Kollaard Associates
Engineers
210 Prescott Street, Unit 1
P.O. Box 189
Kemptville, Ontario K0G 1J0

Civil • Geotechnical •
Structural • Environmental •
Hydrogeology •

(613) 860-0923
FAX: (613) 258-0475

SERVICING AND STORMWATER MANAGEMENT REPORT
121 BRAE CRESCENT
STITTSVILLE, ONTARIO

Prepared For:
Bryden Gibson Architects Incorporated
1066 Somerset Street West
Suite 200
Ottawa, Ontario
K1Y 4T3

PROJECT #: 220338

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1 INTRODUCTION

Kollaard Associates was retained by Bryden Gibson Architects Incorporated to complete a Site Servicing and Stormwater Management Report for a new multi-unit residential development in Stittsville, Ontario.

This report will address the serviceability of the proposed site, specifically relating to the adequacy of the existing sanitary sewer, storm sewer, and watermains to hydraulically convey the necessary storm runoff, sanitary sewage and water demands that will be placed on the existing system. The report shall also summarize the stormwater management (SWM) design requirements and proposed works that will address stormwater flows arising from the site under post-development conditions. The report will identify any stormwater servicing concerns and also describe any measures to be taken during construction to minimize erosion and sedimentation.

The proposed development is located at 121 Brae Crescent. The property is on the south side of Brae Crescent at the intersection of Brae Crescent and Norway Spruce Street. In older city records, the current Brae Crescent is sometimes referred to as Pine Street or Elm Street. In older city records, Norway Spruce Street is sometimes referred to as Spruce Street.

The site has a total area of 0.06 hectares and is vacant. It is understood that a multi-use building with a 160 square meter footprint will be constructed on the site. The proposed building will be 3-stories in height with associated surface parking. Parking access will be from Norway Spruce Street. There are to be five residential units in the building. Unit one is located in the basement, units two and three are located on the 1st floor, and units four and five will occupy both the 2nd and 3rd floors.

2 BACKGROUND

It is understood the sites at 121 Brae Crescent and 125 Brae Crescent were once part of the property at 123 Brae Crescent (historically labelled as 20 Spruce Street). The properties known as 121 Brae Crescent and 125 Brae Crescent are currently unoccupied.

City of Ottawa Drawing GO-244 p&p 25 (completed in 1979) shows the following information:

- Sanitary laterals extending east from the 250mm diameter sanitary main on Norway Spruce.
- A sanitary main connecting from the west section of Brae Street (Pine Street) to the main on Norway Spruce at manhole no.235.

- The sanitary main on Brae (Pine Street) does not extend eastward past the intersection of Norway Spruce.

A topographic survey completed by Annis, O'Sullivan Vollebekk Ltd in 2022 shows the following:

- A gas line connecting from the gas main on Norway Spruce Street to the residence at 123 Brae Crescent.
- An overhead hydro line connecting from a pole on Norway Spruce Street to the residence at 123 Brae Crescent.
- A water valve on Norway Spruce between the gas line and utility pole adjacent to the site.
- A water valve on Brae Crescent located at the entranceway to 123 Brae.

From these drawings it is understood that the property formerly known as 20 Spruce Street was serviced from Norway Spruce Street through the property now known as 121 Brae Crescent.

Discussions with the City of Ottawa (see appendix for correspondence) indicated that a plan and profile drawing (P&P) was tied to a consent application for the severance of lots 121, 123 and 125 Brae. The drawing shows the design of a proposed sanitary sewer extension from the manhole at the intersection of Norway Spruce and Brae (manhole no 235) to the midpoint on 125 Brae. A note on the drawing indicates that the contractor will locate and use the existing services that previously serviced 123 Brae to service the new development at 121 Brae.

Google Street View imagery shows that after 2009 and prior to 2012 work was completed on Brae Crescent with road cuts that extend from sanitary manhole no.235 eastward, terminating in front of the residence at 123 Brae. Road cuts are also shown above the watermain on Brae Crescent, extending to the water valve at the entrance in front of 123 Brae.

During a site investigation it was found that there is a sanitary pipe coming from the east and connecting to manhole no 235. The overhead hydro line connecting from a pole on Norway Spruce Street to the residence at 123 Brae Crescent still remains.

Although the City of Ottawa does not have records of an extension of a sanitary sewer toward the east on Brae, it is probable that one was completed between 2009 and 2012, and that a new sanitary lateral and water lateral were installed to service the residence at 123 Brae. The original sanitary and water stubs remain on Norway Spruce Street for use with a new development at 121 Brae.

Since the proposed development on 121 Brae will consist of a multi-unit dwelling and not a single family dwelling, it is unlikely that the existing laterals on Norway Spruce will be of adequate size for the sanitary and water demands of the new development. Therefore it is proposed to abandon these service stubs. The existing sanitary lateral should already be

capped at the property line. The existing water lateral should be abandoned at the main in accordance with the City of Ottawa standards. The new service lateral location and sizing information will be located on the Kollaard Associates Servicing Plan drawing 220338-SER.

It is strongly advised that the owner have site locates completed on the property to verify if there are still gas lines, and telecommunication lines running through the property of 121 Brae to service 123 Brae. The exact location of this information is unknown, and these utilities may need to be relocated.

3 STORMWATER DESIGN

3.1 Introduction and Design Summary

Design of the storm sewer system was completed in conformance with the City of Ottawa Sewer Design Guidelines (October 2012 as amended).

The majority of the runoff from the existing property currently drains via overland flows to the northwest, into the roadside ditch on Norway Spruce Street.

On site storage is to be provided on the upper and lower portions of the roof of the building. The release rate from the proposed on-site detention will be restricted by the use of adjustable flow control roof drains such that the post-development flows originating within the building footprint during a 100 year event do not exceed the 2-year pre-development conditions.

Calculations of the required storage volumes have been prepared based on the Rational Method as identified in Section 8.3.10.3 of the City's Sewer Guidelines. The depth and extent of surface storage will be illustrated on the upper roof drainage plan (220338-UPPER ROOF) and lower roof drainage plan (220338-LOWER ROOF).

3.2 Stormwater Management Design Criteria

Quantity and quality control criteria were provided by the City of Ottawa (CoO). The correspondence with the CoO is incuded in Appendix B. The stormwater management criteria for quantity and quality control as follows:

- Control the roof runoff for all storm events (up to and including 100 year events) on the proposed building to the 2-year release rate and the remainder of the site runoff can continue to flow as uncontrolled towards the existing roadside ditches.
- There should be no stormwater ponding in parking areas or drive aisle during the 2-year storm event.

- Stormwater flows from neighbouring properties conveyed through the south-eastern portion of the site should not be obstructed.
- An enhanced level (80% TSS) of protection is required for water quality control.

3.3 Stormwater Quantity Control

3.3.1 Methodology

Peak Flow for runoff quantities for the Pre-Development and Post-Development stages of the project were calculated using the rational method. The rational method is a common and straightforward calculation, which assumes that the entire drainage area is subject to uniformly distributed rainfall. The formula is:

$$Q = \frac{CiA}{360}$$

Where
Q is the Peak runoff measured in ***m^3/s***
C is the Runoff Coefficient, **Dimensionless**
A is the runoff area in ***hectares***
i is the storm intensity measure in ***mm/hr***

All values for intensity, i, for this project were derived from IDF curves provided by the City of Ottawa for data collected at the Ottawa International airport. For this project three return periods were considered 2, 5 and 100-year events. The formulas for each are:

2-Year Event

$$i = \frac{732.951}{(t_c + 6.199)^{0.810}}$$

5-Year Event

$$i = \frac{998.071}{(t_c + 6.053)^{0.814}}$$

100-Year Event

$$i = \frac{1735.688}{(t_c + 6.014)^{0.82}}$$

Where t_c is time of concentration

3.3.2 Time of Concentration

In keeping with the City of Ottawa Storm Sewer Guidelines, a minimum time of concentration of 10 minutes is to be used for urban development. As such a time of concentration of 10 minutes was used for both pre- and post-development conditions.

3.3.3 Runoff Coefficients

Runoff coefficients for impervious surfaces (roofs) were taken as 0.90, and pervious surfaces (grass) were taken as 0.20.

A 25% increase for the post development 100-year runoff coefficients was used as per City of Ottawa guidelines.

3.3.4 Pre-development Site Conditions

As previously indicated, the site is located at the intersection of Brae Crescent and Norway Spruce Street. The property has a total area of about 0.06 hectares and is currently vacant.

Based on the topographic survey, the majority of the runoff from the property drains via overland flows to the northwest into the roadside ditch on Norway Spruce Street. The ditch on Norway Spruce Street conveys the stormwater to the south.

Drawing 220338-PRE shows the pre-development site conditions.

3.3.5 Pre-development Runoff Coefficient

Pre-development site conditions are summarised for the site in the following Table 2-1.

Table 3-1 – Summary of Pre-Development Site Conditions

Description	**Runoff Coefficient**		**Area (ha)**
	2, 5-year	100year	
			0.060
Grass (Part 1: future footprint of building roof)	0.20	0.25	0.023
Grass (Part 2: uncontrolled remainder of the site)	0.20	0.25	0.037
Weighted Average C	0.20		

Since the quantity criteria for the site is based on controlling post-development roof drains to 2-year pre-development release rates, the pre-development site conditions have been separated into two parts. Part 1 is grass areas that will be occupied by the building roof in the future, and part 2 is the remainder of the site.

Based on the existing ground cover the pre-development runoff coefficient is 0.20.

3.3.6 Pre-development Flow Rate

The following parameters were used with the Rational Method to determine the pre-development runoff rate for a 2-year design storm:

- A time of concentration of 10 minutes
- IDF curves yielded an intensity of 76.81mm/hr for a 2-year storm.
- A runoff coefficient of 0.2.
- The part 1 site area of 0.023ha that will be occupied by the building roof in the future.

The pre-development runoff rate for the 2-year storm is:

$2\text{-year}_{\text{pre-development part 1}} = 2.78 \times 0.20 \times 76.81 \times 0.023 = 0.98$ L/s

3.3.7 Post-Development Site Conditions

For the purposes of this stormwater management design, the site has been divided into uncontrolled and controlled areas as outlined on drawing 220338-POST. The site has two controlled areas. The upper roof of the building (catchment CA1) and the lower roof of the building is the other controlled area (catchment CA2). Stormwater storage will be provided in CA1 and CA2. The CA1 roof area is 0.020ha. The CA2 roof area is 0.003ha.

In catchment CA1, run-off will be restricted by means of two WATTS Accutrol Roof Drains (with adjustable flow control. In catchment CA2, run-off will be restricted by means of one WATTS Accutrol Roof Drain (with adjustable flow control. The roof drainage from both the upper roof and lower roof will outlet to the roadside ditch on Norway Spruce Street. The internal piping or downspout configuration and sizing at the building will be determined by the mechanical engineer.

Majority of the runoff from the remaining uncontrolled areas will be conveyed to the roadside ditch on Norway Spruce Street. A marginal amount of runoff will be conveyed to the roadside ditch on Brae Crescent. The water in the ditch on Brae Crescent is conveyed to the ditch on Norway Spruce Street.

The uncontrolled area includes the driveway and parking lot south of the building. The uncontrolled area also consists of grass areas and concrete walkways surrounding the building. The following table provides a summary of the post development conditions.

Table 3-2 – Summary of Post-Development Site Conditions

Description	Runoff Coefficient (5yr)	Runoff Coefficient (100yr)	Weighted Average C (5yr)	Weighted Average C (100yr)	Catchment Area (Ha)
Controlled CA1					0.020
Upper Roof	0.90	1.00	0.90	1.00	0.020
Controlled CA2					0.003
Lower Roof	0.90	1.00	0.90	1.00	0.003
Uncontrolled					0.037
Asphalt/ Concrete	0.90	1.00	0.75	0.84	0.029
Grass	0.20	0.25			0.008
Total					***0.060***

3.3.8 Uncontrolled Runoff

Flow from the uncontrolled area will be directed without restriction towards the roadside ditch on Norway Spruce Street.

Since the quality control criteria provided by the City of Ottawa only included criteria for the controlled roof area, detailed runoff calculations for the uncontrolled ground surfaces were not calculated.

3.3.9 Allowable Release Rate

The City of Ottawa requires that storm runoff from the roof areas be controlled to the 2-year pre-development levels (originating from the building footprint area). As determined in section 3.3.6 the pre-development runoff rate of part 1 (building roof areas) is 0.98 L/s. Therefore the maximum release rate from the combined CA1 and CA2 roof areas cannot be greater than 0.98L/s.

3.3.10 Post Development Restricted Flow and Storage

Runoff generated on the roof areas in excess of the allowable release rate will be temporarily stored on the building roofs of CA1 and CA2. The stored water will be released at a controlled rate during and following the storm event.

In order to achieve the allowable controlled area storm water release rate, storm water runoff from the upper roof (CA1) will be controlled by two roof drains fitted with one weir slot in each drain for flow control. The roof drain information for CA1 is as follows:

- Type of Drain: WATTS Large area roof drains with adjustable flow control RD-100-A1-ADJ
- Number of Drains: 2
- Number of Weirs in each drain: 1
- Weir Setting: Closed weir setting to control flows to a constant 0.32 L/s (5gpm) per weir.

The roof drains in CA1 will control all storm events up to and including 100yr event to a release of 0.63 L/s.

Stormwater runoff from the lower roof (CA2) will be controlled by one roof drain fitted with one weir slot. The roof drain information for CA2 is as follows:

- Type of Drain: WATTS Large area roof drain with adjustable flow control RD-100-A1-ADJ
- Number of Drains: 1
- Number of Weirs in each drain: 1
- Weir Setting: Closed weir setting to control flows to a constant 0.32 L/s (5gpm)

The roof drain in CA2 will control all storm events up to and including 100yr events to a release of 0.32 L/s.

The controlled roof drains are selected in order to ensure that the allowable maximum release rate for the 2-year, 5-year and 100-year storm events are not exceeded.

Runoff from the roof will be collected by a storm drain pipe specified by the mechanical engineer. The roof drainage from both the upper roof and lower roof will be directed to one storm drain outlet that will discharge the water to the roadside ditch on Norway Spruce Street.

The final roof layout will be completed once all mechanical systems are finalized in the building permit submission. Since it is unknown if there will be any HVAC equipment or access hatches added to the upper roof (CA1) it has been assumed that only 80% of the roof area is available for storage. In the lower roof portion (CA2) it has been assumed that 100% of the roof area is available for rooftop storage. Calculations for available rooftop storage are summarized in Appendix C. Roof drain specifications are provided in Appendix E.

The following tables present a summary of the controlled and uncontrolled runoff for each catchment and the required storage resulting from the restriction in flow rate.

Table 3-3 – Summary of Runoff Rates and Storage

Catchment Area ID.	Area	5 – year design Storm			100-year design Storm		
		Release Rate (L/s)	Required Storage (m^3)	Available Storage (m^3)	Release Rate (L/s)	Required Storage (m^3)	Available Storage (m^3)
CA1	0.020	0.64	3.60	9.30	0.64	8.60	9.30
CA2	0.003	0.32	0.26	2.80	0.32	0.72	2.80
Total Actual Controlled Area Release Rate							
		0.96			0.96		
Total Allowable Controlled Area Release Rate							
		0.98			0.98		

The total allowable runoff rate from the controlled area is 0.98 L/s. The total actual runoff rate from the combined roof area (during a 100 year storm event) is 0.96 L/s, which is less than the total allowable runoff rate.

Refer to Appendix A for a detailed summary of the stormwater management.

3.3.11 Rooftop Storage

The rooftop storage will be provided on the proposed building in catchments CA1 and CA2. The roof will be provided with a low slope towards the rooftop drains be means of a tapered roofing system product. The minimum slope on the roof will be 2.0%. The roof will be fitted with overflow scuppers 0.15 meters above the lowest point on the roof. Please refer to drawings 220338-UPPER ROOF and 220338-LOWER ROOF in the Appendix G.

3.4 Stormwater Flows from Offsite Areas

There is a swale that originates from the property at 125 Brae Crescent, and conveys water between the south-eastern portion of the lots at 121-125 Brae and the lot at 3 Norway Spruce Street to the roadside ditch on Norway Spruce Street. A GeoOttawa snapshot is included in appendix D showing the swale location.

The City of Ottawa provided design criteria that the stormwater flows from neighbouring properties conveyed through the south-eastern portion of the site (121 Brae) should not be obstructed.

A ditch inlet catchbasin is proposed at the south-east corner of the site at 121 Brae Crescent to capture the offsite runoff from the swale upstream of the site. The water is then conveyed

through a 375mm diameter pipe under the parking lot, and outlets to the roadside ditch on Norway Spruce.

In the GeoOttawa snapshot included in the appendix, the estimated catchment area contributing runoff to the proposed catchbasin is highlighted in red. The total catchment area is 0.36ha.

The runoff coefficients and offsite conditions are summarized in the table below.

Table 3-4 – Summary of Offsite Conditions

Description	Runoff Coefficient 100-year	Area (ha)
Entranceway (Uncontrolled Area)		0.363
Roof & Asphalt	1.00	0.048
Gravel	0.70	0.000
Grass	0.25	0.315
Weighted Average C	*0.35*	

The post-development time of concentration (tc) was taken from the City of Ottawa Sewer Design Guideline where the minimum time of concentration used is 10 minutes.

The rainfall intensity for a 100yr storm event was calculated using the same equation as shown in section 3.3.1. Using a time of concentration of 10min corresponds to a storm intensity of 178.56mm/hr for a 100yr storm event.

Using the rational method and the above calculated runoff coefficients and rainfall intensities, the runoff rate for the combined uncontrolled areas of the site is calculated as follows:

$Q_{100\text{-offsite}}$ = 2.78 x 0.35x 178.56 x 0.36 = 62.5 L/sec.

The runoff rate from the offsite neighbouring properties was therefore calculated to be 62.5L/s for a 100 year storm event, respectively.

The capacity of the proposed 375mm diameter storm pipe (under the parking area) was determined using manning's equation. The manning's equation was given by:

$$Q_{culvert} = \left(\frac{1}{n} \times R^{\frac{2}{3}} \times S^{\frac{1}{2}} \times A\right) x\ 1000$$

Where:
Q is the pipe flow rate measured in ***L/s***
n is the Manning roughness coefficient for a HDPE pipe.
R is the hydraulic radius **(m^2/m)**
S is the culvert slope **(m/m)**
A is the cross sectional area of the culvert **(m^2)**

Using a roughness coefficient of 0.013 and a slope of 0.41% for the 375mm diameter HDPE pipe the capacity was calculated to be 111 L/s m^3/s.

Since the capacity of the pipe is greater than the 100yr stormwater flows directed to the pipe from the neighbouring properties, the proposed pipe size is sufficient to convey the stormwater without restriction to the roadside ditch on Norway Spruce Street.

3.5 Stormwater Quality Control

3.5.1 Quality Criteria

As previously indicated, during a pre-consultation with the City of Ottawa, the following quality control criteria were provided as follows:

- An enhanced level of treatment is to be provided for runoff from the site, corresponding to 80% total suspended solids removal.

3.5.2 Quality Control Design Rationale

The main consideration for quality control is the runoff from the parking lot on the site. Runoff from the impervious surfaces in the parking lot can accumulate pollutants such as sediment, nutrients (nitrogen and phosphorous) as well as oil, grease and heavy metals.

Treatment for the runoff being discharged from the parking lot will be provided by a treatment train approach. The treatment train consists of sedimentation within rain garden plantings followed by filtration through a sand filter located at the side of the garden. The combined area containing the plantings, as well as the area adjacent to the plantings containing the sand filter is referred to in the remainder of the report as the rain garden area.

Water from the parking lot will travel by sheet flow to a curb cut in the south west corner of the driveway. Water will be directed from the curb cut to the rain garden area. The rain garden area is sized to provide temporary detention of the entire quality control volume generated in the parking lot.

The rain garden area has been designed to outlet the quality storage volume horizontally through the sand filter into a subdrain. The perforated subdrain outlets to the roadside ditch on Norway Spruce Street.

It was assumed that runoff from roofs is considered clean water, not required to be filtered through the rain garden. The runoff from concrete walkways to the east and north of the building were also not considered in the sizing of the garden. Sources of pollution are considered minimum in the walkway areas. However, the walkways are to be surrounded by grass areas, where vegetative filtration would be provided as the stormwater enters the roadside ditch.

Design of the rain garden area was completed in conformance with the following documents:

- The Vermont Rain Garden Manual “Gardening to Absorb the Storm”
- Ministry of Environment Stormwater Management Planning and Design Manual (MOE Manual)

3.5.3 Rain Garden Vegetation, Planting Strategy and Plant Medium Depth

In part 4 of The Ministry of Environment Stormwater Management Planning and Design Manual (March 2003)(MOE Manual), it describes vegetation as a means of taking up nutrients from the stormwater, promote settling by reducing flow velocities and preventing particles from re-suspension.

The manual also maintains that the rooting system of many species of trees and shrubs effectively bind soils to establish a layer that is resistant to erosion.

Plantings will be receiving runoff from the parking lot. Plant selection is important when choosing vegetation that can tolerate both wet and dry conditions, as well as salt tolerance when in close proximity to the parking lot and public roadway. The plantings should be a mixture of bushes, perennials and grasses.

It is also recommended that sand be used instead of salt when completing snow removal in the parking lot, to reduce the amount of salt concentrations that will enter the gardens.

Part 4 of the MOE Manual indicates that common plant spacing is 0.75m to 1.5m. Planting rows should be perpendicular to the direction of water flow and staggered to minimize the potential for channelization.

The growing medium depth for the rain garden was calculated using the Vermont Rain Garden Manual table. Table 1 of the rain garden manual shows various depths of rain gardens depending on the slope of the landscape.

Table 1	
Slope	**Depth**
< 4%	3-5 in
5-7%	6-7 in
8-12%	8 in+

The location for the rain garden has a slope of less than 4%. Therefore using table 1 of the Vermont Rain Garden Manual shows the minimum depth as 75mm. A minimum growing medium depth of 100mm was used for the proposed bottom of the rain garden.

3.5.4 Quality Control Through Sand Filters

The MOE Manual provides guidance on design for stormwater quality control. Quality control design is completed with the fundamental understanding that the majority of sediment and particulate pollutants are washed from the site surfaces during minor (frequent) storm events. Section 3.3.1 of the MOE Manual indicates that in most cases, quality control design storms range from 12.5 mm to 25 mm. The MOE Manual also indicates that an alternate approach to the volumetric sizing of stormwater facilities for quality control has been applied in Ontario. The alternate approach is summarized in Table 3.2 *Water Quality Storage Requirements Based on Receiving Waters.* Table 3.2 of the MOE manual specifies the storage volume required to achieve an enhanced minimum required quality control level of treatment using filtration.

In Part 4, the MOE Manual details the design requirements of several types of end of pipe stormwater management facilities. The proposed stormwater management design for quality control will consist of filtration. Design guidance for filtration is provided in Part 4 Section 4.6.7 Filters of the MOE Manual.

Section 4.6.7 provides the design guidance with respect to the use of a filter as summarized in the table below. A column has been added to indicate how the proposed design conforms to the Criteria.

Table 3-5 MOE Design Guidance and Design Conformance

Design Element	Design Objective	Minimum Criteria	Design Conformance
Drainage Area		< 5 hectares	~ 0.02 hectares
Pre-treatment	Longevity	Pre-treatment by means of sedimentation chamber, or forebay, vegetated filter strip, swale or oil/grit separator	Vegetative filtration in rain garden storage area.
Storage Depth	Avoid Filter Compaction	Subsurface sand and organic filters: 0.5 m Maximum 1.0 m	Maximum storage depth of swale 0.5m.
Filter Media Depth	Filtering	Sand: 0.5 m	sand: 0.5m
Under-drain	Discharge	Minimum 100 mm perforated pipes bedded in 150 – 300 mm of 50 mm gravel	Horizontal discharge to 150mm diameter perforated pipe surrounded in minimum 150mm thickness of 50 mm clear stone.
Land use		any land use, often employed for commercial and industrial	Residential
Volumetric Sizing		provided in Table 3.2 under infiltration. By-pass flows should not occur below a 4 hr 15 mm design event	Quality storage volume sufficient to contain entire volume of a 4h 15 mm storm event before by-pass
Filter Size		Determined using the Darcy Equation	Determined using the Darcy Equation
Filter Lining	prevent clogging	liner to prevent native material from entering filter	Non-woven geotextile filter cloth used between native material/planting medium and sandfilter. Filter cloth also between filter and clearstone
Overflow / by-pass		required	overflow is provided above the quality storage requirement

3.5.5 Volumetric Sizing

The water quality storage volume requirement to achieve an enhanced level of treatment using the sand filter was determined from the MOE Manual Table 3.2 under infiltration. Please refer to the table below showing the percentage of impervious area for the parking lot as well as the required storage volume extrapolated from Table 3.2.

