

McINTOSH PERRY

STORMWATER MANAGEMENT & SERVICING REPORT 106 REIS ROAD, CARP, ON

City File No.: D07-12-22-0118

Project No.: CCO-23-3606

Prepared for:

Grace Monuments Inc.
106 Reis Road
Carp, Ontario, K0A 1L0

Prepared by:

McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road
Carp, ON K0A 1L0

Submitted: October 13, 2023

Revised: February 9, 2024

TABLE OF CONTENTS

1.0 PROJECT DESCRIPTION 3

1.1 Purpose 3

1.2 Site Description..... 3

1.3 Proposed Development and Statistics 4

1.4 Existing Conditions and Infrastructure..... 4

1.5 Approvals 4

2.0 BACKGROUND STUDIES, STANDARDS, AND REFERENCES..... 5

2.1 Background Reports / Reference Information..... 5

2.2 Applicable Guidelines and Standards..... 5

3.0 PRE-CONSULTATION SUMMARY 7

4.0 WATER SERVICING..... 8

4.1 Existing Water Services 8

4.2 Water Quantity..... 8

4.3 Water Quality..... 9

4.3.1 Bacteriological Results 9

4.3.2 Chemical Results 9

5.0 SANITARY SERVICING 11

5.1 Existing Sanitary Servicing 11

5.2 Analysis 11

5.3 Results..... 11

6.0 STORM SERVICING DESIGN 12

6.1 Existing Storm Servicing 12

6.2 Proposed Storm System 12

6.2.1 Well Separation 12

7.0 PROPOSED STORMWATER MANAGEMENT 13

7.1 Design Criteria and Methodology..... 13

7.2 Runoff Calculations..... 14

7.3 Allowable Release Rate..... 14

7.4	Existing Drainage Conditions (Before Property Acquisition)	15
7.5	Proposed Drainage Conditions (After Property Acquisition)	15
7.6	Quantity Control	17
7.7	Quality Control	17
7.7.1	Best Management Practices	17
7.7.2	Low Impact Development	18
7.7.3	Infiltration.....	18
7.7.4	Total Suspended Solids Removal	19
8.0	EROSION AND SEDIMENT CONTROL.....	20
8.1	Temporary Measures.....	20
8.2	Permanent Measures.....	20
9.0	SUMMARY	21
10.0	RECOMMENDATION.....	22
11.0	STATEMENT OF LIMITATIONS.....	23

LIST OF TABLES

Table 1: Water Supply Design Criteria	8
Table 2: Sewage Flow Design Criteria	11
Table 3: Approved Runoff Release Rate.....	14
Table 4: Existing Runoff Coefficient Summary	15
Table 5: Existing Uncontrolled Peak Flow Summary.....	15
Table 6: Post-Acquisition Runoff Coefficient Summary	16
Table 7: Post-Acquisition Uncontrolled Peak Flow Summary	16
Table 8: Runoff Summary.....	17

APPENDICES

Appendix A: Site Location Plan

Appendix B: Background Information

Appendix C: Drainage Area Plans and Stormwater Management Calculations

1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry (MP) has been retained by Grace Monuments Inc. (the Owner) to prepare a Stormwater Management and Servicing Report in support of the Site Plan Control amendment for the proposed property modification of 106 Reis Road, located in Carp (Ottawa). The main purpose of this report is to present the servicing and stormwater management justification and quality control additions for the proposed property expansion in accordance with the recommendations and guidelines provided by the City of Ottawa (City), the Rideau Valley Conservation Authority (RVCA), the Ministry of the Environment Conservation and Parks (MECP), and the Reis Industrial Park Site Plan Agreement and Engineering Report. This report should be read in conjunction with the following drawings:

- CCO-23-3606, C100 – Site Plan
- CCO-23-3606, C101 – Site Grading Plan
- CCO-23-3606, C102 – Erosion & Sediment Control Plan
- CCO-23-3606, SWM1 – Pre-Acquisition (Existing) Drainage Area Plan (**Appendix C**)
- CCO-23-3606, SWM2 – Post-Acquisition (Proposed) Drainage Area Plan (**Appendix C**)

1.2 Site Description

The property is located at 106 Reis Road and is described as Part of Block 1, Registered Plan 4m-745, City of Ottawa, and is part of the Reis Road Industrial Park. The existing site covers approximately 0.98ha and is bound by Regional Road No. 5 (known as Carp Road) to the southwest, Reis Road to the southeast, a developed light industrial property to the northeast, and undeveloped agricultural lands to the northwest. Additionally, there is an existing drainage easement located along the northwest property limit for an existing drainage course. See Site Location Plan in **Appendix A** for more details.



Figure 1: Site Location

1.3 Proposed Development and Statistics

The Owner has proposed to acquire approximately 30.5m by the full depth of the adjacent property directly to the northeast of the subject site which has a total area of approximately 0.28ha. The property acquisition would expand the existing parcel from 0.98ha to 1.27ha. The Owner is not proposing any building additions, or other site modifications at this time other than the property acquisition. The existing property has one two (2) storey commercial building with an area of paved parking, compacted gravel outdoor storage areas, and other areas mixed with maintained and unmaintained vegetation which are to remain. Refer to the Site Plan for more details.

1.4 Existing Conditions and Infrastructure

The existing property has one two (2) storey building which is serviced via a drilled well and septic system. Stormwater for the site and the rest of the subdivision is managed via overland sheet flow to adjacent open drainage ditching within the right of way (ROW). Stormwater is ultimately conveyed to the Carp River via various ditching and creeks.

Topography of both the existing property and property to be acquired is relatively low sloping and generally drains towards either the roadside ditches on Carp Road and Reis Road, or directly to the adjacent drainage ditch to the rear of the properties within a drainage easement.

The property to be acquired is generally comprised of compacted gravel and vegetation that is currently undeveloped with no buildings or structures.

1.5 Approvals

The proposed development is subject to the City of Ottawa's site plan control process. Site plan control requires the City to review, provide concurrence and approve the engineering design package. Permits to construct can be requested once the City has issued a site plan agreement.

An Environmental Compliance Approval (ECA) through the Ministry of Environment, Conservation and Parks (MECP) is not anticipated to be required as although the property is zoned industrial, the primary use of the land is not considered industrial in nature. Further confirmation from the MECP will be required to determine if the proposed works substantiates a need for an ECA.

2.0 BACKGROUND STUDIES, STANDARDS, AND REFERENCES

2.1 Background Reports / Reference Information

Background studies that have been reviewed for the proposed site include the Reis Road Industrial Park Subdivision Agreement and Engineering Report, a Hydrogeological Investigation completed by Gemtec Consulting Engineers and Geoscientists, and a topographic plan of survey. The topography was used to review the existing conditions of the property and determine the current drainage patterns and prepare servicing and stormwater management schemes for the site based on the current available information.

The following reports and documents were reviewed and are available under separate cover:

- Hydrogeological Investigation & Terrain Analysis, Proposed Lot Line Adjustment, 106 & 122 Reis Road, completed by Gemtec Consulting Engineers, dated January 30, 2024
- Environmental Impact Statement, Proposed Lot Line Adjustment, 106 & 122 Reis Road, completed by Gemtec Consulting Engineers, dated October 5, 2023
- Topographic Plan of Survey completed by Annis, O’Sullivan, Vollebakk Ltd., dated May 30, 2023
- Reis Industrial Park Site Plan Agreement and Engineering Report, dated December 5, 1989
- Reis Business Park Stormwater Management Memorandum, Ref: Reis Road, Tansley Road & Maple Creek Court (D07-17-4M75), prepared by the City of Ottawa, edited September 6, 2016

2.2 Applicable Guidelines and Standards

City of Ottawa:

- Ottawa Sewer Design Guidelines, City of Ottawa, SDG002, October 2012. (Ottawa Sewer Guidelines)
 - Technical Bulletin ISTB-2014-01 City of Ottawa, February 2014. (ISTB-2014-01)
 - Technical Bulletin PIEDTB-2016-01 City of Ottawa, September 2016. (PIEDTB-2016-01)
 - Technical Bulletin ISTB-2018-01 City of Ottawa, January 2018. (ISTB-2018-01)
 - Technical Bulletin ISTB-2018-03 City of Ottawa, March 2018. (ISTB-2018-03)
 - Technical Bulletin ISTB-2019-01 City of Ottawa, January 2019. (ISTB-2019-01)
 - Technical Bulletin ISTB-2019-02 City of Ottawa, February 2019. (ISTB-2019-02)
- Ottawa Design Guidelines – Water Distribution City of Ottawa, July 2010. (Ottawa Water Guidelines)
 - Technical Bulletin ISD-2010-2 City of Ottawa, December 15, 2010. (ISD-2010-2)
 - Technical Bulletin ISDTB-2014-02 City of Ottawa, May 2014. (ISDTB-2014-02)
 - Technical Bulletin ISTB-2018-02 City of Ottawa, March 2018. (ISTB-2018-02)

- City of Ottawa – Hydrogeological and Terrain Analysis Guidelines, March 2021.

Ministry of Environment, Conservation and Parks (MECP):

- Stormwater Planning and Design Manual, Ministry of the Environment, March 2003.
(MECP Stormwater Design Manual)
- Design Guidelines for Sewage Works, Ministry of the Environment, 2008.
(MECP Sewer Design Guidelines)

3.0 PRE-CONSULTATION SUMMARY

A pre-consultation meeting was conducted on February 22, 2023, regarding the proposed site. Meeting notes are included in **Appendix B**.

Based on the understanding of the stormwater management requirements at the time of the pre-consultation, specific requirements to be incorporated within this submission should include the following:

- The pre-development condition should reflect the site as it existed prior to the current Site Plan Agreement (i.e. undeveloped).
- The post-development conditions should reflect the existing conditions of the site, or proposed conditions if modifications from the existing are required.
- The controlled surface runoff flow from the site is to be restricted to the levels defined in the current Site Plan Agreement.

4.0 WATER SERVICING

4.1 Existing Water Services

Currently the site is serviced via a drilled well for domestic drinking water as there are no municipal water services available within the ROW on Reis Road.

As noted in the Hydrogeological Investigation completed by Gemtec Consulting Engineers (Gemtec), groundwater is currently supplied by an aquifer that can be characterized as limestone bedrock. Currently 106 Reis Road has one on-site well that was reported to be completed in limestone on the corresponding water well records, referred to as PW-106. Information for the other two existing on-site wells on the adjacent property (122 Reis Road) were also evaluated and will be discussed herein for quality results.

