Robinson Consultants

Engineer's Report
Amendments to the Simpson Municipal Drain
Construction of the Biltmore Branch and Modification of Branch 3

Prepared For:

Ottawa

Prepared By:

Robinson Consultants Inc.
Consulting Engineers

Our Project No. 19060
August 2023

Robinson Consultants

August 11, 2022

Mayor and Members of Council
City of Ottawa
110 Laurier Avenue West
Ottawa, ON K1P 1J1

Attention: **Mr. Rick O'Connor**
City Clerk

Reference: **Engineer's Report for Amendments to the Simpson Municipal Drain Construction of the Biltmore Branch and Modification of Branch 3**
Our Project No. 19060

Dear Sir:

This Engineer's Report for the Amendments to the Simpson Municipal Drain – Construction of the Biltmore Branch and Modification of the (existing) Branch 3, Rideau-Jock Ward, which is respectfully submitted for Council's consideration, was initiated by the City of Ottawa in response to a petition received under Section 4(1)(c) of the Drainage Act, R.S.O. 1990, c. D17. The purpose of the report is to address the need for improved drainage for Fallowfield Road, Munster Road and Biltmore Crescent in Rideau-Jock Ward and provide a legal outlet through the existing Branch 3, all within the drainage area of the Simpson Municipal Drain.

All costs associated with this Engineer's Report and identified amendments to the Simpson Municipal Drain, including construction of the new Biltmore Branch and modification of the existing Branch 3, will be assessed to the properties identified on Dwg. No. 19060-A3.1 and 19060-A3.2 as per the assessment schedule.

If you have any questions, please feel free to contact Andy Robinson (ajrobinson@rcii.com) at 613-761-0161 or Lorne Franklin (lfranklin@rcii.com) at 613-592-6060, extension 123.

Yours very truly,

ROBINSON CONSULTANTS INC.

A.J. Robinson, P.Eng.
Drainage Engineer

Lorne Franklin, L.E.T., C.E.T., rcca, CISEC
Licensed Engineering Technologist
Drainage Services

c.c. David Ryan, P. Geo., Municipal Drainage Manager/Drainage Superintendent

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1.0 INTRODUCTION

Robinson Consultants Inc. was appointed by the City of Ottawa on October 9, 2019, to prepare a report under Section 4(1)(c) of the Drainage Act, R.S.O. 1990, c. D17 (Petition by Road Superintendent) to address the need for improved drainage for Fallowfield Road, Munster Road and Biltmore Crescent. This Engineer's Report details the amendments to the existing Simpson Municipal Drain Branch 3 and the establishment/construction of the Biltmore Branch

1.1 On-Site Meeting

An on-site meeting of the affected property owners and concerned parties was held on November 14, 2019.

2.0 PURPOSE OF THE AMENDMENT REPORT

The City of Ottawa Road Superintendent initiated a petition seeking to address the need for improved drainage for Fallowfield Road, Munster Road, and Biltmore Crescent under Section 4 of the Drainage Act, R.S.O. 1990, c. D17. The purpose of the Report is to make provisions for the establishment/construction of the Biltmore Branch and the modification of the existing Branch 3 of the Simpson Municipal Drain (as necessary to provide a legal outlet for the Biltmore Branch). Lands and roads affected by this petition are located in Lots 10 through 12 of Concessions 6 through 8 in the former Township of Goulbourn, within the City of Ottawa (Rideau-Jock Ward). (See Dwg. No. 19060-A3.1 and 19060-A3.2).

To accommodate drainage improvements an amendment to establish a new Biltmore Branch and modify the existing Branch 3 is required to the existing Engineer's Report, entitled "Engineer's Report – Simpson Municipal Drain", dated September 2, 1969, Revised November 25, 1969, by Graham, Berman & Associates Ltd. The Graham, Berman report was adopted under By-law 3-70 of the former Township of Goulbourn. In addition, there is a second report entitled "Engineer's Report for the Extension and Improvements of Branch #1 of the Simpson Municipal Drainage Works", Dec. 7th, 1973. However, the 1973 report is not affected nor modified by the information contained in this report. The amendments in this report include construction/establishment of a new branch to extend the drain from Branch 3, through the Biltmore subdivision, to Fallowfield Road and includes improvements to the existing Simpson Municipal Drain Branch 3 to provide a sufficient legal outlet. All sections of the Simpson Municipal Drain covered by the 1969 and 1973 reports that are not altered by this report and accompanying by-law will continue to be governed by the 1969 and 1973 reports (and accompanying by-laws 3-70 and 74-55 respectively).

Modifications are detailed in the following sections.

2.1 Modifications – Existing Branch No. 3

Modifications to the existing Branch No. 3 of the Simpson Municipal Drain downstream of the connection of the new Biltmore Branch include the following:

- Maintenance to the original design profile
- Adjustment of the existing cross-section to provide a 2:1 drain side slope where it is not already provided.
- Additional width as necessary to provide sufficient capacity.
- Provision of 4 new proposed field entrance crossings and
- Replacement of 4 existing culvert crossings with 3 larger culverts (one area will replace 2 existing culverts, located in the same spot, with one larger culvert)

2.2 New Biltmore Branch Drain

In order to provide the required improvements for drainage of Fallowfield Road, Munster Road, and Biltmore Crescent, as requested by the City of Ottawa Roads Department (by petition), a new branch drain is required to be established. The new branch will be identified as the Biltmore Branch with modifications to the existing drainage ditches being proposed. This report will identify new profiles, side slopes, crossings, and cross-sections for the new drain.