Table 3-6 Volumetric Sizing Parameters from MOE Manual Table 3.2

Drainage Area (ha)	% impervious	Storage Volume m^3/ha	Storage Volume Required (quality) m^3
0.02	85	40	0.80

From the table above, quality control drainage area is 0.02 ha. The drainage area is a combination of the parking lot area and the footprint of the rain garden. 0.020 ha x 40 m^3/ha gives a quality storage requirement of 0.80m^3.

The MOE Manual in section 4.6.7 under the heading Volumetric Sizing provides the following additional design guidance when using filtration for quality control:

"Water quality volumes to be used in the design are provided in Table 3.2 under the "infiltration" heading. Erosion and quantity control volumes are not applicable to this type of SWMP. The design should be such that at a minimum, the by-pass of flows should not occur below or at the peak runoff from a 4 hour 15 mm design event."

In order to ensure that by-pass would not occur below a 4 hr 15 mm design event, the storm pond is designed to accommodate the volume of a 15 mm rainfall originating from the parking lot and rain garden area. The weighted average runoff coefficient for quality control drainage area of the site is C = 0.85. This indicates that 85% of the rainfall originating on the drainage area wills runoff into the quality storage pond.

A 15mm storm event will result in a runoff volume of (0.02ha x 0.85 x15mm) 2.6m^3 for the quality control drainage area. This results in a minimum quality storage requirement of 2.6m^3 There is a total storage volume for quality control purposes of 3.3m^3 in the rain garden area before discharge by means of the overflow channel will occur.

The sizing considerations for the rain garden area are summarized in the following table 3-7.

Table 3-7 Rain Garden Area Sizing Comparison for Quality Control

MOE Table 3.2 Storage Volume Required	15mm rainfall x catchment area x runoff coefficient= Volume Required prior to by-pass	Actual Storm Pond Volume to be Provided
m^3	m^3	m^3
0.8	2.6	3.3

Since the storm pond volume to be provided is greater than or equal to the MOE sizing requirements it is considered that the storm pond is of sufficient size to satisfy the quality treatment requirements.

3.5.5.1 Sand Filter Sizing

The MOE Manual indicates that the size of the filter be designed to ensure a specified volume is discharged within a specified time period using the Darcy Equation. The size of the filter and storage volume must be sufficient to ensure that no overflow or by-pass occurs below the 4 hr 15 mm design storm.

The proposed filter has been sized based on the space available for the filter. The proposed filter will be a horizontal sand filter and will be constructed with a minimum filter thickness (width) of 0.5m and a length of 4.4m.

The sand used to construct the filter will consist of imported filter media sand having a percolation rate “T” time of 6 min/cm and a maximum of 3 percent passing the 0.08 millimetre sieve size. This corresponds to a coefficient of permeability of k = 3600 millimetres per hour. The sand will be placed as shown on Kollaard Associates Inc. drawing #220338–GR and 220338-Details will have a minimum filter thickness of 0.5metres. The filter will be protected on the surface by a 100 mm thick layer of riverstone. A non-woven geotextile filter fabric (such as Terrafix 360R or an approved alternative) will be placed between the sand and the top layer of riverstone. The filter fabric will also be extended beneath and beside the filter to prevent contamination of the filter sand from the underlying native material. This fabric offers medium tensile strength at high elongation and good filtration, coupled with high permeability to allow for proper filtration, while holding the filter sand in place as designed. The Terrafix Geosynthetics Inc. specification sheet can be found in Appendix E.

The height of the sand filters was determined based on the quality storage volume requirement and the capacity of the rain garden area. The filter height was set to ensure that the minimum volume equal to the quality requirement would discharge through the sand filter.

As such the entire quality control volume required by the MOE Manual will be stored below the top of the sand filter and no by-pass or overtopping of the filter will occur below the 15mm storm event.

3.5.5.2 Discharge Through Filters

The average flow rate through the sand filters was calculated using Darcy's Equation to be:
Q= A K i
A = the cross sectional area of the filter
K= coefficient of permeability
i= hydraulic gradient = head across the filter/ flow path across the filter

A= 0.3m (depth) x 4.5m (sand filter length)
K= $1x10^{-3}$m/s
i = 0.45/0.9
$Q_{rain\text{-}garden}$= 0.7L/s

Based on the discharge rates through the filter, it is expected that the draw down time in the rain garden is 3 hours.

3.6 Stormwater System Operation and Maintenance

3.6.1 Roof Drains

The accontrol roof drains should be inspected on a semi-annual basis and following major storm events. Any blockages or debris should be removed. If surface ponding on the roof areas area does not recede in a normal manner, the drains should be inspected for blockages.

3.6.2 Rain Garden Maintenance

Once plants mature, the maintenance of a rain garden is very low. Rain Garden maintenance information is provided below from the Rain Garden Manual for the Vermont and Lake Champlain Basin.

Inspect the rain garden after large storm events and at least monthly for improper water drainage, berm settling, soil erosion, as well as invasive plants.

Always water plants throughout the first year after planting until they are established. Species should be able to tolerate dry conditions on their own afterward. However, if plants become distressed additional hand watering may be required.

Cut away excessive dead plant material from living plants and for species that have died or may need replacement if they are not thriving. Shrubs and trees may need occasional pruning depending on desired aesthetics. Some plants may need to be divided if plantings become too crowded.

Remove weeds by hand pulling. Make sure to remove the entire root. Remove weeds before they flower or go to seed to prevent weeds from seeding themselves. After removal of extensive areas of weeds, consider adding vegetation or wood chips to prevent new weeds from establishing. Always bag and remove any invasive plants. Do not compost them on-site.

To prevent soil erosion, stabilize settled berms (with stone, quick-rooting species, or ground covers) and replace eroded soils. If the garden is holding water for more than 72 hours, soil compaction may have occurred. Resolve this problem through physical or vegetative methods such as deep tilling, soil amendment, or establishing deep rooted plant species.

The surface of the rain garden is to be covered with an erosion control blanket (such as a coconut rolled erosion control product) to protect the planting medium until vegetation is established. The erosion control blanket is suggested only in the first few years after the initial installation. Once the rain garden is established, the erosion control blanket may not be necessary.

3.6.3 Inspections

The owner or designated Property Management Company is responsible for inspections and maintenance. Records of inspections and maintenance should be kept for each visit. The suggested inspection schedule should be followed until the records indicate a more appropriate site specific schedule.

4 SANITARY SEWER DESIGN

The sanitary service lateral from the proposed development will be connected to the existing 250 mm diameter sanitary sewer along Norway Spruce Street.

Sewage discharges will be domestic in type and in compliance with the City of Ottawa Sewer Use By-law. The anticipated peak sanitary flow will be a total of approximately 0.18 L/s.

4.1 Design Flows

The proposed building will contain five residential units. The residential design flows were calculated using the Ottawa Sewer Guidelines – Technical Bulletin ISTB-2018-01.

Residential

Total domestic pop:		
One Bedroom units	*(0) x 1.4 ppu:*	*0*
Two Bedroom units	*(3) x 2.1 ppu:*	*6.3*
Three Bedroom units	*(2) x 3.1 ppu:*	*6.2*
Total:		12.5

12.5 rounded to 13

$Q_{Domestic}$ = 13x 280 L/person/day x (1/86,400 sec/day) = 0.042 L/sec

Peaking Factor = $1 + \left(\frac{14}{4+\left(\frac{P}{1000}\right)^{0.5}}\right) * 0.8$ = 3.72(4 maximum)

$Q_{Peak\ Domestic}$ = 0.042 L/sec x 3.72 = 0.156 L/sec

Infiltration

$Q_{Infiltration}$ = 0.33 L/ha/sec x 0.06ha = 0.020 L/sec

Total Peak Sanitary Flow = 0.156 + 0.020 = 0.18 L/sec

4.2 Sanitary Service Lateral

4.2.1 Sanitary Service Lateral Requirements

The maximum peak sanitary flow for total residential use of the building is 0.18L/sec. The Ontario Building Code specifies minimum pipe size and maximum hydraulic loading for sanitary sewer pipe. OBC 7.4.10.8 (2) states "Horizontal sanitary drainage pipe shall be designed to carry no more than 65% of its full capacity." The capacity of the proposed 150 mm diameter

PVC sanitary sewer lateral at a 1% slope is 15.23/sec. Since 0.65 x 15.23 =9.90 L/s is much greater than 0.18L/sec, a single sanitary sewer service lateral of 150 mm diameter at a 1% slope will be sufficient according to O.B.C 7.4.10.8 (2). It is noted that the actual slope varies to 12% which provides a much greater capacity. At 12% the flow velocity in the 150mm diameter sanitary service at full flow condition would be 2.98m/s. At the peak design flow the actual velocity would be 0.7m/s. Since the full flow and peak flow velocities are both less than 3.0m/s the velocity is within an acceptable range.

Alternatively Kollaard Associates has obtained the number of fixtures from floor plan drawings provided by Bryden Gibson Architects (2023/02/02).

From the Ontario Building Code (O.B.C) table 7.4.9.3, the total number of fixture units for the building is 92.5.

From OBC Table 7.4.10.8, the allowable number of fixture units for a 5” drain size (150mm diameter) sanitary service pipe at 1% is 600. Since the proposed number of fixture units is less than 600, than the proposed 150mm diameter service lateral would have adequate capacity.

The proposed 150mm diameter sanitary lateral is greater than 50% of the diameter of the main sewer diameter on Norway Spruce Street. The sanitary main is of asbestos concrete material. A manhole has been proposed at the connection of the lateral to the main, as per section 4.4.4.11 of the Ottawa Sewer Guidelines.

Extra care should be taken when installing the new lateral connection to the asbestos cement sanitary main. Cutting of the main pipe shall be in accordance with the Ontario Health and Safety Act (OSHA). Personal protective equipment and cleanup shall be in accordance with the OSHA.

If it is found that the existing lateral still goes into the site, it is to be abandoned and capped at the property line. The new lateral is to be installed at the location indicated on the Site Servicing drawing 220338 – SER.

5 WATERMAIN DESIGN

It is considered likely that the existing water service lateral and connections are undersized for a multi unit dwelling. The existing water lateral is to be blanked at the watermain to the satisfaction of City of Ottawa Services. The new lateral is to be installed at the location indicated on the Site Servicing drawing 220338 – SER.

The proposed 40mm (1.5 inch) diameter water service is to be used for the proposed building. The service lateral will be connected to the municipal watermain on Norway Spruce Street as indicated on the Site Servicing drawing 220338- SER.

5.1 Water Demand

The water demand for the proposed development was calculated based on the City of Ottawa Water Distribution Design Guidelines (as amended) as follows:

Residential
13persons x 350 L/person/day x (1/86,400 sec/day)

- Average daily demand 0.053 L/s
- Maximum daily demand (factor of 2.5) is 0.053L/s x 2.5 = 0.132 L/s
- Peak hourly demand (factor of 2.2) = 0.132 L/s x 2.2= 0.29L/s

5.2 Fire Flow

Fire flow protection requirements are calculated as per the Ontario Building Code.
The building is of combustible construction. The building does not contain sprinkers. Calculations of the fire flow required for the building are provided in Appendix F.

From Appendix D, the minimum fire flow requirement is 2700 L/min or 45 L/sec.

The fire protection will be provided by the existing hydrant on Norway Spruce, as described in section 5.3 below.

5.3 Existing Fire Hydrant

The fire hydrant within the vicinity of the site is located as follows: Norway Spruce directly in front of the property on the east side of the road (5 Norway Spruce Street) and 60m south of the site.

City of Ottawa Technical Bulletin ISTB-2018-02 Appendix I Table 1 provides guidance with respect to maximum flow from to be considered from a given hydrant. From this table, a Class AA hydrant can contribute a maximum flow of 5,700 L/min when located less than 75 metres from the building.

As previously indicated, the required fire flow is 2700L/min. The existing hydrants is considered to be sufficient to meet the required fire flow without needing an additional hydrant.

5.4 Boundary Conditions

The water demand due to occupancy together with the fire flow requirements were provided to the City of Ottawa as follows:

- Average daily water demand 0.05L/s
- Maximum daily water demand 0.13 L/s
- Peak hourly water demand 0.29L/s
- Fire Flow required 45L/s

The following are the boundary conditions, HGL, for hydraulic analysis that were provided for the above indicated peak hourly demand and fire flow demand.

Maximum HGL = 160.2
Minimum HGL = 155.6
Max Day + FireFlow = 155.4m

The boundary conditions were received for a connection on Brae Crescent at a ground surface elevation of 122.60. The City of Ottawa has confirmed that the boundary conditions are still valid for a proposed connection on Norway Spruce Street.

The pressure loss to the third floor of the proposed building was calculated using Bernoulli's Equation in Combination with the Darcy – Weisbach Equation and the Colebrook Equation. The equations are shown below.

$$H_P + Z_1 - Z_2 + \frac{P_1 - P_2}{S} + \frac{V_1^2 - V_2^2}{2g} = h_f + h_m \quad \text{where:}$$

$$h_m = K_m \frac{V^2}{2g} \qquad \mathrm{Re} = \frac{VD}{\nu} \qquad Q = VA \qquad A = \frac{\pi}{4} D^2$$

$$\text{Darcy – Weisbach Equation: } h_f = f \frac{L}{D} \frac{V^2}{2g} \quad \text{where:}$$

$$\text{If laminar flow } \left(\mathrm{Re} < 4000 \text{ and any } \frac{e}{D}\right), \quad f = \frac{64}{\mathrm{Re}}$$

$$\text{If turbulent flow } \left(4000 \le \mathrm{Re} \le 10^8 \text{ and } 0 \le \frac{e}{D} < 0.05\right), \text{ then}$$

$$\text{Colebrook Equation: } \frac{1}{\sqrt{f}} = -2.0 \log\left(\frac{e/D}{3.7} + \frac{2.51}{\mathrm{Re}\sqrt{f}}\right)$$

Table 5.0: Water Flow Analysis with a Maximum Hourly Design Flow

Scenario	Elevation (m)		HGL (m)		Pressure (KPa)		Flow (L/s)	Service Dia (mm)
Connection to existing 150mm watermain								
	Street	Basement	Street	Basement	Street	Basement		
Min HGL	122.10	124.5	155.60	155.57	328	305	0.29	40
Max HGL	122.10	124.5	160.20	160.14	373	349	0.29	40
	Street	3rd floor	Street	3rd floor	Street	3rd floor		
Min HGL	122.10	133.22	155.60	155.53	328	219	0.29	40
Max HGL	122.10	133.22	160.20	160.12	373	264	0.29	40

*Assuming that the highest fixtures on each floor were 2.2m from the floor slab.
**Ground elevation is at 122.10.

In accordance with MOE Design Guidelines for Drinking Water Systems, the distribution system shall be sized so that under maximum hourly demand conditions the pressures are not less than 276 kPa (40 psi.)

In general conformance with the MOE Guidelines, and City of Ottawa Technical Bulletin ISD-2010-2, the desired range in pressure should be approximately 350KPa (50psi) to 480KPa (70psi) during normal operating conditions. As per the Ontario Building Code, the residual pressure should not exceed 552KPa (80psi).

Based on the results of the analysis as presented in the above table and using a 40mm diameter service, the minimum and maximum HGL provide a water pressure of between 305kPa and 349kPa at the basement of the proposed building.

The minimum and maximum HGL provide a water pressure of between 219kPa and 264kPa at the 3rd floor of the proposed building The calculated residual pressure is below the minimum recommended residual pressure by the MOE of 275 kPa, and well below the desired pressure of 350KPa. The loss of pressure due to the elevation difference is of much more significance than the friction and minor losses.
Since the pressure on the first floor and third floor is less than 350 kPa, a booster pump would be required to provide adequate pressure in the building at all floors. The booster pump size is to be specified by the mechanical engineer.

5.5 Water Service Requirements

Based on the proposed occupancy through the City of Ottawa Water Distribution Design Guidelines (as amended) and the Ontario Building Code requirements with respect to water service size based on number of fixture units served, a minimum water service size of 40mm is required.

6 EROSION AND SEDIMENT CONTROL

The owner (and/or contractor) agrees to prepare and implement an erosion and sediment control plan at least equal to the stated minimum requirements and to the satisfaction of the the City of Ottawa, appropriate to the site conditions, prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and during all phases of site preparation and construction in accordance with the current best management practices for erosion and sediment control. It is considered to be the owners and/or contractors responsibility to ensure that the erosion control measures are implemented and maintained.

In order to limit the amount of sediment carried in stormwater runoff from the site during construction, it is recommended to install a silt fence along the property, as shown in Kollaard Associates Inc. Drawing #220338 - GEC. The silt fence may be polypropylene, nylon, and polyester or ethylene yarn.

If a standard filter fabric is used, it must be backed by a wire fence supported on posts not over 2.0 m apart. Extra strength filter fabric may be used without a wire fence backing if posts are not over 1.0 m apart. Fabric joints should be lapped at least 150 mm (6") and stapled. The bottom edge of the filter fabric should be anchored in a 300 mm (1 ft) deep trench, to prevent flow under the fence. Sections of fence should be cleaned, if blocked with sediment and replaced if torn.

The surface of the rain garden is to be covered with an erosion control blanket (such as a coconut rolled erosion control product) to protect the planting medium until vegetation is established. The coconut rolled erosion control product literature is provided in appendix E. Many gardens use a top layer of wood chips or mulch on the surface, however these items can float if plants become submerged during an intense rainstorm. The erosion control blanket is to be staked or stapled to the ground surface to keep in place.

Filter socks should be installed across existing storm manhole and catch basin lids. As well, filter socks should be installed across the proposed catch basin and manhole lids immediately after the structures are placed. The filter socks should only be removed once the asphaltic concrete is installed and the site is cleaned.

The proposed landscaping works should be completed as soon as possible. The proposed granular and asphaltic concrete surfaced areas should be surfaced as soon as possible.

The silt fences should only be removed once the site is stabilized and landscaping is completed.

These measures will reduce the amount of sediment carried from the site during storm events that may occur during construction.

7 CONCLUSIONS

This report addresses the adequacy of the existing municipal storm and sanitary sewer system and watermain to service the proposed development of the residential building on Brae Crescent. Based on the analysis provided in this report, the conclusions are as follows:

SWM for the proposed development will be achieved by controlling the 100 year post development flow from the roof areas to 2-year pre-development levels.

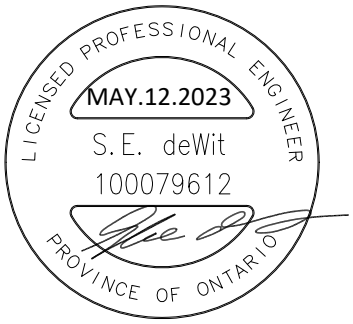
The peak sewage flow rate from the proposed development will be 0.18 L/sec. The existing municipal sanitary sewer on Norway Spruce Street should have adequate capacity to accommodate the increase in peak flow. The City has not identified any capacity issues in the existing sanitary sewer system.

The existing municipal watermain along Norway Spruce Street will have adequate capacity to service the proposed development for both domestic and fire protection.

During all construction activities, erosion and sedimentation shall be controlled.

We trust that this report provides sufficient information for your present purposes. If you have any questions concerning this report or if we can be of any further assistance to you on this project, please do not hesitate to contact our office.

Sincerely,
Kollaard Associates, Inc.



Amanda Van Bruggen, E.I.T

Steven deWit, P.Eng.

Appendix A: Background Information

- City of Ottawa Drawing – GO-244 Plan & Profile 25
- Topographic Plan of Survey – Part of Lot 1, Registered Plan 528
- City of Ottawa Correspondence

No.	BY	DATE	REVISION
8	EC	30/4/81	AS BUILT
7	D.M.	23/4/80	GENERAL REVISION
6	D.M.	12/2/80	MH229 RELOCATED, INVERTS REVISED

J. D. McMANUS — Registered Professional Engineer — Province of Ontario

SCALE (METRIC)
HORIZONTAL 0 5 10 20m
VERTICAL 0 0.5 1 2m

DESIGN D.M. — CHKD M.J.H.
DRAWN E.C. — CHKD D.M.
APPROVED
W.P. No. 949

KOSTUCH ENGINEERING LIMITED
CONSULTING ENGINEERS
BROCKVILLE · OTTAWA · BELLEVILLE · CORNWALL

Ontario
Ministry Of The Environment
Sewage Works Project No. 1-0127
Township Of Goulbourn
Stittsville Sanitary Sewers

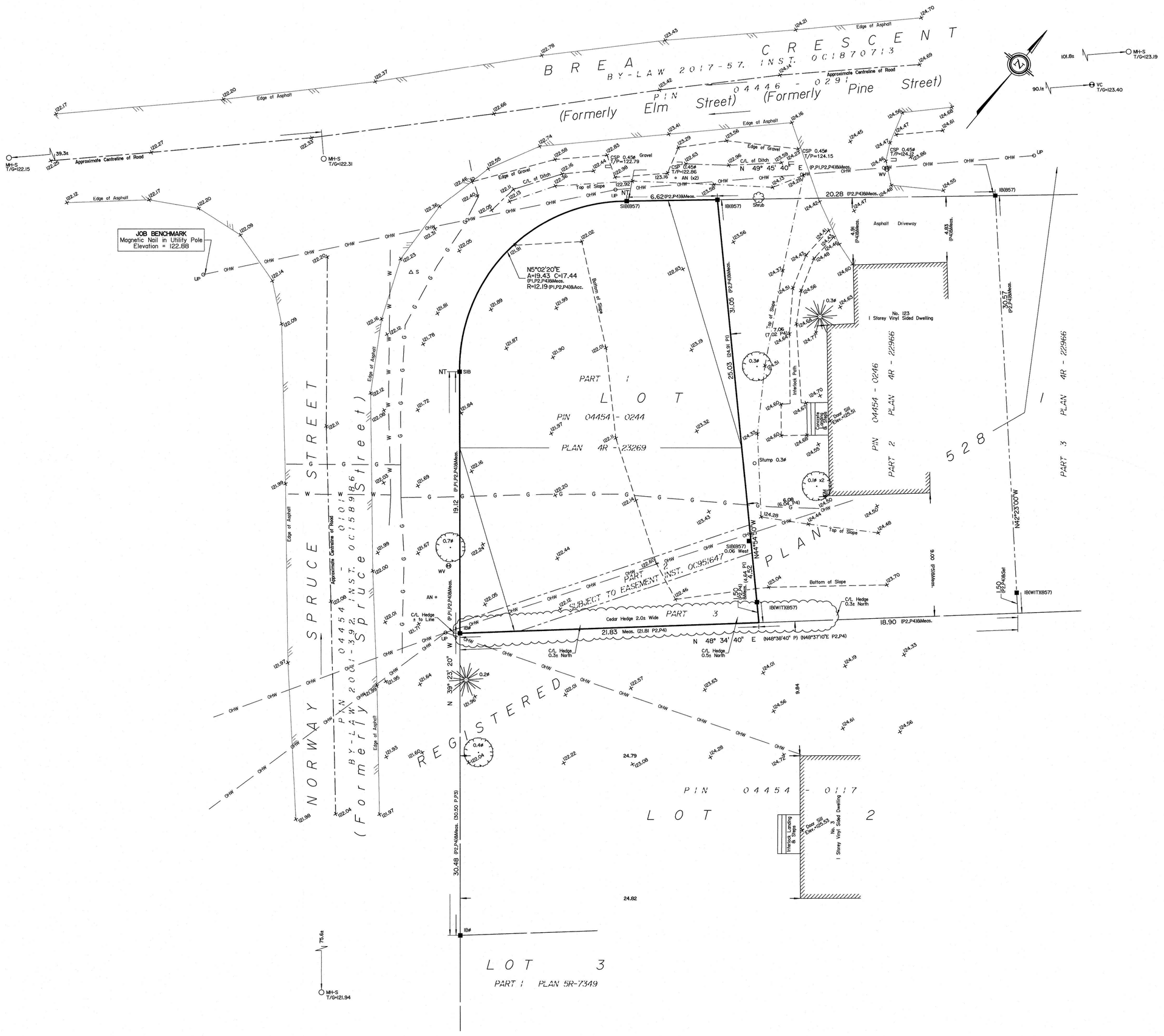
SPRUCE STREET
STA.0+700 to STA.0+912
BELL STREET WEST
STA. 0+350 to STA.0+407

DATE DRAWN JULY 10, 1979
CONT. No. 3
DRAWING No. 25
REV. No. 8

TOPOGRAPHIC PLAN OF SURVEY OF

PART OF LOT 1
REGISTERED PLAN 528
CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.



