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6158 Rideau Valley Drive

Conceptual Servicing and Stormwater Management Report

Prepared for: Millers Group



6158 Rideau Valley Drive Ottawa, Ontario

Conceptual Servicing and Stormwater Management Report

Prepared By:

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

July 2024

Novatech File: 121265 Ref: R-2023-162



July 12, 2024

BY EMAIL

City of Ottawa Planning, Development and Building Services Department 110 Laurier Ave W. Ottawa, ON K1P 1J1

Attention: Jeff Ostafichuk, Planner, Development Review – Rural Branch

Reference: Conceptual Servicing and Stormwater Management Report 6158 Rideau Valley Drive Our File No.: 121625

Please find enclosed the Conceptual Servicing and Stormwater Management Report (July 2024) issued in support of a minor zoning by-law amendment application for 6158 Rideau Valley Drive.

If you have any questions, please contact us.

Yours truly,

NOVATECH

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Lisa Bowley, P. Eng. Senior Project Manager Land Development Engineering

cc: Millers Group

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Table of Contents

1.0	INTRODUCTION	1
1.1	Site Location	1
1.2	Reference Documents	1
1.3	Existing Conditions	1
2.0	CONCEPTUAL SERVICING AND GRADING	2
3.0	CONCEPTUAL STORMWATER MANAGEMENT	3
3.1	Stormwater Management Criteria	3
3.2	Stormwater Quantity Control	3
3.3	Stormwater Quality Control	5
3.4	Erosion and Sediment Control	5
4.0	CONCLUSIONS	5

Figures

Figure 1	Key Plan
Figure 2	Site Context Plan
Figure 3	Pre-Development Conditions (2002)
Figure 4	Post-Development Conditions (2023)

Appendices

Appendix A	Correspondence
Appendix B	Stormwater Management Calculations

Drawings

121265-EXC	Existing Conditions Plan	Rev. 1
121265-GR	Grading Plan & Erosion and Sediment Control Plan	Rev. 1
121265-SDA	Pre & Post Development Storm Drainage Area Plan	Rev. 1

1.0 INTRODUCTION

Novatech has been retained to provide a Conceptual Servicing and Stormwater Management Report for the Millers Group property at 6158 Rideau Valley Drive. This report outlines the stormwater management strategy and site servicing for the property in support of a Minor Zoning By-law amendment application.

It is proposed to bring the existing home-based business on the property into compliance with the requirements of the City of Ottawa's Zoning By-law for home-based businesses. No changes to the current use of the property are proposed by the Minor Zoning By-law Amendment application.

Details of the required Minor Zoning By-law amendment application were discussed with City staff at a pre-consultation meeting held November 2, 2021. Notes of the meeting are included in **Appendix A**.

1.1 Site Location

The site is legally described as Part of Lot 13 Concession Broken Front AKA Concession 'A' Broken Front in the Geographic Township of North Gower now City of Ottawa. The site is located at 6158 Rideau Valley Drive. Refer to **Figure 1 – Key Plan** for the site location.

The total area of the property is 60.89 hectares in size, however only a small portion of the front of the property, approximately 5.45 hectares, that fronts onto Rideau Valley Drive, is considered for the Minor Zoning By-law amendment. The limits of the subject property for the purposes of this report are indicated on **Figure 2- Site Context Plan**.

The balance of the property is used for agricultural purposes.

1.2 Reference Documents

This report should be read in conjunction with the following reference documents:

- Environmental Impact Statement, prepared by Gemtec
- Hydrogeological and Terrain Analysis report prepared by Gemtec
- Geotechnical Investigation report prepared by Gemtec

1.3 Existing Conditions

The current landowner purchased the property in 1991. Based on discussions with the owner, the development of the site home-based businesses began in 2002. For the purposes of this report the pre-development conditions are assumed to be the conditions in 2002. Refer to **Figure 3** – **Pre-Development Conditions (2002)**. This plan within aerial imagery shows one 4-bedroom house and several outbuildings.

The subject property is currently used for agriculture and has been developed to accommodate a trucking and excavation home-based business, a snow removal home-based business, an on-farm diversified retail store, greenhouses, and accessory buildings, which led to the requirement for the Minor Zoning by-law amendment. For the purposes of this report the current site conditions are assumed to be the conditions in 2023, the date of the topographic survey, see below. The current site conditions are shown in **Figure 4 – Post-Development Conditions (2023)**. These features are expected to remain. No changes have been made to the site since the 2023 survey.

The property was surveyed in 2023. The current site features are detailed on the Existing Conditions Plan **(121265-EXC)**.

Property Access

The property is accessed from Rideau Valley Drive by a shared 6.0m wide gravel laneway. The laneway provides access to 6158 Rideau Valley Drive as well as 6168 Rideau Valley Drive. The owner of 6158 Rideau Valley Drive uses the driveway for both residential and home-based business purposes. The homeowner of 6168 uses the driveway as a residential access only.

Existing Services

Two wells service the property. Well No.1 is located near the residential dwelling. This well services the domestic water demands of this existing dwelling and the 2-storey storage shed which has a 3-piece bathroom for seasonal workers. Well No. 2 is located south of the workshop building. This well provides water for washing and cleaning of farm vehicles/equipment.

The property is serviced by two septic systems. Septic tanks/bed No.1 is located by the existing residential dwelling and provides domestic sewage treatment and disposal for the house. Septic tank No.2 services the 2-storey storage shed and provides domestic sewage treatment and disposal for the seasonal workers. The location of this second septic system is in the gravel area north of the workshop building.

The workshop building has an oil and grit separator within an internal trench drain. The trench drain outlets to the surface, west of the workshop.

Sewage demands for the retail store employees and customers are provided by portable toilets.

The locations of the existing services are shown on the Existing Conditions Plan (121265-EXC).

2.0 CONCEPTUAL SERVICING AND GRADING

This site is located outside the City of Ottawa urban boundary. Municipal services are not proposed or anticipated for the subject property as the closest municipal services are in the village of Manotick, approximately 4km west of the subject property.

The site is serviced by private wells and septic systems as described above.

The total drainage area for the purposes of this report is 6.0 hectares as depicted on Pre & Post Development Storm Drainage Area plan **(121265-SDA)**. Approximately half of this area (2.72ha) flows overland to the east and is collected by the roadside ditch on Rideau Valley Drive. The remainder of the area (3.28ha) flows overland to the west and is collected by the McIntyre-Scoobie Municipal Drain. There are no proposed changes to the current grading and drainage patterns.

Refer to the Grading Plan & Erosion and Sediment Control Plan (121265-GR) for details.

3.0 CONCEPTUAL STORMWATER MANAGEMENT

For the purposes of this report the pre-development conditions are assumed to be the conditions in 2002, and the post-development conditions are assumed to be the current site conditions as surveyed in 2023.