3.0 EXISTING CONDITIONS, DRAWINGS AND SPECIAL PROVISIONS

3.1 Location of the Drain

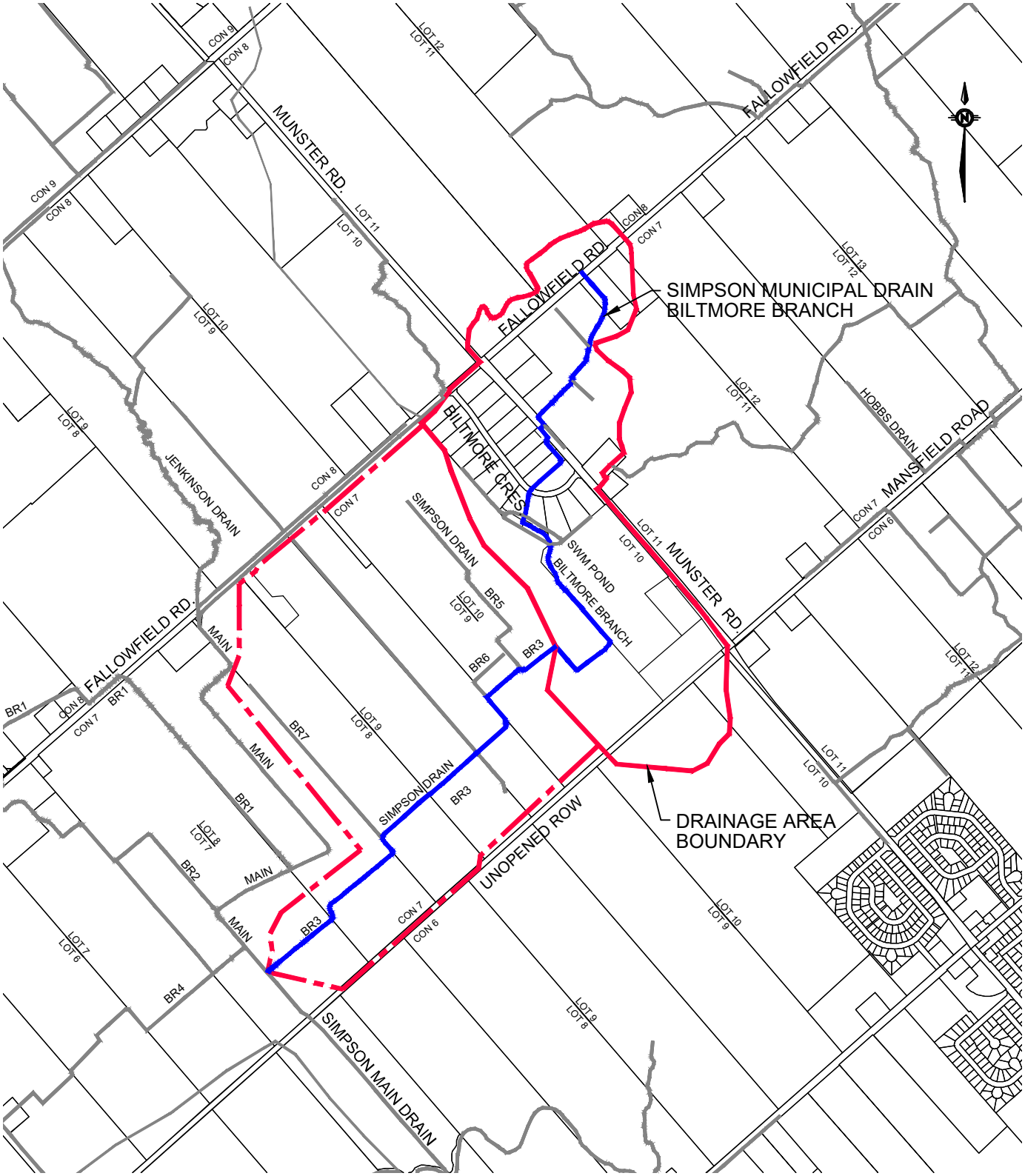
The limits of modifications within the Simpson Municipal Drain, as identified by this report, to construct/establish the new Biltmore Branch and modify the existing Branch 3 are as follows:

- Biltmore Branch - commences at Station 5+000 (at the upstream end of Branch No. 3 of the Simpson Municipal Drain) to Station 6+945.60 (north side of Fallowfield Road).
- Branch 3 - commences at Station 0+000 (confluence with the Main Branch of the Simpson Municipal Drain) to Station 1+746.20 (downstream end of the new Biltmore Branch, identified as station 58+47 (ft) in the 1969 Engineer's Report).

The location of the drain is shown on the Location Plan - **Figure 3.1**.

3.2 Drainage Basin and Limits

The drainage basin for the Simpson Municipal Drain is modified to accommodate the area served by the new Biltmore Branch including parts of the following Lots and Concessions:



ALL LOTS AND CONCESSIONS ARE WITHIN THE GEOGRAPHIC TOWNSHIP OF GOULBOURN

Robinson Consultants

Title: LOCATION PLAN		Fig. No. 3.1
Project: SIMPSON MUNICIPAL DRAIN - BILTMORE BRANCH AND BRANCH 3		Job No. 19060
	Scale: NTS	Date: AUG 2023

- Lot 10 of Concession 6, geographic Township of Goulbourn
- Lots 10, 11 and 12 of Concession 7, geographic Township of Goulbourn
- Lots 11 and 12 of Concession 8, geographic Township of Goulbourn

The drainage area associated with the proposed new Biltmore Branch of the Simpson Municipal Drain is approximately 101 hectares (250 acres). The limits of the drainage boundary (drainage basin) are shown on Dwg. No. 19060-A1. These limits have been determined by the drainage design of the proposed development, the drainage area boundaries of adjacent drains, existing City of Ottawa LiDAR mapping of the area and field reconnaissance.

3.3 Drawings Forming Part of the Engineer's Report

Dwg. No. 19060-A1 and Dwg. No. 19060-A1.1 – "Simpson Municipal Drain Biltmore Branch and Branch 3 - Drainage Area Plan" have been prepared. As per Dwg. No. 19060-A1.1, the drainage area boundary of the new Biltmore Branch is shown as a bold heavy dash-dot-dot line (red when provided in color), the drainage area boundary of the existing Simpson Drain - Branch 3 is shown as a bold dash-dot (red when provided in colour) while the remaining existing Simpson Drain (other existing branches as per the 1969 Engineer's Report) is shown as a bold solid line (green when provided in colour).

Dwg. Nos. 19060-A2.1 and 19060-A2.2 - "Simpson Municipal Drain Biltmore Branch – Culvert, Sediment, and Erosion Control Plan Biltmore Branch" and "Simpson Municipal Drain Branch 3 – Culvert, Sediment, and Erosion Control Plan Branch 3" have been prepared showing the location of existing culvert crossings (to remain in place), new proposed culvert crossings and culvert crossings proposed to be removed. Minimum measures required for construction phase sediment and erosion control including straw bale check dams, rock check dams and permanent erosion control (rock protection) are also provided on this plan.