4.2 Water Quantity

For the purposes of this report, the anticipated water demands have been assumed to be directly related to twice the anticipated sewage flow demands for the development. Based on Appendix 4-A (Daily Sewage Flow for Various Establishments) of the City of Ottawa's Sewer Design Guidelines and Table 8.2.1.3.B of the Ontario Building Code (OBC), the anticipated average sewage flow for various buildings and places of employment with office workers is 75 L/person/day. It is understood that 12 employees are expected to use the facility on any given day, and so, the resulting average daily water volume demand was calculated to be 1,800 L for the facility.

As noted in Gemtec's report, it is understood that PW-106 is currently servicing the development at 106 Reis Road, and based on consultation with the Owner and employees, the water quantity has been sufficient to service the property. Based on the water quantity results presented in the Gemtec Hydrogeology Investigation report, the existing well on site (PW-106) is capable of providing sufficient water quantity for typical commercial developments in the area. The water demand results are summarized in **Table 1**, below.

Table 1: Water Supply Design Criteria

Parameter	Total
Facility Population (No. of Employees per Day)	12 persons
Anticipated Demand Rate (Per App. 4-A and Table 8.2.1.3.B)	(X2) 75 L/person/day
Total Daily Volume Demand	1,800 L per day

4.3 Water Quality

The water quality of the existing well at 106 Reis Road was reviewed by Gemtec through consultation with the Owner and employees of the existing establishment. The Owner reported that the water quality of the well servicing the development is good but there is a sulfur smell in the water pre-treatment, but that the drinking water does not have a sulfur smell post-treatment.

Further testing was completed by Gemtec on a separate well (PW-122) on the adjacent property, 122 Reis Road. The well was tested for bacteriological and chemical impacts which are described below.

4.3.1 Bacteriological Results

Gemtec reported that total and free chlorine were measured at the time of sampling, and confirmed that the total chlorine concentrations in the groundwater were non-detectable. Based on the bacteriological testing, Gemtec has indicated that the water is suitable for consumption.

4.3.2 Chemical Results

The chemical testing results have been provided by Gemtec and are summarized below:

Hardness concentration was reported to be 487 mg/L and 432 mg/L as CaCO₃ which exceeds 200 mg/L and is considered poor but tolerable. It is recommended to utilize a water softener to treat the hardness of the water.

Sulfide levels were reported to be 0.27 mg/L which exceeds odour-related aesthetic objective of 0.05 mg/L as hydrogen sulphide. Low levels of sulphide can be removed effectively using aeration or chlorination followed by sand or multimedia filtration.

Iron levels were reported to be 1.2 mg/Lm which exceeds the aesthetic objective of 0.3 mg/L. The iron levels are below the maximum treatable limits of 10.0 mg/L provided in Table 3 of the MECP Guideline D-5-5. It is recommended to utilize a water softener and/or greensand filters to treat the water for elevated iron levels.

Manganese levels were reported to be 0.134 mg/L, which exceeds the aesthetic objective of 0.05 mg/L. It is recommended to utilize a water softener and/or greensand filters to treat the water for elevated manganese levels.

Chloride levels were reported to be 326 mg/L and 313 mg/L which exceeds the aesthetic objective. Chloride levels above 250 mg/L may produce detectable salty tastes.

Turbidity levels were reported to be 11.5 NTU, which exceeds the aesthetic guideline of 5 NTU. Gemtec has stated that based on the high levels of iron concentrations, the high laboratory turbidity level was the result of iron precipitation.

Total Dissolved Solids (TDS) were reported to be 984 mg/L, which exceeds the aesthetic objective of 500 mg/L. Based on Health Canada publications, TDS levels between 600 and 900 mg/L are considered to be 'fair', and so the palatability of the drinking water is expected to be acceptable.

Colour was reported to be 9 TCU which exceeds the aesthetic objective of 5 TCU. Iron and manganese treatment is expected to greatly reduce water colour, and so it is recommended to utilize a water softener and/or greensand filters to treat the water for elevated levels of iron and manganese.

Barium levels were reported to be 1.07 mg/L which exceeds the maximum acceptable concentration of 1 mg/L. As noted in the ODWQS most treatment methods used for water softening are effective for barium removal.

Based on the water quality results presented in the Gemtec report, the results of the physical, chemical, and bacteriological groundwater analyses indicate that the water quality in the supply aquifer exceeds several operation guidelines, however, is considered to be safe for consumption. It was noted that treatment units such as water softeners and/or greensand filters may be used to treat the exceedances if desired by the Owner.

5.0 SANITARY SERVICING

5.1 Existing Sanitary Servicing

Currently the site is serviced via a conventional septic system located to the northwest of the existing building, as there are no municipal sanitary services available within the ROW on Reis Road.

5.2 Analysis

The existing septic system was reviewed by Gemtec to confirm if the system will still be adequate to service the property after the proposed lot addition transferred. As noted in the report, the available infiltration is dependent upon the amount of hard surface area on the property, which is ultimately used to determine the maximum allowable septic flows. The findings of the report show that 106 Reis Road will result in approximately **62%** impervious surfaces after the proposed lot addition.

For the purposes of this report, the anticipated sewage demands have been calculated based on Appendix 4-A (Daily Sewage Flow for Various Establishments) of the City of Ottawa’s Sewer Design Guidelines and Table 8.2.1.3.B of the Ontario Building Code (OBC). The anticipated average sewage flow for various buildings and places of employment with office workers is 75 L/person/day. It is understood that 12 employees are expected to use the facility on any given day, and so, the resulting average daily sewage volume demand was calculated to be **900 L** for the facility.

5.3 Results

Based on the analysis of the existing septic system analysis presented in the Gemtec Hydrogeology Investigation report, the current system is capable of servicing up to 16 employees based on a calculated hard surface of 62%, resulting in a maximum capacity of approximately **1,175 L/day**. Therefore, the existing system is sufficient to support the current property demands of 900 L/day based on 12 employees. The sewage demand results are summarized in **Table 1**, below. Please refer to the final Hydrogeology Investigation report prepared by Gemtec for the full details on septic system analysis and recommendations.

Table 2: Sewage Flow Design Criteria

Parameter	Total
Facility Population (No. of Employees per Day)	12 persons
Anticipated Demand Rate (Per App. 4-A and Table 8.2.1.3.B)	75 L/person/day
Total Daily Volume Demand	900 L per day
Maximum No. of Employees	16 persons
Maximum capacity of Existing Septic System	1,175 L per day

6.0 STORM SERVICING DESIGN

6.1 Existing Storm Servicing

Stormwater for the site is currently managed by overland sheet flow across the site. There are no existing storm sewers in the Reis Road ROW, however, both sides of the road have drainage ditching which flows from west to east beyond the site, and discharges to the drainage ditch which crosses Reis Road to the east and ultimately discharges to the Carp River.

6.2 Proposed Storm System

The proposed stormwater modifications for this project are limited to regrading the area along the new property boundary between the newly acquired property and 122 Reis Road, to ensure that neither property negatively impacts the other with surface runoff. The regrading work will include two new drainage swales with a low slopes installed on both sides of the new property line to help encourage natural filtration and infiltration of stormwater runoff prior to discharging to either drainage ditch to the north and south of the properties. The swales will be constructed separate from each other and completely within their respective property. These swales have been designed with Low Impact Development (LID) and infiltration facilities, using an underground 150mm diameter perforated subdrain pipes surrounded by clear stone and non-woven geotextile. The subdrains are proposed to be capped at both ends and are solely intended to help encourage infiltration and dispersion of stormwater along the length of the swale. Major overland flow will maintain existing drainage patterns and discharge overland as it currently does today.

6.2.1 Well Separation

It is noted that there is an existing well located near the southwest corner of the adjusted 122 Reis Road property. As noted in section 5.2.2 of the City of Ottawa's Hydrogeological and Terrain Analysis Guidelines (March 2021), it is recommended to maintain a minimum of 15 meters of separation to stormwater management facilities. As this well is already drilled and is located approximately 4m from both the municipal and private property lines, it is currently within 15 meters of the existing private drainage swale and municipal roadside ditch. Due to the existing constraints of the site, the proposed LID and infiltration facilities have been designed to terminate 15 meters away from the existing well as this design aspect would have the greatest impact to the groundwater table. The surface drainage within 15 meters of the well is only expected to collect and convey a small portion of the runoff from the two sites and will therefore be primarily used for major overland flow relief to the ROW. Additionally, to help limit any potential impacts to the well, the ground surface elevation at the well is proposed to be increased by approximately 100mm to an elevation of 114.45 increasing the gradient to 2-3% directly adjacent to the well. This will also help mitigate any impact from potential ponding in the ROW as a result of surcharging in the ditch, as the spill point would be at the existing driveway of 122 Reis Road at an elevation of 114.25, providing 200mm of freeboard in an extreme event.

7.0 PROPOSED STORMWATER MANAGEMENT

7.1 Design Criteria and Methodology

It is acknowledged that the original 2006/2007 site plan for 106 Reis Road, did in fact implement stormwater management controls to manage the overall stormwater runoff from the site, however this stormwater management design appears to have been completed with limited understanding of the original drainage design completed for the overall subdivision in 1989. As recently as 2016, the City has issued a memo of their interpretation of the original drainage design which explains the stormwater management design requirements for each site within the subdivision. A summary of these requirements is provided below:

The allowable runoff rate from sites within the Reis Industrial Park is governed by the design assumptions used in the approved Engineering Report contained in Schedule “H” of the subdivision agreement. If the resulting runoff from the proposed site will be less than the allowable rate, no on-site SWM will be required. The design parameters used in the subdivision Engineering Report are as follows:

- The design of the internal drainage for the subdivision was based on site developments that would be: 50% building area (C=1.0), 25% parking/drive aisles (C=0.9), and 25% undeveloped/pervious area (C=0.2);
- By the interpretation of design assumptions in the subdivision Engineering Report, sites in this subdivision can be developed without a requirement for on-site SWM as long as the combined C-value does not exceed 0.775; and
- It is important to note that the original subdivision design used constant C-values, while the newer City of Ottawa Sewer Design Guidelines (see section 5.4.5.2.1 and Table 5.7) now stipulate that C-values be increased by 25% during the 100-year event (to a maximum of C=1.0). Accordingly, the City’s increased 100-year runoff coefficient is to be used when determining the post-development combined C-value for the site. If the post-development C-value is below 0.775, no on-site SWM will be required. If SWM is required, the allowable release will be based on the 5-year flow, with a C-value of 0.775.