Pre-development and post-development drainage areas were developed to assess the stormwater management design criteria for the subject property. The overall drainage patterns are unchanged from the pre-development conditions, including external drainage patterns onto and off the site in the post-development condition.

Refer to Pre & Post Development Storm Drainage Area plan (121265-SDA).

3.1 Stormwater Management Criteria

The following stormwater management criteria is proposed:

<u>Stormwater Quantity</u>: Stormwater peak flows are to be controlled to pre-development levels for all storms up to and including the 1:100 year event.

Stormwater Quality: Implementation of lot level and conveyance Best Management Practices.

Erosion & Sediment Control: Provide guidelines for site preparation and construction.

3.2 Stormwater Quantity Control

Pre-Development

Under pre-development conditions (2002), the stormwater runoff for the 6.0-hectare drainage area is split, approximately 2.72 hectares flows east and approximately 3.28 hectares flows west. The drainage areas consist of mostly grassed area and crops, with some buildings and gravel laneways. The existing drainage patterns are described below.

• Stormwater runoff from the east portion of the site sheet drains to the roadside ditch at Rideau Valley Drive, which flows south towards the Rideau River.

• Stormwater runoff from the west area sheet drains to a shallow ditch, which outlets to the McIntyre-Scoobie Municipal Drain. The McIntyre-Scoobie Municipal Drain flows south and outlets to the Rideau River approximately 2km to the south.

Peak Flows

Peak flows were estimated using the Modified Rational Method. Supporting calculations are provided in **Appendix B.**

	Drainag	ge Area	Peak Flow (L/s)					
Outlet Location	(ha)		2-year		5-year		100-year	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Area 1: Rideau Valley Drive	2.72	2.72	139.4	238.1	189.1	323.0	397.1	641.7
Area 2: McIntyre- Scoobie Municipal Drain	3.28	3.28	217.1	308.1	294.5	418.0	596.9	831.5

Pre-Development vs. Post-Development Peak Flows

Storage Requirements

There are no changes to the existing drainage patterns (2002) in the post-development conditions (2023). However, runoff has increased due to the expanded hard surface areas (gravel access roads and additional buildings). Therefore, stormwater detention would be required.

Storage requirements were calculated using the Modified Rational Method. To control 100-year post-development flows to the 100-year pre-development rate, storage would be provided in the proposed grassed swales. Calculated storage volumes are outlined below.

Outlet Location	Storage Required	Storage Provided
Area 1: Rideau Valley Drive	147m ³	150m ³
Area 2: McIntyre-Scoobie Municipal Drain	160m ³	190m ³

The stormwater management storage would be provided by two linear dry detention ponds located as follows

- Area 1: West of Rideau Valley Drive roadside ditch
- Area 2: East of McIntyre-Scoobie Municipal Drain

Refer to the Grading Plan & Erosion and Sediment Control Plan (121265-GR) for details.

Detailed stormwater management calculations are provided in **Appendix B**.

Flow Control Structures

Flow control structures are proposed for both the outlet to Rideau Valley Drive roadside ditch and to the McIntyre-Scoobie Municipal Drain, from the grassed storage areas. The flow control structures would be designed to control the post-development stormwater peak flows to the pre-development condition.

3.3 Stormwater Quality Control

Best Management Practices (BMPs) would be implemented including:

- Overall site drainage patterns would remain the same.
- Surface drainage via grassed swales.
- Swales at minimal slopes.
- The existing landscape would be maintained where possible to minimize erosion and sediment transport.

3.4 Erosion and Sediment Control

Erosion and sediment control measures would be implemented prior to, during and after construction of the stormwater detention areas in accordance with the "Guidelines on Erosion and Sediment Control for Urban Construction Sites" (Government of Ontario, May 1987).

4.0 CONCLUSIONS

Conceptual Servicing and Grading

- The site is serviced by private wells and septic systems.
- The total drainage area for the purposes of this report is 6.0 hectares. Approximately half of the area flows overland to the east and is collected by the roadside ditch on Rideau Valley Drive and the remainder of the area flows overland to the west and is collected by the McIntyre-Scoobie Municipal Drain. There are no proposed changes to the current grading and drainage patterns.

Quantity Control

- Quantity control measures would be implemented to reduce post-development peak flows to pre-development levels for storm events ranging from the 1:5 year to the 1:100 year event.
- Quantity control storage would be provided inn grassed swales with flow control structures.

Quality Control

 Quality control measures would be Implementation of lot level and conveyance Best Management Practices.

Erosion and Sediment Control

• Erosion and sediment control would be implemented prior to, during and after construction.

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Prepared By:

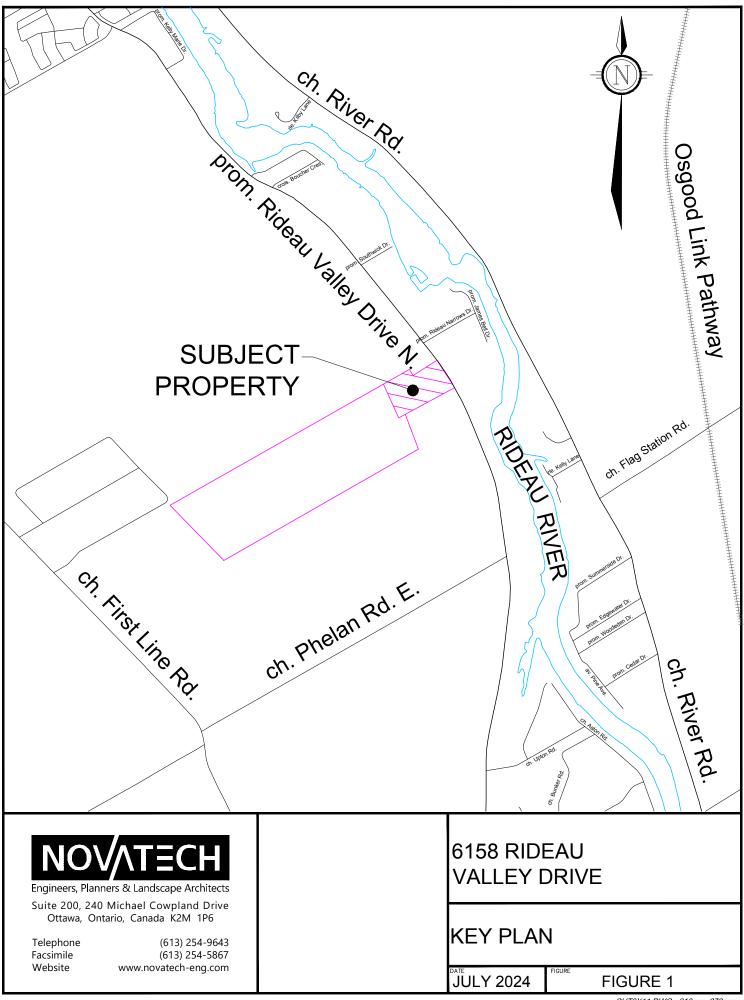
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Ryan Kargus, C Tech. Design Technologist Land Development Engineering