Dwg. Nos. 19060-A3.1 and 19060-A3.2 – "Simpson Municipal Drain Biltmore Branch - Property Ownership Information Plan Biltmore Branch" and "Simpson Municipal Drain Branch 3 - Property Ownership Information Plan Branch 3" have been prepared showing property information including a property ID No. (for reference to schedules), property lines, and the area of each property (or portion of a property) within the contributing drainage basin.

Profiles of the proposed drain are shown on Dwg. Nos. 19060-P1 through 19060-P6 inclusive. The profile shows the existing bottom of the ditch profile and top of bank (as per survey), the 1969 Engineer's Report profile, existing/known tile outlets and culvert/bridge/structure crossings (where surveyed), and the proposed profile.

Cross-Sections of the proposed Municipal Drain are shown on Dwg. Nos. 19060-C1 through 19060-C2 to identify the existing and proposed sections through typical locations of the proposed new Biltmore Branch and modified Branch 3 portion of the Simpson Municipal Drain. Cross-Sections are shown in the direction of increasing chainage.

All plans, profiles and cross-sections are provided in **Appendix A** of this report. Applicable Ontario Provincial Standard Drawings and/or Robinson Consultants Inc. Standard Detail Drawings are also provided in **Appendix A**.

3.4 Special Provisions

Special provisions for the construction and future maintenance of this municipal drain are included in **Appendix B**.

4.0 AREA REQUIRING DRAINAGE

The area requiring drainage under this report for Modifications and Improvements of the Biltmore Branch of the Simpson Municipal Drain is described as the following Lots and Concessions:

- Lot 10 of Concession 6, geographic Township of Goulbourn
- Lots 10, 11 and 12 of Concession 7, geographic Township of Goulbourn
- Lots 11 and 12 of Concession 8, geographic Township of Goulbourn

Flows are to be conveyed downstream to a sufficient outlet. In this case, sufficient outlet was determined by the Drainage Engineer to be the Main Branch of the Simpson Municipal Drain, with modification required to Branch 3.

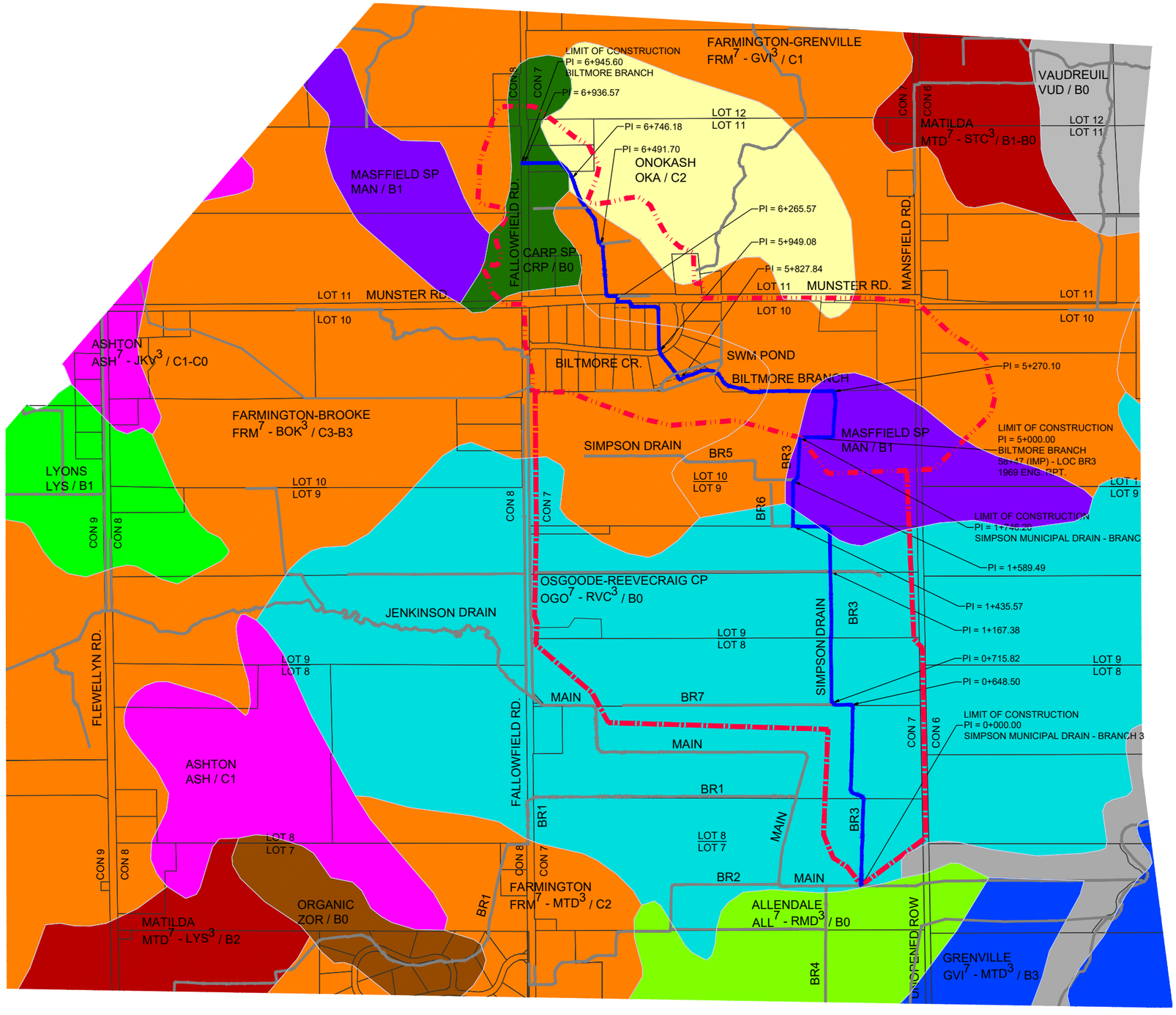
5.0 DESIGN CONSIDERATIONS

5.1 Soil Characteristics

Soil types have been determined utilizing the following information sources:

"Ontario Soil Survey Complex," Ontario Ministry of Agriculture Food and Rural Affairs – OMAFRAGIS, Ontario GeoHub, available at geohub.lio.gov.on.ca, last updated Nov. 29, 2019

Soils within the basin are mainly silt loams and clay. Soil groups found within the proposed Biltmore Branch and modified Branch 3 of the Simpson Municipal Drain watershed are listed in **Table 5.1** and shown on **Figure 5.1**.