The City’s interpretation memo has been included in **Appendix B** for reference. Please refer to the drainage area plans and calculations included in **Appendix C** of this report for more details on the proposed site drainage areas. The Stormwater Management design for the subject property will be outlined in **Section 7.5** of this report.

7.2 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:

	2/5-Year C-Value	100-Year C-Value
Roofs	1.00	1.00
Concrete/Asphalt	0.90	1.00
Gravel	0.70	0.88
Landscaped and Grass	0.20	0.25

As per the City of Ottawa’s 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.

7.3 Allowable Release Rate

Due to the limited information on the original 2006/2007 stormwater management design for the subject property, the current design will be based on the City’s interpretation of the original drainage design as described in the Site Plan Agreement. The estimated allowable release rates are based on a maximum runoff coefficient (C-value) of 0.775 for the site both before and after the property acquisition, and are summarized in **Table 3** below.

Table 3: Approved Runoff Release Rate

Condition	Area (ha)	C 5-Year	C 100-Year	Tc (min)	I (mm/hr)		Q (L/s)	
					5-Year	100-Year	5-Year	100-Year
Before Property Acquisition (Existing)	0.9840	0.775	0.775	10	104.2	178.6	220.89	378.55
After Property Acquisition	1.2698	0.775	0.775	10	104.2	178.6	285.05	488.50

7.4 Existing Drainage Conditions (Before Property Acquisition)

The existing runoff coefficients and peak flow rates were calculated based on the current site conditions and its existing topography. The site is divided into three drainage areas which all sheet drain either towards the rear drainage ditch, or the municipal roadside ditching in the ROW on Carp Road and Reis Road. The calculated existing runoff coefficients and resulting peak flows for the 5- and 100-year events for the site are summarized below in **Tables 4** and **5**, respectively. Please refer to the detailed calculations and drainage plan CCO-23-3606 – SWM1 provided in **Appendix C** for more information.

Table 4: Existing Runoff Coefficient Summary

Area ID	Area (ha)	Impervious Area (m ²)	C	Asp. / Con. Area (m ²)	C	Gravel Area (m ²)	C	Pervious Area (m ²)	C	Result	
										C _{AVG} 5-Yr	C _{AVG} 100-Yr
A1	0.4969	233.00	1.00	535.00	0.90	2,283.00	0.70	1,918.00	0.20	0.543	0.653
A2	0.2071	0.00	1.00	467.00	0.90	443.00	0.70	1,161.00	0.20	0.465	0.553
A3	0.2800	187.00	1.00	1,450.00	0.90	707.00	0.70	456.00	0.20	0.742	0.846
Total	0.9840	420		2452		3433		3535		0.583	0.687

Table 5: Existing Uncontrolled Peak Flow Summary

Drainage Area	Area (ha)	C 5-Year	C 100-Year	T _c (min)	I (mm/hr)		Q (L/s)	
					5-Year	100-Year	5-Year	100-Year
A1	0.4969	0.54	0.65	10	104.2	178.6	78.10	161.09
A2	0.2071	0.46	0.55	10	104.2	178.6	27.88	56.83
A3	0.2800	0.74	0.85	10	104.2	178.6	60.19	117.63
Total	0.9840						166.17	335.54

Based on the current drainage characteristics of the site, the overall combined runoff coefficient (C-value) was calculated to be less than the required 0.775 for the 5-year event, as well as during the 100-year event including the 25% increase to the coefficients. Therefore, the current site as it exists does not warrant the implementation of any Stormwater Management measures based on the interpretation of the original drainage design requirements of the Site Plan Agreement.

7.5 Proposed Drainage Conditions (After Property Acquisition)

The proposed drainage characteristics of the site are based on the site conditions after the property acquisition. The existing drainage of the property to be acquired is split near the middle of the site, and generally slopes towards either the rear drainage ditch or the roadside ditch along Reis Road.

Overall, the general topography of both sites is planned to be maintained with the exception of some minor regrading works proposed along the new adjusted lot line which will separate 106 and 122 Reis Road. The proposed regrading works will consist of constructing a new shallow wide-bottom swale which provides a high point near the middle of the lot line to split the stormwater drainage towards either the rear drainage ditch or the roadside ditch on Reis Road, similarly to existing conditions. It is proposed to maintain the existing ground covers on site and to only regrade and reshape vegetated or landscaped areas, without the addition of any impervious or semi-impervious areas. This work along the lot line will ensure that stormwater runoff from either site does not negatively impact the other. In addition to the regrading works, a new security fence is proposed to be installed along the lot line for both security and privacy. Please refer to the Site Grading Plan.

The resulting runoff coefficients and peak flow rates for the 5- and 100-year events for the site were calculated and are summarized below in **Tables 5** and **6**. Please refer to the detailed calculations and drainage plan CCO-23-3606 – SWM2 provided in **Appendix C** for more information.

Table 6: Post-Acquisition Runoff Coefficient Summary

Area ID	Area (ha)	Impervious Area (m ²)	C	Asp. / Con. Area (m ²)	C	Gravel Area (m ²)	C	Pervious Area (m ²)	C	Result	
										C _{AVG} 5-Yr	C _{AVG} 100-Yr
B1	0.5484	233.00	1.00	535.00	0.90	2,530.00	0.70	2,186.00	0.20	0.533	0.643
B2	0.2071	0.00	1.00	467.00	0.90	443.00	0.70	1,161.00	0.20	0.465	0.553
B3	0.3081	187.00	1.00	1,450.00	0.90	821.00	0.70	623.00	0.20	0.711	0.815
B4	0.1043	0.00	1.00	0.00	0.90	487.00	0.70	556.00	0.20	0.433	0.542
B5	0.1019	0.00	1.00	0.00	0.90	570.00	0.70	449.00	0.20	0.480	0.600
Total	1.2698	420		2452		4851		4975		0.553	0.658

Table 7: Post-Acquisition Uncontrolled Peak Flow Summary

Drainage Area	Area (ha)	C 5-Year	C 100-Year	T _c (min)	I (mm/hr)		Q (L/s)	
					5-Year	100-Year	5-Year	100-Year
B1	0.5484	0.53	0.64	10	104.2	178.6	84.66	175.14
B2	0.2071	0.46	0.55	10	104.2	178.6	27.88	56.83
B3	0.3081	0.71	0.82	10	104.2	178.6	63.47	124.65
B4	0.1043	0.43	0.54	10	104.2	178.6	13.10	28.05
B5	0.1019	0.48	0.60	10	104.2	178.6	14.16	30.33
Total	1.2698						203.27	415.00

Based on the proposed drainage characteristics of the site under post-acquisition conditions, the overall combined runoff coefficient (C-value) was calculated to be less than the required 0.775 for the 5-year event, as well as during the 100-year event including the 25% increase to the coefficients. Therefore, the site conditions after the proposed property acquisition will not warrant the implementation of any Stormwater Management measures.

7.6 Quantity Control

As noted previously, both the pre- and post-acquisition conditions of the site have combined runoff coefficients of less than 0.775 as required by the interpretation of the original drainage design in the Site Plan Agreement. As a result, neither the existing site, nor the proposed site after property acquisition will require the implementation of any SWM quantity controls or other measures.

Table 8: Runoff Summary

Condition	Area (ha)	Calculated				Allowable			Satisfies Constraint (Yes/No)
		C-Value 5-Year	C-Value 100-Yr	Q (L/s) 5-Yr	Q (L/s) 100-Yr	C-Value 5/100-Yr	Q (L/s) 5-Yr	Q (L/s) 100-Yr	
Before Property Acquisition (Existing)	0.9840	0.583	0.687	166.17	335.54	0.775	220.9	378.6	Yes
After Property Acquisition	1.2689	0.553	0.658	203.27	415.00	0.775	284.8	488.1	Yes

The peak flow rates summarized above show that both the current site, and the site after property acquisition are below the allotted flow rate based on their respective combined runoff coefficients and therefore flow control measures or other stormwater management features will not be required for this site.

7.7 Quality Control

The site is located within the Carp River Watershed, and therefore is subject to several quality control objectives and Best Management Practices (BMP) that may be implemented in order to protect, enhance or restore the environment. These include Low Impact Development considerations, infiltration targets, and erosion & sediment control measures.

7.7.1 Best Management Practices

The proposed work will utilize BMP's wherever possible. BMP's will be implemented at the lot and conveyance levels. Lot level BMP's include the directing of runoff onto grassed areas and minimizing ground slopes. Runoff from roofs will flow to grassed areas wherever possible, which will provide

an opportunity for initial filtration and collection of any sediment runoff and provide an opportunity for absorption and groundwater recharge.

The conveyance system to be used in the proposed development will be overland sheet flow and channelized drainage. The proposed drainage swale has been designed at minimal gradient where possible, thus promoting absorption and infiltration, as well as providing opportunity for particulate and sediment filtration. Rip-rap will be placed at erosion-prone areas and all disturbed areas are to be re-vegetated as soon as possible. It is also noted that a majority of the existing site is gravel, and so, de-icing salts and other road treatment chemicals are not expected to be used on the site, thus reducing the chance of groundwater impact.

7.7.2 Low Impact Development

As noted previously, the proposed work will include two new enhanced grass swales that have been designed with LID considerations, including low slopes, wide flat bottoms, and high void ratio substrates with subdrains to encourage infiltration and limit overland flow runoff for small events. These swales will be installed on both sides of the new property line encouraging natural filtration and infiltration of stormwater runoff prior to discharging to either drainage ditch to the north and south of the properties. The swales will be separate from each other to avoid the requirement for drainage easements for shared services along the property line. These swales have been designed with a 150mm diameter perforated subdrain pipes surrounded by clear stone and non-woven geotextile, which is proposed to be capped at both ends without any direct outlet to surface. The intention of the design is to help collect and filter stormwater runoff by allowing for water to infiltrate through the top layer of soil, and then dispersing the water along the length of the swale into the bottom layer of clear stone. The high void ratio of the clear stone combined with the capped subdrain pipe, will allow for temporary underground storage of runoff which will be released into the native soils by infiltration, thus recharging the existing groundwater table and reducing the site's impact to the surrounding environment.

7.7.3 Infiltration

The site is subject to an infiltration target of 104 mm/year as per the Carp River Watershed Study. The watershed study also indicates that there is an average annual precipitation rate of 950mm per year (25% as snow) and a mean annual evapotranspiration rate of 550mm per year.

