkins SPC 1900 Thomas Argue\12 - Drawings\CCO-22-1643-01_PRESENTATION.dwg
LAST SAVED: Thursday, May 02, 2024 LAST SAVED BY: F.Valenti
LAST PLOTTED: Friday, May 03, 2024 CTB FILE USED: —

APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

CCO-22-1643-01 - 273&275 Russ Bradley - Runoff Calculations

Pre-Development Runoff Coefficient

Drainage Area	Area (ha)	Impervious Area (m^2)	C	Gravel Area (m^2)	C	Pervious Area (m^2)	C	C_{AVG} 5-Year	C_{AVG} 100-Year
A1	2.425	0.00	0.90	805.20	0.60	23,441.53	0.20	0.21	0.27

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	I (mm/hr)		Q (L/s)	
					5-Year	100-Year	5-Year	100-Year
A1	2.425	0.21	0.27	15	82.8	141.6	119.04	254.44
Total	2.425						119.04	254.44

Post-Development Runoff Coefficient

Drainage Area	Area (ha)	Impervious Area (m^2)	C	Gravel Area (m^2)	C	Pervious Area (m^2)	C	C_{AVG} 5-Year	C_{AVG} 100-Year	
B1	1.453	4,365.86	0.90	8,240.50	0.60	1,923.65	0.20	0.64	0.76	Restricted
B2A	0.697	1,230.92	0.90	1,406.65	0.60	4,327.53	0.20	0.40	0.48	Unrestricted
B2B	0.115	260.13	0.90	414.41	0.60	471.52	0.20	0.50	0.60	Unrestricted - NE Swale
B2C	0.161	497.04	0.90	855.00	0.60	253.47	0.20	0.63	0.75	Unrestricted - NW Swale

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	I (mm/hr)		Q (L/s)		
					5-Year	100-Year	5-Year	100-Year	
B1	1.453	0.64	0.76	10	104.2	178.6	268.17	547.38	Restricted
B2A	0.697	0.40	0.48	15	82.8	141.6	64.85	132.56	Unrestricted
B2B	0.115	0.50	0.60	15	82.8	141.6	13.28	27.11	Unrestricted - NE Swale
B2C	0.161	0.63	0.75	15	82.8	141.6	23.27	47.30	Unrestricted - NW Swale
Total	2.425						369.58	754.35	

Required Restricted Flow

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	I (mm/hr)			Q		
					2-Year	5-Year	100-Year	2-Year	5-Year	100-Year
A1	2.425	0.21	0.27	15	61.2	82.8	141.6	88.00	119.04	254.44
Total	2.425							88.00	119.04	254.44

Post-Development Restricted Runoff Calculations

Drainage Area	Unrestricted Flow (L/s)		Restricted Flow (L/s)		Storage Required (m^3)		Storage Provided (m^3)		
	5-Year	100-Year	5-Year	100-Year	5-Year	100-Year	5-Year	100-Year	
B1	268.17	547.38	11.97	47.46	274.69	446.55	290.78	459.40	Restricted
B2A	64.85	132.56	64.85	132.56					Unrestricted
B2B	13.28	27.11	13.28	27.11					Unrestricted - NE Swale
B2B	23.27	47.30	23.27	47.30					Unrestricted - NW Swale
Total	369.58	754.35	113.38	254.43	274.69	446.55	290.78	459.40	

Storage Requirements for Area B1

5-Year Storm Event

Tc (min)	I (mm/hr)	B1 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
50	37.7	96.91	11.97	84.94	254.82
60	32.9	84.79	11.97	72.82	262.14
70	29.4	75.60	11.97	63.62	267.22
80	26.6	68.37	11.97	56.39	270.68
90	24.3	62.51	11.97	50.54	272.91
100	22.4	57.67	11.97	45.70	274.19
110	20.8	53.59	11.97	41.62	274.69
120	19.5	50.11	11.97	38.13	274.55
130	18.3	47.09	11.97	35.11	273.88
140	17.3	44.45	11.97	32.47	272.76

Maximum Storage Required 5-Year (m^3) =	274.69

100-Year Storm Event

Tc (min)	I (mm/hr)	B1 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
30	91.9	281.63	47.46	234.16	421.50
35	82.6	253.15	47.46	205.69	431.94
40	75.1	230.36	47.46	182.90	438.96
45	69.1	211.68	47.46	164.22	443.38
50	64.0	196.05	47.46	148.59	445.78
55	59.6	182.78	47.46	135.32	446.55
60	55.9	171.35	47.46	123.89	445.99
65	52.6	161.39	47.46	113.93	444.32