LEGEND

- PROPERTY LINE
- EXISTING WATERCOURSES
- MUNICIPAL DRAIN - BILTMORE BRANCH AND BRANCH 3
- DRAINAGE AREA BOUNDARY BILTMORE BRANCH
- DRAINAGE AREA BOUNDARY SIMPSON - BRANCH 3

SOILS MAP SOURCE

Ontario Soils Survey Complex
Ontario Ministry of Agriculture Food and Rural Affairs
OMAFRAGIS, Ontario GeoHub
geohub.lio.gov.on.ca. Last updated Nov. 29, 2019

ALL LOTS AND CONCESSIONS ARE WITHIN THE GEOGRAPHIC TOWNSHIP OF GOULBOURN

NOT FOR CONSTRUCTION

No.	DATE dd.mm.yy	REVISION	BY
1	15.06.22	ISSUED FOR CITY REVIEW	AJR
2	28.10.22	ISSUED FOR CITY REVIEW 2	AJR
3	11.11.22	ISSUED FOR AGENCY REVIEW	AJR
4	28.04.23	ISSUED FOR CITY REVIEW 3	AJR
5	11.08.23	ISSUED FOR DISTRIBUTION	AJR

REGISTERED PROFESSIONAL ENGINEER A. J. ROBINSON 23/08/11 PROVINCE OF ONTARIO

Professional Engineers Ontario
23/08/11
Licensed Engineering Technologist
Name: L. FRANKLIN
Number: 100501335
Limitations: Providing plans, non-technical content of reports and other non-technical advice for submission under the Ontario Drainage Act.
Association of Professional Engineers of Ontario

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DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF OTTAWA

SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH AND BRANCH 3

SOILS MAP
BILTMORE BRANCH AND BRANCH 3

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	FIG-5.1

Table 5.1
Soil Descriptions

Soil Type	SYM	Description	HSG	CN (Crop)	CN (Pasture)	CN (Woodlot)
Onokash	OKA	**Onokash**	A	66	58	50
		Sand loam- moderately stony				
		Drainage/Stoniness/Slope				
		2-5% slope and moderately stony and well-draining				
Carp	CRP	**Carp**	C	82	76	71
		Clay- Stone free				
		Drainage/Stoniness/Slope				
		0-2% slope and stone free with poor drainage				
Farmington - Brooke	FRM-BOK	**Farmington-Brooke**	BC	78	71	65
		Silt loam- Very stony				
		Drainage/Stoniness/Slope				
		2-5% slope and very stony and well-draining				
Farmington - Grenville	FRM-GVI	**Farmington-Grenville**	B	74	65	58
		Silt loam- Slightly stony				
		Drainage/Stoniness/Slope				
		2-5% slope and slightly stony and well-draining				
Mansfield	MAN	**Mansfield**	C	82	76	71
		Clay- Slightly stony				
		Drainage/Stoniness/Slope				
		0-2% slope and slightly stony with poor drainage				
Osgoode - Reevecraig	OGO-RVC	**Osgoode-Reevecraig**	C	82	76	71
		Clay- Stone free				
		Drainage/Stoniness/Slope				
		0-2% slope and stone free with poor drainage				

5.2 Hydrologic Modelling

The SWMHYMO model was developed to generate runoff rates from rainfall events. The rainfall events used for the generation of these hydrographs are the 12 hour 2, 5, 10, 25, 50, and 100 year design storms. Rainfall hydrograph ordinates for the various events were calculated using data obtained from the Ottawa Sewer Design Guidelines.

The SCS type II storm distribution was used. An average soil moisture condition was assumed for all flow simulations. Other parameters required for hydrograph generation include basin area, initial abstraction, slope, fraction impervious, and soil curve number.

For modeling purposes, the watershed was divided into 11 sub-catchments (8 within the Biltmore Branch and 3 within Simpson Branch 3) and 11 channel reaches (8 within the Biltmore Branch and 3 within Simpson Branch 3). Each sub-catchment, shown on **Figure 5.2**, was described by the various hydrologic parameters required by the model.

The watershed was modeled using the CALIB WILHYD routine.

The CALIB WILHYD routine requires three basic parameters, CN number, time to peak (TP), and the shape factor K. The CN number or Composite Number is used by the model to transform rainfall inputs into runoff; therefore, the parameter reflects all runoff related phenomena such as infiltration, interception, and depression storage. The time to peak, and shape factor were calculated using the Federal Aviation Agency (FAA) Airport Method.

The SWM pond was also incorporated in the hydrologic model. Input parameters for SWM Pond modelling were determined using SWM pond dimensions from the Trow Consulting Engineers Ltd. June 2, 2001, Biltmore Estates Site and Grading Plan.

5.3 Hydrologic Modeling Results

The rainfall-runoff relationship of the proposed Biltmore Branch and modified Branch 3 of the Simpson Municipal Drain was evaluated for existing land use conditions. This provided flow estimates for the watershed under existing conditions. The total instantaneous peak flows at key locations along the branches are presented in **Table 5.2** which should be reviewed in conjunction with **Figure 5.2**, which shows a plan view of the watershed. The flows are calculated at the downstream limit of the sub-catchment, or the outlet of the sub-catchment basin.

LEGEND

- PROPERTY LINE
- EXISTING WATERCOURSES
- MUNICIPAL DRAIN - BILTMORE BRANCH AND BRANCH 3
- DRAINAGE AREA BOUNDARY BILTMORE BRANCH
- DRAINAGE AREA BOUNDARY SIMPSON - BRANCH 3
- SUBCATCHMENT AREAS

LOT 13
LOT 12
LOT 12
LOT 11
LOT 11
LOT 10
LOT 10
LOT 9
LOT 9
LOT 8
LOT 8
LOT 7

CON 9
CON 8
CON 7
CON 6

FLEWELLYN RD.
FALLOWFIELD RD.
MANSFIELD RD.
BLEEKS RD.