Scale 1 : 150

6 4.5 3.0 1.5 0 3 6 Metres

Metric

DISTANCES 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 and the Surveyors Act and the regulations made under them.
2. The survey was completed on the 30th day of March, 2022.

Mar. 25/22
Date

V. Andrew Shelp
Ontario Land Surveyor.

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
V-26457

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29 (3).

ANNIS, O'SULLIVAN, VOLLEBEKK LTD. grants to
Natalie Taite ("The Client"), their solicitors, mortgagees, and other related parties, permission to use original, signed, sealed copies of the Surveyor's Real Property Report in transactions involving The Client.

Notes & Legend

—□—	Denotes	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
IBø	"	Round Iron Bar
(WIT)	"	Witness
Meas.	"	Measured
Acc.	"	Accepted
NT	"	Non-Tangential
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(P)	"	Registered Plan 528
(P1)	"	Plan 4R-23269
(P2)	"	Plan 4R-22966
(P3)	"	Plan 5R-7349
(P4)	"	(857) Plan dated October 6, 2020
C/L	"	Centreline
T/G	"	Top of Grate
T/P	"	Top of Pipe
CSP	"	Corrugated Steel Pipe
○ MH–ST	"	Maintenance Hole (Storm Sewer)
○ MH-S	"	Maintenance Hole (Sanitary)
⊖ VC	"	Valve Chamber (Watermain)
⊖ WV	"	Water Valve
FH	"	Fire Hydrant
▭ GM	"	Gas Meter
∘ AN	"	Anchor
○ UP	"	Utility Pole
—— OHW ——	"	Overhead Wires
—— W ——	"	Underground Water
—— G ——	"	Underground Gas
	"	Deciduous Tree
	"	Coniferous Tree
ø	"	Diameter
+ 65.00	"	Location of Elevations

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

For comparison purposes, a rotation of 0°23'20" counter-clockwise was applied to (P), (P1), (P2) and (P4).

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. Location of underground utilities illustrated of the plan are as marked by others.
4. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. 22631-21 Taite Pt.1 | RP 528 POS F | ISW

Nicole Rajnovich

From: Smith, Travis [travis.smith@ottawa.ca]
Sent: March 29, 2022 2:37 PM
To: Nicole Rajnovich
Subject: Re: 121 Brae Crescent - Servicing

Follow Up Flag: Follow up
Flag Status: Completed

Hi Nicole,

Quick search through available engineering drawings provided a P&P drawing for a sanitary sewer extension from the manhole at the intersection of Norway Spruce & Elm (Assume it was renamed to Brae) to the midpoint of 125 Brae.

This drawing includes a note that the contractor will locate and use the existing services that serviced 123 Brae (Part 2) previously for the new development at 121 Brae (Part 1).

Engineering drawings are now available through Email GeoInformation@ottawa.ca(link sends e-mail) or call 613-580-2424, ext. 44455.

Any follow-up questions let me know,

Travis Smith, P.Eng.
Engineering Intern
Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique
Development Review - Rural
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West, Ottawa, ON | 110, Avenue. Laurier Ouest, Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 16544, travis.smith@ottawa.ca

From: Nicole Rajnovich <nicole@kollaard.ca>
Sent: Tuesday, March 29, 2022 2:16 PM
To: Smith, Travis <travis.smith@ottawa.ca>
Subject: 121 Brae Crescent - Servicing

Hi Travis,

We were asked to provide a quote for a grading and servicing design at 121 Brae Avenue and were wondering if you have any information on this property. It looks like it may have been part of a previous severance application. However there doesn't appear to be a sanitary sewer on Brae Crescent, so we are curious to where 123 Brae is being serviced from. Is it possible the sanitary service runs through or in from of this property? Any information you have would be helpful.

Thank you and best regards,

Nicole Rajnovich

Kollaard Associates
Engineers

210 Prescott Street, Unit 1
P.O. Box 189
Kemptville, Ontario
K0G 1J0 CANADA
t: 613.860.0923 x.263 f: 613.258.0475
www.kollaard.ca

'

'

Subject: Re: 121 Brae Crescent
From: "Smith, Travis" <travis.smith@ottawa.ca>
Date: 2023-03-03, 8:53 a.m.
To: "amanda@kollaard.ca" <amanda@kollaard.ca>
CC: "Rathnasooriya, Shika" <Thakshika.Rathnasooriya@ottawa.ca>

Hi Amanda,

After looking into the plans further, it appears that the plan I referenced was tied to the consent application for the 3 lots (121, 123, and 125 Elm (Brae)) and one of the conditions associated with that. It does not appear that the work was completed, and I do not have the context of why this work was not followed through. As the severance is completed, my assumption is that there is no plan to complete the works, other than as required to service the development of the parcels.

With that said, I would rely on the information provided by Shika in the pre-consultation and plans provided by GeoInformation Centre as it appears the contents of the plan I referenced would not accurately reflect work completed.

Apologies for the confusion, and if you have any other questions please let me know.

Regards,

Travis Smith, P.Eng.
Project Manager
Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique
Development Review - Rural
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West, Ottawa, ON | 110, Avenue. Laurier Ouest, Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 16544, travis.smith@ottawa.ca

Note that we are in a hybrid work arrangement, phone contact is limited and email is our best option. Thank you in advance.
Notez que nous sommes dans un arrangement de travail hybride, le contact téléphonique est limité et le courriel est notre meilleure option. Merci en avance.

From: Amanda VanBruggen <amanda@kollaard.ca>
Sent: Thursday, March 2, 2023 9:07 AM
To: Smith, Travis <travis.smith@ottawa.ca>
Cc: Rathnasooriya, Shika <Thakshika.Rathnasooriya@ottawa.ca>
Subject: 121 Brae Crescent

Good Morning Travis,
We are working on the stormwater, grading and servicing for a proposed 3 storey - 5 unit residential building at 121 Brae Crescent in Stittsville.
I believe you had talked to Nicole in our office back in March 2022, see the attached email.
I am trying to find more information on the sanitary extension on Brae toward Stittsville Main Street .
I had contacted the Geoinformation Centre and they provided me with the attached drawings. The drawing you were referring to in your email back in 2022, we didnt receive. Is that something we could get a copy of?
Do you know when the sanitary extension is suppose to be completed?
Any information you have on the sanitary extension, and servicing connections for 123 Brae would be greatly appreciated.
Kind Regards,
Amanda Van Bruggen
--

Kollaard Associates
Engineers
210 Prescott Street, Unit 1
P.O. Box 189
Kemptville, Ontario
K0G 1J0
tel: 613-860-0923
www.kollaard.ca

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Appendix B: Storm Design Criteria and City of Ottawa Correspondence

- City of Ottawa Engineering Comments (Quantity Criteria)
- City of Ottawa Correspondence (Quality Criteria

MEMO

Date: October 5, 2022

To / Destinataire	Kelly Livingstone, Planner
From / Expéditeur	Shika Rathnasooriya, Project Manager, Infrastructure Approvals
Subject / Objet	**Pre-Application Consultation** **121 Brae Crescent**

Please note the following information regarding the engineering design submission for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/planning-development-and-construction/developing-property/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#servicing-study-guidelines-development-applications

2. Servicing and site works shall be in accordance with the following documents:

   - ⇨ Ottawa Sewer Design Guidelines (October 2012)
   - ⇨ Ottawa Design Guidelines – Water Distribution (2010)
   - ⇨ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
   - ⇨ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - ⇨ City of Ottawa Environmental Noise Control Guidelines (January 2016)
   - ⇨ City of Ottawa Park and Pathway Development Manual (2012)
   - ⇨ City of Ottawa Accessibility Design Standards (2012)
   - ⇨ Ottawa Standard Tender Documents (latest version)
   - ⇨ Ontario Provincial Standards for Roads & Public Works (2013)

3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).

4. Clearly show and label all the easements on the property, on all plans.

5. Watermain Infrastructure:

   a) There are available 152mm diameter watermains located within the Brae Crescent and Norway Spruce Street ROW. A water boundary condition request is needed for the proposed water connection to the City main.

   b) Assuming this will be one parcel of land, a perimeter meter is anticipated with subsequent sub-metering at each unit. Sub-metering will be the developer's responsibility.

   c) As per Section 4.4.7.2 of the Ottawa Design Guidelines – Water Distribution, a DMA (District Metering Area) chamber will be required for private developments serviced by a connection 150mm or larger.

   d) Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide an email to Shika Rathnasooriya (Thakshika.Rathnasooriya@ottawa.ca) with the following information:

      i. Location of service

      ii. Type of development and the amount of fire flow required (as per FUS, 1999 – See technical bulletin ISTB 2021-03).

      iii. Average daily demand: ___ l/s.

      iv. Maximum daily demand: ___l/s.

      v. Maximum hourly daily demand: ___ l/s.

6. Sanitary / Storm Infrastructure:

   a) There is an existing available 250mm diameter sanitary sewer located within Norway Spruce Street to make a service connection. A connection directly to the existing sanitary sewer within the easement is not permitted.

   b) A monitoring maintenance hole will be required for a private sanitary sewer outletting to a public sanitary sewer. The maintenance hole should be located in an accessible location on private property near the property line (ie. Not in a parking area).

   c) All services (STM, SAN, WTR) should be grouped in a common trench to minimize the number of road cuts.

   d) Sewer connections to be made above the springline of the sewermain as per:

      i. Std Dwg S11.1 for flexible main sewers.

      ii. Std Dwg S11 (For rigid main sewers).

      iii. Std Dwg S11.2 (for rigid main sewers using bell end insert method).

iv. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.

7. The Stormwater Management Criteria, for the subject site, is to be based on the following:

   a) Control the roof drains for all storm events on the proposed building to the 2-year release rate and the remainder of the site runoff can continue to flow as uncontrolled towards the existing roadside ditches.

   b) Stormwater flows from neighboring properties conveyed through the southeastern portion of the site should not be obstructed.

   c) There should be no stormwater ponding in parking areas or drive aisles during the 2-year storm event.

   d) Quality control to be provided as specified by the MVCA. Include correspondence with MVCA in the stormwater/site servicing report.

8. MECP ECA Requirements:

   An MECP Environmental Compliance Approval (Private Sewage Works) should not be required for the proposed development.

9. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

Should you have any questions or require additional information, please contact me directly at Thakshika.Rathnasooriya@ottawa.ca.

Subject: RE: 121 Brae Crescent
From: "Rathnasooriya, Shika" <Thakshika.Rathnasooriya@ottawa.ca>
Date: 2023-02-24, 2:42 p.m.
To: "amanda@kollaard.ca" <amanda@kollaard.ca>

Hi Amanda,

An enhanced level (80% TSS) of protection is required for water quality control on this site.

Please let me know if you have any further questions.

Thanks,

Shika Rathnasooriya, P.Eng
Project Manager
Planning, Real Estate and Economic Development Department - West Branch
City of Ottawa
110 Laurier Avenue West Ottawa, ON
613.580.2424 ext. 23433

From: Amanda VanBruggen <amanda@kollaard.ca>
Sent: February 10, 2023 10:31 AM
To: Rathnasooriya, Shika <Thakshika.Rathnasooriya@ottawa.ca>
Cc: Mercedes Liedtke <mliedtke@mvc.on.ca>
Subject: Re: 121 Brae Crescent

Hello Thakshika,

We are working on the stormwater management for the proposed 3-storey 5 unit apartment at 121 Brae Crescent in Stittsville.

I believe you were involved with the initial pre-consultation on this one. See the attached engineering comments.

From you section 7d comment, for SWM quality criteria I had sent an email to MVCA. See below.

With their review changes, could you provide us with the quality requirements.

Many Thanks,

Amanda Van Bruggen

Kollaard Associates
Engineers
210 Prescott Street, Unit 1
P.O. Box 189
Kemptville, Ontario
K0G 1J0
tel: 613-860-0923
www.kollaard.ca

On 2023-02-10 10:13 a.m., Mercedes Liedtke wrote:

> Good morning Amanda,
>
> Thank you for the inquiry. As of January 1, 2023, MVCA is concentrating on water quantity reviews with respect to natural hazards. It would be best to contact the City in regard to the water quality requirements.
>
> Thank you,
>
> **Mercedes Liedtke**, MSc.| Environmental Planner | Mississippi Valley Conservation Authority
> 10970 Highway 7, Carleton Place, ON K7C 3P1
> www.mvc.on.ca | t. 613 253 0006 ext. 267 | f. 613 253 0122 | mliedtke@mvc.on.ca
>
> Mississippi Valley Conservation Authority

From: Amanda VanBruggen <amanda@kollaard.ca>
Sent: February 10, 2023 8:56 AM
To: Mercedes Liedtke <mliedtke@mvc.on.ca>
Subject: 121 Brae Crescent

Good Morning Mercedes,

We are working on the stormwater management for a proposed 3-storey 5 unit apartment at 121 Brae Crescent in Stittsville.

There will be on site parking provided.

The City of Ottawa provided the owners with Servicing and Stormwater quantity criteria. (See attached). Could you provide us with the quality control requirements for the site?

Many Thanks,

Amanda Van Bruggen

--

Kollaard Associates
Engineers
210 Prescott Street, Unit 1
P.O. Box 189
Kemptville, Ontario
K0G 1J0
tel: 613-860-0923
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Appendix C: Storm Design Information

- Pre Development Flows and STM Summary
- Actual Discharge Rate and Storage Volume Requirements (catchment 1)
- Storage Volume Provided in Catchment 1
- Actual Discharge Rate and Storage Volume Requirements (catchment 2)
- Storage Volume Provided in Catchment 2

APPENDIX A: STORMWATER MANAGEMENT MODEL
ALLOWABLE RELEASE RATE AND SWM SUMMARY

Client: Bryden Gibson Architects Incorporated
Job No.: 220338
Location: 121 Brae Crescent, Ottawa
Date: May 12, 2023

PRE DEVELOPMENT FLOW - Of Future Roof Area Only

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2 + A_{gravel} \times 0.6)/A_{tot}$

Area	Surface	Ha	"C"	C_{avg}
Total	Gravel	0.000	0.60	**0.20**
0.023	Roof/Asphalt/Concrete	0.000	0.90	
	Patio Stones	0.000	0.70	
	Grass	0.023	0.20	

2 Year Event			
Pre Dev.	**C**	**Intensity**	**Area**
5 Year	0.20	76.81	0.023
2.78CIA=	0.98		
	0.98 L/s		

**Use a 10 minute time of concentration for 5 year

Total Allowable Release: **0.98 L/s**

STORMWATER MANAGEMENT SUMMARY

Sub Area I.D.	Sub Area (ha)	2,5 year C	100 yea 'C'	Outlet Location	2 Year Pre-development Release (L/s)	5 Year Controlled Release (L/s)	Required 5 year Storage (m^3)	100 Year Controlled Release (L/s)	Required 100 year Storage (m^3)	Total Storage Provided	100 year Storage Depth (m)
Pre	0.023	0.20	0.25	OFFSITE	0.98	N/A	N/A	N/A	N/A		N/A
CA1	0.020	0.90	1.00	OFFSITE	N/A	0.64	3.60	0.64	8.60		145.00
CA2	0.003	0.90	1.00	OFFSITE	N/A	0.32	0.26	0.32	0.72		70.00
TOTAL	**0.022**					**0.96**	**3.9**	**0.96**	**9.3**		

APPENDIX A: STORMWATER MANAGEMENT MODEL

ACTUAL DISCHARGE RATE AND STORAGE VOLUME REQUIREMENTS

Client: Bryden Gibson Architects Incorporated
Job No.: 220338
Location: 121 Brae Crescent, Ottawa
Date: #VALUE!

**Use a 10 minute time of concentration

(CA1- UPPER ROOF)			5 Year Event				100 Year Event			
Area ha	Surface	Ha	"C"	C_{avg}	Intensity (mm/hr)	Runoff Rate (L/s)	"C"	C_{avg}	Intensity (mm/hr)	Runoff Rate (L/s)
	Roof	0.020	0.90	**0.90**	104.19	5.08	1.00	**1.00**	178.56	9.68
	Gravel	0.000	0.60				1.00			
	Patio Stone/Semipermeable block	0.000	0.70				0.88			
0.020	Grass	0.000	0.20				0.25			

Total Allowable Release Rate 5 year 0.98 L/s
100 year 0.98 L/s

Storage Requirements for Roof Area (CA1)

Area = 0.020 hectares
5-year Runoff Coefficient = 0.90 post development
100-year Runoff Coefficient = 1.00 post development

			Release Rate L/s	0	0.2	0.4	0.6	0.8	1	1.2
Return Period	**Time (min)**	**Intensity (mm/hr)**	**Flow Q (L/s)**	**Storage Required (m^3)**						
5 Year	10	104.19	5.08	3.1	2.9	2.8	2.7	2.6	2.5	2.3
	20	70.25	3.43	4.1	3.9	3.6	3.4	3.2	2.9	2.7
	30	53.93	2.63	4.7	4.4	4.0	3.7	3.3	2.9	2.6
	40	44.18	2.16	5.2	4.7	4.2	3.7	3.3	2.8	2.3
	50	37.65	1.84	5.5	4.9	4.3	3.7	3.1	2.5	1.9
	60	32.94	1.61	5.8	5.1	4.3	3.6	2.9	2.2	1.5
	70	29.37	1.43	6.0	5.2	4.3	3.5	2.7	1.8	1.0
			Maximum 5 year storage rate	6.0	5.2	4.3	3.7	3.3	2.9	2.7
			Release Rate L/s	0	0.2	0.4	0.6	0.8	1	1.2
	10	178.56	9.68	5.8	5.7	5.6	5.4	5.3	5.2	5.1
100 Year	20	119.95	6.50	7.8	7.6	7.3	7.1	6.8	6.6	6.4
	30	91.87	4.98	9.0	8.6	8.2	7.9	7.5	7.2	6.8
	40	75.15	4.07	9.8	9.3	8.8	8.3	7.9	7.4	6.9
	50	63.95	3.47	10.4	9.8	9.2	8.6	8.0	7.4	6.8
	60	55.89	3.03	10.9	10.2	9.5	8.7	8.0	7.3	6.6
	70	49.79	2.70	11.3	10.5	9.7	8.8	8.0	7.1	6.3
	80	44.99	2.44	11.7	10.7	9.8	8.8	7.9	6.9	5.9
			Maximum 100 year storage rate	11.7	10.7	9.8	8.8	8.0	7.4	6.9

APPENDIX A: STORMWATER MANAGEMENT MODEL

STORAGE VOLUME PROVIDED ROOF

Client: Bryden Gibson Architects Incorporated
Job No.: 220338
Location: 121 Brae Crescent, Ottawa
Date: May 12, 2023

Storage Provided for Upper Roof Area (CA1)

Storage Depth (m)	Layer Thickness (m)	Top Layer Area (m^2)	Bottom Layer Area (m^2)	Incremental Volume (m^3)	Cumulative Storage Volume (m3)	Release Rate Per Drain (L/sec)	Accutrol Weirs (L/sec)	Total Outflow (L/sec)	Draw Down Incremental (hrs)	Draw Down Cumulative (hrs)
0.15	0.01	142.3	132.9	1.4	9.3	0.320	0.640	0.640	4.05	19.6
0.14	0.01	132.9	122.9	1.3	7.9	0.320	0.640	0.640	3.45	15.5
0.13	0.01	122.9	112.3	1.2	6.7	0.320	0.640	0.640	2.89	12.1
0.12	0.01	112.3	101.4	1.1	5.5	0.320	0.640	0.640	2.38	9.2
0.11	0.01	101.4	89.8	1.0	4.4	0.320	0.640	0.640	1.92	6.8
0.10	0.01	89.8	77.8	0.8	3.5	0.320	0.640	0.640	1.50	4.9
0.09	0.01	77.8	65.3	0.7	2.6	0.320	0.640	0.640	1.14	3.4
0.08	0.01	65.3	52.3	0.6	1.9	0.320	0.640	0.640	0.83	2.2
0.07	0.01	52.3	39.7	0.5	1.3	0.320	0.640	0.640	0.58	1.4
0.06	0.01	39.7	28.6	0.3	0.9	0.320	0.640	0.640	0.38	0.8
0.05	0.01	28.6	19.3	0.2	0.5	0.320	0.640	0.640	0.23	0.5
0.04	0.01	19.3	11.8	0.2	0.3	0.320	0.640	0.640	0.13	0.2
0.03	0.01	11.8	6.2	0.1	0.1	0.320	0.640	0.640	0.06	0.1
0.02	0.01	6.2	2.3	0.0	0.0	0.250	0.500	0.500	0.03	0.0
0.01	0.01	2.3	0.0	0.0	0.0	0.130	0.260	0.260	0.01	0.0
0.00	0.00	0.0	0.0	0.0	0.0	0.000	0.000	0.000	0.00	0.0

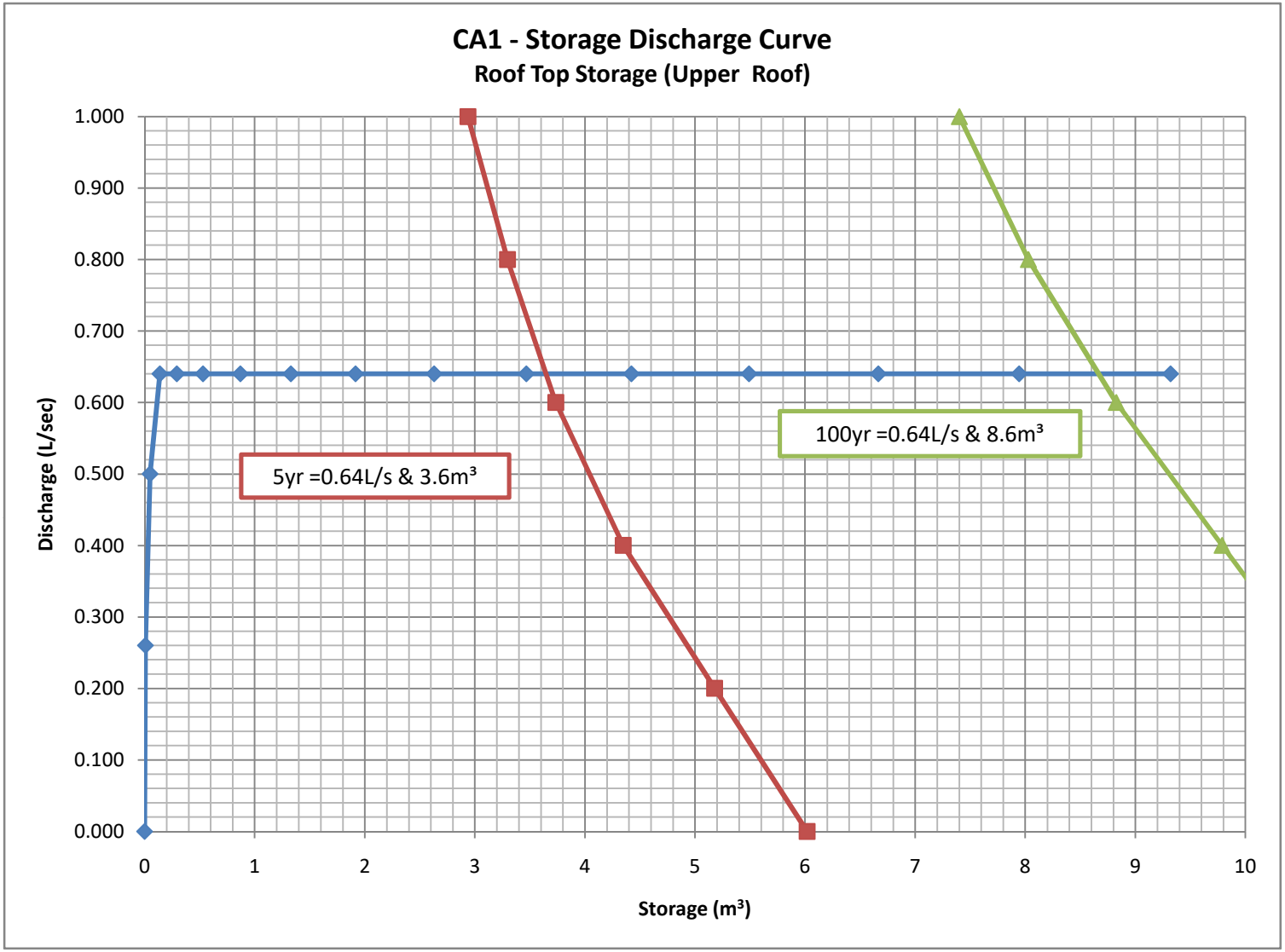
Roof Drain Type - WATTS Large Area Roof Drain with Adjustable Flow Control. RD-100-A-ADJ - Closed Weir.