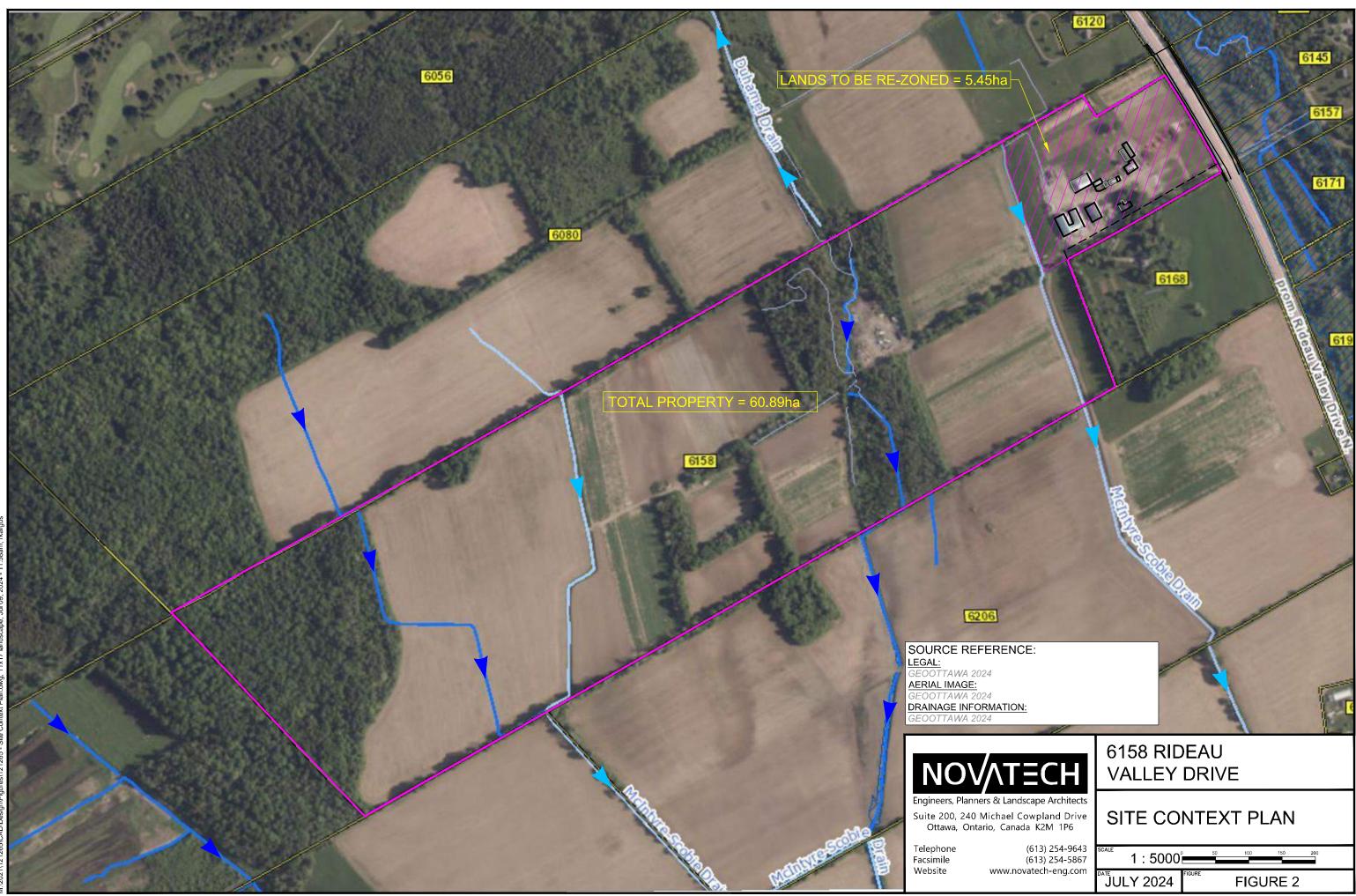
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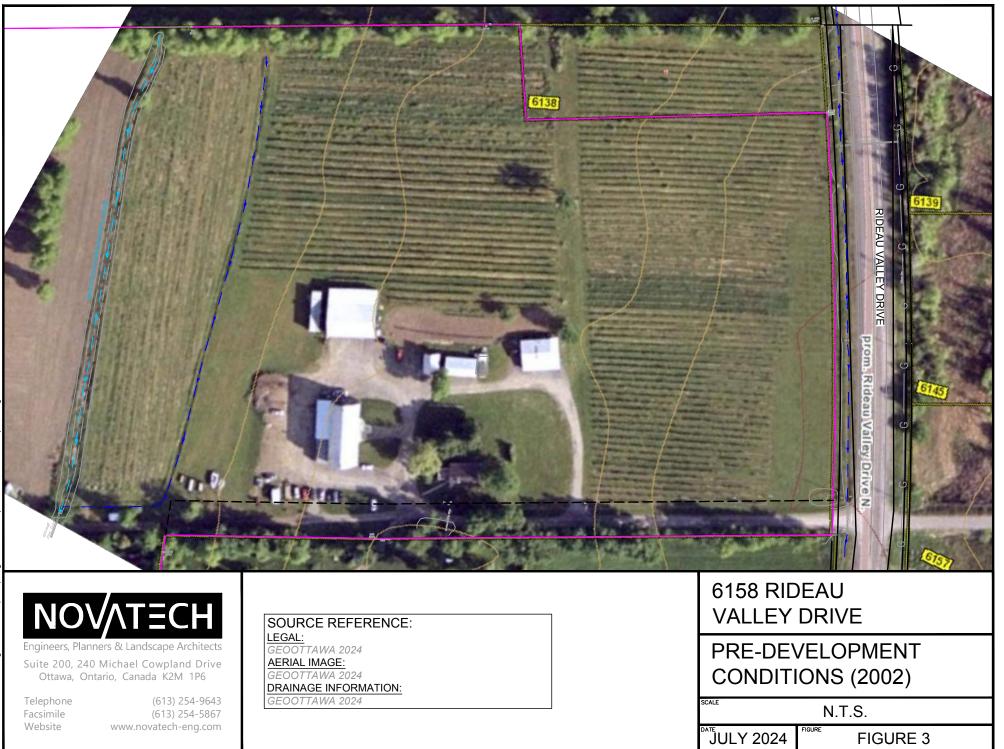
Lisa Bowley, P Eng. Senior Project Manager Land Development Engineering