MUNSTER RD.
BILTMORE CR.
HOBBS DRAIN
JENKINSON DRAIN
SIMPSON DRAIN
JOCK RIVER

B1
B2
B3
B4
B5
B6
B7
B8
SB3-9
SB3-10
SB3-11

SWM POND
BILTMORE BRANCH

BR1
BR2
BR3
BR5
BR6
BR7
MAIN

LIMIT OF CONSTRUCTION
PI = 6+945.60
BILTMORE BRANCH

PI = 6+936.57
PI = 6+746.18
PI = 6+491.70
PI = 6+265.57
PI = 5+949.08
PI = 5+827.84
PI = 5+270.10

LIMIT OF CONSTRUCTION
PI = 5+000.00
BILTMORE BRANCH
58+47 (IMP) - LOC BR3
1969 ENG. RPT.

LIMIT OF CONSTRUCTION
PI = 1+746.20
SIMPSON MUNICIPAL DRAIN - BRANCH 3

PI = 1+589.49
PI = 1+435.57
PI = 1+167.38
PI = 0+715.82
PI = 0+648.50

LIMIT OF CONSTRUCTION
PI = 0+000.00
SIMPSON MUNICIPAL DRAIN - BRANCH 3

SUBCATCHMENT AREA TABLE

No.	AREA (ha)
B1	5.54
B2	26.52
B3	6.52
B4	5.54
B5	6.12
B6	4.64
B7	31.89
B8	15.34
SB3-9	43.86
SB3-10	54.45
SB3-11	45.06

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HORIZONTAL

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DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF OTTAWA

SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH AND BRANCH 3

SUBCATCHMENT AREAS
BILTMORE BRANCH AND BRANCH 3

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	FIG-5.2

Table 5.2
Peak Flow Estimates
Existing Conditions

Location	Peak Flow (m^3/s)					
	2 yr	**5 yr**	**10 yr**	**25 yr**	**50 yr**	**100 yr**
Fallowfield Road						
Sta. 6+945.58 – 6+936.6	0.087	0.162	0.221	0.303	0.364	0.428
Munster Road						
Sta. 6+936.6 – 6+265.6	0.186	0.353	0.483	0.663	0.798	0.941
Biltmore Crescent						
Sta. 6+265.6 – 5+949.1	0.233	0.442	0.609	0.845	1.025	1.214
Upstream of Stormwater Management (SWM) Pond						
Sta. 5+949.1– 5+827.86	0.314	0.596	0.818	1.127	1.360	1.606
Downstream of SWM Pond						
Sta. 5+827.86– 5+700.03	0.425	0.802	1.097	1.507	1.817	2.143
Field Entrance						
Sta. 5+700.03 – 5+270.12	0.625	1.119	1.949	2.808	3.393	4.010
Confluence with Simpson Municipal Drain - Branch 3						
Sta. 5+270.12 – 5+000	0.822	1.487	2.334	3.618	4.393	5.181
Simpson Municipal Drain - Branch 3						
Sta. 1+747.36 to 1+167.25	1.011	1.768	2.759	3.897	4.697	5.538
Sta. 1+167.25 to 0+715.69	1.316	2.247	3.104	4.202	5.047	5.946
Sta. 0+715.69 to 0+000.0	1.629	2.754	3.640	4.829	5.712	6.629
Total Drainage Area	1.629	2.754	3.640	4.829	5.712	6.629

5.4 Secondary Flow Check

Modeled flows from the full drainage area were compared with flow estimates obtained from the MTO regional equation $Q_{25} = C\ A^{0.75}$.

Q_{25} = 25 year flow
C = watershed class
A = area in km^2

Using this method, the Q_{25} was found to be 4.7 m^3/s. This is approximately 2.7% lower than the SWMHYMO peak flow.

5.5 Drain Capacity

The hydrology of the proposed Biltmore Branch and modified Branch 3 of the Simpson Municipal Drain was assessed for existing land use conditions. **Table 5.2** summarizes the flow from key stations along the drainage system. This table is best reviewed in conjunction with Dwg No. 19060-A1 that shows an overall view of the watershed. The flows are listed from the upstream end of the existing drain to the outlet of the watershed.

The proposed channel can accommodate flows for the 5-year design storm event upstream of the SWM Pond and the 2-year design storm event downstream of the SWM Pond. Capacities of the proposed channel for the proposed Biltmore Branch range from 0.503 m^3/s to 3.203 m^3/s. Capacities of the proposed channel for Branch 3 of the Simpson Municipal Drain range from 1.483 m^3/s to 6.605 m^3/s.

5.6 Side Slopes (Typical Cross-Section)

The existing and proposed side slopes (typical bottom width of 1.0m and minimum 2:1 side slopes) at various sections of the proposed Biltmore Branch and modified Branch 3 of the Simpson Municipal Drain are as shown on Drawing Nos. 19060-C1 and 19060-C2.

5.7 Capacity of Culverts and Bridges

5.7.1 General

The capacities of existing culverts along the proposed Biltmore Branch and modified Branch 3 of the Simpson Municipal Drain were calculated using MTO nomographs. The modeled flow at these culverts was then used to verify if sufficient capacity exists. A summary of capacities and flows is included in **Table 5.3**.

Table 5.3
Summary of Culvert and Bridge Capacities
Existing Conditions

Location	Existing Capacity (m^3/s)	Peak Flow (m^3/s)					
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
Access Culverts – Biltmore Branch							
Sta. 6+799.2	0.325	0.186	0.353	0.483	0.663	0.798	0.941
Sta. 5+299.8	0.325	0.625	1.119	1.949	2.808	3.393	4.010
Sta. 5+172.0	0.325	0.822	1.487	2.334	3.618	4.393	5.181
Sta. 5+014.6	0.55	0.822	1.487	2.334	3.618	4.393	5.181
Access Culverts – Branch 3 (Simpson Municipal Drain)							
Sta. 1+416.5	1.15	1.011	1.768	2.759	3.897	4.697	5.538
Sta. 0+944.2	1.15	1.316	2.247	3.104	4.202	5.047	5.946
Sta. 0+157.3	1.15	1.629	2.754	3.640	4.829	5.712	6.629

Table 5.3 cont'd
Summary of Culvert and Bridge Capacities
Existing Conditions

Location	Existing Capacity (m^3/s)	Peak Flow (m^3/s)					
		2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
Roadway Culverts – Biltmore Branch							
Sta. 6+936.6 (Fallowfield Road)	2.52	0.087	0.162	0.221	0.303	0.364	0.428
Sta. 6+265.6 (Munster Road)	0.65	0.186	0.353	0.483	0.663	0.798	0.941
Sta. 5+949.1 (Biltmore Crescent)	0.55	0.314	0.596	0.818	1.127	1.360	1.606

Note: For culverts, existing capacity is based on inlet control with a HW/D equal to 1 for comparison purposes only.