Based on historical data, over 60% of all rainfall events in Ottawa are low to normal intensities. The proposed design is anticipated to accommodate all normal rainfall intensities, and so, it is expected that up to 60% of the total precipitation will be captured and infiltrated through the proposed LID infiltration facility. Therefore, 60% of the remaining precipitation rate of 163mm per year (accounting for 240mm per year of snow and 550mm per year of evapotranspiration), will result in approximately 98mm per year of infiltration through the LID. Although this does not necessarily meet the required 104mm per year target infiltration rate, the difference is within approximately

5% and should be considered negligible, as this is a significant improvement over the existing site drainage.

7.7.4 Total Suspended Solids Removal

It is noted that although the site is zoned as industrial, the primary use of the facility is not industrial in nature, and so the primary source of pollutants would simply be from sediment and particulate runoff. The proposed infiltration facility is designed to reduce stormwater flow velocities with 0.5% gradients and rock flow check dams, which will restrict overland flow and encourage filtration of sediment by infiltrating runoff through topsoil, geotextile fabric, clear stone and the subdrain pipe, prior to re-entering the groundwater table.

Other design implementations include rock flow check dams which are proposed to be installed near both ends of each swale. The rock flow check dams are intended to provide runoff reduction from the site to increase the time of concentration while overtop of the underlying subdrain and LID facility, as well as providing additional contaminant removal by filtering overland runoff. As noted in the Credit Valley Conservation Authority Low Impact Development Stormwater Management Planning and Design Guide, a median TSS removal of 76% has been determined for enhanced grassed swales based on available performance studies.

The Design Guide also reports that to improve water quality within an enhanced grass swale, flow velocities must be below 0.5m/sec for a 25mm storm. Based on the drainage area of approximately 1800m² draining to the proposed swale within the limits of the site, the flows from the 5- and 100-year storm events were used to find the resultant flow velocities to be conservative. The resultant velocities were calculated to be 0.35m/sec and 0.48m/sec, respectively, meeting the quality control recommendations.

The proposed LID and infiltration features utilizing low slopes, wide bottoms and rock flow check dams, are therefore expected to provide sufficient quality control to meet the required 80% TSS removal requirement for the area.

8.0 EROSION AND SEDIMENT CONTROL

8.1 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 the inspection of sediment and erosion controls are to 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 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. The measures for the existing/proposed structures are to be removed only after all areas have been paved or landscaped. Care shall be taken at the removal stage to ensure that any silt that has accumulated is properly handled and disposed of. 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 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.

8.2 Permanent Measures

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 property owner to maintain the vegetation and ensure that the vegetation is not overgrown or impeded by foreign objects.

9.0 SUMMARY

- 106 Reis Road property is proposing to acquire an additional parcel of land to the northeast of approximately 0.28ha.
- Based on the water quantity results presented in the Gemtec report, the existing well on site is capable of providing sufficient water quantity for typical commercial developments in the area.
- Based on the water quality results presented in the Gemtec report, the results of the physical, chemical, and bacteriological groundwater analyses indicate that the water quality in the supply aquifer meets the ODWQS MAC and MCCRT and is considered to be safe for consumption.
- Based on the septic system analysis presented in the Gemtec Hydrogeology Investigation report, the existing conventional system installed at 106 Reis Road is sufficient to service the site after the proposed lot line adjustment.
- The requirements for Stormwater Management have been based on the original drainage design found in the Engineering Report of the Site Plan Agreement. The City has interpreted the requirements and have stated that all sites within the subdivision must ensure the combined runoff coefficient of the site does not exceed 0.775, or SWM measures will have to be implemented.
- Based on the current and future drainage characteristics of the site, the combined runoff coefficients were calculated to be less than 0.775 for both the 5- and 100-year storm events, which also accounts for a 25% increase under the 100-year event. Therefore, the site is not required to implement any Stormwater Management.
- The proposed work will utilize Best Management Practices (BMP) wherever possible. BMP's will be implemented at the lot and conveyance levels.
- Quality Control will be provided through low sloped enhanced grass swales, in combination with infiltration facilities and rock flow check dams.

10.0 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 Site Plan Amendment at 106 Reis Road.

Sincerely,

McIntosh Perry Consulting Engineers Ltd.



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

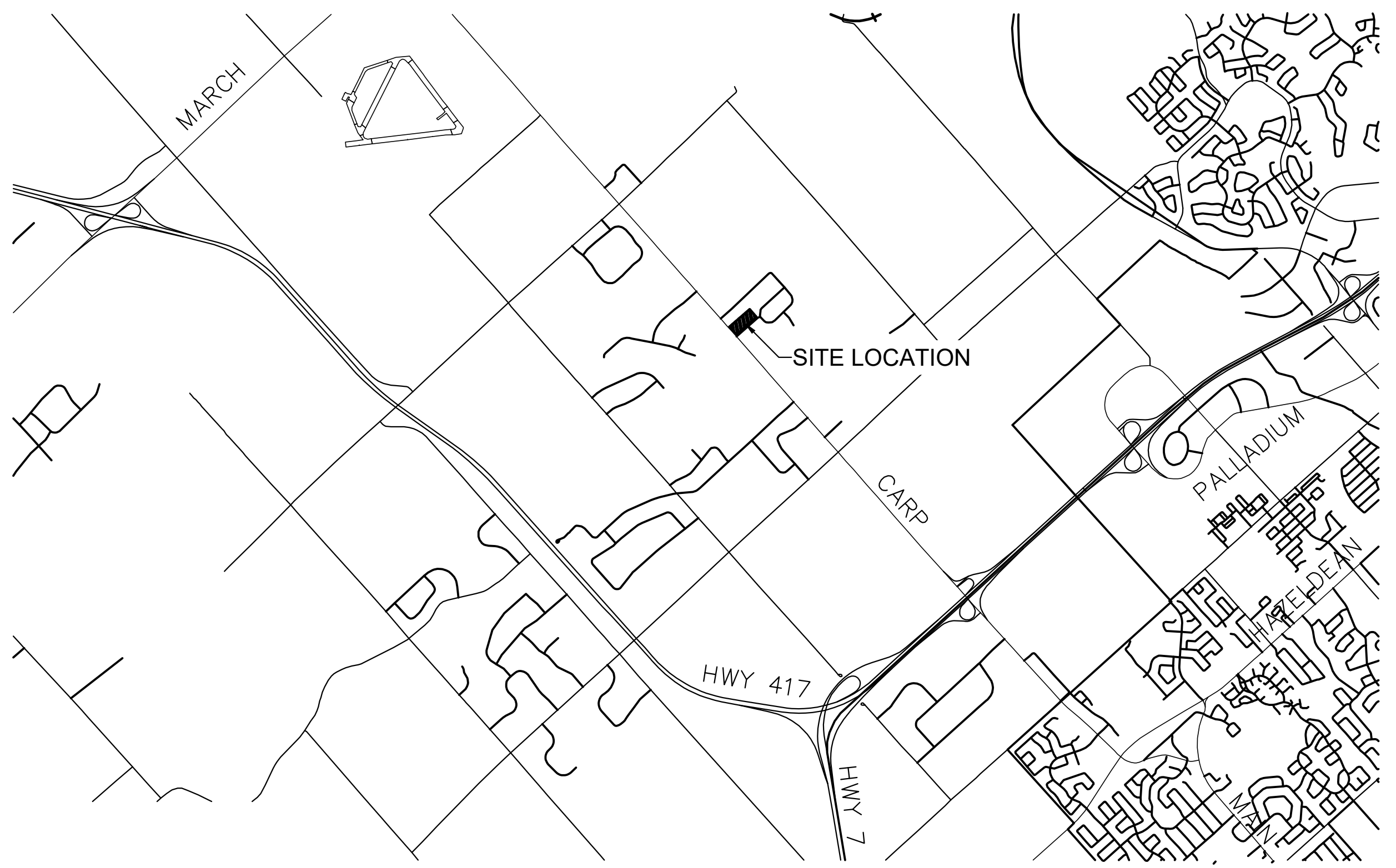
11.0 STATEMENT OF LIMITATIONS

This report was produced for the exclusive use of **106 Reis Road**. 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, Parks and Climate Change, City of Ottawa and local approval agencies. McIntosh Perry reviewed the site information and background documents listed herein. While the previous data was reviewed by McIntosh Perry, no field verification/measures of any information were conducted.

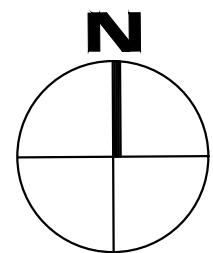
Any use of this review by a third party, or any reliance on decisions made based on it, without a reliance report is the responsibility of such third parties. McIntosh Perry accepts no responsibility for damages, if any, suffered by any third party as a result of decisions or actions made based on this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



FILENAME: U:\Ottawa\01 Project - Proposals\2023\106&122 Reis Road\12 - Drawings\CCO-23-3606-FIG.dwg
 LAST SAVED: Friday, October 13, 2023 1:57:54 PM BY: J. Hewson
 LAST PLOTTED: Friday, October 13, 2023 2:18:15 PM USING: ...



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

Client:		GRACE MONUMENTS 106 REIS ROAD, CARP, ON K0A 1L0	
Project:		106 & 122 REIS ROAD - SITE PLAN AMENDMENT	
Drawing Title:		SITE LOCATION PLAN	
Drawn by:	Checked By:	Drawing Number:	
J.H.	B.C.	A1	
Scale:	Project Number:	1 SITE PLAN AMENDMENT	OCT, 2023
N.T.S.	CCO-23-3606	No. Revisions	Date

**APPENDIX B
BACKGROUND DOCUMENTS**

James Hewson

From: Bridgette Alchawa
Sent: June 22, 2023 10:09 AM
To: James Hewson
Subject: FW: 106 Reis Road & 122 Reis Road - Applications for Site Plan Control Amendments, City File Nos. D07-12-22-0118 & D07-12-22-0119

Bridgette Alchawa

Planner

T. 613.778.8760 | F. 613.836.3742 | C. 613.807.5000

b.alchawa@mcintoshperry.com | www.mcintoshperry.com



Turning Possibilities Into Reality

From: Teeft, Luke <Luke.Teeft@ottawa.ca>
Sent: March 21, 2023 9:39 AM
To: Bridgette Alchawa <b.alchawa@mcintoshperry.com>
Cc: Kulyk, Derek <derek.kulyk@ottawa.ca>; Rehman, Sami <Sami.Rehman@ottawa.ca>; Di Iorio, Tessa <tessa.diiorio@ottawa.ca>; Andrius Paznekas <andrius.paznekas@gemtec.ca>; Brent Cuming <b.cuming@mcintoshperry.com>; Brittany Moy <BMoy@mvc.on.ca>
Subject: RE: 106 Reis Road & 122 Reis Road - Applications for Site Plan Control Amendments, City File Nos. D07-12-22-0118 & D07-12-22-0119

Good morning Bridgette,

Thank you for your continued patience with these files. I have compiled the full comments prepared by our engineer, hydrogeologist and environmental planner for your review. I have confirmed with the beforementioned individuals and senior staff that the following studies and information will be required in support of your applications. Please see the following details for clarification of what we are requesting:

106 Reis Road (D07-12-22-0118)

Required Reports:

- 1) Hydrogeological and Terrain Analysis (HGTA) Study and Report – is required (signed and sealed by a qualified professional) to confirm suitable well water quantity, water quality and investigate potential impacts from the septic systems; one report can be submitted for both properties. The HGTA report requirements are provided below:
 - Existing Well: If the building will remain connected to the existing well and water use will remain the same (i.e. water use not increase), then the report should identify that the water use will remain the same and clarify if the well has produced sufficient water for the existing use to date.