Maximum Storage Required 100-Year (m^3) =	446.55

Storage Occupied In Area B1

5-Year Storm Event

Water Elev. (m) =			114.14		
Structure	INV. (out)	Depth (m)	Head (m)	Volume (m^3)	
SWM Area	114.00	0.24	0.07	290.78	*
				Total	

Storage Available (m^3) =	290.78
Storage Required (m^3) =	274.69

100-Year Storm Event

Water Elev. (m) =			114.26		
Structure	INV. (out)	Depth (m)	Head (m)	Volume (m^3)	
SWM Area	114.00	0.36	0.19	459.40	*
				Total	

Storage Available (m^3) =	459.40
Storage Required (m^3) =	446.55

* Storage Calculated in AutoCAD

For Orifice Flow, C= 0.60
For Weir Flow, C= 1.84

	Orifice 1	Orifice 2	Weir 1	
invert elevation	114.00		114.19	
center of crest elevation	114.08			
orifice width / weir length	150 mm		0.80 m	
orifice height				
orifice area (m^2)	0.018	0.000		

Elevation Discharge Table - Storm Routing

Elevation	Orifice 1		Orifice 2		Weir 1		Weir 2		Total
	H [m]	Q [m^3]	H [m]	Q [m^3]	H [m]	Q [m^3]	H [m]	Q [m^3]	Q [l/s]
114.06	x	x			x	x			0.00
114.07	x	x			x	x			0.00
114.08	0.01	0.003			x	x			3.32
114.09	0.02	0.006			x	x			5.75
114.10	0.03	0.007			x	x			7.43
114.11	0.04	0.009			x	x			8.79
114.12	0.05	0.010			x	x			9.96
114.13	0.06	0.011			x	x			11.01
114.14	0.07	0.012			x	x			11.97
114.15	0.08	0.013			x	x			12.86
114.16	0.09	0.014			x	x			13.69
114.17	0.10	0.014			x	x			14.48
114.18	0.11	0.015			x	x			15.22
114.19	0.12	0.016			x	x			15.93
114.20	0.13	0.017			0.01	0.00			18.08
114.21	0.14	0.017			0.02	0.00			21.42
114.22	0.15	0.018			0.03	0.01			25.53
114.23	0.16	0.018			0.04	0.01			30.27
114.24	0.17	0.019			0.05	0.02			35.53
114.25	0.18	0.020			0.06	0.02			41.28
114.26	0.19	0.020			0.07	0.03			47.46
114.27	0.20	0.021			0.08	0.03			54.05
114.28	0.21	0.021			0.09	0.04			61.01
114.29	0.22	0.022			0.10	0.05			68.33
114.30	0.23	0.022			0.11	0.05			75.98
114.31	0.24	0.023			0.12	0.06			83.96
114.32	0.25	0.023			0.13	0.07			92.24
114.33	0.26	0.024			0.14	0.08			100.82
114.34	0.27	0.024			0.15	0.09			109.69
114.35	0.28	0.025			0.16	0.09			118.84
114.36	0.29	0.025			0.17	0.10			128.25
114.37	0.30	0.026			0.18	0.11			137.92
114.38	0.31	0.026			0.19	0.12			147.85
114.39	0.32	0.026			0.20	0.13			158.02

Notes: 1. For Orifice Flow, User is to Input an Elevation Higher than Crown of Orifice.
2. Orifice Equation: $Q = cA(2gh)^{1/2}$
3. Weir flow calculated in Bentley's FlowMaster - Trapezoidal Channel at 0.8%, 3:1 side slopes, roughness coeff. Of 0.035
4. These Computations Do Not Account for Submergence Effects Within the Pond Riser.
5. H for orifice equations is depth of water above the centroide of the orifice.
6. H for weir equations is depth of water above the weir crest.

SOAKAWAY PIT INFILTRATION CALCULATION

Volume Required to be Infiltrated			
Required Infiltration Rate:	262	mm/yr	High Recharge Area per Carp River Watershed / Subwatershed Study)
Site Area:	2.42	ha	
Required Infiltration Volume:	6353	m^3/yr	(Required Infiltration X Site Area)
Post-Dev Pervious Area:	0.70	ha	
Infiltration in Pervious Area:	1,828	m^3/yr	
Infiltration needed in Basin:	4,525	m^3/yr	

Annual Rainfall Data (Up to 25mm Storm Event)			
Number of events/yr 5mm<x<25mm:	51		
Average Days Between Events:	7.1		
Average Depth 5mm<x<25mm:	11.88	mm	
Site Area being collected	14530.01	m^2	
Cummulative Rainfall Depth 5mm<x<25mm:	605.88	mm/yr	(Number of Events X Average Depth)
Maximum Volume of Runoff per year to Infiltrate:	8803.44	m^3/yr	(Area X Cummulative Rainfall Depth)