Number of Weirs 2

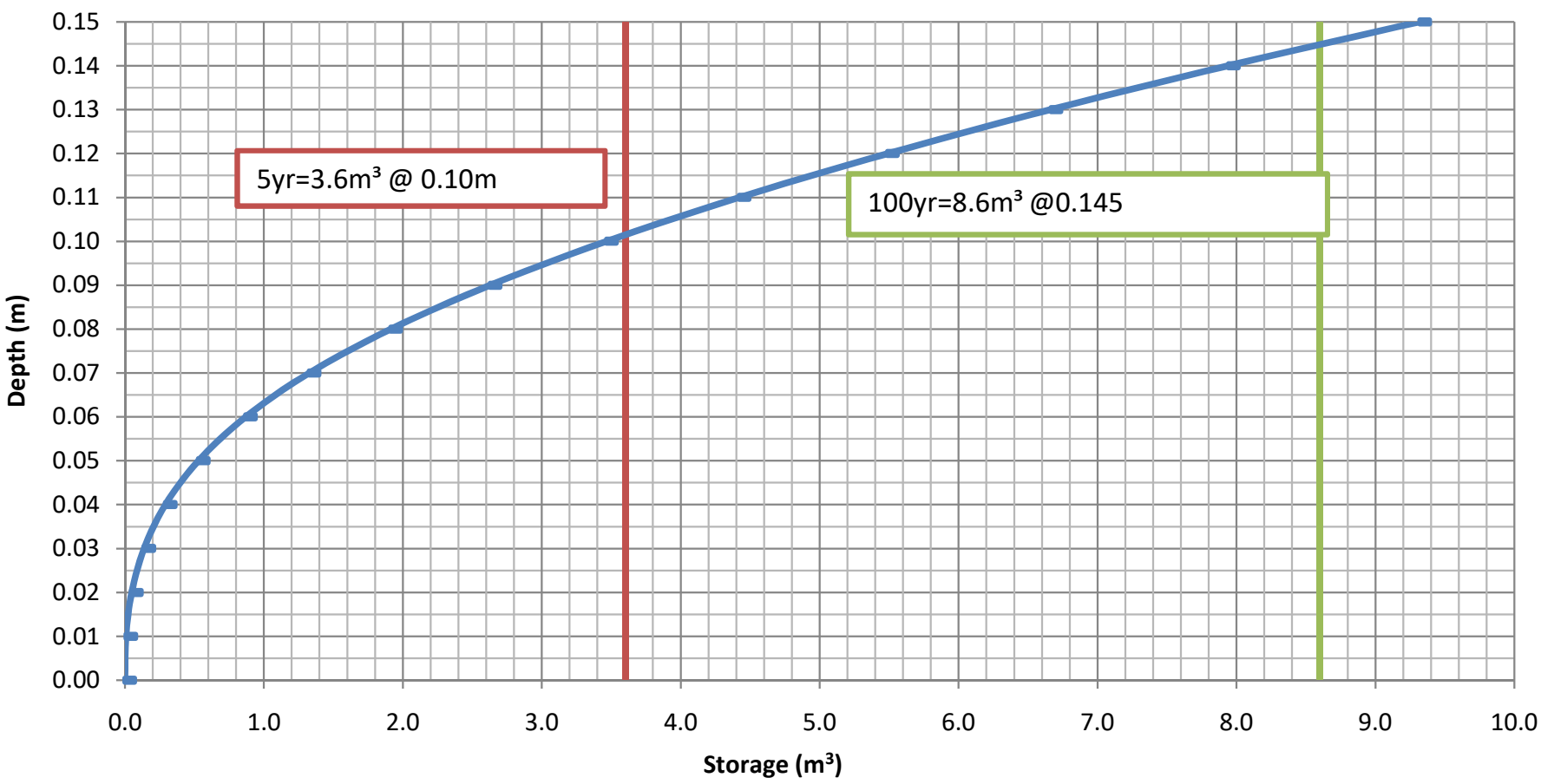
Number of Slots per Weir 1

Discharge per slot 0.32 L/sec

Maximum Discharge for the 5 year Storm Event	0.640	L/s
Maximum Discharge for the 100 year Storm Event	0.640	L/s
Maximum Storage required for the 5 year Storm Event	3.6	(m^3)
Maximum Storage required for the 100 year Storm Event	8.6	(m^3)
Storage Depth for the 5 year Storm Event	100	mm
Storage Depth for the 100 year Storm Event	145	mm


CA1 - Storage Discharge Curve
Roof Top Storage (Upper Roof)
Discharge (L/sec)
1.000
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
0
1
2
3
4
5
6
7
8
9
10
Storage (m³)
5yr =0.64L/s & 3.6m³
100yr =0.64L/s & 8.6m³

APPENDIX A: STORMWATER MANAGEMENT MODEL
Stage-Storage Curve CA1



APPENDIX A: STORMWATER MANAGEMENT MODEL

ACTUAL DISCHARGE RATE AND STORAGE VOLUME REQUIREMENTS

Client: **Bryden Gibson Architects Incorporated**
Job No.: **220338**
Location: **121 Brae Crescent, Ottawa**
Date: **May 12,2023**

**Use a 10 minute time of concentration

(CA2- LOWER ROOF)

			5 Year Event				100 Year Event			
Area ha	**Surface**	**Ha**	**"C"**	**C_{avg}**	**Intensity (mm/hr)**	**Runoff Rate (L/s)**	**"C"**	**C_{avg}**	**Intensity (mm/hr)**	**Runoff Rate (L/s)**
	Asphalt/ Concrete/Roof	0.003	0.90	**0.90**	104.19	0.70	1.00	**1.00**	178.56	1.34
	Gravel	0.000	0.60				1.00			
	Patio Stone/Semipermeable block	0.000	0.70				0.88			
0.003	Grass	0.000	0.20				0.25			

Total Allowable Release Rate 5 year 0.98 L/s
100 year 0.98 L/s

Storage Requirements for Roof Area (CA1)

Area = 0.003 hectares
5-year Runoff Coefficient = 0.90 post development
100-year Runoff Coefficient = 1.00 post development

			Release Rate L/s	0	0.2	0.4	0.6	0.8	1	1.2
Return Period	**Time (min)**	**Intensity (mm/hr)**	**Flow Q (L/s)**	**Storage Required (m^3)**						
5 Year	10	104.19	0.70	0.4	0.3	0.2	0.1	-0.1	-0.2	-0.3
	20	70.25	0.47	0.6	0.3	0.1	-0.2	-0.4	-0.6	-0.9
	30	53.93	0.36	0.7	0.3	-0.1	-0.4	-0.8	-1.1	-1.5
	40	44.18	0.30	0.7	0.2	-0.2	-0.7	-1.2	-1.7	-2.2
	50	37.65	0.25	0.8	0.2	-0.4	-1.0	-1.6	-2.2	-2.8
	60	32.94	0.22	0.8	0.1	-0.6	-1.4	-2.1	-2.8	-3.5
	70	29.37	0.20	0.8	0.0	-0.8	-1.7	-2.5	-3.4	-4.2
			Maximum 5 year storage rate	0.8	0.3	0.2	0.1	-0.1	-0.2	-0.3
			Release Rate L/s	0	0.2	0.4	0.6	0.8	1	1.2
	10	178.56	1.34	0.8	0.7	0.6	0.4	0.3	0.2	0.1
100 Year	20	119.95	0.90	1.1	0.8	0.6	0.4	0.1	-0.1	-0.4
	30	91.87	0.69	1.2	0.9	0.5	0.2	-0.2	-0.6	-0.9
	40	75.15	0.56	1.4	0.9	0.4	-0.1	-0.6	-1.0	-1.5
	50	63.95	0.48	1.4	0.8	0.2	-0.4	-1.0	-1.6	-2.2
	60	55.89	0.42	1.5	0.8	0.1	-0.6	-1.4	-2.1	-2.8
	70	49.79	0.37	1.6	0.7	-0.1	-1.0	-1.8	-2.6	-3.5
	80	44.99	0.34	1.6	0.7	-0.3	-1.3	-2.2	-3.2	-4.1
			Maximum 100 year storage rate	1.6	0.9	0.6	0.4	0.3	0.2	0.1

APPENDIX A: STORMWATER MANAGEMENT MODEL

STORAGE VOLUME PROVIDED ROOF

Client: Bryden Gibson Architects Incorporated
Job No.: 220338
Location: 121 Brae Crescent, Ottawa
Date: May 12, 2023

Storage Provided for Lower Roof Area (CA2)

Storage Depth (m)	Layer Thickness (m)	Top Layer Area (m^2)	Bottom Layer Area (m^2)	Incremental Volume (m^3)	Cumulative Storage Volume (m3)	Release Rate Per Drain (L/sec)	Accutrol Weirs (L/sec)	Total Outflow (L/sec)	Draw Down Incremental (hrs)	Draw Down Cumulative (hrs)
0.15	0.01	26.8	26.8	0.3	2.8	0.320	0.320	0.320	2.47	14.8
0.14	0.01	26.8	26.8	0.3	2.6	0.320	0.320	0.320	2.23	12.3
0.13	0.01	26.8	26.8	0.3	2.3	0.320	0.320	0.320	2.00	10.1
0.12	0.01	26.8	26.7	0.3	2.0	0.320	0.320	0.320	1.77	8.1
0.11	0.01	26.7	26.7	0.3	1.8	0.320	0.320	0.320	1.54	6.3
0.10	0.01	26.7	26.7	0.3	1.5	0.320	0.320	0.320	1.30	4.8
0.09	0.01	26.7	26.7	0.3	1.2	0.320	0.320	0.320	1.07	3.5
0.08	0.01	26.7	26.4	0.3	1.0	0.320	0.320	0.320	0.84	2.4
0.07	0.01	26.4	20.4	0.2	0.7	0.320	0.320	0.320	0.61	1.5
0.06	0.01	20.4	15.0	0.2	0.5	0.320	0.320	0.320	0.41	0.9
0.05	0.01	15.0	10.4	0.1	0.3	0.320	0.320	0.320	0.25	0.5
0.04	0.01	10.4	6.6	0.1	0.2	0.320	0.320	0.320	0.15	0.3
0.03	0.01	6.6	3.8	0.1	0.1	0.320	0.320	0.320	0.07	0.1
0.02	0.01	3.8	1.6	0.0	0.0	0.250	0.250	0.250	0.04	0.0
0.01	0.01	1.6	0.0	0.0	0.0	0.130	0.130	0.130	0.01	0.0
0.00	0.00	0.0	0.0	0.0	0.0	0.000	0.000	0.000	0.00	0.0

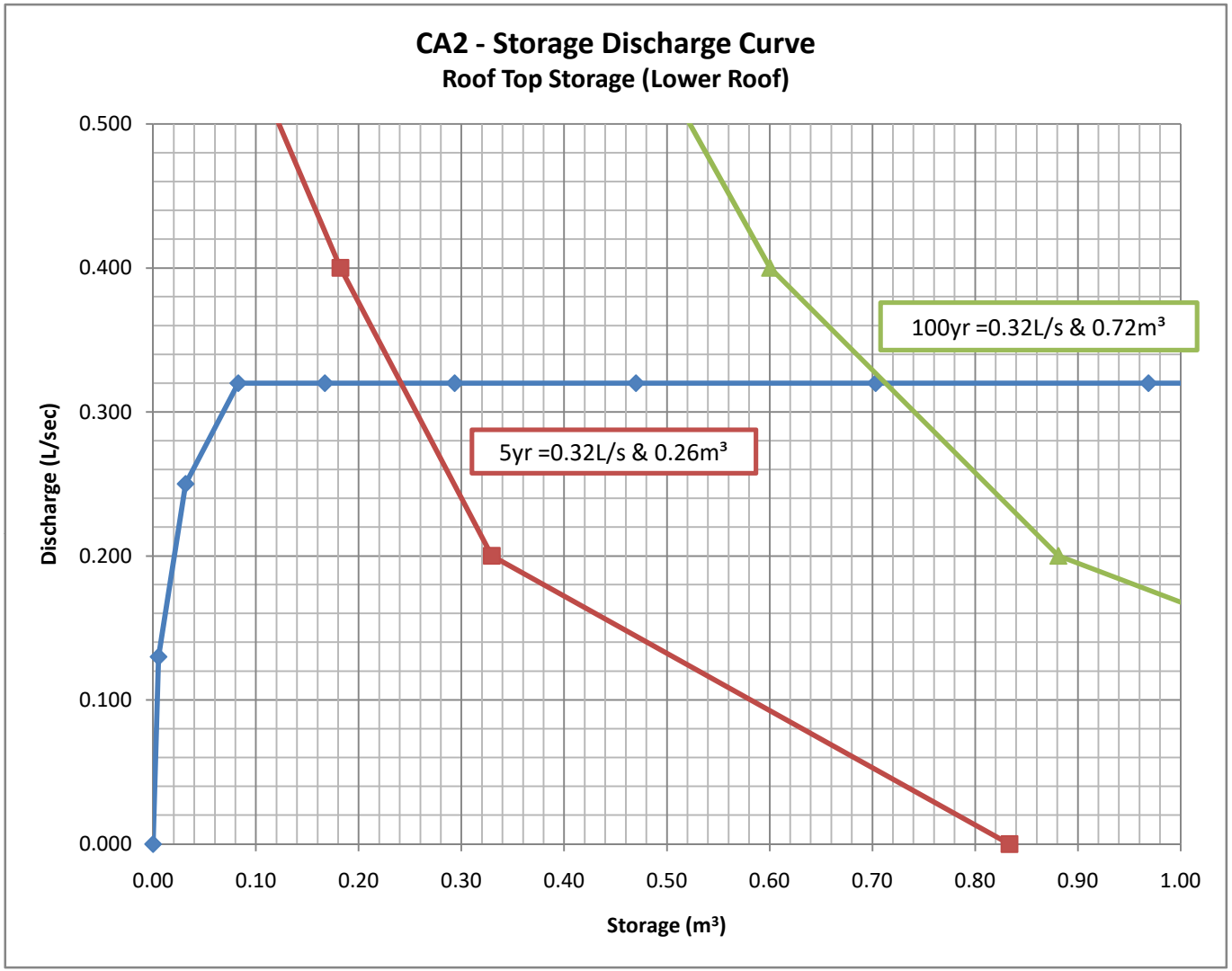
Roof Drain Type - WATTS Large Area Roof Drain with Adjustable Flow Control. RD-100-A-ADJ - Closed Weir.

Number of Weirs 1

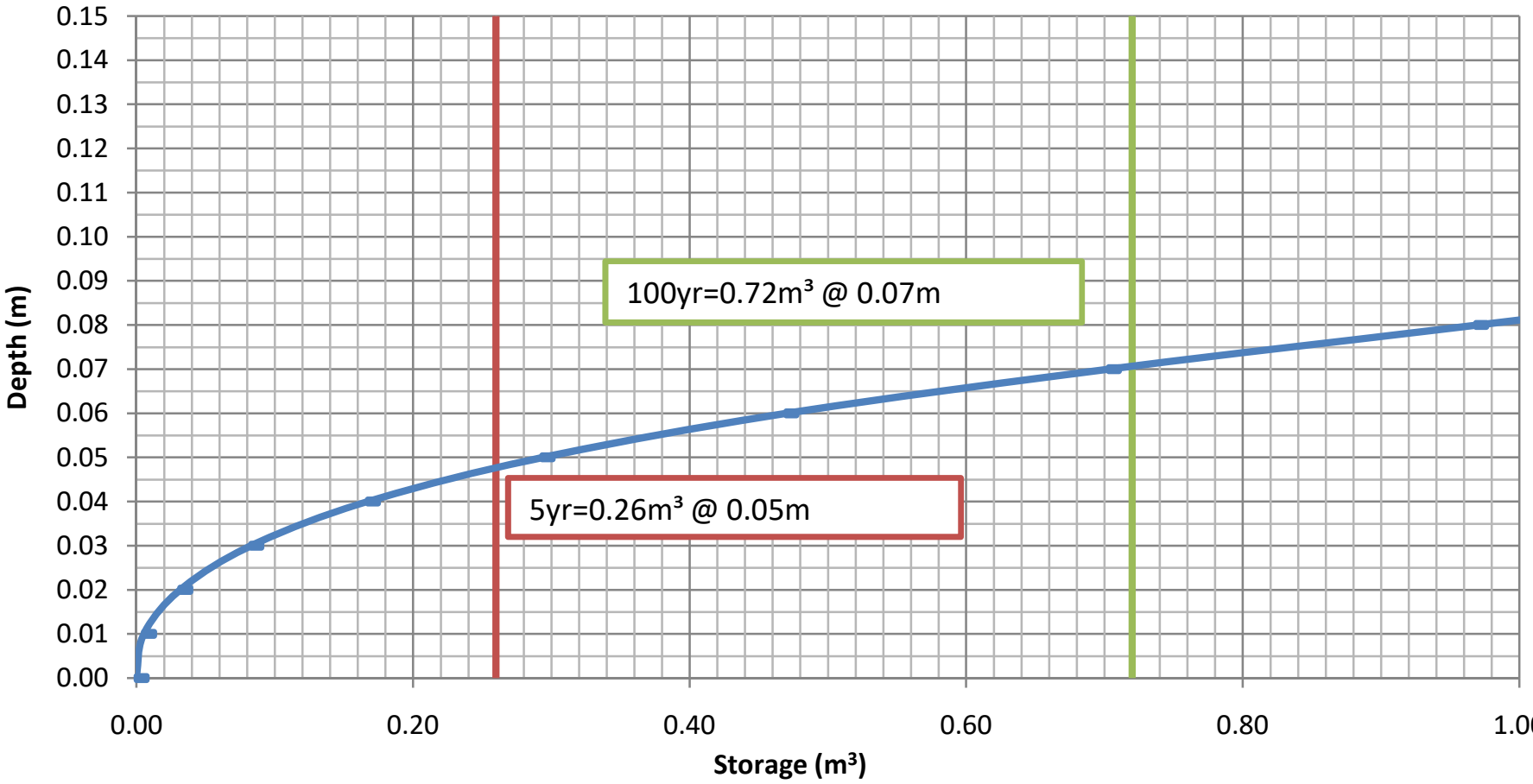
Number of Slots per Weir 1

Discharge per slot 0.32 L/sec

Maximum Discharge for the 5 year Storm Event	0.320	L/s
Maximum Discharge for the 100 year Storm Event	0.320	L/s
Maximum Storage required for the 5 year Storm Event	0.26	(m^3)
Maximum Storage required for the 100 year Storm Event	0.72	(m^3)
Storage Depth for the 5 year Storm Event	50	mm
Storage Depth for the 100 year Storm Event	70	mm


CA2 - Storage Discharge Curve
Roof Top Storage (Lower Roof)
Discharge (L/sec)
0.500
0.400
0.300
0.200
0.100
0.000
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
Storage (m³)
100yr =0.32L/s & 0.72m³
5yr =0.32L/s & 0.26m³

APPENDIX A: STORMWATER MANAGEMENT MODEL
Stage-Storage Curve CA2



APPENDIX A: STORMWATER MANAGEMENT MODEL

OUTLET CONTROL STRUCTURE DESIGN SHEET - Rain Garden Area

Client: Bryden Gibson Architects Incorporated
Job No.: 220338
Location: 121 Brae Crescent, Ottawa
Date: May 12,2023

Outlet pipe invert: 121.85

Infiltration Information
Permeability k = 0.001 m/sec

Channel Information
Top Width: 1.300
Bottom Width: 1.000 (0.01 slope)
Roughness coefficient: 0.03 (grass)
Channel Invert: 122.25

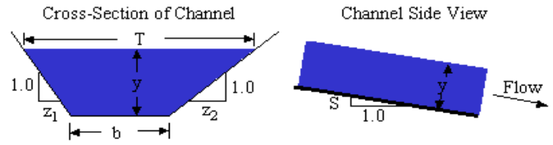
Stage, WSE Elev (m)	Comments	Layer Thickness (m)	Water column depth (m)	Top Layer (m^2)	Bottom Layer (m^2)	Layer Volume (m^3)	Cummulative Storage Volume (m^3)	Infiltration: Length of sand filter (m)	Infiltration: Infiltration Area (m^2)	Infiltration: Head (m)	Infiltration: Flow Path Length (m)	Infiltration: Hydraulic Gradient	Infiltration: Outflow filtration (L/sec)	Channel Flow: Head (m)	Channel Flow: Z	Channel Flow: Cross scectional area (m^2)	Channel Flow: Wetted Perimeter	Channel Flow: Outflow channel flow (L/sec)	Total outflow	Draw Down Incremental (hrs)	Draw Down Cummulative (hrs)
122.300	Top of Rain Garden Area	0.050	0.35	15.40	14.70	0.8	4.1	4.4	1.5	0.45	0.41	1.1	1.7	0.05	3.00	0.06	1.32	23.774	25.5	0.01	3.23
122.250	Bottom of Outflow channel	0.050	0.30	14.70	13.90	0.7	3.3	4.4	1.3	0.40	0.43	0.9	1.2	0.00	0.00	0.00	0.00	0.000	1.2	0.16	3.22
122.200	Top of Sand Filter	0.050	0.25	13.90	13.10	0.7	2.6	4.4	1.1	0.35	0.46	0.8	0.8	0.00	0.00	0.00	0.00	0.000	0.8	0.22	3.06
122.150		0.050	0.20	13.10	12.30	0.6	2.0	4.4	0.9	0.30	0.49	0.6	0.5	0.00	0.00	0.00	0.00	0.000	0.5	0.33	2.83
122.100		0.050	0.15	12.30	11.50	0.6	1.3	4.4	0.7	0.25	0.53	0.5	0.3	0.00	0.00	0.00	0.00	0.000	0.3	0.53	2.51
122.050		0.050	0.10	11.50	10.60	0.6	0.7	4.4	0.4	0.20	0.57	0.4	0.2	0.00	0.00	0.00	0.00	0.000	0.2	0.99	1.98
122.000		0.050	0.05	10.60	0.00	0.2	0.2	4.4	0.2	0.15	0.66	0.2	0.1	0.00	0.00	0.00	0.00	0.000	0.1	0.98	0.98
121.950	Bottom of Storage	0.000	0.0	0.00	0	0.0	0.0	4.4	0.0	0.10	0.66	0.2	0.0	0.00	0.00	0.00	0.00	0.000	0.0	0.00	0.00

Overland Flow Channel Calculations

$$Q=VA \qquad V=\frac{k}{n}R^{2/3}S^{1/2} \qquad R=\frac{A}{P} \qquad A=\frac{y}{2}(b+T)$$