- The report should also include a description of the well and confirmation that the well meets current regulations (physical well condition, required stickup, grading around the well, etc.).
 - Existing Well #2 (formerly connected to the building at 122 Reis): It is understood that the well that previously serviced 122 Reis is located in the land that will be transferred to 106 Reis and is no longer connected to 122 Reis. The Wells Regulation (O.Reg. 903) under the *Ontario Water Resources Act* specifies that a well which is not being used or maintained for future use must be decommissioned, see O.Reg. 903 - Section 21(3). As such, the HGTA report must either include a statement and a description of the future well use and confirmation that it will be maintained in the future OR provide the well decommissioning record to support that the well has been decommissioned as per the regulations.
 - Septic System: At the Feb 22, 2023 consultation meeting, it was identified that 106 Reis Road was not developed as originally intended based on the original Site Plan; the site includes more impermeable surface. As such, as part of the current site plan control application, the City requests an updated septic impact assessment as per [Ottawa's Hydrogeological and Terrain Analysis Guidelines](#) (please use the assessment methodology intended for industrial/commercial developments in Procedure D-5-4). The purpose of the assessment is to ensure there is sufficient septic dilution such that the groundwater in the receiving aquifer is not being contaminated. Please note that there are special considerations for developments within the Carp Road Corridor, as noted in the City memo entitled: *Carp Road Corridor – Nitrate Impact Assessment Recommendations*, dated September 2016. Note that compact gravel will be considered impermeable unless supported with field data related to infiltration capacity.
 - An analysis of the existing septic system condition should be provided with the report; the system should be in good working condition and meet current building code regulations.
 - The properties are located within the area identified as high recharge in the Carp Road Corridor Community Design Plan, as such there is a requirement to maintain recharge onsite. It is expected pre to post recharge be maintained, as compared to the original site plan design. A water budget analysis can be submitted to support that recharge will be maintained, information in the water budget should be harmonized with that in the stormwater management report.
- 2) Stormwater Management (SWM) Report - will be required (sealed, dated, and signed by a Professional Engineer licensed in the province of Ontario) to ensure proper site drainage and SWM control, as per previously defined criteria of the Industrial Subdivision and the Site plan Agreement. Since it is an industrial subdivision site, ECA will be required for SWM modifications.

It was noted that, as per the City approved Site plan, the entire north and southeast portion of the property was intended to be left as an open grassed surface (also indicated by run-off coefficients of C=25 & C=29, in the report) and the Quantity/Quality control swale with an orifice plate was to be constructed at the east limit of the property.

While examining the aerial database, it was noted that the existing site condition does not match the approved site plan. The areas that were intended to be covered with grass appear to be all compacted granular parking lot surfaces and the swale no longer appears to exist.

The report needs to consider the pre-development condition, as it existed prior to the current Site Plan Agreement (i.e. undeveloped) and the post-development condition should reflect the existing condition of the site or the proposed condition, if modifications from the existing condition are

required or proposed. The controlled surface run-off flow from the site needs to be restricted to the levels defined in the current Site Plan agreement (100-year post-development flow to the 5-year pre-development flow).

The report needs to provide clear recommendations to ensure run-off drainage control on the entire site.

- 3) Servicing Brief - is required (sealed and signed by a Professional Engineer licensed in the province of Ontario) and it needs to address the available water quality and quantity. It should identify the required water demand on site and the expected well capacity (sustainably to be in excess of demand). It should also address the site sanitary servicing needs.

Site Plan Comments:

- 1) The submitted Site plan needs to be sealed and signed by a Professional Engineer, to endorse the latest changes and adjustments to the Site plan (currently an old Site plan from the year 2006 was submitted with modifications drawn over the old plan). It is understood that the Engineer that originally sealed the drawing has not endorsed the modified Site Plan.
- 2) The fence at the east property limit should be shown as existing and its removal indicated on the plans.
 - I) Pre-construction and post-construction drainage plans are required (sealed, dated, and signed by a Professional Engineer licensed in the province of Ontario). They need to identify the SWM control features, tributary areas, run-off coefficients and the 100-year storm overland drainage patterns to ensure that surface run-off is not crossing property lines.

The swale directing water to the SWM pond needs to be proposed within the property (106 Reis Rd), not at the property line.

- II) A Site Servicing plan is required (sealed, dated, and signed by a Professional Engineer licensed in the province of Ontario). Rather than showing the proposed site features, it must show features as they currently exist on the property (i.e.: buildings, wells, septic beds, vegetation, etc.). It should provide a note that references the horizontal and vertical datums with the local benchmarks. Underground water and sanitary pipe networks need to be shown, to ensure that none cross the property lines (122 Reis Rd Site Plan shows underground water pipes crossing the proposed property line).
- III) A Topographic Plan of Survey needs to be submitted with the application, sealed and signed by an Ontario Land Surveyor (OLS).
- IV) A Grading Plan is required (sealed, dated, and signed by a Professional Engineer licensed in the province of Ontario) – it needs to show accurate topographic information (existing and proposed grades and features). The grading plan should also show the property address and to provide a note that references the horizontal and vertical datums with the local benchmarks (needs to provide direct reference to an official topographic survey endorsed by an OLS).

It is understood that the site re-grading is not proposed for the entire extended area allocated from 122 Reis Rd., however, it was noted that some re-grading will be required. Please indicate clearly existing and proposed grades with a limit of grading identified with solid lines.

Water well set-backs and drainage around the water well need to comply with section 5.2.2 of the City's [Hydrogeological and Terrain Analysis Guidelines](#) (March 2021) – grading and storm water flow direction needs to be shown to ensure storm water is directed away from the well, as per City guidelines. The existing well appears to be less than 3.0 m from the property line. Please provide the set-back dimension on the plan. Confirmation from a qualified well driller will be required to confirm if the current set-back from the property line is adequate to service the well in the future without impact to the adjacent property.

- V) An Erosion and Sedimentation control plan is required (sealed, dated, and signed by a Professional Engineer licensed in the province of Ontario). Please be mindful of the fact that there is a watercourse at the north-east corner of the property.
- VI) It is understood that no development of any kind is proposed at this point in time, and the grading extent is as it is identified in the comments above, otherwise additional comments and report requirements will likely be required.

122 Reis Road (D07-12-07-0217)

Required Reports:

- 1) Hydrogeological and Terrain Analysis (HGTA) Study and Report - is required (signed and sealed by a qualified professional) to confirm suitable well water quantity, water quality and investigate potential impacts from the septic systems; one report can be submitted for both properties. The HGTA report requirements are provided below:
 - New Well: It is understood that a new well was installed to service the existing building. Since the well has not previously been tested as part of a previous Site Plan Control application, the well should be tested to confirm quantity and quality as part of the current application. Water quantity test should be based on a 6-hour pump test at the maximum day rate. Well testing requirements are outlined in Section 5 of the City's Hydrogeological and Terrain Analysis Guidelines, water quality testing should include the subdivision suite of parameters, trace metals, VOCs and other parameters that may be a concern based on current or past land uses.
 - If raw (untreated) groundwater quality exceeds aesthetic MCCRTs, please contact the City hydrogeologist to discuss potential options for non-residential developments.
 - The report should include a description of the well and confirmation that the well meets current regulations (physical well condition, required stickup, grading around the well, etc.).
 - Septic System: Since the size of the lot will decrease with the lot line adjustment, a septic impact assessment should be completed to ensure that the new lot size/configuration can accommodate the impacts from the existing septic on the property.
 - The septic impact assessment should be prepared based on the [Ottawa's Hydrogeological and Terrain Analysis Guidelines](#) (use the assessment for industrial/commercial developments), and note the special considerations the City memo entitled: *Carp Road Corridor – Nitrate Impact Assessment Recommendations*, dated September 2016.
 - As discussed at the meeting, the design flows of the existing septic systems may exceed those permitted by the OSSO in the Sept 2016 memo; thus the septic impact assessment may apply

the flow requirements outlined in the Sept 2016 memo (based on employment) for the purposes of the calculation.

- An analysis of the existing septic system condition should be provided with the report; the system should be in good working condition and meet current building code regulations.
 - The properties are located within the area identified as high recharge in the Carp Road Corridor Community Design Plan, as such there is a requirement to maintain recharge onsite. It is expected pre to post recharge be maintained, as compared to the original site plan design. A water budget analysis can be submitted to support that recharge will be maintained, information in the water budget should be harmonized with that in the stormwater management report.
- 2) Stormwater Management (SWM) Report - will be required (sealed, dated, and signed by a Professional Engineer licensed in the province of Ontario) to ensure proper site drainage and SWM control, as per previously defined criteria of the Industrial Subdivision and the Site plan Agreement. Since it is an industrial subdivision site, ECA will be required for SWM modifications.

It was noted that originally no SWM report was prepared for this property. It was also noted that, as per the City approved Site plan, the entire north and the west portion of the property was supposed to be left as an open grassed space. While examining the aerial database, it was observed that the existing site condition does not match the approved site plan. The areas that were intended to be covered with grass, appear to be partially compacted granular parking lot surfaces, with all the above-mentioned areas void of any vegetation.

The report needs to consider the pre-development condition, as it existed prior to the current Site Plan Agreement (i.e. undeveloped) and the post-development condition should reflect the existing condition of the site. Considering that, at the time of the existing site plan approval, no SWM report was provided to the City and the site directly adjacent to the proposal, within the same subdivision, was designed with 100-year post-development run-off flow from the site restricted to the 5-year pre-development flow, and no changes, other than the property line adjustment, are proposed now, the same requirement will be accepted.