5.7.2 Culverts Requiring Replacement

The farm/residence access culverts that require replacement as part of this contract to increase the capacity and/or lowering to accommodate the new drain profile are listed in **Table 5.4.** The road culverts that require replacement as part of this contract to increase the capacity and/or lowering to accommodate the new drain profile are listed in **Table 5.5.** The road culverts that require replacement under future maintenance are listed in **Table 5.6.**

Table 5.4
Capacities of Farm/Residence Access Culverts
that Require Replacement or Installation as Part of this Report

Culvert No. and Location	Design Return Period (year)	Existing		Proposed	
		Capacity (m^3/s)	Size (mm)	Capacity (m^3/s)	Size (mm)
Access Culverts					
Biltmore Branch					
Sta. 6+799.2*	5	0.325	1- 600mm Ø CSP	0.325	1- 600mm Ø CSP
Sta. 6+700.0*	5	N/A	N/A	0.325	1- 600mm Ø CSP
Sta. 5+299.8	2	0.325	1- 600mm Ø CSP	N/A	To be removed
Sta. 5+172.0	2	0.325	1- 600mm Ø CSP	N/A	To be removed
Sta. 5+014.6	2	0.55	1- 500mm Ø CSP 1- 600mm Ø CSP	1.15	1- 1000mm Ø CSP

Table 5.4 cont'd
Capacities of Farm/Residence Access Culverts
That Require Replacement or Installation as Part of this Report

Culvert No. and Location	Design Return Period (year)	Existing		Proposed	
		Capacity (m^3/s)	Size (mm)	Capacity (m^3/s)	Size (mm)
Branch 3 (Simpson Municipal Drain)					
Sta. 1+500.0	2	N/A	N/A	1.15	1- 1000mm Ø CSP
Sta. 1+416.5	2	1.15	1- 1000mm Ø CSP	1.15	1- 1000mm Ø CSP
Sta. 1+250.0	2	N/A	N/A	1.15	1- 1000mm Ø CSP
Sta. 0+944.2	2	0.55	1- 750mm Ø CSP	1.15	1- 1000mm Ø CSP
Sta. 0+875.0	2	N/A	N/A	1.15	1- 1000mm Ø CSP
Sta. 0+500.0	2	N/A	N/A	1.8	1- 1200mm Ø CSP
Sta. 0+157.3	2	1.15	1- 1000mm Ø CSP	1.80	1- 1200mm Ø CSP

Note: For culverts, existing capacity is based on inlet control with a HW/D equal to 1 for comparison purposes only.

Note: Flow at proposed culverts as noted (*) is greater than the capacity based on HW/D equal to 1. However, HW/D for these culverts is within acceptable tolerances.*

Table 5.5
Capacity of Roadway Culverts
That Require Replacement or Installation as Part of this Report

Culvert No. and Location	Design Return Period (year)	Existing		Proposed	
		Capacity (m^3/s)	Size (mm)	Capacity (m^3/s)	Size (mm)
Roadway Culverts					
Biltmore Branch					
Sta. 5+949.1 (Biltmore Crescent)	25	0.55	1- 750mm Ø CSP	1.15	1- 1000mm Ø CSP

Note: For culverts, existing capacity is based on inlet control with a HW/D equal to 1 for comparison purposes only.

Table 5.6
Capacity of Roadway Culverts
That Require Replacement Under Future Maintenance

Culvert No. and Location	Design Return Period (year)	Existing		Proposed	
		Capacity (m^3/s)	Size (mm)	Capacity (m^3/s)	Size (mm)
Roadway Culverts					
Biltmore Branch					
Sta. 6+265.6**/*** (Munster Road)	25	0.65	1- 800mm Ø CSP	0.65	1- 800mm Ø CSP

Note: For culverts, existing capacity is based on inlet control with a HW/D equal to 1 for comparison purposes only.

*Note**: Culverts as noted (**) are undersized and/or off-grade but within acceptable tolerances and, as such, may remain in place until such time as they are required to be replaced (poor condition) under future maintenance or otherwise at the discretion of the Drainage Superintendent.*

*Note***: Flow at proposed culverts as noted (***) is greater than the capacity based on HW/D equal to 1. However, HW/D for these culverts is within acceptable tolerances.*

5.7.3 Road Authority Recommendations

Biltmore Crescent is considered to be a "local road." The typical design standard for culverts associated with rural local roads is the 5 to 10 year return period flow. However, detailed design, including (but not limited to) the selection of the design return period, culvert size and culvert material is the responsibility of the Road Authority. Due to field observations, we recommend the culvert under Biltmore Crescent should be sized to accommodate the 25 year return period flow in order to provide satisfactory drainage of the adjacent lands.

Munster Road is considered to be a "rural arterial road." The typical design standard for culverts associated with rural arterial roads is the 25 year return period flow. However, detailed design, including (but not limited to) the selection of the design return period, culvert size and culvert material is the responsibility of the Road Authority. Culverts should be sized to accommodate the 25 year return period flow in order to provide satisfactory drainage of the adjacent lands unless the Road Authority demonstrates that a design to accommodate a lower flow will not impact upstream lands.

Fallowfield Road is considered to be a "rural arterial road." The typical design standard for culverts associated with rural arterial roads is the 25 year return period flow. However, detailed design, including (but not limited to) the selection of the design return period, culvert size and culvert material is the responsibility of the Road Authority.

Culverts should be sized to accommodate the 25 year return period flow in order to provide satisfactory drainage of the adjacent lands unless the Road Authority demonstrates that a design to accommodate a lower flow will not impact upstream lands.