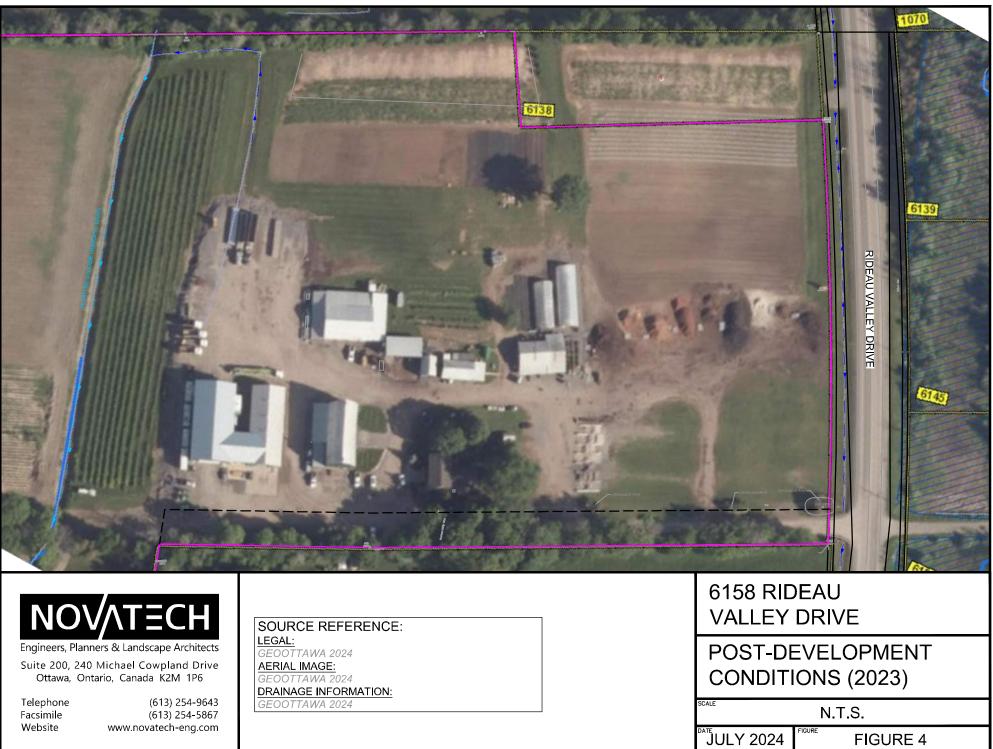
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Appendix A

Correspondence

1. City of Ottawa Pre-Consultation Notes (PC2021-0368), dated November 2, 2021

	Meeting Overview							
Pre-consultation meeting	November 2, 2021 2pm							
Requested Follow-up								
Information	December 24, 2021							
City Departments and	Planner and File Lead: Jeff Ostafichuk							
Agencies who may have an	Project Manager: Brian Morgan							
interest:	Environmental Planner: Matthew Hayley							
	Rideau Valley Conservation Authority: Eric Lalande							
	Transportation Engineer: Josiane Gervais							
	Hydrogeology: Tessa Di Iorio							
Owner:	Suzanne & Ronald Miller							
	Tel: 613.692.2380							
	Email: office@millersfarm.ca							
Applicant:	Novatech c/o Taylor West							
	Tel: 613.254.9643							
	Email: <u>t.west@novatech-eng.com</u>							
	Murray Chown m.chown@novatech-eng.com							
Project Description:	The applicant wishes to permit a trucking business and							
	landscape material outlet as an agricultural-related							
	industrial/commercial use on site.							
PC2021-0368								
	Subject Site Overview							
Site Address/ Location:	6158 Rideau Valley Dr; Concession A Lot 13, Ward 21							
Current/ Previous Site Use:	Agriculture, ag-related (from google maps: market, garden							
centre, mulch, and gravel sales)								
Lot Area:	60.9ha							
Method of Servicing:	Private well and septic system and ditches							
Environmental Site	- Natural Heritage along rear of property							
Conditions:	- Unevaluated wetlands across property near zone limit							
	- Multiple watercourses through property							
	Policy							
Zoning:	AG & AG[147r]							
Official Plan Designation:	Agricultural Resource Area							
NEW Official Plan:	Agricultural Resource Area							
What we Know								

Information provided by Consultant:

The trucking business was originally part of the agricultural operations on the Subject Site. The trucks include 7 tractor trailers, 2 triaxle dump trucks, 1 straight truck, 2 backhoes and shovels. The trucking business has various trailers for the trucks which include dump trailers, flat beds, belly dumps and a float. The trucks were originally (and still are) used to haul beans, corn, and straw for the agricultural operations on the Subject Site. The vehicles were eventually used for agricultural purposes serving other farms in the immediate area. The "trucking use" on the Subject Property has since expanded, originally starting as a way to keep the trucks from standing idle in the off seasons. The trucking use now consists of

hauling for aggregate and soils, and snow removal in the winter months. The trucking business also plows snow. Similar to the trucks used for agriculture, this use originated from on-site snow clearing, and expanded to a few local contracts. The trucking business is operated by a resident of the farm, and is a home-based business. This home based-business is secondary to the farm. It is estimated that the trucking business takes up 500m2 of area, or roughly 0.1% of the lot area.

Our understanding is that the trucking business requires the following relief:

- Pursuant to subsections 127(1) and 128(1), home-based businesses may not become a nuisance because of noise, odour, dust, fumes, vibration, radiation, glare, traffic, or parking generated.
- Pursuant to subsections 127(8) and 128(1), Home-based businesses must not involve the use of the premises as a dispatching office or supply depot.
- Pursuant to subsection 128(2), a maximum of three on-site employees are permitted that are not residents of the Subject Property.
- Pursuant to subsection 126(1), no more than three heavy vehicles of any type are permitted to be parked on a lot within the Agricultural Zone
- Pursuant to subsection 128(10), a maximum area of 100 sqm is permitted for outdoor storage associated with a home-based business.

The excavation business is the landscaping supply business. The business involves the sale of landscaping material including soil, mulch and gravel. The material is stockpiled in mounds toward the front of the Subject Property where it is sold to customers. Soil is also bagged on the Subject Property and shipped on trucks. Please note that the landscaping business is a seasonal use, with the majority of the business taking place in April and May. The excavation business is operated by a resident of the farm, and is a home-based business. This home based-business is secondary to the farm. It is estimated that the landscaping supply business takes up 300m2 of area, or roughly 0.05% of the lot area.

Our understanding is that the excavation business requires the following relief:

- Pursuant to subsection 127(12) and 128(1), a home-based business may not sell any item or material that is not produced on the premises (unless it is done through telemarketing or by mail-order).
- Pursuant to subsection 128(8), sale areas are not permitted outside of the dwelling unit or accessory buildings. Outdoor sales are therefore prohibited.
- Pursuant to subsection 128(10), a maximum area of 100 sqm is permitted for outdoor storage associated with a home-based business.