However, if a new site plan application is filed in the future with a proposed site modification, the 100-year post development flow will need to be restricted to the 2-year pre-development flow.

The report needs to provide clear recommendations to ensure run-off drainage control on the entire site.

- 3) Servicing Brief - is required (sealed and signed by a Professional Engineer licensed in the province of Ontario) and it needs to address the available water quality and quantity. It should identify the required water demand on site and the expected well capacity (sustainably to be in excess of the demand) and analyze the impacts of a well loss from the site (well is proposed to be moved to 106 Reis Rd). It should also address the site sanitary servicing needs and any impacts related to the surface area reduction, which will likely affect potential future sanitary system maintenance or expansion.

Site Plan Comments:

- 1) The submitted Site plan needs to be sealed and signed by a Professional Engineer, to endorse the latest changes and adjustments to the Site plan (currently an old Site plan drawing from the year 2007 was submitted with modifications drawn over the old drawing).
 - 2) The water well setback needs to show actual (not superimposed) dimensions on the site plan to both adjacent property lines.
 - 3) Please verify the parking lot set-backs to ensure compliance with the City Standards.
- I) Pre-construction and post-construction drainage plans are required (sealed, dated, and signed by a Professional Engineer licensed in the province of Ontario). They need to identify the SWM control features, tributary areas, run-off coefficients and the 100-year storm overland drainage patterns to ensure that surface run-off is not crossing property lines. Potential swale(s) directing water to the SWM control feature need(s) to be proposed within the property (122 Reis Rd), not at the property line. If a swale is proposed at the property line (between 106 Reis Rd & 122 Reis Rd), it needs to be shown and an Easement needs to be registered, allowing unobstructed access to it by both property owners.

It also appears that, with the property shift, the parking lot might be draining directly to the adjacent property, and this will need to be corrected.

- II) A Site Servicing plan is required (sealed, dated, and signed by a Professional Engineer licensed in the province of Ontario). Rather than showing the proposed site features, it must show features as they currently exist on the property (i.e.: buildings, wells, septic beds, vegetation, etc.). It should provide a note that references the horizontal and vertical datums with the local benchmarks. Underground water and sanitary pipe networks need to be shown, to ensure that none cross the property lines (122 Reis Rd Site Plan shows underground water pipes crossing the proposed property line).

With the property line shift, the lot driveway entrance at 122 Reis Rd appears to violate the private approach by-law (Private Approach (By-law No. 2003-447) | City of Ottawa). The driveway setback needs to be a minimum of 3.0 m from the property line and it should be measured, along the edge of the pavement, from the point where the property line extension intercepts the edge of pavement, to the tangent end point of the driveway corner radius at the edge of pavement. To determine the property line edge of pavement intercept point, the property line needs to be extended along its natural angle to the conclusion at the edge of the pavement.

- III) A Topographic Plan of Survey needs to be submitted with the application, sealed and signed by an Ontario Land Surveyor (OLS).
- IV) A Grading Plan is required (sealed, dated, and signed by a Professional Engineer licensed in the province of Ontario) – it needs to show accurate topographic information (existing and proposed grades and features). The grading plan should also show the property address and to provide a note that references the horizontal and vertical datums with the local benchmarks (needs to provide direct reference to an official topographic survey endorsed by an OLS).

It is understood that the site re-grading is not proposed for the entire area, however, it was noted that some re-grading might be required, specifically at the interface of both properties. Also,

parking lot set-back adjustments and consequently re-grading might be required. Please provide changes specific to the 122 Reis Rd. property, clearly indicating existing and proposed grades with a limit of grading clearly shown with solid lines.

- V) An Erosion and Sedimentation control plan is required (sealed, dated, and signed by a Professional Engineer licensed in the province of Ontario). Please be mindful of the fact that there is a watercourse at the north side of the property.
- VI) It is understood that no development of any kind is proposed at this point in time, and the grading extent is as identified in the comments above, otherwise additional comments and report requirements will likely be required.

Both Properties:

Given the presence of a watercourse on and adjacent to the two properties, an Environmental Impact Statement (EIS) will be required. The EIS should look at the following:

- 1) The appropriate surface water feature setbacks, as per OP policies in section 4.9.3.
- 2) Recommendations to curb any further encroachment into the setbacks.
- 3) As a consideration for not requiring the existing development to retract to the appropriate watercourse setbacks (i.e. pulling the development back to comply with setback requirements), recommendations to ecologically enhance and restore surface water features.
- 4) Recommendations to contribute to City's tree canopy, using locally appropriate native species of trees, shrubs and plants.
- 5) Addressing any potential impacts from stormwater on the surface water features and recommendations to mitigate those impacts.

I hope the above details provide some clarity on the additional information that is being requested to support the application. Although no new development is being proposed, there are significant changes to the topography of these properties that needs to be accounted for. These items are being requested as a part of the site plan process and as a result of the information that was provided with the applications.

Kind regards,


Lucas Teeft (he/him)

Planner I | Urbaniste I

Development Review | Examen des projets d'aménagement

Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique

City of Ottawa | Ville d'Ottawa

 613.580.2424 ext./poste 21886

ottawa.ca/planning / ottawa.ca/urbanisme

*****During this period of uncertainty due to COVID-19, City staff are following best practices to minimize exposure and risk. I am currently working from home and will respond to any emails as soon as I am able.***

PART OF BLOCK 1 REGISTERED PLAN 4M-745 CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebek Ltd.

Scale 1:300

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

Surveyor's Certificate I CERTIFY THAT: 1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the regulations made under them. 2. The survey was completed on the 29th day of May, 2023.

Notes & Legend

- Denotes Survey Monument Planted, Survey Monument Found, Standard Iron Bar, Short Standard Iron Bar, Iron Bar, Concrete Pin, Witness, Measured, Annis, O'Sullivan, Vollebek Ltd., Plan 4R-34826, Registered Plan 4M-745, Plan 4R-16781, Deciduous Tree, Coniferous Tree, Corrugated Steel Pipe, Water Valve, Gas Meter, Sign, Utility Pole, Air Conditioner, Light Standard, Bell Terminal Box, Unidentified Terminal Box, Bollard, Location of Elevations, Top of Concrete Curb Elevation, Wood Pole, Hydro Transformer, Edge of Asphalt, Edge of Gravel, Top of Grate, Invert, Chain Link Fence, Board Fence, Metal Fence, Gate, Diameter, Centreline, Property Line, Overhead Wires, Top of Slope, Bottom of Slope.

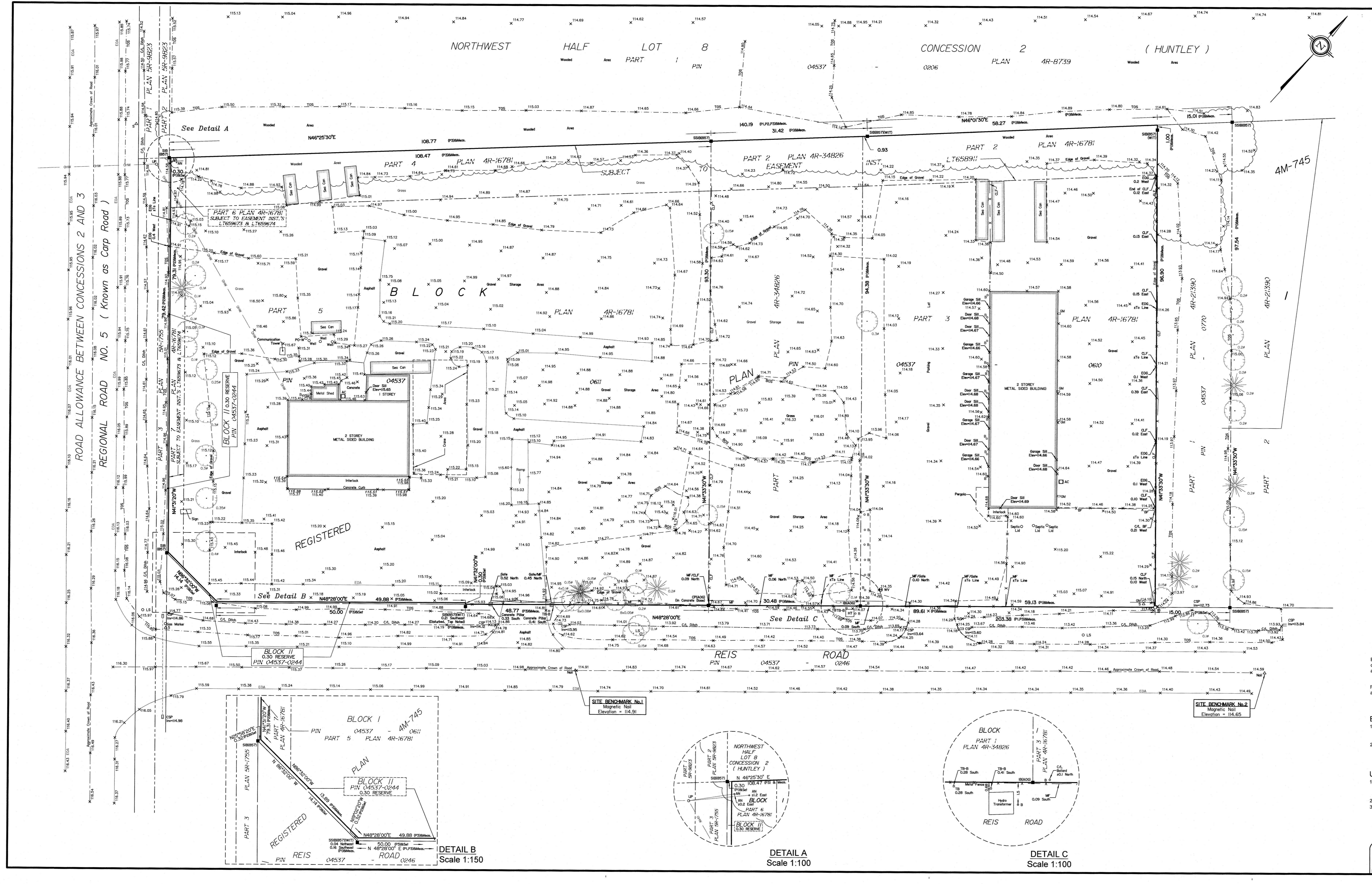


Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations and are referenced to Specified Control Points 01919680037 and 01919791051, MTM Zone 9 (78°30' West Longitude) - NAD-83 (original).