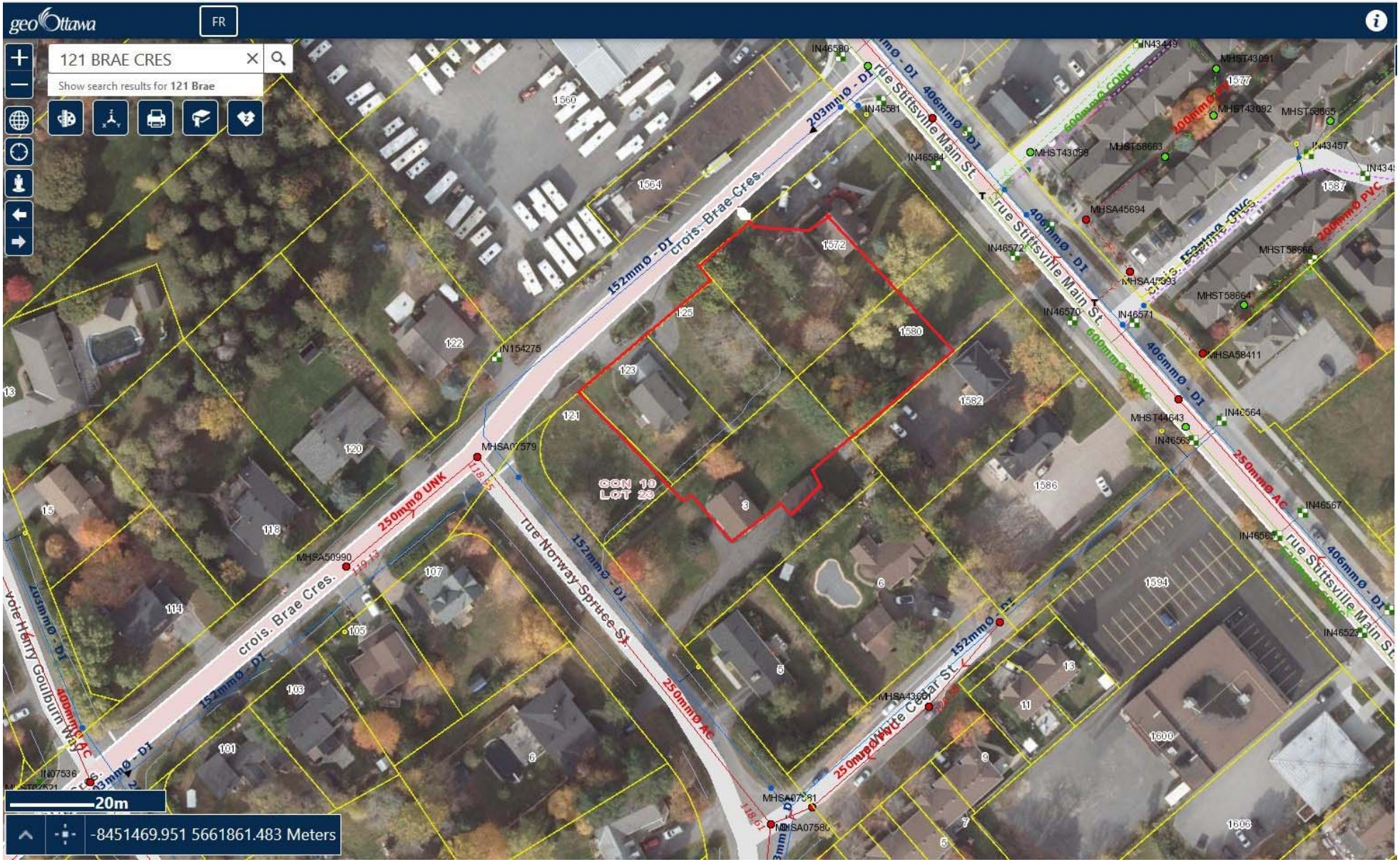
$$P=b+y\left(\sqrt{1+z_1^2}+\sqrt{1+z_2^2}\right) \qquad T=b+y(z_1+z_2)$$

$$F=V\sqrt{\frac{T}{gA\cos\theta}} \qquad \theta=Tan^{-1}(S)$$



Appendix D: Offsite Stormwater

- Offsite Stormwater Catchment Area


geoOttawa
FR
121 BRAE CRES
Show search results for 121 Brae
20m
-8451469.951 5661861.483 Meters
crois. Brae Cres.
rue Stittsville Main St.
rue Norway Spruce St.
rue Cedar St.
voie Henry Goulburn Way
152mmØ - DI
203mmØ - DI
406mmØ - DI
250mmØ UNK
250mmØ AC
600mmØ CONC
200mmØ PVC
GCN 10
LOT 23
1572
1580
1582
1586
1594
1600
1606
1560
1564
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Appendix E: Product Information

- Accutrol Weirs Flow Control and Roof Drains Sheets
- 360R Non Woven Geotextile
- Coconut Erosion Control Blanket

Adjustable Accutrol Weir

Tag: _____

Adjustable Flow Control for Roof Drains

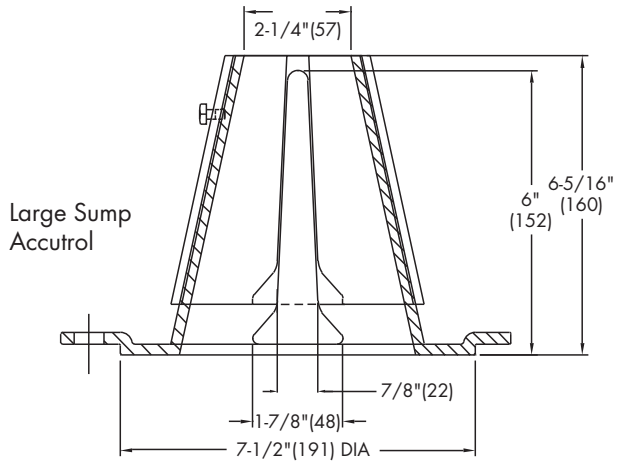
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

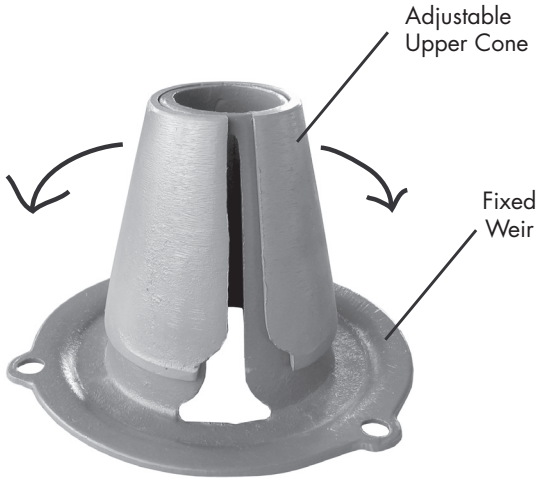
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.
Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2"of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3"of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:
[5 gpm (per inch of head) x 2 inches of head] + 2-1/2 gpm (for the third inch of head) = 12-1/2 gpm.





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

USA: Tel: (800) 338-2581 • Fax: (828) 248-3929 • Watts.com
Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • Watts.ca
Latin America: Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • Watts.com

A Watts Water Technologies Company

Accutrol Weirs

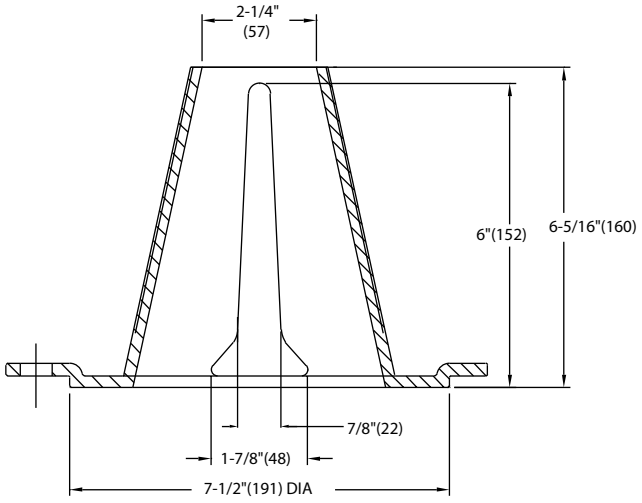
Tag: _____

Flow Control for Roof Drains

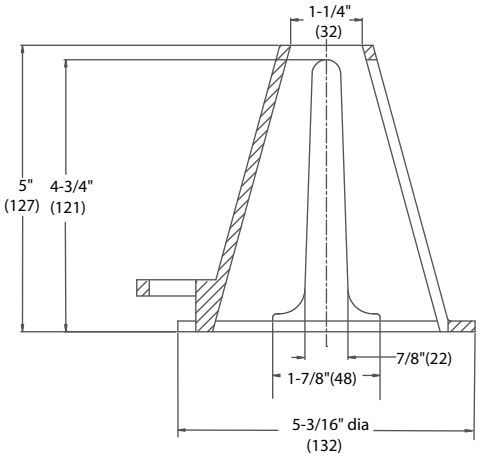
ACCUTROL WEIR FLOW CONTROL

SPECIFICATION: Watts Drainage Products epoxy coated cast iron Accutrol Weir is designed with parabolic openings which limit the flow of rain water off a roof. Each weir slot controls flow to 5 gpm per inch of head to a maximum of 30 gpm at 6" head(for large sump), 25 gpm at 5" head(for small sump) . The Accutrol Weir is secured to the flashing clamp of the roof drain. The Accutrol Weir is available with 1 to 4 slots for the large sump drain and up to 3 slots for the small sump drain.

For Large Sump Roof Drains Specify the "-A" option and number of slots required. (ie. "RD-100-A2" for two slot weir)
For Small Sump Roof Drains Specify the "-A" option and number of slots required. (ie. "RD-200-A1" for one slot weir)



LARGE SUMP ACCUTROL WEIR



SMALL SUMP ACCUTROL WEIR

Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

CANADA: 5435 North Service Road, Burlington, ON, L7L 5H7 TEL: 905-332-6718 TOLL-FREE: 1-888-208-8927 Website: www.wattsdrainage.ca

Terrafix 360R - Geotextile

Function: Filtration & Drainage.

Terrafix 360R is a needle-punched nonwoven geotextile made of 100% virgin polypropylene staple fibers, which are formed into a random network for dimensional stability. Terrafix 360R resists ultraviolet deterioration, rotting, biological degradation, naturally encountered alkalis and acids. Polypropylene is stable within the pH range of 2-13.

Types of applications for 360R are: Subdrains, French Drains, Foundation Drains, Trench Drains, Blanket Drains.

360R used in weaker soil conditions. Used in conjunction with coarser drainage materials.

Property	ASTM Test Method	Value Metric Units
Typical Geotextile Properties		
• Weight (Typical)	D 5261	200 g / m^2 (6 oz/sqyd)
• Grab Tensile Strength	D 4632	711 N
• Grab Elongation	D 4632	50%
• Tear Resistance	D 4533	267 N
• Puncture CBR	D 6241	400 N
• Permittivity	D 4491	1.6 sec^{-1}
• Water Flow	D 4491	4480 l/min/m^2
• Apparent Opening Size	D 4751	0.212 mm
• U.V. Stability	D 4355	70% @ 500hrs

Geosynthetic Systems
3543 Conroy Rd., Ottawa, ON K1T 3S6
(866)490-4436
info@geosyn.ca
www.geosyn.ca

Material and Performance Specification

ECC-2™ Double Net Coconut Rolled Erosion Control Product

Description:

The ECC-2™ is made with uniformly distributed 100% coconut fiber and two polypropylene netsecurely sewn together with UV stabilized thread. The tightly compressed blankets are wrapped and include a product label, code and installation guide. The blankets are palletized for easy transportation.
The ECC-2™ has functional longevity of approximately 36 months, but will vary depending on soil and climatic conditions, and is suitable for slopes 1:1 and medium to high flow channels. The ECC-2™ meets Type 4 specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.17.

Matrix:	1	2
	100% Coconut	

Netting:	Type	Net Color
Top:	Medium weight UV Stabilized Polypropylen	Black
Middle:	None	
Bottom:	Medium weight UV Stabilized Polypropylen	

Net Opening:	Top	Middle	Bottom
	0.75" x 0.75"		0.75" x 0.75"

Thread:	Type	Color
	UV Stabilized Thread	Black

Roll Sizes:	Standard	"A" Size	Mega
Width:	8 ft 2.4 m	4 ft 1.2 m	16 ft 4.9 m
Length:	112.5 ft 34.3 m	225 ft 68.6 m	112.5 ft 34.3 m
Weight*:	57 lbs 25.9 kg	57 lbs 25.9 kg	114 lbs 51.7 kg
Area:	100 yd^2 83.6 m^2	100 yd^2 83.6 m^2	200 yd^2 167.2 m^2
#/Pallet:	25	9	25

*Weight at time of manufacturing

Index Value Properties*:

Property	Test Method	Typical	
Mass/Unit Area	ASTM D6475	8.30 oz/yd^2	281.4 g/m2
Thickness	ASTM D6525	0.26 in	6.60 mm
Tensile Strength-MD	ASTM D6818	260 lb/ft	3.79 kN/m
Elongation-MD	ASTM D6818	20 %	
Tensile Strength-TD	ASTM D6818	175 lb/ft	2.55 kN/m
Elongation-TD	ASTM D6818	20.0 %	
Light Penetration	ASTM D6567	16 %	
Density / Specific Gravity	ASTM D792	N/A g/cm^3	
Water Absorption	ASTM D1117	199 %	

*May differ depending upon raw material variations

Bench-Scale Testing* (NTPEP***):

Test Method	Parameters	Results
ECTC Method 2 Rainfall	50mm (2in) / hr-30 min	SLR**=8.45
	100mm (4in) / hr-30 min	SLR**=10.43
	150mm (6in) / hr-30 min	SLR**=12.90
ECTC Method 3 Shear Resistance	Shear at .50 in soil loss	2.59 lb/ft^2
ECTC Method 4 Germination	Top soil; Fescue; 21 day incubation	772 %

*Bench scale tests should not be used for design purposes.

**Soil Loss Ratio=Soil Loss Bare Soil/Soil Loss with RECP=1/C-Factor

***The preceding test data excerpts were reproduced with the permission of AASHTO, however, this does not constitute endorsement or approval of the product, material or device by AASHTO

Slope Performance Design Values*:

Property	Test Method		Value
C-Factors	ASTM D6459		0.01
Slope Length (L)	≤ 3:1	3:1-2:1	≥ 2:1
< 50 ft (15 m)	0.010	0.023	0.072
50 ft – 100 ft	0.030	0.054	0.090
>100 ft (30 m)	0.064	0.084	0.104

*Large-Scale Results obtained by 3rd Party GAI Accredited Independent Laboratory

Channel Performance Design Values*:

Property	Test Method				
Unvegetated Shear Stress	ASTM D 6460	2.50	lbs/ft^2	119.70	Pa
Unvegetated Velocity	ASTM D 6460	10.0	ft/s	3.05	m/s
Vegetated Shear Stress	NA	N/A	lbs/ft^2	N/A	Pa
Vegetated Velocity	NA	N/A	ft/s	N/A	m/s
Manning's N (Value Represents a Range)			0.025		

*Large-Scale Results obtained by 3rd Party GAI Accredited Independent Laboratory

Revised 1/11/2016

Appendix F: Fire Flow Calculations and Boundary Conditions

- O.B.C Fire Flow Calculations
- Separation Distances and Hydrant Map
- Boundary Condition Submission to City of Ottawa

FIRE FLOW REQUIREMENTS

Client:	**Bryden Gibson Architects**
Job No.:	**220338**
Location:	**121 Brae Crescent, Stittsville**
Date:	**April 10, 2023**

Fire Water Storage and Supply Flow Rate Requirements

The following equation from the latest version of the Ontario Building Code (2012) was used for calculation of the on-site supply rates required to be supplied by the hydrants.

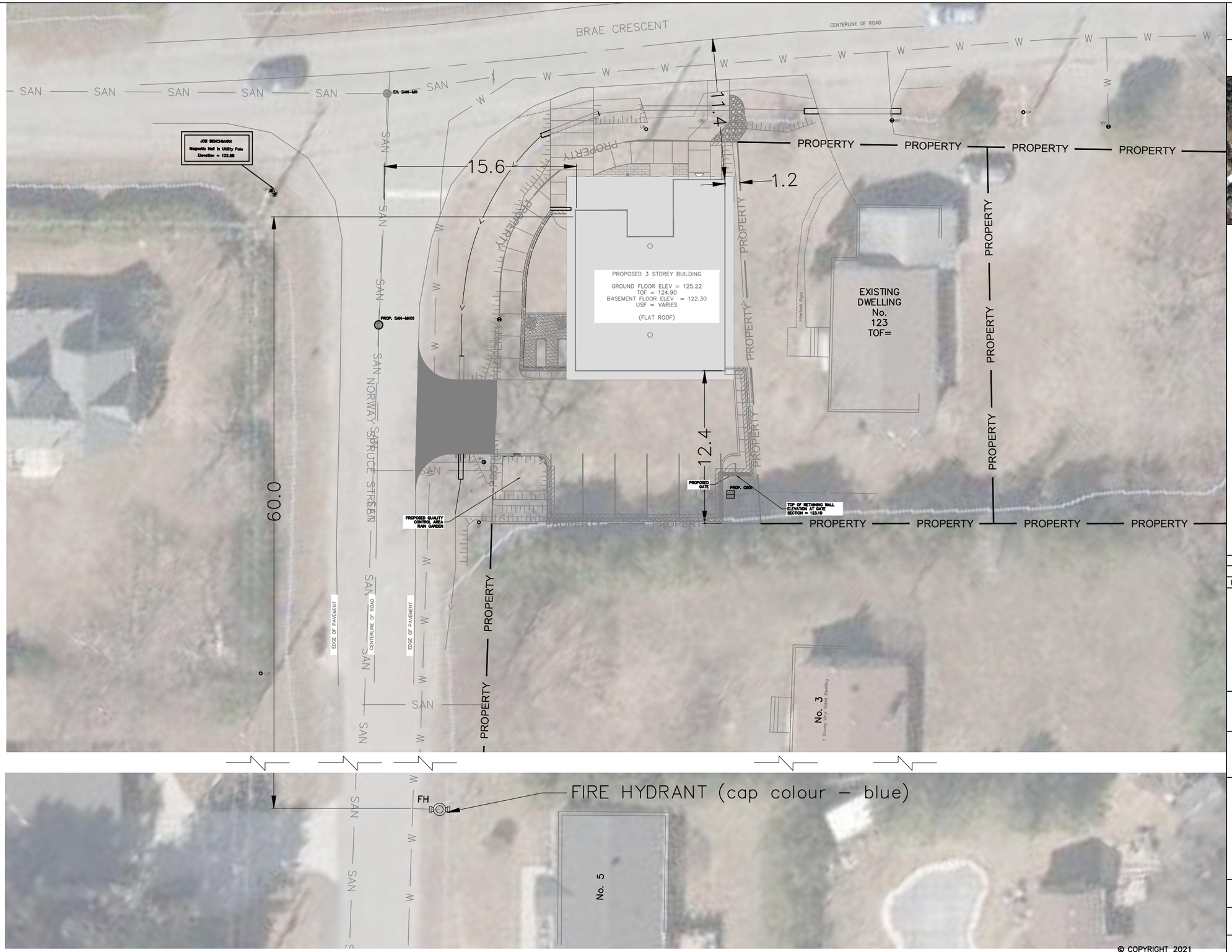
Formulae:

$$Q = KVS_{Tot}$$

$$S_{Tot} = 1.0 + [S_{side1} + S_{side2} + S_{side3} + S_{side4} + ...]$$

OBC Classification of Building Use	Group, Division	2-storey Animal Hospital 'D'		
Assumed Type of Construction	Combustible	Building is of Combustible construction		
Water Supply Coefficient (Table 1, OBC)	K	23		
Exposure Distance 1		11.4	m	
Exposure Distance 2		1.2	m	
Exposure Distance 3		12.4	m	
Exposure Distance 4		15.6	m	
Spatial Coefficient 1	Sside	0		
Spatial Coefficient 2	Sside	0.5		
Spatial Coefficient 3	Sside	0		
Spatial Coefficient 4	Sside	0		
Total Spatial Coefficient	Stot	1.5		
Average Building Height	H	10.8	m	
Building Footprint	A	161	sq.m	
Total Building Volume	V	1,739	cu.m	
Minimum Supply of Water	Q	59,989	L	
Required Fire Flow	Qf	2700	L/min	*per Table 2 on A-3.2.5.7 of the OBC*
		45	L/s	
		713	US gpm	

OBC - Table 2 of A-3.2.5.7. REQUIRE MINIMUM WATER SUPPLY FLOW RATE (L/min)		
Qf =	2700	If Q ≤ 108 000 L
Qf =	3600	108 000L < Q ≤ 135 000 L
Qf =	4500	135 000L < Q ≤ 162 000 L
Qf =	5400	162 000L < Q ≤ 190 000 L
Qf =	6300	190 000L < Q ≤ 270 000 L
Qf =	9000	Q > 270 000 L



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KOLLAARD ASSOCIATES INCORPORATED

DRAWING NUMBER:
220338 – FIRE

O.B.C SEPARATION DISTANCES & HYDRANT LOCATIONS

GENERAL NOTES:

1. All dimensions are in metres; all elevations are in metres and are geodetic. TBM = Nail in utility pole. Elevation= 122.88.
2. This is not a legal survey. Boundary information was derived from topographic plan of survey of part lot 1, registered plan 528, City of Ottawa, by Annis, O'Sullivan, Vollebekk Ltd. April 25, 2022
3. Contractor is responsible for location and protection of utilities.
4. All dimensions to be verified on site by contractor prior to construction.
5. Any changes made to this plan must be verified and approved by Kollaard Associates Inc.
6. Client is responsible for acquiring all necessary permits. This drawing is not for construction until a building permit has been granted.
7. The proposed grades have been set and verified for site grading control only. The grade raise at the building location should be verified with regard to subsurface conditions by qualified geotechnical personnel after completion of the excavation.
8. The underside of footing elevation has been set based on the information available and may not have accounted for actual ground water conditions at the exact house location and should be verified by qualified geotechnical personnel upon completion of the excavation.
9. A geotechnical engineer should be retained to provide recommendations with respect to the sub-grade conditions prior to footing installation.
10. The owner agrees to prepare and implement an erosion and sediment control plan to the satisfaction of the City of Ottawa, appropriate to the site conditions, prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and during all phases of site preparation and construction in accordance with the current Best Management Practices for Erosion and Sediment Control such as, and not limited to installing filter cloths across manhole/catchbasin lids to prevent sediments from entering structures and install and maintain a light duty silt fence barrier as required.
8. Inspection of rough grade by Kollaard Associates Inc. and City of Ottawa must be conducted prior to placement of topsoil or sod.
8. Hydro service to be installed according to the specifications of Ontario Hydro and the Mechanical Engineer.
9. All materials and construction to be in accordance with City of Ottawa standards and Ontario Provincial Standards and Specifications.
10. This drawing is part of Kollaard Associates design report # 220338.

REV	BY	DATE	DESCRIPTION
0	AVB	2023/05/10	FOR SPC SUBMISSION

Kollaard Associates Engineers
P.O. BOX 189, 210 PRESCOTT ST
KEMPTVILLE, ONTARIO
K0G 1J0 FAX (613) 258-0475
http://www.kollaard.ca
(613) 860-0923
info@kollaard.ca

CLIENT:
BRYDEN GIBSON

PROJECT:
PROPOSED 3 STOREY RESIDENTIAL DEVELOPMENT

LOCATION:
121 BREA CRESCENT, STITTSVILLE, ON, K2S 1P1

DESIGNED BY:	*DATE:*
--	MAY 05, 2023
DRAWN BY: AVB	*SCALE:* 1:300

KOLLAARD FILE NUMBER:
220338

On 2023-04-12 1:56 p.m., Amanda VanBruggen wrote:

From: Amanda VanBruggen <amanda@kollaard.ca>
Sent: April 10, 2023 9:21 AM
To: Rathnasooriya, Shika <Thakshika.Rathnasooriya@ottawa.ca>
Cc: james@kollaard.ca
Subject: Re: 121 Brae Crescent

Hello Shika,

Could you provide us with the boundary conditions for the site based on the following information:

i) Location of service - see the attached geoOttawa screenshot. The red X denotes the proposed connection location.
ii) Type of Development - Residential - 5 unit. (fire flow required as per OBC using technical bulletin ISTB 2021-03) : 45L/s
iii) Average Daily Demand: 0.05L/s
iv) Maximum Daily Demand: 0.13L/s
v) Maximum hourly demand: 0.29L/s

Please let us know if you need any more information.