The other uses of the property include farming, greenhouse farming, craft shop (permitted under the provisions of exception 147r), and seasonal activities associated with the farm, such as tractor rides. The site also has indoor storage of boats and cars within the barns. It is our understanding that the indoor storage of boats and cars is a legally non-complying use.

The site was originally Zoned A1 (Restricted Rural Zone) and A2 (General Rural Area) in the Township of Rideau Zoning By-law 84-77. The A1 zone applied to the portion of the property that is now subject to the 147r exception. In January of 2003, an application for zoning

amendment was filed in order to permit the additional uses of indoor and outdoor storage, and a gift shop.

The Zoning By-law amendment affected the portion of the Subject Property zoned A1 to a site-specific A1-8 zone. The A1-8 zone permitted the additional non-residential uses of a craft shop, limited to 115 sqm, and a rural home occupation.

Next Steps							
Anticipated Applications required:	Rezoning						
Anticipated required Studies/Plans:	 Grade control and drainage plan Transportation impact assessment Stormwater management report Geotechnical Study Groundwater Impact study Assessment of Adequacy of Servicing/Site Service Brief Erosion and sediment control plan Hydrogeological and terrain analysis Noise/ Vibration study Phase 1 ESA Survey plan Environmental Impact Statement Planning Rationale Concept Plan detailing all structures, private services, water courses, natural features and their setbacks. 						

Special Notes

Engineering

For the "Assessment of adequacy of existing servicing" report, in terms of the water (well) and wastewater (septic). The applicant should be aware that if the 'Adequacy of existing servicing' report identifies that additional water is needed for the proposed uses compared to existing uses, or there is a need to increase the septic sizing, then a Hydrogeolgoical and Terrain Analysis (HGTA) Report will be needed to support the zoning application. Note that the HGTA Guidelines identify that any change in land used (through OPA or zoning) must be viable and sustainable from a servicing perspective. If a HGTA report is required (due to change in existing use), then technical pre-consultation is recommended to appropriately scope the study.

With some uncertainty about the proposed uses. I.e. will there be vehicle servicing or washing on site. These issues should be clearly identified in the "Assessment of adequacy of existing servicing" report, since it may impact the water and wastewater requirements. In addition, if there will be vehicle washing or vehicle servicing onsite, then washwater and servicing areas must be appropriately managed such that they do not contaminate the supply aquifer; a hydrogeologic impact assessment would be needed (to be included in the HGTA Report) and should reference the stormwater management report.

Environmental

If the rezoning is for the entire property, then there may natural features within the wooded areas and along some of the watercourses/surface water features in the rear yard. There are no triggers for an Environmental Impact Statement to support this application to rezone the site as there are limited environmental features on the property <u>adjacent to the home/barn (as illustrated in the concept plan provided</u>, If a rezoning for the entire property is submitted, then an EIS is required to identify the natural features and assess the impact proposed uses on those features. If the rezoning is limited to the area illustrated in the concept plan then an EIS is not required.

Additionally as discussed at the pre-application consultation meeting, *any structures and servicing should respect the setbacks to the surface water features.*

Conservation Authority

Maintain the required 30m setback from all watercourses on the subject property. Alterations to a watercourse, including culverts, require written permission from the RVCA. There is an interest to be involved in review as it relates to potential wetlands on the property, however as they are not regulated at present, any review would be in support of the City of Ottawa's Application review process.

Site Map



Zoning Provisions

Agriculture-related use means those farm-related uses that that are intended to provide direct products and/or services to farm operations as a primary activity, are compatible with local farm operations, and are limited to:

- non-accessory storage of farm products and farm related machinery;
- sorting or packing of farm products

Agricultural use means the cultivation of the soil to produce crops and the raising of farm animals, and without limiting the generality of the foregoing includes:

- a. the growing of crops;
- b. nurseries, greenhouses, market gardens, orchards, vineyards, agro-forestry operations and maple syrup production;
- c. the keeping and raising of livestock, fowl, fish, bees or fur or wool bearing animals;
- d. farm-based home industry involving the production of value-added or valueretained products from produce grown or raised on-site;
- e. a farm produce outlet selling agricultural products produced on the premises.

Garden centre means an outdoor or indoor area used primarily for the display and retail sales of plants, gardening and landscaping supplies and equipment.

Home-based business means one or more businesses operated by a resident as secondary and subordinate **uses** to a residence or farm, and includes a home-based day care

On-farm diversified use means a use that is ancillary to the principal agricultural use of a property, and includes but is not limited to educational displays, veterinary clinic, restaurant, bakery, retail store, retail food store, micro-brewery, micro-distillery, place of assembly, solar installations, agri-tourism uses, uses that produce value-added agricultural products, and agriculture-related uses.

Storage yard means land used for outdoor storage, including:

- a. the storage of vehicles, including an automobile salvage operation or scrap yard;
- b. the storage of road maintenance material such as gravel or sand;
- c. the storage of construction, building or landscaping material; and
- d. the storage of heavy vehicles or construction equipment, and includes an accessory maintenance garage used for the service and repair of the stored vehicles and equipment

79A – On-farm Diversified Uses

- 1) on-farm diversified uses are subject to the following provisions
 - a. An on-farm diversified use is permitted if the principal use of the lot is agricultural;
 - b. On-farm diversified uses are limited to 2% of the total lot area, to a maximum of 1 hectare;
 - c. the area of on-farm diversified uses on a lot includes:
 - i. The total area of buildings, structures and outdoor storage associated with home-based businesses, and
 - ii. The total area of buildings and structures built after November 8, 2017 associated with the on-farm diversified use, and
 - 1. 50% of the area of buildings or structures built prior to November 8, 2017 that have been converted to an on-farm diversified use, and
 - iii. The area of laneways and septic systems that were developed on or after November 8, 2017, and
 - iv. Parking areas, outdoor storage areas, and landscaped areas that are associated with an on-farm diversified use, and
 - v. Despite the above, the area of agri-tourism uses associated with activities such as wagon rides or corn mazes on lands producing harvestable crops are not included in the area calculations;
 - d. The total floor area occupied by on-farm diversified uses may not exceed 20% of the total land area permitted for on-farm diversified uses on the lot, to a maximum of 600 square metres (except where otherwise stated), and;
 - i. The total floor area occupied by on-farm diversified uses, limited to place of assembly, instructional facility and restaurant uses, whether located in new or existing buildings, may not exceed 150 square metres;
 - ii. The total cumulative floor area of all on-farm diversified uses on a lot may not exceed 600 square metres, with a maximum of 300 square metres for floor area built after November 8, 2017;
 - iii. Floor area used for processing that may incorporate inputs grown offsite does not need to be counted towards the maximum total floor area and is subject only to the maximum areas under b) above.
 - e. Any outdoor storage or parking areas associated with an on-farm diversified use must be screened from view from a public street or a residential use on an abutting lot.
 - f. Outdoor storage areas and parking areas associated with an on-farm diversified use must not be located within 10 metres of any lot line.
 - g. Maximum number of heavy vehicles, including recreational vehicles, associated with an on-farm diversified use: 3
 - h. Required parking is as identified under Table 101 for the use proposed.
 - i. Every effort should be made to cluster on-farm diversified uses, make use of existing laneways, and locate on areas of poorer soil.