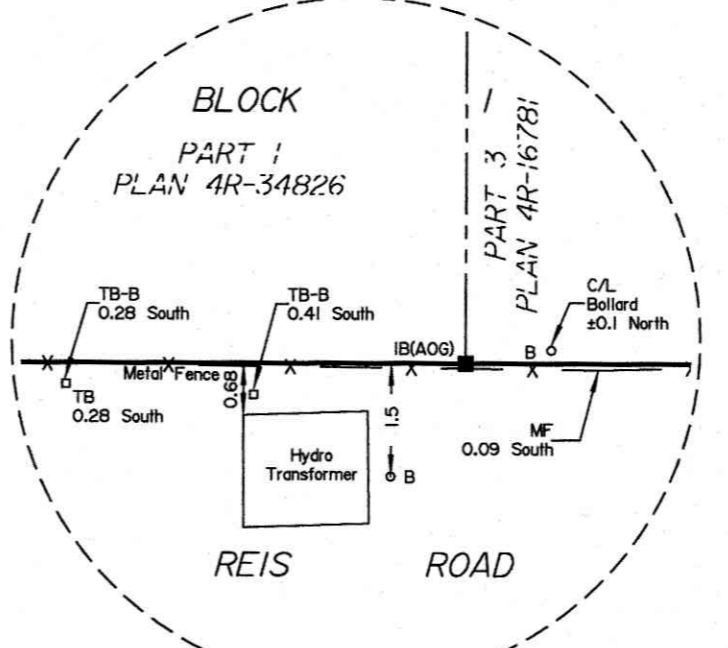
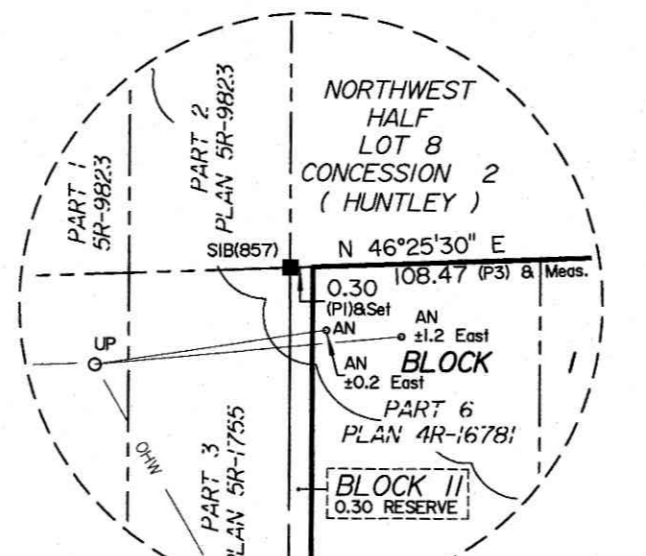
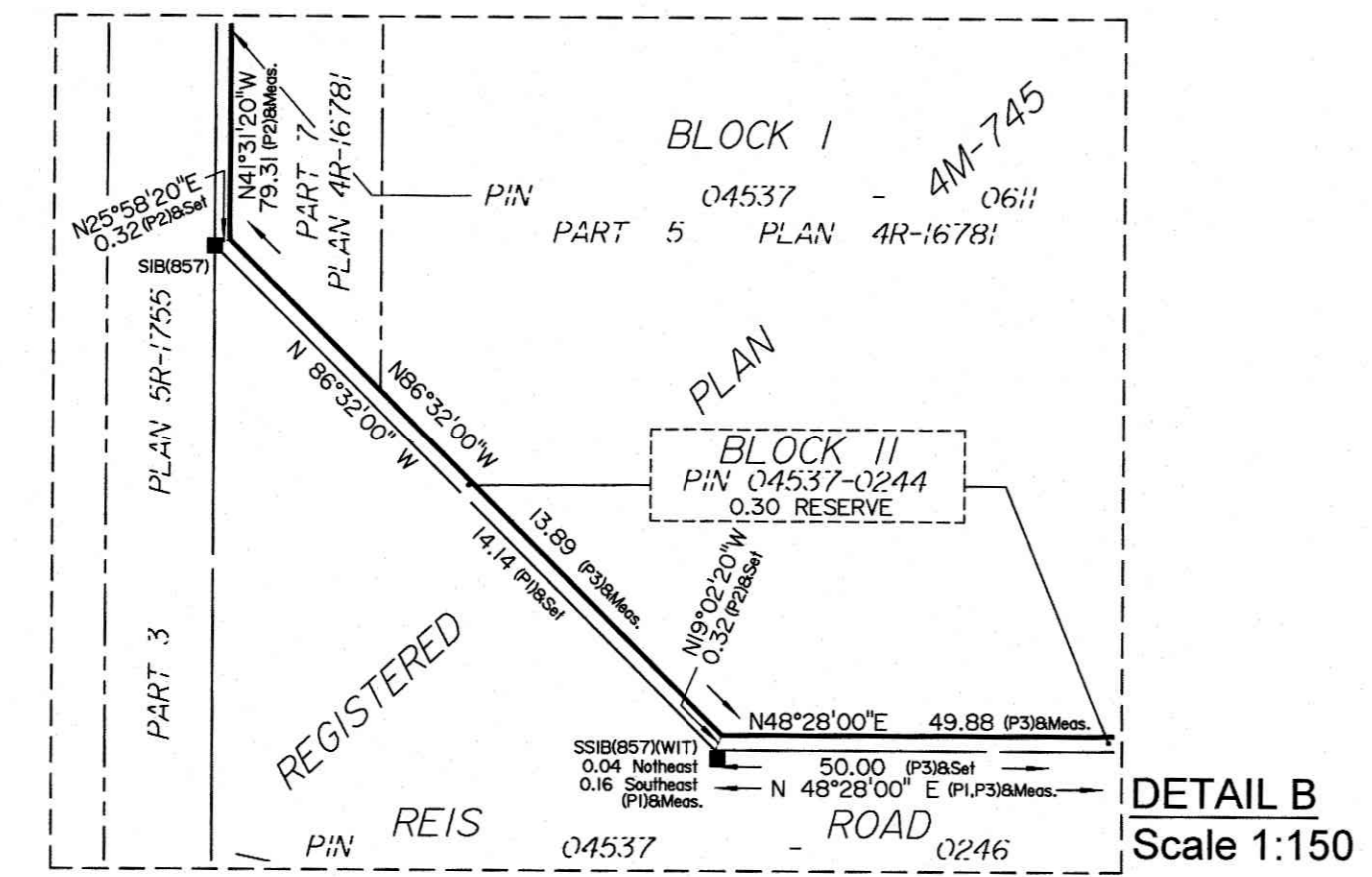
For bearing comparisons, a rotation of 0°19'10" counter-clockwise was applied to bearings on plan P2.

ELEVATION NOTES 1. Elevations shown are geodetic, derived from a Spike in Utility Pole having a published elevation of 144.28m (AOG Ref. 17008-16) and are referred to the CGV028 geodetic datum. 2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that its relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES 1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation. 2. Only visible surface utilities were located. 3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.



ROAD ALLOWANCE BETWEEN CONCESSIONS 2 AND 3 REGIONAL ROAD NO. 5 (Known as Carp Road)



Reis Business Park
Stormwater Management

Ref Info: Reis Road, Tansley Road, & Maple Creek Court
 15-86-3062 (Phase 1)
 D07-17-4M745

Stormwater Management – The allowable runoff rate from sites within the Reis Industrial Park is governed by the design assumptions used in the approved Engineering Report contained in Schedule “H” of the subdivision agreement. If the resulting runoff from the proposed site will be less than the allowable rate, no on-site SWM will be required. The design parameters used in the approved subdivision Engineering Report are as follows:

- The design of the internal drainage for the subdivision was based on site developments that would be: 50% building (C=1.0), 25% parking (C=0.9) and 25% undeveloped (C=0.2). By my interpretation of design assumptions in the subdivision Engineering Report, sites in this subdivision can be developed without a requirement for on-site SWM as long as the combined C-value does not exceed 0.775.

It is important to note that the original subdivision design used constant C-values, while the newer City of Ottawa Sewer Design Guidelines (see Section 5.4.5.2.1 and Table 5.7) now stipulate that C-values be increased by 25% during the 100-year event (to a maximum of C=1.0). Accordingly, I would ask that you use the City’s increased 100-year runoff coefficients when determining the post-development combined C-value for the site. If the post-development C-value is below 0.775, no on-site SWM will be required. If SWM is required, the allowable release will be based on the 5-year flow, with a C-value of 0.775.

As per Tim Newton, Project Manager, City of Ottawa
Edits supplied by Damien Whittaker and Brian Morgan. 06-Sep-2016

**APPENDIX C
DRAINAGE AREA PLANS AND
STORMWATER MANAGEMENT CALCULATIONS**

McINTOSH PERRY

CCO-23-3606 - 106 Reis Road - D07-12-22-0118 - Stormwater Management Calculations

1 of 1

Table E1 Approved Runoff Release Rate Calculations

Condition	Area (ha)	C 5-Year	C 100-Year	Tc (min)	I (mm/hr)			Q (L/s)		
					2-Year	5-Year	100-Year	2-Year	5-Year	100-Year
PRE	0.9840	0.775	0.775	10	76.8	104.2	178.6	162.83	220.89	378.55
POST	1.2698	0.775	0.775	10	76.8	104.2	178.6	210.12	285.05	488.50

Table E2 Existing Runoff Coefficient Calculations

Drainage Area	Area (ha)	Impervious Area (m ²)	C	Asp. / Con. Area (m ²)	C	Gravel Area (m ²)	C	Pervious Area (m ²)	C	Result	
										C _{AVG} 5-Year	C _{AVG} 100-Year
A1	0.4969	233.00	1.00	535.00	0.90	2,283.00	0.70	1,918.00	0.20	0.543	0.653
A2	0.2071	0.00	1.00	467.00	0.90	443.00	0.70	1,161.00	0.20	0.465	0.553
A3	0.2800	187.00	1.00	1,450.00	0.90	707.00	0.70	456.00	0.20	0.742	0.846
Total	0.9840	420		2452		3433		3535		0.583	0.687

Table E3 Post-Acquisition Runoff Coefficient Calculations

Drainage Area	Area (ha)	Impervious Area (m ²)	C	Asp. / Con. Area (m ²)	C	Gravel Area (m ²)	C	Pervious Area (m ²)	C	Result	
										C _{AVG} 5-Year	C _{AVG} 100-Year
B1	0.5484	233.00	1.00	535.00	0.90	2,530.00	0.70	2,186.00	0.20	0.533	0.643
B2	0.2071	0.00	1.00	467.00	0.90	443.00	0.70	1,161.00	0.20	0.465	0.553
B3	0.3081	187.00	1.00	1,450.00	0.90	821.00	0.70	623.00	0.20	0.711	0.815
B4	0.1043	0.00	1.00	0.00	0.90	487.00	0.70	556.00	0.20	0.433	0.542
B5	0.1019	0.00	1.00	0.00	0.90	570.00	0.70	449.00	0.20	0.480	0.600
Total	1.2698	420		2452		4851		4975		0.553	0.658