5.7.4 Future Private or Roadway Culverts

Future private crossing culverts or public roadway culverts installed on the drain shall not impact upstream land usage by obstructing the drainage flow. The proponent of a new culvert installation shall obtain approvals from all governing agencies as well as the Drainage Superintendent. Provided that the full cost of the culvert and material is paid for by the proponent and is installed under the direction of the Drainage Superintendent there is no requirement to complete an amendment report to this drainage report for new private or roadway culverts. A record of the additional culverts must be appended to the original By-Law and Engineer's Report.

5.8 Clearing

Property owners are advised, the Contractor will clear only those trees which may affect its operation within the working space. All necessary trees will be cleared and those trees having a diameter of 150 mm or greater shall be cleared of limbs and cut in reasonable lengths and neatly piled clear of the drain so the wood may be salvaged by the property owners. All trees under 150mm diameter, brush, limbs, and other debris resulting from the clearing operation shall be removed from the site at the Contractor's expense.

5.9 Excavation

The construction of the proposed Biltmore Branch and improvements to Branch 3 will be an open channel with design grades, side slopes and ditch bottom widths as specified on the design profile Dwg. Nos. 19060-P1 through 19060-P6 (inclusive) and Cross-Section Dwg. Nos. 19060-C1 through 19060-C2.

Associated with the drain improvements for the drain, erosion control measures will be placed during construction at bends which are subject to erosion, at tile outlets, at culvert crossings, confluences, and areas of bank instability. Erosion control measures will be of an engineering type, primarily rock protection with filter cloth.

5.10 Fisheries Act and Special Design Considerations

The Department of Fisheries and Oceans (DFO) typically provides a drain classification for Municipal Drains in this area. The existing Branch 3 of the Simpson Municipal Drain is classified as Class F (DFO ID-98174, Class F, 2017). The proposed Biltmore Branch has not been rated/classified by the DFO.

The proposed Biltmore Branch consists generally of low gradients but with some differential grade at the outlet From the Biltmore Branch to the Simpson Municipal Drain – Branch No. 3 (currently Class F) as well as at the inlet to the previously approved (and unmodified) In-Line Storm Water Management Facility (Dry Pond) along the Biltmore Branch. Additionally, the existing Dry Pond Control Structure likely limits fish passage. Observed conditions in the Biltmore Branch indicate that it is periodically dry/limited in flow. In conjunction with the observed flow conditions, limited backwater (due to differential grades) and limited fish passage (due to the SWM Control Structure) it is anticipated that the Biltmore Branch provides conditions typically associated with a Class F drain.

In conjunction with preliminary review of this Engineer's Report consultations were conducted with the Rideau Valley Conservation Authority (RVCA), the Ontario Ministry of Environment Conservation and Parks (MECP) and the Federal Department of Fisheries and Oceans (DFO) to refine parameters of the design that would allow the works to proceed under the requirements of the Conservation Authorities Act, Fisheries Act, and the Ontario Endangered Species Act. Measures to minimize or eliminate the impact on this drain/watercourse or adjacent watercourses and fish or endangered species (that may exist in the general vicinity) have been incorporated into this report and the related plans and specifications.

Typical conditions for a "Class F" drain include periods of the year where the drain is subject to low or no flows, may be periodically dry and has no sensitive species present that use the drain. As such, where work is completed within the prescribed time frame, there is a limited impact on fish and fish habitat.

The proposed work provides for continued (generally unmodified) capacity and it is not anticipated that the work will change the nature of the drain or the fish that utilize the drain. As such we propose that the standard conditions for the maintenance of a "Type F" Municipal Drain be implemented for the reconstruction of the drain

Typical conditions for work on a "Type F" Municipal Drain are listed below:

- Timing - All work to be completed within prescribed timing windows.
- Complete all work in dry or low flow conditions.
- Seed all banks within 48 hours of construction.
- Sediment control features to be in place prior to the commencement of work and to remain in place until permanent features (such as vegetation) are in place.

Reconstruction is proposed to be completed from the north/east side of the drain where there are areas of bank instability to be addressed. The primary method for addressing bank instability will be slope flattening (to the standard 2h:1v side-slope).

During construction, a series of check dams will be installed to the relevant Ontario Provincial Standard (Straw Bale Check Dam – OPSD 219.180 or Rock Check Dam – OPSD 219.211) to control sediment movement to downstream areas. Where prescribed, sediment traps will be constructed upstream and in conjunction with check dams.

Sediment Traps are constructed as per RCI Dwg. I (a modified version of OPSD 219.220). The standard sediment trap excavation is 500 mm deep and 15 meters long, with the width as per the prescribed width of the channel for the section where installed. Once construction has been completed the check dams will be removed along with the sediment and the excavations will remain. Depending on placement, these excavations form areas of concentrated future cleanout (where close to roads), limiting the need for full maintenance activities, or provide pool habitat/refuge (remote locations). Culverts will be installed with invert elevations below that of the adjacent drain by 150mm for culverts sized 600mm to 1500mm, or by 10% of the height for circular, arches or box culverts greater than 1500mm in height. The proposed culvert inset complies with the intent of DFO recommendations in this regard, while preserving culvert capacity, and ensures barrier-free fish passage.

Rock or straw bale check dams, complete with sediment traps (where specified), will be installed at locations as shown on Dwg. Nos. 19060-A2.1 and 19060-A2.2.

Following construction, the disturbed areas (excluding spread areas on agricultural fields outside of the scheduled buffer area) will be seeded with a seed mix composed of perennial rye, white clover, red top, creeping red fescue and Canada bluegrass, as detailed in Section 6.1 of the Engineer's Report.

Seeding will be completed as soon as possible after the channel is excavated. Erosion and sediment control works will be implemented and maintained throughout the length of the drain during and following construction, until other measures implemented, such as seeding, become effective. The locations and details of proposed erosion and sediment control works are shown on Dwg. Nos. 19060-A2.1 and 19060-A2.2.

Other erosion or sediment control works may be implemented by the contractor during construction, if reviewed by the Drainage Engineer, in an effort to maintain the required sediment free conditions downstream of the work area.

The provisions of this report for channel design include measures to preserve and protect fish habitat. It is anticipated that many measures associated with the construction or clean-out will improve water quality.

Tree removal may be required. Since riparian cover on the south or west side of the drain has been shown to improve water temperatures within the drain, where possible, any required clearing of trees for excavation will be completed on the north or east side of the drain.