Kind Regards,

Amanda Van Bruggen

Kollaard Associates
Engineers
210 Prescott Street, Unit 1
P.O. Box 189
Kemptville, Ontario
K0G 1J0
tel: 613-860-0923
www.kollaard.ca

121 brae_GeoOttawa.JPG

Attachments:

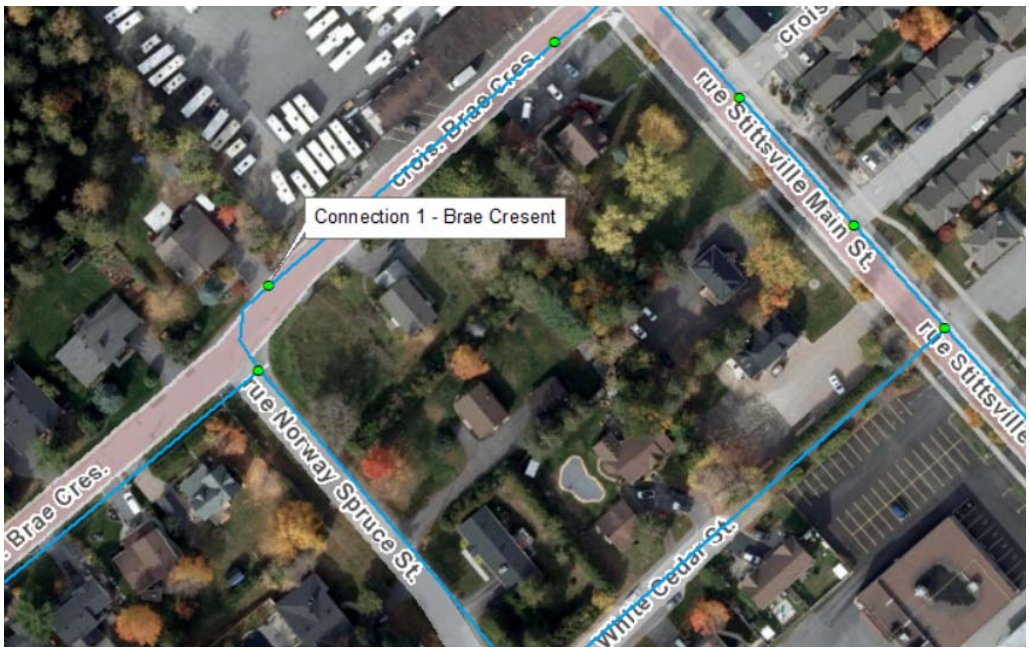
121 brae_GeoOttawa.JPG 394 KB

Boundary Conditions
121 Brae Crescent

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	3	0.05
Maximum Daily Demand	8	0.13
Peak Hour	17	0.29
Fire Flow Demand #1	2,700	45.00

Location



Results

Connection 1 –Brae Crescent

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	160.2	53.5
Peak Hour	155.6	46.9
Max Day plus Fire Flow	155.4	46.6

[1] Ground Elevation = 122.6 m

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Subject: RE: 121 Brae Crescent
From: "Rathnasooriya, Shika" <Thakshika.Rathnasooriya@ottawa.ca>
Date: 2023-04-27, 9:57 a.m.
To: "amanda@kollaard.ca" <amanda@kollaard.ca>

Hi Amanda,

The BC is still valid since a 152 mm watermain is located on Norway Spruce and Brae Crescent.

Thanks,
Shika

From: Amanda VanBruggen <amanda@kollaard.ca>
Sent: April 21, 2023 9:56 AM
To: Rathnasooriya, Shika <Thakshika.Rathnasooriya@ottawa.ca>
Subject: Re: 121 Brae Crescent

Hello Shika,

You had provided me with boundary conditions last week.

I just noticed that you have the proposed connection on Brae.

Please see the attached picture. The X denotes the proposed connection location on Norway Spruce.

Could you provide us with revised boundary conditions.

Many Thanks,

Amanda Van Bruggen

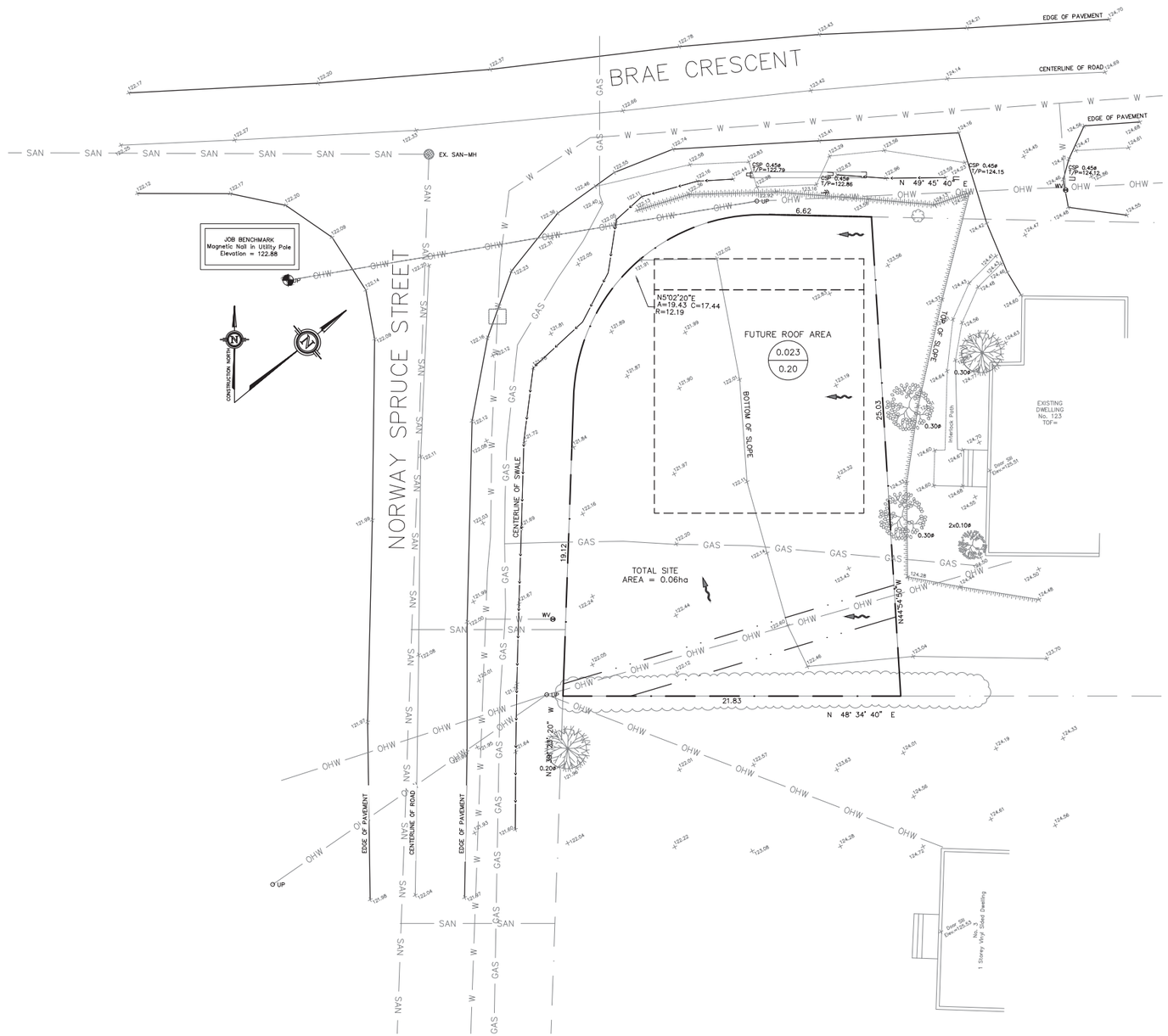
Kollaard Associates
Engineers
210 Prescott Street, Unit 1
P.O. Box 189
Kemptville, Ontario
K0G 1J0
tel: 613-860-0923
www.kollaard.ca

On 2023-04-14 8:48 a.m., Rathnasooriya, Shika wrote:

> Hi Amanda,
>
> Pleas find boundary conditions attached.
>
> Thanks,
> Shika
>
> ---
>
> **From:** Amanda VanBruggen <amanda@kollaard.ca>
> **Sent:** April 12, 2023 1:56 PM
> **To:** Rathnasooriya, Shika <Thakshika.Rathnasooriya@ottawa.ca>
> **Subject:** Re: 121 Brae Crescent
>
>

Appendix G: Drawings

- 220338– PRE – Pre-Development Water Flows
- 220338 – POST – Controlled and Uncontrolled Areas
- 220338 – UPPER ROOF – Upper Roof Stormwater Plan
- 220338 – LOWER ROOF – Lower Roof Stormwater Plan
- 220338 – GR – Grading & Drainage Plan
- 220338 – SER – Site Servicing Plan
- 220338 – DETAILS – Site Servicing Details
- 220338 – RR – Roadway Reinstatement Plan
- 220338 – ESC – Erosion & Sediment Control Plan



PRE-DEVELOPMENT DRAWING

SCALE = 1:150

DRAWING NUMBER:
220338-PRE

SCALE:
0 1 2 3 4 5 10 15
1:150 METRES

LEGEND (STORM WATER MANAGEMENT)

CONTROLLED
0.39
0.34

- CATCHMENT LABEL
- CATCHMENT AREA (HECTARES)
- 5 YEAR RUNOFF COEFFICIENT
- CATCHMENT AREA BOUNDARY
- DIRECTION OF FLOW
- PROPERTY LINE
- TOP OF SLOPE
- (QUANTITY) CONTROLLED AREA
- (QUANTITY) UNCONTROLLED AREA
- QUALITY CONTROLLED AREA
- PRE-DEVELOPMENT DRAINAGE PATTERN

No.	REVISION	DATE	BY
0	ISSUED FOR SITE PLAN CONTROL	2023/05/10	AVB
#	REVISION ITEM / DESCRIPTION	REV. DATE	INT.

Kollaard Associates
Engineers
(613) 860-0923
info@kollaard.ca
P.O. BOX 189, 210 PRESCOTT ST.
KEMPTVILLE, ONTARIO
K0G 1J0 FAX (613) 258-0475
http://www.kollaard.ca

CLIENT:
BRYDEN GIBSON

PROJECT:
PROPOSED 3 STOREY RESIDENTIAL DEVELOPMENT

LOCATION:
121 BREA CRESCENT, STITTSVILLE, ON, K2S 1P1

DESIGNED BY:	CHECKED BY:
--	--
DRAWN BY:	APPROVED BY:
JR	--

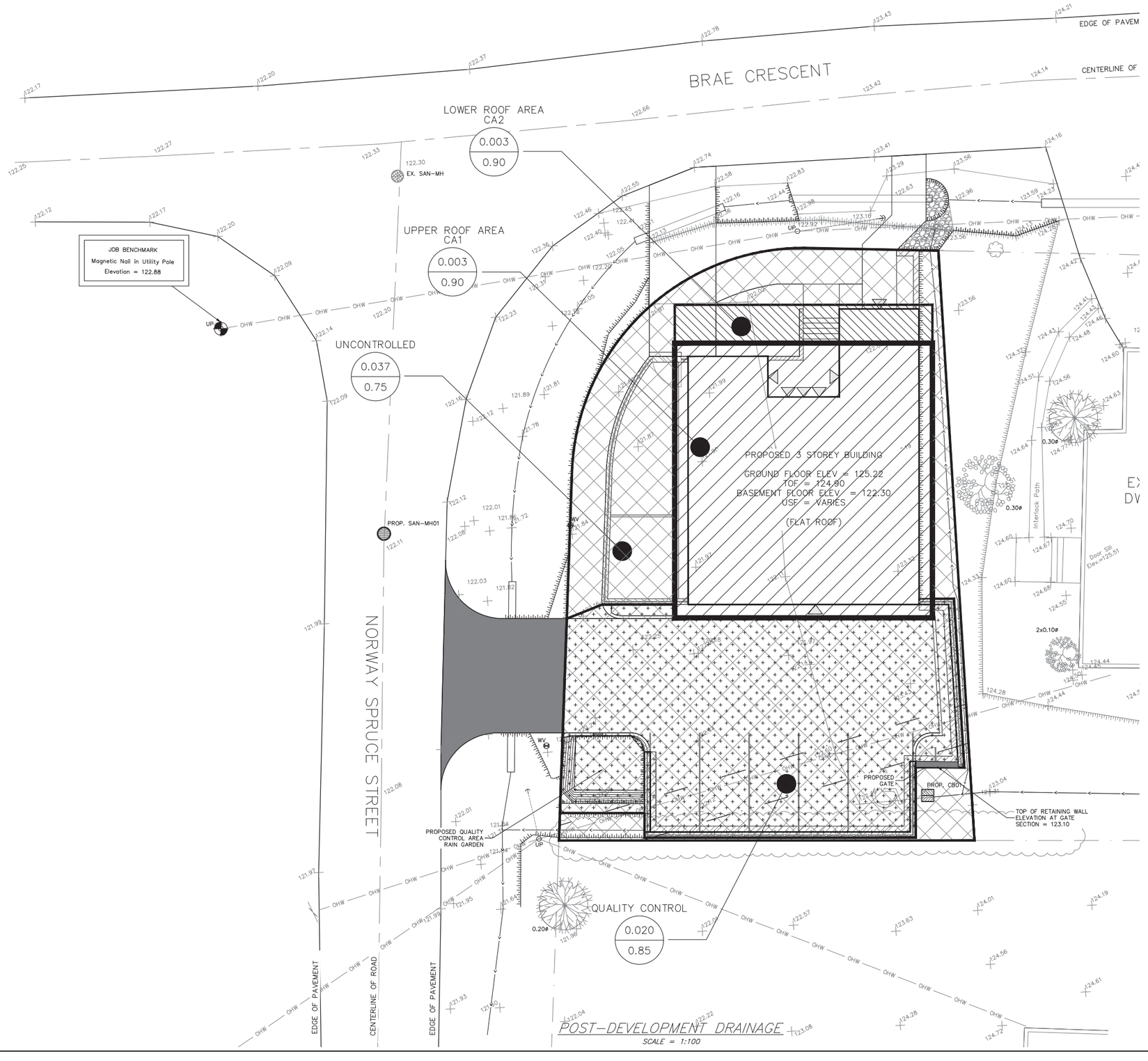
DATE: MAY 12, 2023

KOLLAARD FILE NUMBER: 220338

DRAWING NUMBER: 220338-PRE

DRAWING NAME: PRE-DEVELOPMENT DRAINAGE

ARCH D



POST-DEVELOPMENT DRAINAGE

SCALE = 1:100

DRAWING NUMBER: 220338-POST

SCALE: 0 1 2 3 4 5 10 METRES
1:100

LEGEND (STORM WATER MANAGEMENT)

- CONTROLLED — CATCHMENT LABEL
- 0.39 / 0.34 — CATCHMENT AREA (HECTARES) / 5 YEAR RUNOFF COEFFICIENT
- CATCHMENT AREA BOUNDARY
- DIRECTION OF FLOW
- PROPERTY LINE
- TOP OF SLOPE
- (QUANTITY) CONTROLLED AREA
- (QUANTITY) UNCONTROLLED AREA
- QUALITY CONTROLLED AREA
- PRE-DEVELOPMENT DRAINAGE PATTERN

No.	REVISION	DATE	BY
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CLIENT: BRYDEN GIBSON

PROJECT: PROPOSED 3 STOREY RESIDENTIAL DEVELOPMENT

LOCATION: 121 BREA CRESCENT, STITTSVILLE, ON, K2S 1P1

DESIGNED BY:	CHECKED BY:
SD	SD
DRAWN BY:	APPROVED BY:
JR	SD

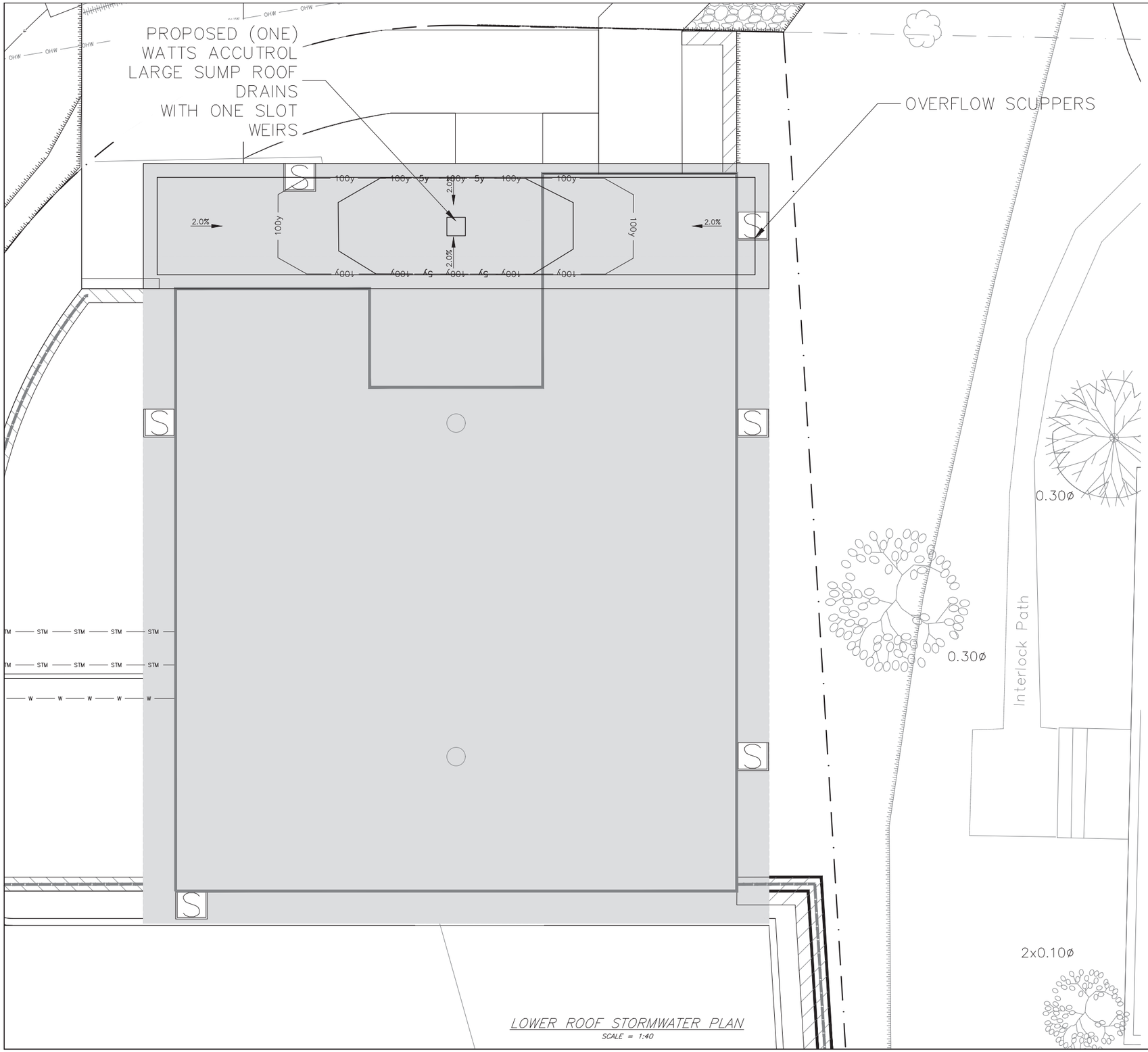
DATE: MAY 12, 2023

KOLLAARD FILE NUMBER: 220338

DRAWING NUMBER: 220338-POST

DRAWING NAME: POST-DEVELOPMENT DRAINAGE

ARCH D



LOWER ROOF STORMWATER PLAN
SCALE = 1:40

ROOF DRAIN DETAILS (LOWER ROOF)

1. MODELL TYPE: WATTS MODEL "ADJUSTABLE ACCUTROL ONE SLOT WEIR" FOR LARGE ROOF DRAINS. CLOSED WEIR SETTING TO PERMIT THE RELEASE RATE OF 5gpm OR 0.32L/s PER DRAIN. UNDER A HEAD OF 150mm.
2. NUMBER OF CONTROL DEVICES FOR TOTAL ROOF AREA: 1
3. TOTAL RELEASE FROM ROOF AT MAXIMUM HEAD OF 150mm WITH (1) ONE DRAIN IS 5.0gpm or 0.32L/s.
4. 5 YEAR ELEVATION: 50mm ABOVE THE ROOF DRAIN. 100 YEAR ELEVATION 70mm ABOVE THE ROOF DRAIN.
5. ROOF PITCH IS ASSUMED TO HAVE 2% MINIMUM FOR MODIFIED BITUMINOUS MEMBRANE.
6. THIS DRAWING IS PART OF KOLLAARD ASSOCIATES REPORT #220338.
7. PROPOSED ROOF DRAINS AND SCUPPER LOCATIONS SHALL BE REVIEWED BY THE MECHANICAL AND STRUCTURAL BUILDING DESIGNERS.
8. THE OWNER'S MECHANICAL AND STRUCTURAL ENGINEERS SHALL ENSURE THAT THE ADDITIONAL STORMWATER STORAGE VOLUME FROM STORMWATER MANAGEMENT MEASURES ARE ACCOUNTED FOR IN THE STRUCTURAL DESIGN OF THE WATERPROOFING OF THE ROOF AREA AND ANY OF THE SUPPORTING STRUCTURES THAT MAY BE AFFECTED BY THE STORED WATER.
9. ROOF DRAINS SHALL OUTLET TO THE ROADSIDE DITCH ON NORWAY SPRUCE STREET AS SHOWN IN THE SERVICING PLAN 220338-SER.

DRAWING NUMBER:
220338-LOWER ROOF

SCALE:

GENERAL NOTES:

1. All dimensions are in metres; all elevations are in metres and are geodetic. TBM = Nail in utility pole, Elevation= 122.88.
2. This is not a legal survey. Boundary information was derived from topographic plan of survey of part lot 1, registered plan 528, City of Ottawa, by Annis, O'Sullivan, Vollebekk Ltd. April 25, 2022
3. Contractor is responsible for location and protection of utilities.
4. All dimensions to be verified on site by contractor prior to construction.
5. Any changes made to this plan must be verified and approved by Kollaard Associates Inc.
6. Client is responsible for acquiring all necessary permits. This drawing is not for construction until a building permit has been granted.
7. The proposed grades have been set and verified for site grading control only. The grade raise at the building location should be verified with regard to subsurface conditions by qualified geotechnical personnel after completion of the excavation.
8. The underside of footing elevation has been set based on the information available and may not have accounted for actual ground water conditions at the exact house location and should be verified by qualified geotechnical personnel upon completion of the excavation.
9. A geotechnical engineer should be retained to provide recommendations with respect to the sub-grade conditions prior to footing installation.
10. The owner agrees to prepare and implement an erosion and sediment control plan to the satisfaction of the City of Ottawa, appropriate to the site conditions, prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and during all phases of site preparation and construction in accordance with the current Best Management Practices for Erosion and Sediment Control such as, and not limited to installing filter cloths across manhole/catchbasin lids to prevent sediments from entering structures and install and maintain a light duty silt fence barrier as required.
8. Inspection of rough grade by Kollaard Associates Inc. and City of Ottawa must be conducted prior to placement of topsoil or sod.
8. Hydro service to be installed according to the specifications of Ontario Hydro and the Mechanical Engineer.
9. All materials and construction to be in accordance with City of Ottawa standards and Ontario Provincial Standards and Specifications.
10. This drawing is part of Kollaard Associates design report # 220338.