Table E4 Existing Uncontrolled Peak Flow 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	0.4969	0.54	0.65	10	104.2	178.6	78.10	161.09
A2	0.2071	0.46	0.55	10	104.2	178.6	27.88	56.83
A3	0.2800	0.74	0.85	10	104.2	178.6	60.19	117.63
Total	0.9840						166.17	335.54

Table E5 Post-Acquisition Uncontrolled Peak Flow 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	0.5484	0.53	0.64	10	104.2	178.6	84.66	175.14
B2	0.2071	0.46	0.55	10	104.2	178.6	27.88	56.83
B3	0.3081	0.71	0.82	10	104.2	178.6	63.47	124.65
B4	0.1043	0.43	0.54	10	104.2	178.6	13.10	28.05
B5	0.1019	0.48	0.60	10	104.2	178.6	14.16	30.33
Total	1.2698						203.27	415.00

McINTOSH PERRY

CCO-23-3606 - Reis Road - Swale Calculations

Swale Capacity Calculations

1 of 1

Runoff Calculations

Swale	Tc (min)	I (mm/hr)	I (mm/hr)	Estimated Drainage Area (ha)	Average C (5-year)	Average C (100-year)	Runoff (m ³ /s) (5-Year)	Runoff (m ³ /s) (100-Year)	Notes
New	10	104.2	178.6	0.18	0.65	0.81	0.034	0.072	Conservative

Manning's Equation For Channels:

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

Where

- Q= Volumetric Flow Rate [m³/s]
- k= Dimensionless Unit Conversion Factor [1 for Metric Units]
- n= Manning Roughness Coefficient (Per Chow, 1959)
- A= Cross sectional Flow Area [m²] (Smallest cross sectional area assumed)
- Pw= Wetted Perimeter [m] (smallest wetted perimeter assumed)
- S= Stream Slope [dimensionless](smallest slope assumed)

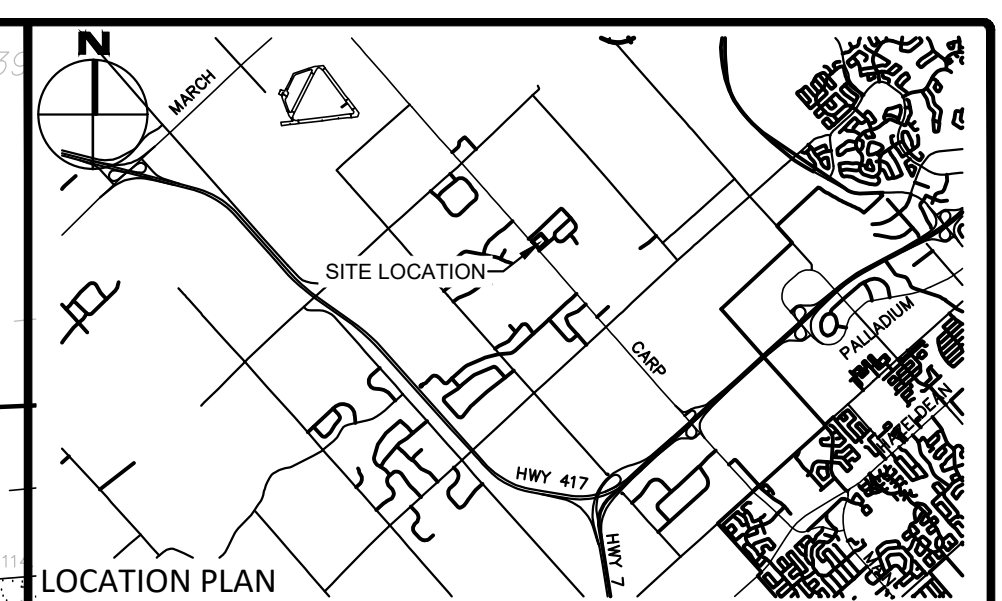
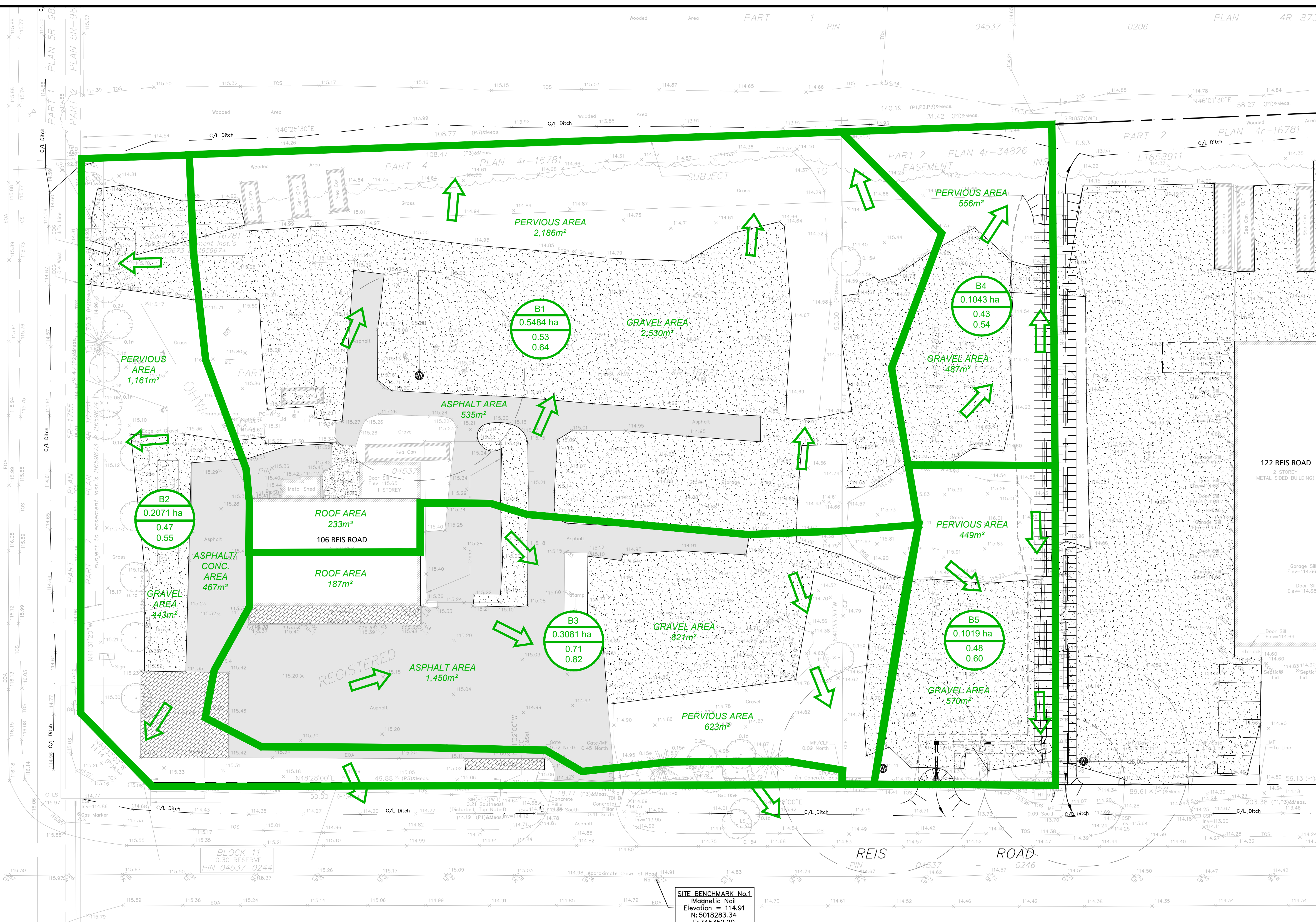
Capacity Calculations

Swale	Channel Material	Manning's n Value	Cross-Sectional Area (m ²)	Wetted Perimeter (m)	Slope (m/m)	Maximum Capacity (m ³ /s)	Occupied Capacity (5-Year)	Occupied Capacity (100-Year)
New	Grass	0.030	0.16	1.70	0.005	0.07803	43%	93%

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)
New	0.10	0.15	0.034	0.072	0.346	0.484

ROAD ALLOWANCE BETWEEN CONCESSIONS 2 AND 3
REGIONAL ROAD NO. 5 (Known as Carp Road)



LEGEND

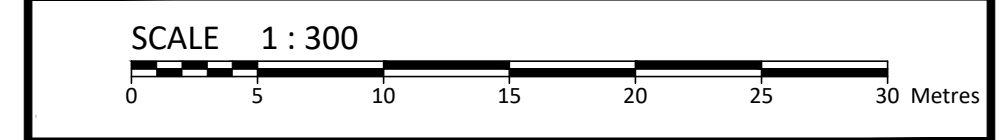
AREA I.D. **B1**
AREA SIZE (HECTARES) **X.XXXX ha**
RUNOFF COEFFICIENT **X.XX** (5-YEAR), **X.XX** (100-YEAR)

OVERLAND FLOW DIRECTION

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revisions	Date
2	ISSUED FOR SITE PLAN CONTROL AMENDMENT	FEB. 09, 2024
1	ISSUED FOR SITE PLAN CONTROL AMENDMENT	OCT. 13, 2023

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



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

Stamp:

Client: **GRACE MONUMENTS INC.**
106 REID ROAD
CARP, ON K0A 1L0

Project: **SITE PLAN CONTROL AMENDMENT**
106 REID ROAD, CARP, ON K0A 1L0

Drawing Title: **POST-ACQUISITION (PROPOSED) STORMWATER DRAINAGE AREA PLAN**

Scale: 1:300	Project Number: CCO-23-3606
Drawn By: J.H.	Checked By: B.S.C.
Designed By:	Drawing Number: SWM2

PROJECT: 115 Walgreen Road, RR3, Carp, ON K0A 1L0, 106 & 122 Reid Road. Drawing: CCO-23-3606-SWM2.dwg
LAST SAVED: Monday, February 12, 2024, 11:58:57 AM
LAST PLOTTED: Monday, February 12, 2024, 11:58:57 AM

D07-12-22-0118

XXXXX