Required Storage Volume (6mm)			
Required Storage Volume:	101.71	m^3	(Area x 7mm)
Total Volume Infiltrated :	5187.21	m^3/yr	7mm Event Volume X Number of Events Per Year)

Ponding Area Sizing			
Depth of Pond Area:	0.10	m	
Area:	1195.29	m^2	* calculated from AutoCAD
Volume:	113.21	m^3	* calculated from AutoCAD

Infiltration Rate Through Soil			
Percolation Rate:	21.2	mm/hr	(Lowest measured rate from percolation testing)
Percolation Rate:	2.5	mm/hr	(Factor of safety of 8.5 applied)
Infiltration Rate:	0.83	L/s	(Percolation Rate X Area of Ponding)

Retention Time (6 mm)			
Volume of Water during the 6mm event:	101.71	m^3	
Depth of Ponding Area:	0.10	m	
Time:	34.1	hr	(Volume / Infiltration Rate)
	1.42	days	

Time of Concentration Pre-Development

Drainage Area ID	Sheet Flow Distance (m)	Slope of Land (%)	Tc (min) (5-Year)	Tc (min) (100-Year)
A1	47	2.20	15	14

Tc= (3.26(1.1-c)L^0.5/S^0.33)

c= Balanced Runoff Coefficient

L= Length of Drainage Area

S= Average Slope of Watershed

Time of Concentration Post-Development - B2

Drainage Area ID	Sheet Flow Distance (m)	Slope of Land (%)	Tc (min) (5-Year)	Tc (min) (100-Year)
B2	81	2.04	15	13

Tc= (3.26(1.1-c)L^0.5/S^0.33)

c= Balanced Runoff Coefficient

L= Length of Drainage Area

S= Average Slope of Watershed

CCO-22-1643 - 273 & 275 Russ Bradley - Swale Calculations

Swale Capacity Calculations

Runoff Calculations

Swale	Tc (min)	I (mm/hr)	I (mm/hr)	Area Tributary To Swale (ha)	Average C (5-year)	Average C (100-year)	Runoff (m^3/s) (5-Year)	Runoff (m^3/s) (100-Year)	Notes
Northeast	10	104.2	178.6	1.57	0.63	0.75	0.025*	0.075*	*Controlled
Northwest	15	82.8	141.6	0.16	0.63	0.75	0.023	0.047	-

Manning's Equation For Channels:

$$Q = \frac{k}{n} A \left(\frac{A}{Pw}\right)^{2/3} S^{1/2}$$

Where

Q= Volumetric Flow Rate [m^3/s]
k= Dimensionless Unit Conversion Factor [1 for Metric Units]
n= Manning Roughness Coefficient (Per Chow, 1959)
A= Cross sectional Flow Area [m^2] (Smallest cross sectional area assumed)
Pw= Wetted Perimeter [m] (smallest wetted permiter assumed)
S= Stream Slope [dimensionless](smallest slope assuemd)

Capacity Calculations

Swale	Channel Material	Manning's n Value	Max Cross-Sectional Area (m^2)	Max Wetted Perimeter (m)	Slope (m/m)	Maximum Capacity (m^3/s)	Occupied Capacity (5-Year)	Occupied Capacity (100-Year)
Northeast	Grass	0.025	1.25	4.16	0.005	1.59	1.6%	4.7%
Northwest	Grass	0.025	0.45	2.59	0.005	0.39	5.9%	12.0%

Velocity Calculations

Swale	Cross-Sectional Area at Flow Depth (m^2)		Runoff (m^3/s)		Flow Velocity (m/s)	
	(5-Year)	(100-Year)	(5-Year)	(100-Year)	(5-Year)	(100-Year)
Northeast	0.06	0.13	0.025*	0.075*	0.404	0.591
Northwest	0.05	0.09	0.023	0.047	0.427	0.535

APPENDIX H
CARP ROAD DITCH REVIEW

McINTOSH PERRY

PICTURE 1: Carp Road Ditch @ Russ Bradley Road - Facing South

PICTURE 2: Farm Access Culvert with Rock End Protection

PICTURE 3: Example of Minor Debris Buildup - Facing Northwest

PICTURE 4: Shoulder Embankment Washout - Facing Southeast

PICTURE 5: Large Box Culvert Crossing Carp Road 1.2km From Site - Facing North

PICTURE 6: Box Culvert Interior in Good Condition - Facing Northeast