No.	REVISION	DATE	BY
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http://www.kollaard.ca

CLIENT:
BRYDEN GIBSON

PROJECT:
PROPOSED 3 STOREY RESIDENTIAL DEVELOPMENT

LOCATION:
121 BREA CRESCENT, STITTSVILLE, ON, K2S 1P1

LICENSED PROFESSIONAL ENGINEER
MAY, 12, 2023
S.E. deWit
100079612
PROVINCE OF ONTARIO

DESIGNED BY:	CHECKED BY:
SD	SD
DRAWN BY:	APPROVED BY:
JR	— —

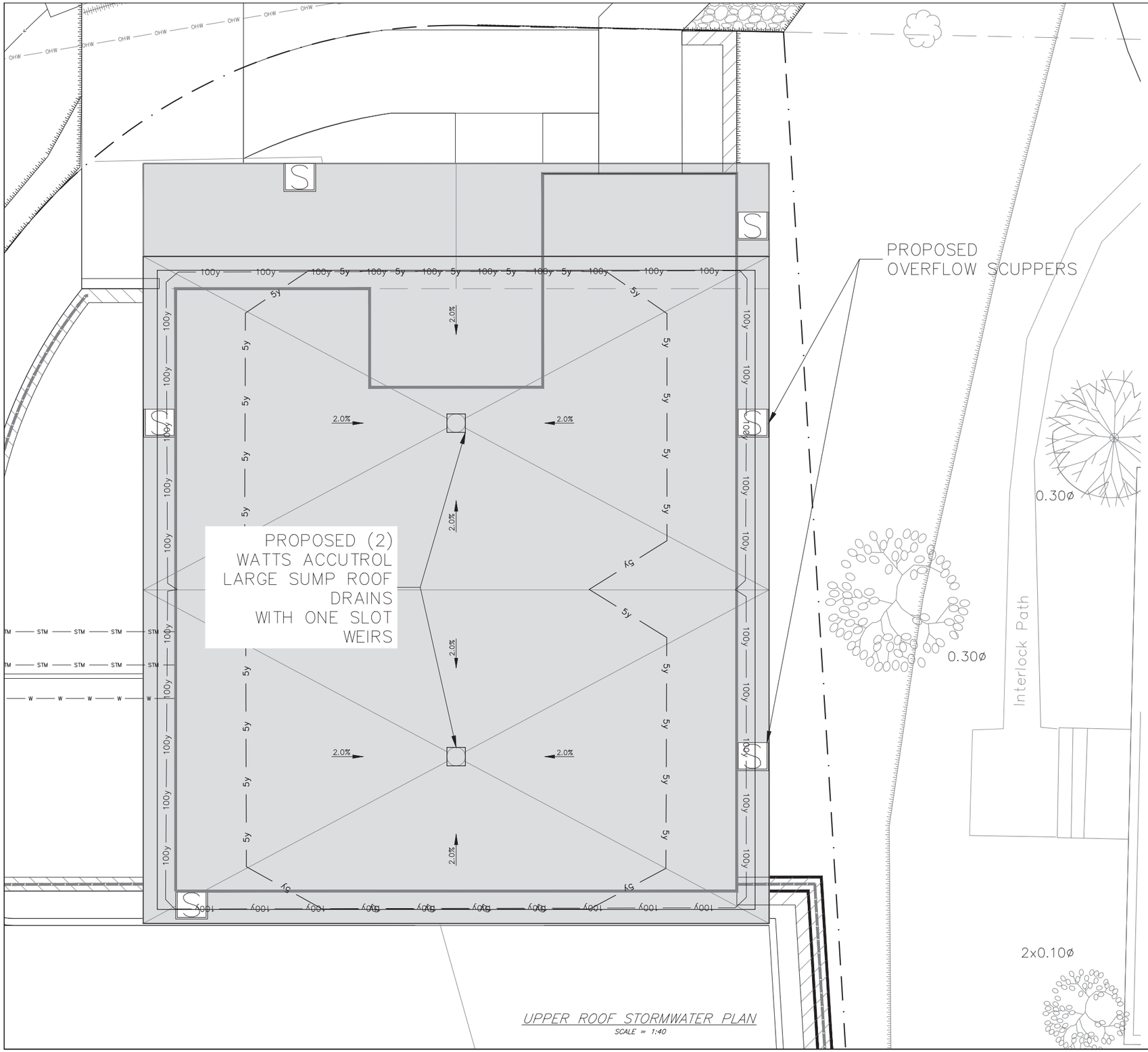
DATE: MAY 12, 2023

KOLLAARD FILE NUMBER: 220338

DRAWING NUMBER:
220338-LOWER ROOF

DRAWING NAME:
LOWER ROOF STM PLAN

ARCH B



UPPER ROOF STORMWATER PLAN
SCALE = 1:40

ROOF DRAIN DETAILS (UPPER ROOF)

1. MODELL TYPE: WATTS MODEL "ADJUSTABLE ACCUTROL ONE SLOT WEIR" FOR LARGE ROOF DRAINS. CLOSED WEIR SETTING TO PERMIT THE RELEASE RATE OF 5gpm OR 0.32L/s PER DRAIN. UNDER A HEAD OF 150mm.
2. NUMBER OF CONTROL DEVICES FOR TOTAL ROOF AREA: 2
3. TOTAL RELEASE FROM ROOF AT MAXIMUM HEAD OF 150mm WITH (2) TWO DRAINS IS 10gpm or 0.63L/s.
4. 5 YEAR ELEVATION: 100mm ABOVE THE ROOF DRAINS. 100 YEAR ELEVATION 145mm ABOVE THE ROOF DRAINS.
5. ROOF PITCH IS ASSUMED TO HAVE 2% MINIMUM FOR MODIFIED BITUMINOUS MEMBRANE.
6. THIS DRAWING IS PART OF KOLLAARD ASSOCIATES REPORT #220338.
7. PROPOSED ROOF DRAINS AND SCUPPER LOCATIONS SHALL BE REVIEWED BY THE MECHANICAL AND STRUCTURAL BUILDING DESIGNERS.
8. THE OWNER'S MECHANICAL AND STRUCTURAL ENGINEERS SHALL ENSURE THAT THE ADDITIONAL STORMWATER STORAGE VOLUME FROM STORMWATER MANAGEMENT MEASURES ARE ACCOUNTED FOR IN THE STRUCTURAL DESIGN OF THE WATERPROOFING OF THE ROOF AREA AND ANY OF THE SUPPORTING STRUCTURES THAT MAY BE AFFECTED BY THE STORED WATER.
9. ROOF DRAINS SHALL OUTLET TO THE ROADSIDE DITCH ON NORWAY SPRUCE STREET AS SHOWN IN THE SERVICING PLAN 220338-SER.

DRAWING NUMBER:
220338-UPPER ROOF

SCALE:

GENERAL NOTES:

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8. The underside of footing elevation has been set based on the information available and may not have accounted for actual ground water conditions at the exact house location and should be verified by qualified geotechnical personnel upon completion of the excavation.
9. A geotechnical engineer should be retained to provide recommendations with respect to the sub-grade conditions prior to footing installation.
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8. Inspection of rough grade by Kollaard Associates Inc. and City of Ottawa must be conducted prior to placement of topsoil or sod.
8. Hydro service to be installed according to the specifications of Ontario Hydro and the Mechanical Engineer.
9. All materials and construction to be in accordance with City of Ottawa standards and Ontario Provincial Standards and Specifications.
10. This drawing is part of Kollaard Associates design report # 220338.

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CLIENT:
BRYDEN GIBSON

PROJECT:
PROPOSED 3 STOREY RESIDENTIAL DEVELOPMENT

LOCATION:
121 BREA CRESCENT, STITTSVILLE, ON, K2S 1P1

LICENSED PROFESSIONAL ENGINEER
MAY, 12, 2023
S.E. deWit
100079612
PROVINCE OF ONTARIO

DESIGNED BY:	CHECKED BY:
SD	SD
DRAWN BY:	APPROVED BY:
JR	SD

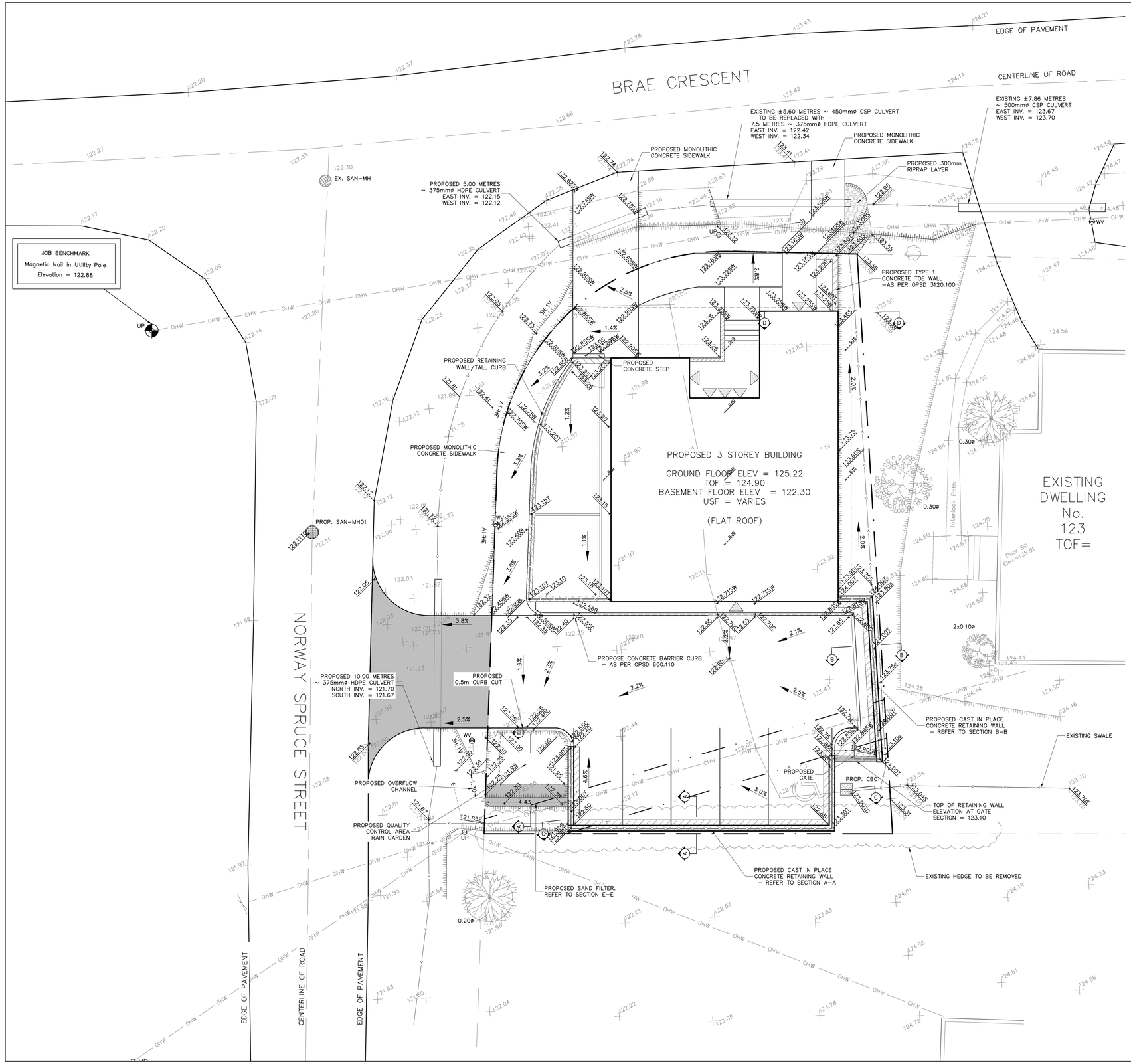
DATE: MAY 12, 2023

KOLLAARD FILE NUMBER: 220338

DRAWING NUMBER:
220338-UPPER ROOF

DRAWING NAME:
UPPER ROOF STM PLAN

ARCH D

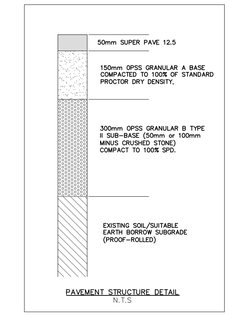


PROPOSED GRADING AND DRAINAGE PLAN

SCALE = 1:100

GENERAL LEGEND

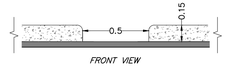
- EXISTING ELEVATION
- PROPOSED/EXISTING ELEVATIONS
- PROPOSED CURB ELEVATION
- PROPOSED TOP OF GRATE ELEVATION
- PROPOSED CATCH BASIN TOP OF GRATE ELEVATION
- PROPOSED SWALE ELEVATION
- PROPOSED SIDEWALK ELEVATION
- PROPOSED TOP OF RETAINING WALL ELEVATION
- PROPOSED BOTTOM OF RETAINING WALL ELEVATION
- PROPOSED ELEVATION
- DRAINAGE SLOPE
- WATERMAIN
- STORM SEWER
- SANITARY SEWER
- CENTRELINE OF ROAD
- EDGE OF ROAD
- TOP OF SLOPE
- PROPERTY LINE
- GAS LINE
- OVERHEAD WIRE
- EXISTING HYDRO POLE
- EXISTING HYDRO GUY WIRE ANCHOR
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- PROPOSED WATER VALVE
- EXISTING STORM MANHOLE
- EXISTING SANITARY MANHOLE
- EXISTING VALVE CHAMBER
- EXISTING CURB INLET CATCH BASIN
- EXISTING CATCH BASIN
- PROPOSED CATCH BASIN/MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- TEMPORARY BENCHMARK
- BUILDING ENTRANCE LOCATION
- STREET SIGN
- SILT FENCE



PAVEMENT STRUCTURE DETAIL
N.T.S

PAVEMENT STRUCTURE DETAIL

N.T.S



PROPOSED CURB CUT

N.T.S

DRAWING NUMBER: 220338–GR

PLAN:

SCALE:
0 1 2 3 4 5 10
1:100 METRES

GENERAL NOTES:

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9. All materials and construction to be in accordance with City of Ottawa standards and Ontario Provincial Standards and Specifications.
10. This drawing is part of Kollaard Associates design report # 220338.

No.	REVISION	DATE	BY
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#	REVISION ITEM / DESCRIPTION	REV. DATE	INT.

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CLIENT:
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PROJECT:
PROPOSED 3 STOREY RESIDENTIAL DEVELOPMENT

LOCATION:
121 BREA CRESCENT, STITTSVILLE, ON, K2S 1P1

LICENSED PROFESSIONAL ENGINEER
MAY. 12, 2022
S.E. deWit
100079612
PROVINCE OF ONTARIO

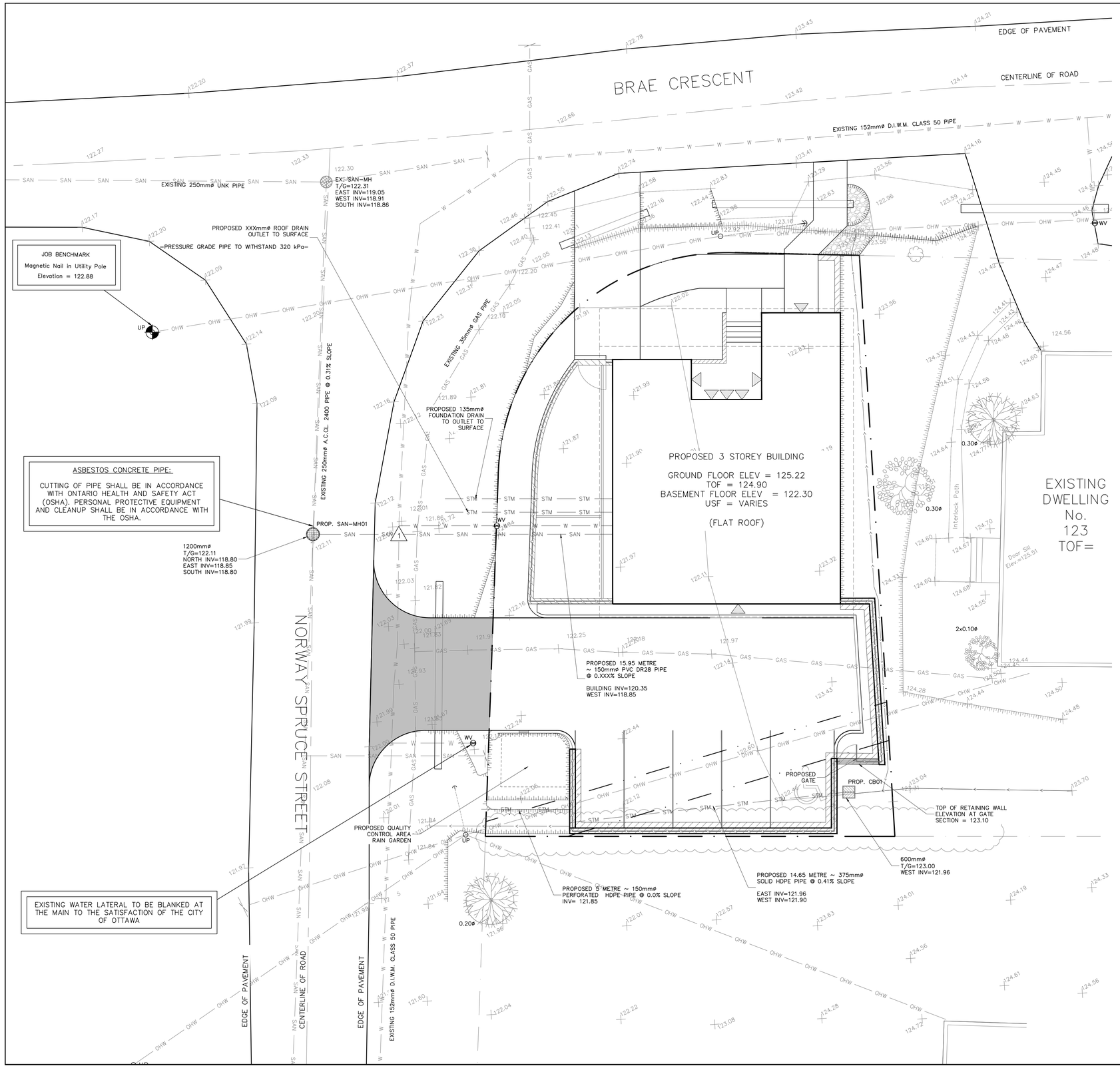
DESIGNED BY:	CHECKED BY:
SD	SD
DRAWN BY:	APPROVED BY:
JR	SD

DATE: MAY 12, 2023
KOLLAARD FILE NUMBER: 220338

DRAWING NUMBER: 220338–GR

DRAWING NAME: GRADING AND DRAINAGE PLAN

ARCH D



GENERAL LEGEND

EXISTING ELEVATION	EXISTING HYDRO POLE
PROPOSED/EXISTING ELEVATIONS	EXISTING HYDRO GUY WIRE ANCHOR
PROPOSED CURB ELEVATION	EXISTING FIRE HYDRANT
PROPOSED TOP OF GRATE ELEVATION	EXISTING WATER VALVE
PROPOSED CATCH BASIN TOP OF GRATE ELEVATION	PROPOSED WATER VALVE
PROPOSED SWALE ELEVATION	EXISTING STORM MANHOLE
PROPOSED SIDEWALK ELEVATION	EXISTING SANITARY MANHOLE
PROPOSED TOP OF RETAINING WALL ELEVATION	EXISTING VALVE CHAMBER
PROPOSED BOTTOM OF RETAINING WALL ELEVATION	EXISTING CURB INLET CATCH BASIN
PROPOSED ELEVATION	EXISTING CATCH BASIN
DRAINAGE SLOPE	PROPOSED CATCH BASIN/MANHOLE
WATERMAIN	PROPOSED CATCH BASIN
STORM SEWER	PROPOSED STORM MANHOLE
SANITARY SEWER	PROPOSED SANITARY MANHOLE
CENTRELINE OF ROAD	TEMPORARY BENCHMARK
EDGE OF ROAD	BUILDING ENTRANCE LOCATION
TOP OF SLOPE	STREET SIGN
PROPERTY LINE	SILT FENCE
GAS LINE	
OVERHEAD WIRE	

REFER TO KOLLAARD DRAWING 220338-DETAILS FOR SERVICING DETAILS

SEWER NOTES:

1. SUPPLY AND CONSTRUCT ALL SEWERS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARDS AND SPECIFICATIONS AND ONTARIO PROVINCIAL STANDARDS FOR ROADS AND PUBLIC WORKS.
2. SPECIFICATIONS:

ITEM	SPEC. No.	CITY STD DWG No.
SANITARY MANHOLE (1200ø)	OPSD 701.010	
SANITARY BENDWAY	OPSD 701.021	
SEWER TRENCH		S6 & S7
SANITARY MANHOLE FRAME & COVER 600mmX600mm CATCHBASIN	OPSD 401.030 OPSD 705.010	S24 & S25

SEWER TRENCH:
SITE SERVICES EXCAVATION, BEDDING & BACKFILL AS PER THE RECOMMENDATIONS OF THE GEOTECHNICAL INVESTIGATION PREPARE BY KOLLAARD ASSOCIATES INC.

3. INSULATE ALL STORM LATERALS THAT HAVE LESS THAN 2.0m COVER AND ALL SANITARY PIPES THAT HAVE LESS THAN 2.0m COVER WITH THERMAL INSULATION. PROVIDE 150mm CLEARANCE BETWEEN PIPE AND INSULATION.
4. PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 98% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.
5. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTION PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITIVE SEAL AND DURASEAL). SANITARY RUBBER GASKET TYPE JOINTS SHALL CONFORM TO CSA (B-182.2,3,4).
6. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.15., 410.07.16.04 AND 407.07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS.
7. STORM CATCHBASIN TO HAVE MINIMUM 300mm SUMP
8. BUILDING CONTRACTOR TO PROVIDE TEMPORARY ADDITIONAL GRANULAR BACKFILL ABOVE SHALLOW CULVERTS AND STORM SEWERS TO SUPPORT HEAVY CONSTRUCTION EQUIPMENT.
9. CONTRACTOR TO TELEVISE (CCTV) ALL PROPOSED SEWERS, 200mmø OR GREATER PRIOR TO BASE COURSE ASPHALT. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES TO MUNICIPAL SATISFACTION.
10. WHERE THE SANITARY SEWER CROSSES ABOVE THE WATERMAIN, THE CONTRACTOR IS TO PROVIDE A MINIMUM OF 0.50m VERTICAL SEPARATION, ADEQUATE STRUCTURAL SUPPORT OF THE SEWER TO PREVENT SETTLING AND EXCESSIVE JOINT DEFLECTION AND ENSURE THAT THE LENGTH OF THE WATER PIPE BE CENTERED AT THE POINT OF CROSSING SO THAT THE JOINTS ARE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER.

WATERMAIN NOTES:

1. CITY TO SUPPLY, INSTALL & DISINFECT THE WATER SERVICE; CONTRACTOR TO EXCAVATE, BACKFILL AND REINSTATE THE ROADWAY AS PER STD DWG R10.
2. SPECIFICATIONS:

ITEM REFERENCE	SPEC. No.	City Std Dwg No.
WATERMAIN BEDDING AND BACKFILL OPSD	802.010/802.031	W17 (trench detail)
CATHODIC PROTECTION OPSD	1109.010	W40
PRESSURE TESTING AWWA	C-605-5	
CHLORINATION AWWA	C-651-05	
WATERMAIN MATERIAL	PVC DR18	(CLASS 150)

3. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED. WHERE LESS THAN 2.4m COVER, THERMAL INSULATION IS TO BE PROVIDED AS PER CITY STD DWG W22 (in shallow trenches), W23 (At open structures).
4. A MINIMUM OF 0.5m VERTICAL CLEARANCE IS REQUIRED BETWEEN THE WATERMAINS AND ALL UTILITIES AND SEWERS. IN LOCATIONS WHERE THIS IS NOT ACHIEVABLE, MUST FOLLOW PROCEDURE F-6-1 SEC. 5.2 OF THE ONTARIO DRINKING WATER RESOURCES ACT.
5. METALLIC WARNING TAPE SHALL BE USED OVER ALL WATERMAINS.
6. INSTALL AND TEST TRACER WIRE FOR ALL PROPOSED WATERMAIN IN ACCORDANCE WITH THE CITY OF OTTAWA DESIGN STANDARDS AS SPECIFIED IN SECTION 8.2B.
7. EXISTING WATERMAIN INFORMATION SHOWN IS BASED ON BEST CURRENT INFORMATION. CONTRACTOR TO VERIFY EXACT LOCATION OF WATERMAIN AND REPORT ANY DISCREPANCIES TO KOLLAARD ASSOCIATES INC.
8. WATER SHUTOFF VALVE AND VALVE BOX TO BE WITHIN THE ROAD ALLOWANCE AND LOCATED A MINIMUM OF 1.0 METRES FROM THE BUILDING FOUNDATION. TYPICAL PRIVATE SERVICE AS PER STD. DWG. W50 (with the exception that the Valve are to be located 1.0 m minimum from the foundation wall); VALVE BOX ASSEMBLY AS PER STD. DWG. W24.
9. CONNECTIONS AT ELBOWS AND TEEs IN WATER MAINS SHOULD BE MADE WITH THE USE OF JOINT RESTRAINERS DESIGNED FOR WATERMAIN APPLICATION. JOINT AND PIPE RESTRAINERS SHOULD MEET THE REQUIREMENTS OF AWWA C900, C905 AND C907 AND ASTM F1674-11. JOINT RETRAINERS SHOULD BE INSTALLED AS PER MANUFACTURERS RECOMMENDATIONS.
10. ALL CONNECTORS, RODS AND VALVE BOLTS SHALL BE STAINLESS STEEL.
11. VALVES ARE TO BE OPERATED BY CITY OF OTTAWA STAFF ONLY.
12. NO CONNECTION TO EXISTING WATER NETWORK SHALL BE COMPLETED UNTIL A WATER PERMIT IS OBTAINED FROM THE CITY OF OTTAWA AND CITY OF OTTAWA FORCES ARE ON HAND TO MAKE THE CONNECTION.