79B – Agriculture- related uses

- 1) Agriculture-related uses are subject to the following provisions:
 - a) The maximum combined area of all agriculture-related uses and on-farm diversified uses on a lot is 1 hectare;
 - b) The minimum lot area for an agriculture-related use is as per the zone;
 - c) If there is more than one agriculture-related use or on-farm diversified use on a lot, the combined area of all agriculture-related and on-farm diversified uses is included in the total;
 - d) The maximum area of agriculture-related uses includes any buildings, structures, outdoor storage areas, parking areas, and well and septic systems that are associated with the use.

Agricultural Zone

Permitted Uses:

- Agricultural use
- Agricultural-related use
- Home-based business
- On-farm diversified use

Zoning Mechanisms	Agricultural use	Other uses
Min lot width	90m	30m
Min lot area	36ha	0.2ha
Front yard setback	10m	10m
_	6m from farm produce outlet of	
	GFA 28m2 or less	
Rear yard setback	10m	10m
Interior side yard setback	5m	5m
Max height	12m	12m
Max lot coverage	20%	20%

AG[147r]

Additional permitted uses: retail store limited to a craft shop Provisions: retail store limited to a max size of 155m2

New Official Plan Policies

9.1 Agricultural Resource Area

2.1. On lands designated as Agricultural Resource Area, a variety of types, and intensities of agricultural uses and normal farm practices are permitted and shall be consistent with Provincial guidelines related to uses and practices in prime agricultural areas.

2.2. On-farm diversified uses and agricultural-related uses that are compatible with and do not hinder surrounding agricultural operations and permitted subject to limitations on size, scale and location on the property as determined by the Zoning By-law. A Zoning By-law Amendment is required for any increase to the permitted size of an on-farm diversified use or agriculture-related use.

Planning Comments

To conclude, based on the information <u>currently</u> before City, staff cannot support a zoning bylaw application to recognize the uses currently not in conformity to the Official Plan and Zoning by-law.

The requested plans and studies identified in our summary are required to support the application to amend the zoning by-law should your client choose to proceed. A recommendation will be made based on the supporting documents, more specifically the planning rationale.

Appendix B

Stormwater Management Calculations

PROJECT #: 121265 PROJECT NAME: Millers Group LOCATION: 6158 Rideau Valley Drive



Area 1 - Rideau Valley Drive

Pre-Development Runoff Coefficient "C"

Area	Surface	Ha	"C"	C _{avg}	*C ₁₀₀	Runoff C
Total	Hard	0.16	0.90	0.24	0.29	$C = (A_{har})$
2.72	Soft	2.56	0.20	0.24	0.29	*C = (A _{ha}

Coefficient Equation

ard x 0.9 + A_{soft} x 0.2)/A_{Tot}

hard x 1.0 + A_{soft} x 0.25)/A_{Tot} * Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100year event

Pre-Development (uncontrolled)

Outlet Options	Area (ha)	Q _{2 Year} (L/s)	Q _{5 Year} (L/s)	Q _{100 Year} (L/s)
Rideau Valley Drive	2.72	139.4	189.1	397.1
Time of Concentration	Tc=	10	min	
Rainfall Intensity (2 Year Event)	I ₂ =	76.81	mm/hr	
Rainfall Intensity (5 Year Event)	I ₅ =	104.19	mm/hr	
Rainfall Intensity (10 Year Event)	I ₁₀ =	122.14	mm/hr	
Rainfall Intensity (25 Year Event)	I ₂₅ =	144.69	mm/hr	
Rainfall Intensity (50 Year Event)	I ₅₀ =	161.47	mm/hr	
Rainfall Intensity (100 Year Event)	I ₁₀₀ =	178.56	mm/hr	

100 year Intensity = 1735.688 / (Time in min + 6.014) 0.820 10 year Intensity = 1174.184 / (Time in min + 6.014)^{0.816} 5 year Intensity = $998.071 / (Time in min + 6.053)^{0.814}$ 2 year Intensity = 732.951 / (Time in min + 6.199)^{0.810}

For 25 year storms add 10% to C value For 50 year storms add 20% to C value

For 100 year storms add 25% to C value



Area 1 - Rideau Valley Drive

Post-Development Runoff Coefficient "C"

Area	Surface	На	"C"	C _{avg}	*C ₁₀₀	Runoff Co
Total	Hard	0.82	0.90	0.41	0.48	$C = (A_{hard})$
2.72	Soft	1.90	0.20	0.41	0.40	$*C = (A_{har})$

unoff Coefficient Equation

 $= (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

*C = $(A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$ * Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100year event

Post-Development (uncontrolled)

Outlet Options	Area	Q _{2 Year}	Q _{5 Year}	Q _{100 Year}
	(ha)	(L/s)	(L/s)	(L/s)
Rideau Valley Drive	2.72	238.1	323.0	641.7
Time of Concentration	Tc=	10	min	
Rainfall Intensity (2 Year Event)	₂ =	76.81	mm/hr	
Rainfall Intensity (5 Year Event)	₅ =	104.19	mm/hr	

Rainfall Intensity (10 Year Event) I₁₀= 122.14 mm/hr Rainfall Intensity (25 Year Event) I₂₅= 144.69 mm/hr Rainfall Intensity (50 Year Event) I₅₀= 161.47 mm/hr Rainfall Intensity (100 Year Event) 178.56 mm/hr I₁₀₀=

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$ 10 year Intensity = 1174.184 / (Time in min + 6.014) $^{0.816}$ 5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$ 2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

For 25 year storms add 10% to C value For 50 year storms add 20% to C value For 100 year storms add 25% to C value



Area 1 - Rideau Valley Drive

QUANTITY STORAGE REQUIREMENT - 2 YEAR

2.72 =Area (ha)

0.41 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m ³)
	0	167.22	518.43	139.4	379.03	0.00
2 YEAR	5	103.57	321.10	139.4	181.70	54.51
ZTEAR	10	76.81	238.12	139.4	98.72	59.23
	15	61.77	191.49	139.4	52.09	46.89

QUANTITY STORAGE REQUIREMENT - 5 YEAR

2.72 =Area (ha)