CROSSING TABLE

1	SAN OBV = 119.25
	W/M INV = 119.78

SITE SERVICING PLAN
SCALE = 1:100

DRAWING NUMBER: 220338-SER

PLAN:

SCALE: 0 1 2 3 4 5 10
1:100 METRES

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No.	REVISION	DATE	BY
0	ISSUED FOR SITE PLAN CONTROL	2023/05/10	AVB
#	REVISION ITEM / DESCRIPTION	REV. DATE	INT.

Kollaard Associates Engineers
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info@kollaard.ca
P.O. BOX 189, 210 PRESCOTT ST.
KEMPTVILLE, ONTARIO
K0G 1J0 FAX (613) 258-0475
http://www.kollaard.ca

CLIENT: BRYDEN GIBSON

PROJECT: PROPOSED 3 STOREY RESIDENTIAL DEVELOPMENT

LOCATION: 121 BREA CRESCENT, STITTSVILLE, ON, K2S 1P1

LICENSED PROFESSIONAL ENGINEER — MAY. 12, 2023 — S.E. deWit 100079612 — PROVINCE OF ONTARIO

DESIGNED BY:	CHECKED BY:
SD	SD
DRAWN BY:	APPROVED BY:
JR	SD

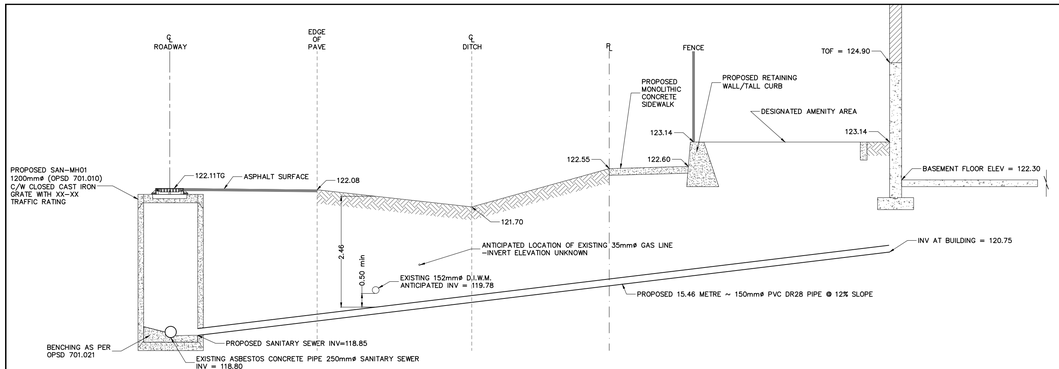
DATE: MAY 12, 2023

KOLLAARD FILE NUMBER: 220338

DRAWING NUMBER: 220338-SER

DRAWING NAME: SITE SERVICING PLAN

ARCH D



SANITARY SERVICE CONNECTION

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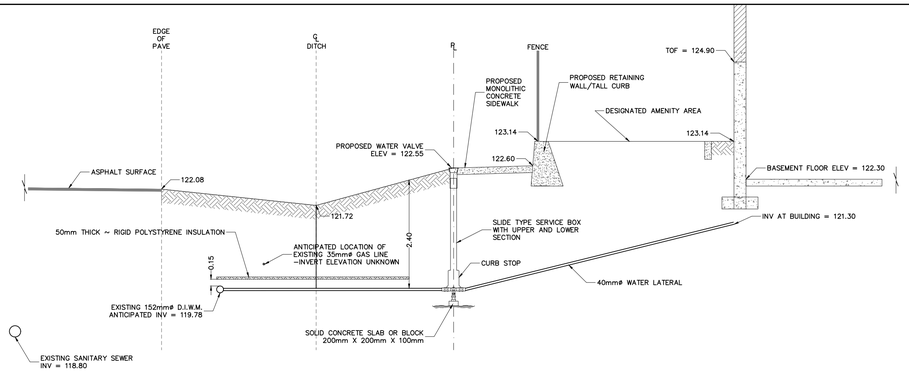

WATER SERVICE CONNECTION

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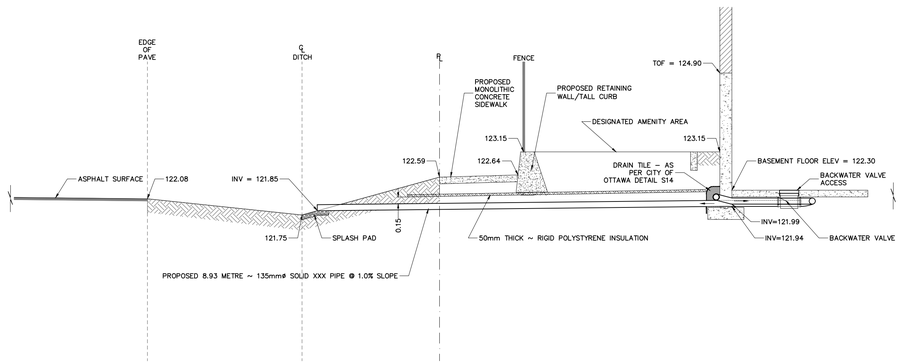
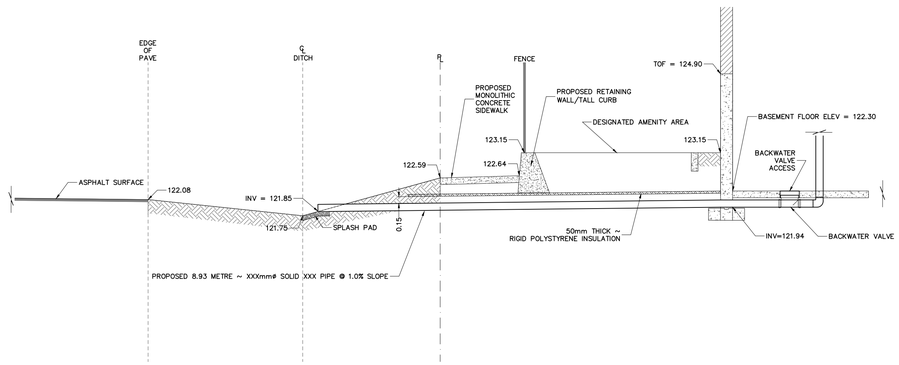


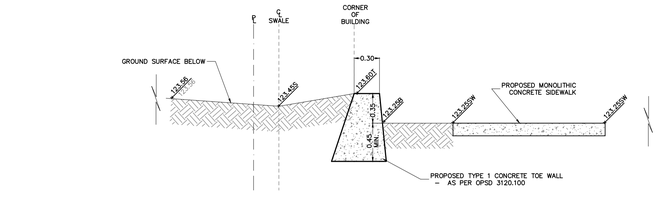
FOUNDATION DRAIN WITH SPLASH PAD

N.T.S.



ROOF DRAIN WITH SPLASH PAD

N.T.S.



SECTION D–D

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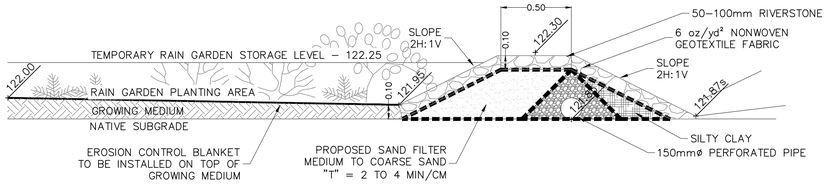

PROPOSED RAIN GARDEN AREA SECTION E–E

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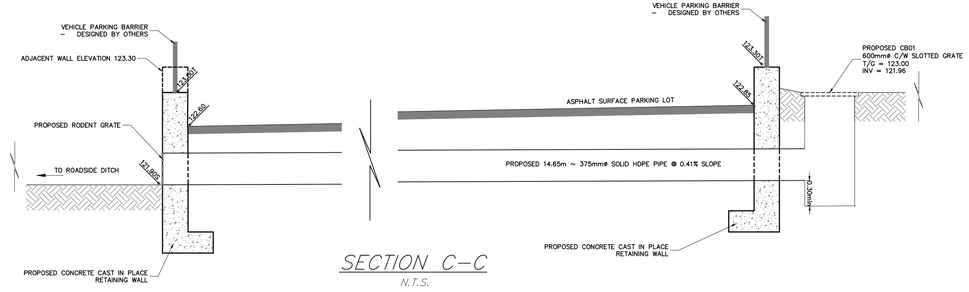

SECTION C–C

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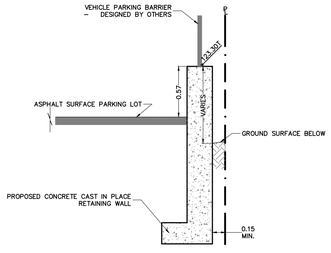
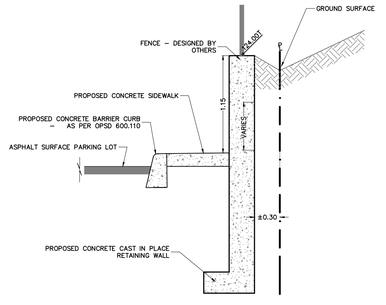


SECTION A–A

N.T.S.



SECTION B–B

N.T.S.

DETAILS

NOT TO SCALE

DRAWING NUMBER:
220338–DETAILS

KEY PLAN:

SCALE:
AS NOTED

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CLIENT:
BRYDEN GIBSON

PROJECT:
PROPOSED 3 STOREY RESIDENTIAL DEVELOPMENT

LOCATION:
121 BREA CRESCENT, STITTSVILLE, ON, K2S 1P1

LICENSED PROFESSIONAL ENGINEER
MAY. 12, 2022
S.E. deWit
100079612
PROVINCE OF ONTARIO

DESIGNED BY:	CHECKED BY:
SD	SD
DRAWN BY:	APPROVED BY:
JR	SD

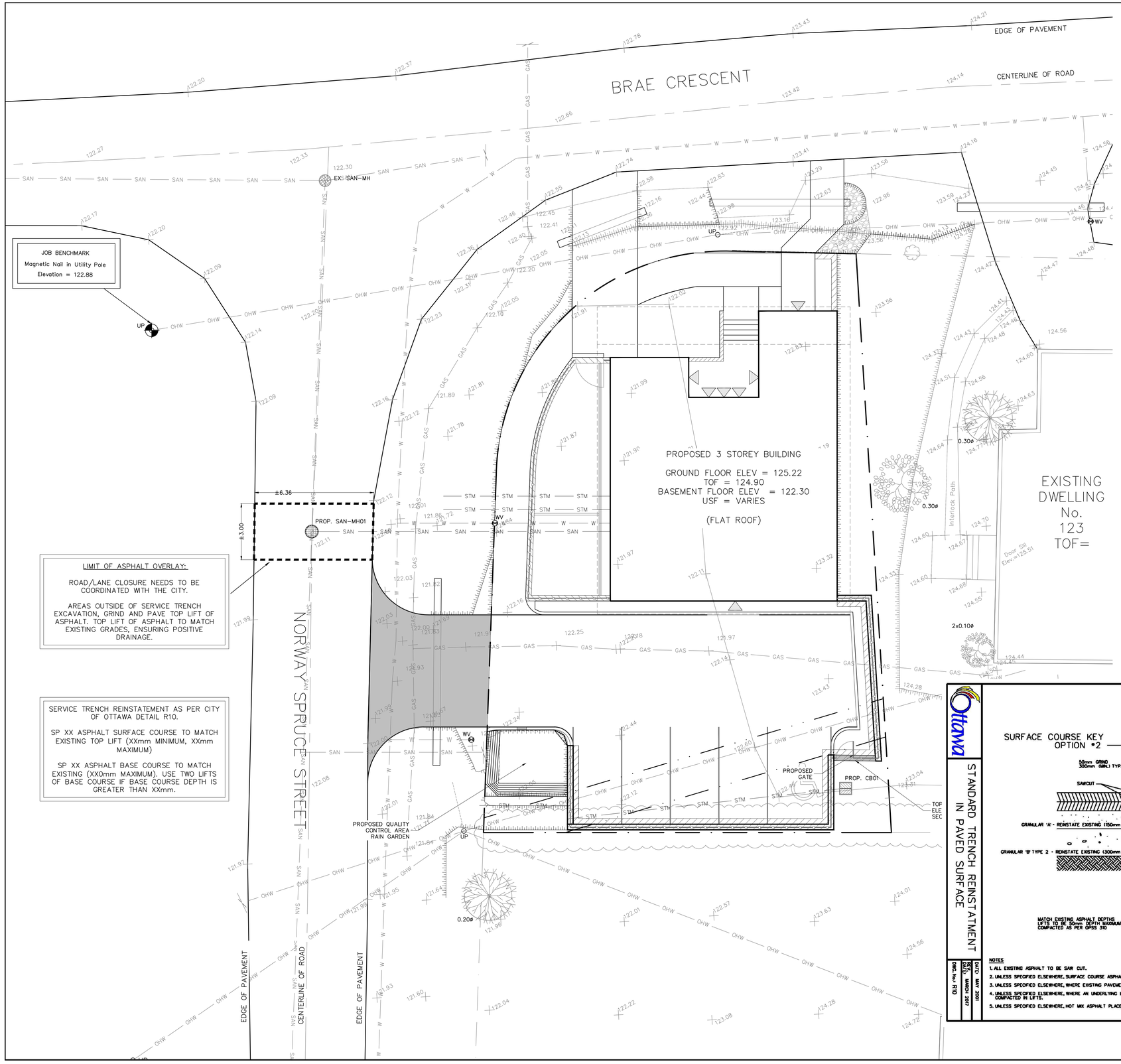
DATE: MAY 12, 2023

KOLLAARD FILE NUMBER: 220338

DRAWING NUMBER:
220338–DETAILS

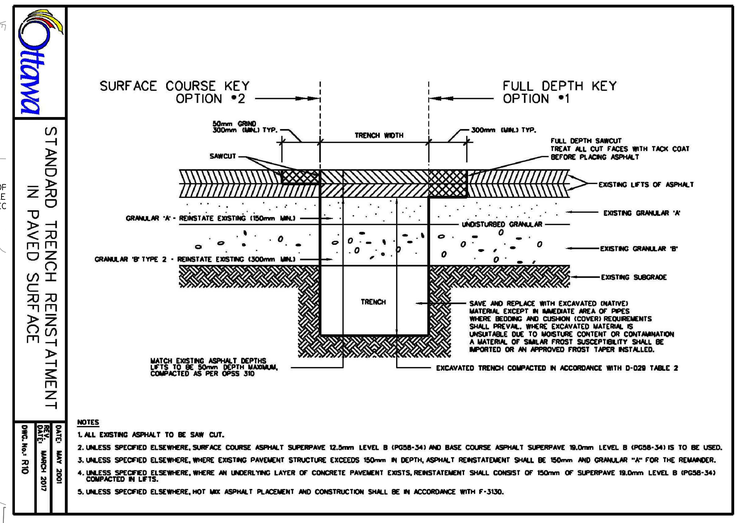
DRAWING NAME:
DETAILS

ARCH D



GENERAL LEGEND

EXISTING ELEVATION	EXISTING HYDRO POLE
PROPOSED/EXISTING ELEVATIONS	EXISTING HYDRO GUY WIRE ANCHOR
PROPOSED CURB ELEVATION	EXISTING FIRE HYDRANT
PROPOSED TOP OF GRATE ELEVATION	EXISTING WATER VALVE
PROPOSED CATCH BASIN TOP OF GRATE ELEVATION	PROPOSED WATER VALVE
PROPOSED SWALE ELEVATION	EXISTING STORM MANHOLE
PROPOSED SIDEWALK ELEVATION	EXISTING SANITARY MANHOLE
PROPOSED TOP OF RETAINING WALL ELEVATION	EXISTING VALVE CHAMBER
PROPOSED BOTTOM OF RETAINING WALL ELEVATION	EXISTING CURB INLET CATCH BASIN
PROPOSED ELEVATION	EXISTING CATCH BASIN
DRAINAGE SLOPE	PROPOSED CATCH BASIN/MANHOLE
WATERMAIN	PROPOSED CATCH BASIN
STORM SEWER	PROPOSED STORM MANHOLE
SANITARY SEWER	PROPOSED SANITARY MANHOLE
CENTRELINE OF ROAD	TEMPORARY BENCHMARK
EDGE OF ROAD	BUILDING ENTRANCE LOCATION
TOP OF SLOPE	STREET SIGN
PROPERTY LINE	SILT FENCE
GAS LINE	
OVERHEAD WIRE	



PROPOSED ROADWAY REINSTATEMENT
SCALE = 1:100

DRAWING NUMBER: 220338-RR

PLAN:

SCALE: 0 1 2 3 4 5 10 — 1:100 METRES

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CLIENT: BRYDEN GIBSON

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LOCATION: 121 BREA CRESCENT, STITTSVILLE, ON, K2S 1P1

LICENSED PROFESSIONAL ENGINEER — MAY. 12, 2022 — S.E. deWit — 100079612 — PROVINCE OF ONTARIO

DESIGNED BY:	CHECKED BY:
SD	SD
DRAWN BY:	APPROVED BY:
JR	SD

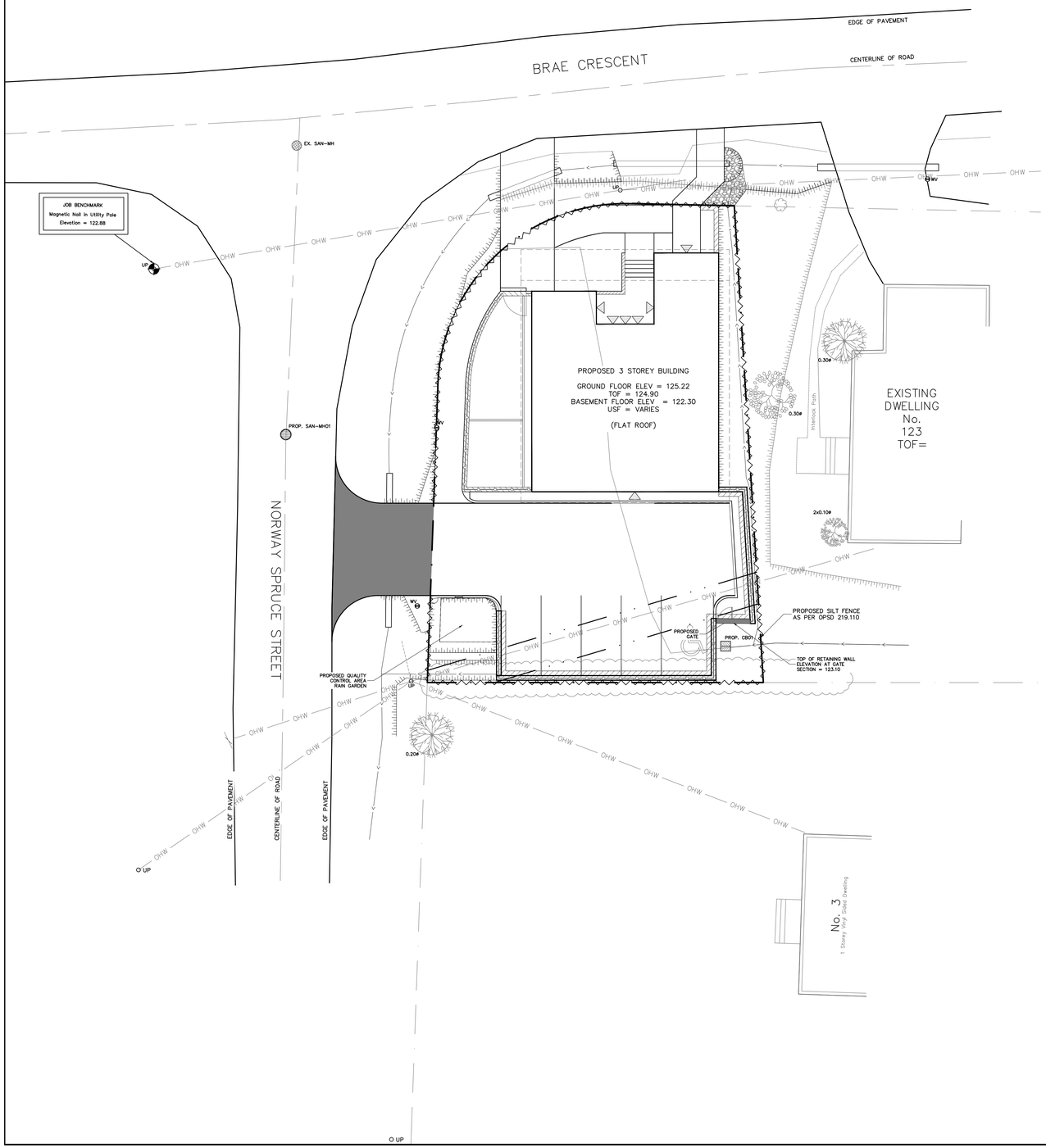
DATE: MAY 12, 2023

KOLLAARD FILE NUMBER: 220338

DRAWING NUMBER: 220338-RR

DRAWING NAME: ROADWAY REINSTATEMENT

ARCH D

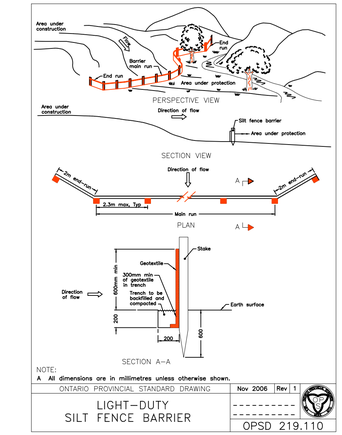


EROSION AND SEDIMENT CONTROL

SCALE = 1:150

GENERAL LEGEND

122.00	EXISTING ELEVATION
122.00	PROPOSED/EXISTING ELEVATIONS
122.00CB	PROPOSED CURB ELEVATION
122.00TG	PROPOSED TOP OF GRATE ELEVATION
122.00CB/TG	PROPOSED CATCH BASIN TOP OF GRATE ELEVATION
122.00SW	PROPOSED SWALE ELEVATION
122.00SW	PROPOSED SIDEWALK ELEVATION
122.00TW	PROPOSED TOP OF RETAINING WALL ELEVATION
122.00BW	PROPOSED BOTTOM OF RETAINING WALL ELEVATION
122.00	PROPOSED ELEVATION
0.0%	DRAINAGE SLOPE
W	WATERMAIN
STM	STORM SEWER
SAN	SANITARY SEWER
	CENTRELINE OF ROAD
	EDGE OF ROAD
	TOP OF SLOPE
	PROPERTY LINE
GAS	GAS LINE
OHW	OVERHEAD WIRE
HP	EXISTING HYDRO POLE
HP	EXISTING HYDRO GUY WIRE ANCHOR
FH	EXISTING FIRE HYDRANT
WV	EXISTING WATER VALVE
WV	PROPOSED WATER VALVE
EX. STM-MH	EXISTING STORM MANHOLE
EX. SAN-MH	EXISTING SANITARY MANHOLE
EX. VC	EXISTING VALVE CHAMBER
EX. CB	EXISTING CURB INLET CATCH BASIN
EX. CB	EXISTING CATCH BASIN
PROP. CB-MH	PROPOSED CATCH BASIN/MANHOLE
PROP. CB	PROPOSED CATCH BASIN
PROP. STM-MH	PROPOSED STORM MANHOLE
PROP. SAN-MH	PROPOSED SANITARY MANHOLE
	TEMPORARY BENCHMARK
	BUILDING ENTRANCE LOCATION
S	STREET SIGN
	SILT FENCE



DRAWING NUMBER: 220338-ESC

PLAN:

SCALE:
0 1 2 3 4 5 10 15
1:150 METRES

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PROVINCE OF ONTARIO

DESIGNED BY:	CHECKED BY:
SD	SD
DRAWN BY:	APPROVED BY:
JR	SD

DATE: MAY 12, 2023

KOLLAARD FILE NUMBER: 220338

DRAWING NUMBER: 220338-ESC

DRAWING NAME: EROSION AND SEDIMENT CONTROL

ARCH D