0.41 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m ³)
	0	230.48	714.55	189.1	525.45	0.00
5 YEAR	5	141.18	437.69	189.1	248.59	74.58
JILAK	10	104.19	323.03	189.1	133.93	80.36
	15	83.56	259.05	189.1	69.95	62.95

QUANTITY STORAGE REQUIREMENT - 100 YEAR

2.72 =Area (ha)

0.48 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m ³)
	0	398.62	1432.57	397.1	1035.47	0.00
100 YEAR	5	242.70	872.24	397.1	475.14	142.54
100 TEAK	10	178.56	641.71	397.1	244.61	146.77
	15	142.89	513.54	397.1	116.44	104.80



Area 2 - McIntyre-Scoobie Drain

Pre-Development Runoff Coefficient "C"

Area	Surface	На	"C"	C _{avg}	*C ₁₀₀	Runoff Coeffic
Total	Hard	0.51	0.90	0.31	0.37	$C = (A_{hard} \times 0.9)$
3.28	Soft	2.77	0.20	0.51	0.57	$*C = (A_{hard} \times 1)$

icient Equation

.9 + A_{soft} x 0.2)/A_{Tot}

1.0 + A_{soft} x 0.25)/A_{Tot} * Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100year event

Pre-Development (uncontrolled)

Outlet Options	Area	Q _{2 Year}	Q _{5 Year}	Q _{100 Year}
	(ha)	(L/s)	(L/s)	(L/s)
McIntyre-Scoobie Drain	3.28	217.1	294.5	596.9
Time of Concentration	Tc=	10	min	
Rainfall Intensity (2 Year Event)	I ₂ =	76.81	mm/hr	
Rainfall Intensity (5 Year Event)	I ₅ =	104.19	mm/hr	
Rainfall Intensity (10 Year Event)	I ₁₀ =	122.14	mm/hr	
Rainfall Intensity (25 Year Event)	I ₂₅ =	144.69	mm/hr	

I₅₀=

I₁₀₀=

161.47

178.56

mm/hr

mm/hr

100 year Intensity = 1735.688 / (Time in min + 6.014) 0.820 10 year Intensity = 1174.184 / (Time in min + 6.014)^{0.816} 5 year Intensity = $998.071 / (Time in min + 6.053)^{0.814}$

2 year Intensity = 732.951 / (Time in min + 6.199)^{0.810}

For 25 year storms add 10% to C value For 50 year storms add 20% to C value

Rainfall Intensity (50 Year Event)

Rainfall Intensity (100 Year Event)

For 100 year storms add 25% to C value



Area 2 - McIntyre-Scoobie Drain

Post-Development Runoff Coefficient "C"

Area	Surface	Ha	"C"	C _{avg}	*C ₁₀₀	Runoff C
Total	Hard	1.14	0.90	0.44	0.54	$C = (A_{har})$
3.28	Soft	2.14	0.20	0.44	0.51	$*C = (A_{ha})$

unoff Coefficient Equation

= (A_{hard} x 0.9 + A_{soft} x 0.2)/A_{Tot}

 $C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$ * Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100year event

Post-Development (uncontrolled)

Outlet Options	Area (ha)	Q _{2 Year} (L/s)	Q _{5 Year} (L/s)	Q _{100 Year} (L/s)
McIntyre-Scoobie Drain	3.28	308.1	418.0	831.5
Time of Concentration	Tc=	10	min	
Rainfall Intensity (2 Year Event)	I ₂ =	76.81	mm/hr	
Rainfall Intensity (5 Year Event)	I ₅ =	104.19	mm/hr	
Rainfall Intensity (10 Year Event)	I ₁₀ =	122.14	mm/hr	
Rainfall Intensity (25 Year Event)	I ₂₅ =	144.69	mm/hr	
Rainfall Intensity (50 Year Event)	I ₅₀ =	161.47	mm/hr	

I₁₀₀=

178.56

mm/hr

100 year Intensity = $1735.688 / (Time in min + 6.014)^{0.820}$ 10 year Intensity = $1174.184 / (Time in min + 6.014)^{0.816}$ 5 year Intensity = $998.071 / (Time in min + 6.053)^{0.814}$ 2 year Intensity = $732.951 / (Time in min + 6.199)^{0.810}$

For 25 year storms add 10% to C value For 50 year storms add 20% to C value

For 100 year storms add 25% to C value

Rainfall Intensity (100 Year Event)



Area 2 - McIntyre-Scoobie Drain

QUANTITY STORAGE REQUIREMENT - 2 YEAR

3.28 =Area (ha)

0.44 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m ³)
	0	167.22	670.91	217.1	453.81	0.00
2 YEAR	5	103.57	415.54	217.1	198.44	59.53
ZILAR	10	76.81	308.15	217.1	91.05	54.63
	15	61.77	247.82	217.1	30.72	27.65

QUANTITY STORAGE REQUIREMENT - 5 YEAR

3.28 =Area (ha)

0.44 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m ³)
	0	230.48	924.72	294.5	630.22	0.00
5 YEAR	5	141.18	566.42	294.5	271.92	81.58
JILAK	10	104.19	418.03	294.5	123.53	74.12
	15	83.56	335.24	294.5	40.74	36.67

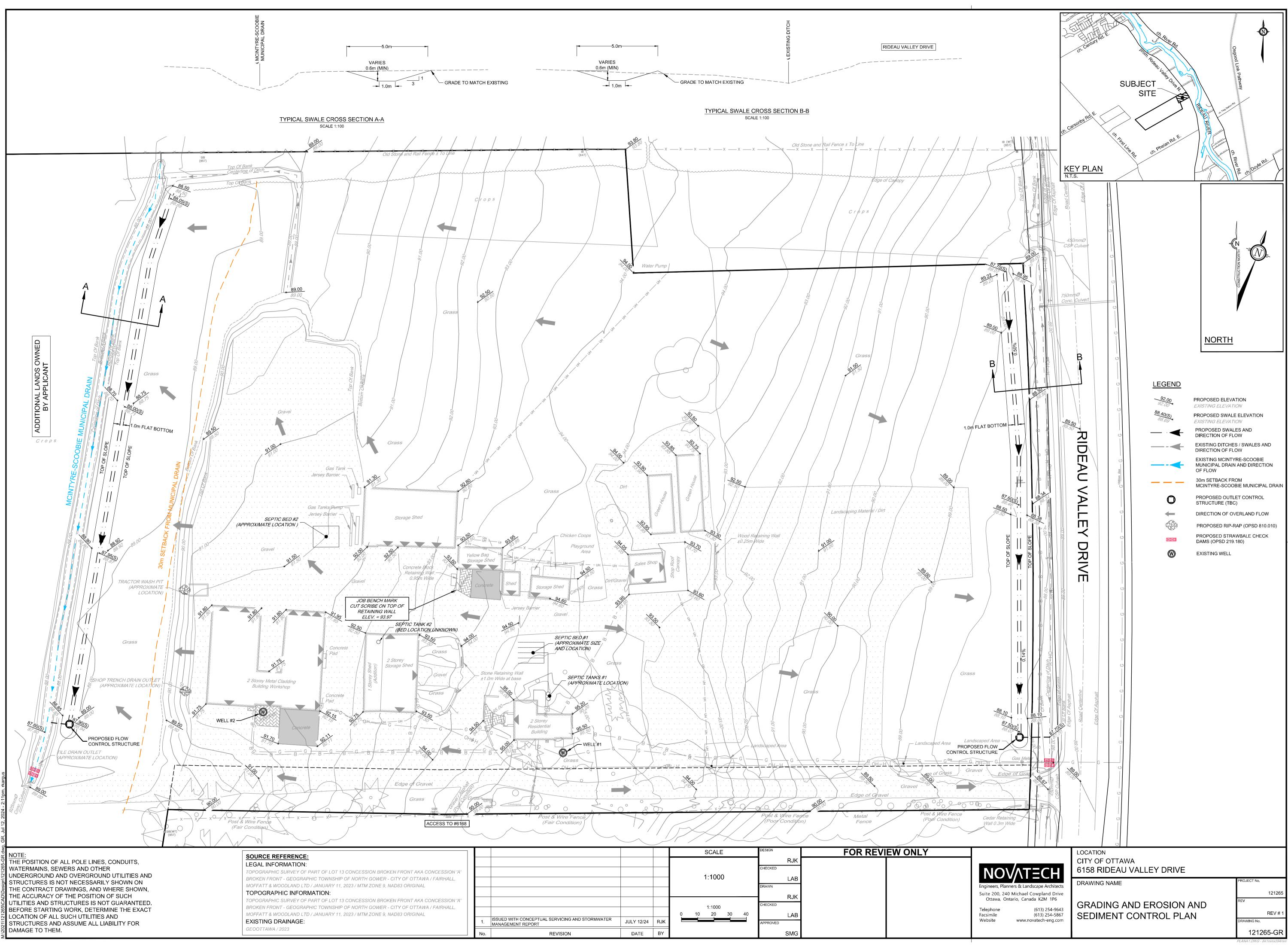
QUANTITY STORAGE REQUIREMENT - 100 YEAR

3.28 =Area (ha)

0.51 = C

					Net Flow	
Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	to be Stored (L/s)	Storage Req'd (m ³)
Fenou	(11111)	(((((((((((((((((((((((((((((((((((((((Q (L/S)	(L/3)	(L/S)	ixeq u (iii)
	0	398.62	1856.17	596.9	1259.27	0.00
100 YEAR	5	242.70	1130.15	596.9	533.25	159.98
100 TEAR	10	178.56	831.46	596.9	234.56	140.74
	15	142.89	665.39	596.9	68.49	61.64



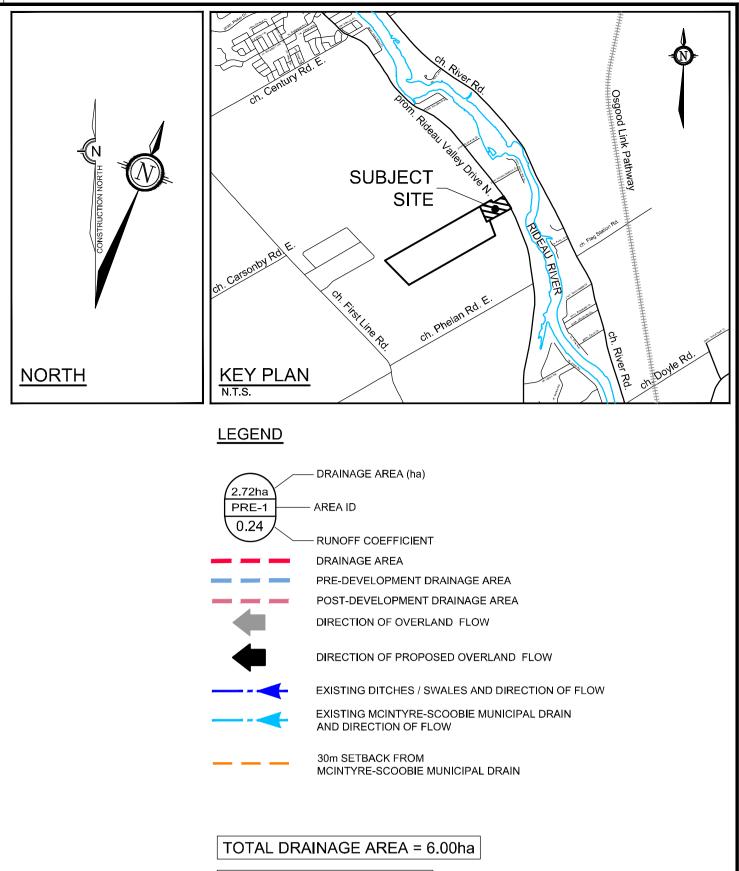


					SCALE	DESIGN	FOR REVIEW ONLY
						RJK	
'A'					1:1000	CHECKED	
					1.1000	LAB	
						RJK	
Ά'					1:1000	CHECKED	
					0 10 20 30 40	LAB	
	1.	ISSUED WITH CONCEPTUAL SERVICING AND STORMWATER MANAGEMENT REPORT	JULY 12/24	RJK		APPROVED	
	No.	REVISION	DATE	BY		SMG	



LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

					SCALE	DESIGN	FOR REVIEW ONLY
					- 1:1000	RJK CHECKED LAB	
-					- 1:1000 0 10 20 30 40	CHECKED LAB	
	1.	ISSUED WITH CONCEPTUAL SERVICING AND STORMWATER MANAGEMENT REPORT	JULY 12/24	RJK		APPROVED	
	No.	REVISION	DATE	BY		SMG	



TOTAL SITE AREA = 5.45ha

SOURCE REFERENCE: LEGAL INFORMATION:

Topographic Survey of Part of Lot 13 Concession Broken Front AKA Concession 'A' Broken Front - Geographic Township of North Gower -City of Ottawa / Fairhall, Moffatt & Woodland Ltd / January 11, 2023 / MTM Zone 9, NAD83 Original TOPOGRAPHIC INFORMATION:

• Topographic Survey of Part of Lot 13 Concession Broken Front AKA Concession 'A' Broken Front - Geographic Township of North Gower - City of Ottawa / Fairhall, Moffatt & Woodland Ltd / January 11, 2023 / MTM Zone 9, NAD83 Original • GeoOttawa / 2023

EXISTING DRAINAGE:

GeoOttawa / 2023