Where possible, excavation will be limited to one side of the drain (north or east preferably), leaving the one side of the drain intact, while providing the required additional channel width and side slopes. Where possible, work is to be limited to a bottom clean-out, leaving the sides of the drain intact, with access from the north or east side.

This is anticipated to minimize impacts of full riparian zone removal. In zones of current bank instability banks will be repaired and/or protected as necessary, with efforts made to maintain as much of the natural conditions as possible.

5.11 Mitigation Measures

Typical measures recommended by the reviewing environmental authorities, including (but not limited to) the Rideau Valley Conservation Authority (RVCA), the Ministry of Environment Conservation and Parks (MECP), the Ministry of Natural Resources and Forestry (MNRF) and the Department of Fisheries and Oceans (DFO) for the type of work are listed below. When implemented, these measures should allow for reasonable mitigation of the proposed reconstruction.

The proposed construction must abide by timing window restrictions, which include "no in-water work between March 15th and July 15th to protect local fish spawning populations". In addition, the following measures must also be adhered to:

- Finished channel to be as narrow and deep as possible.
- Riparian vegetation can be removed from either bank (preferably not both).
- Minimize tree removal.
- Install sediment & erosion control measures.
- Bends in channel to be stabilized.
- Work in water only when flows are not elevated.
- Where applicable, measures must be implemented to protect any hibernating turtles during the period from October 15th to March 15th and nesting turtles from March 15th to June 30th.

The requirements associated with Species at Risk (SAR) legislation are included in the Special Provisions of this report.

The above noted requirements have been addressed in the design of the proposed works and are anticipated to form part of the permitting requirements by the RVCA, MNRF, MECP and DFO. Where applicable, the permit conditions will be incorporated into the construction contract.

5.12 Disposal of Excavated Materials

The excavation of the drain shall be completed along all sections as previously described and all materials including silt, debris, etc. shall be removed from the drain.

In excavation areas, all suitable material(s) will be placed outside the required buffer area. Typically, the construction and spreading is completed on the north/east side of the drain. However, the alternate side may be prescribed by the Drainage Engineer in consideration of special circumstances (i.e., where clearing is not required for disposal). The excavated material shall be spread and seeded, except in areas of tilled agricultural fields, which will be spread but not seeded.

All material shall be spread on the adjacent lands no closer than 5 meters to the top of the slope and no further than the prescribed working space outlined in Section 10.0 of the Engineer's Report. All material shall be spread to a maximum depth of 150mm for agricultural fields, and 300mm for non-agricultural fields. Spreading is to be completed in conformance with RCI Std. Dwg. A, provided in **Appendix A**.

Drainage openings shall be constructed wherever required throughout the disposal area at a maximum spacing of 50 meters for agricultural land and 100 meters for non-agricultural land. All drainage openings shall be maintained, and the soil spread to accommodate these drainage openings to ensure that the drainage from adjacent land is not impeded.

Any non-suitable material, such as rock, hard-pan, boulders, or garbage/debris, shall be disposed of off the site at a location arranged for by the Contractor and agreed to by the Drainage Engineer.

Seeding is to be completed as soon as possible after the channel is excavated (within 48 hours of construction) with a seed mix composed of perennial rye, white clover, red top, creeping red fescue and Canada bluegrass, as detailed in Section 6.1 of the Engineer's Report.

Property owners may procure a Contractor privately, at the expense of the property owner, to dispose of the excavated material off site, subject to approval by the Drainage Engineer. It remains the responsibility of the property owner to adhere to all applicable legislation, including excess soil regulations, for the disposal and transportation of such material.

In areas of smaller lots up to 2.0 Ha in size, the access corridor will be limited to 8 metres in width and all excavated material will be removed from the area and disposed of off-site in accordance with excess soil regulations.

5.13 Permit Requirements and Underground Utilities

It may be expected that the Contractor will have to fill out an application for an encroachment permit within the City right-of-ways department prior to the commencement of construction. It is also expected that underground utility lines may be encountered during the construction of the project. A copy of the drawings must be submitted by the contractor to all area utilities, so that they may show any underground plant on the plan. A copy of the drawings so marked, must be returned to the Drainage Engineer prior to commencing construction.

The Contractor will also be required to arrange with all Utilities to obtain field locates, to mark underground cables or pipelines in the field before commencing construction, and to review any private utilities installed by property owner. If any property owner knows of other underground utilities, please make the Drainage Engineer and Contractor aware of such.

Typical contract methodology including the impoundment and by-pass pumping of water or passive instream diversion no longer require Ministry of Environment Conservation and Parks (MECP) registration or a Permit-To-Take-Water provided that prescribed procedures are met. The Contractor may be required to obtain a Permit-To-Take-Water (PTTW) from the MECP should its methodology exceed the MECP conditions for exemption.

5.14 Site Access and Access Plan

It is intended that for the purpose of construction and future maintenance, the drain be accessed from adjacent roads with equipment moving along the side of the drain scheduled for construction, within the designated work area as specified in SP1.0, and designated future Drain Right-of-Way. Equipment may only cross the drain at temporary crossing or existing crossings as shown on the Culvert, Sediment, and Erosion Control Plan, Dwg. Nos. 19060-A2.1 and 19060-A2.2

Wherever possible, isolated work areas are to be accessed by existing roads (farm lanes/unpaved driveways) on adjacent lands. This is to limit the disturbance of non-work areas adjacent to the drain. The Contractor is required to provide notification to the property owner of the intended use of existing farm lanes in advance of the usage (minimum 48 hours). The Contractor will be responsible for the repair and maintenance of any access used, and for the restoration of the access following the construction to existing or better conditions. Property owners are to notify the Drainage Engineer/ Superintendent of issues within the warranty period, otherwise repair/maintenance of access routes will not be conducted. The contractor will be required to make the arrangements for access and notify the Drainage Engineer of the proposed access routes.

6.0 EROSION CONTROL

6.1 Seeding

To help protect the drain banks against erosion the following shall be required:

For agricultural areas all disturbed banks and a 5 metres buffer strip adjacent to the drain shall be hand seeded. Beyond the 5-meter buffer strip, spoils are not to be seeded. It is anticipated that property owners will till these areas and return to normal crop production.

For non-agricultural areas all disturbed banks and spread spoils shall be hand seeded.

All identified areas are to be seeded a maximum of 48 hours after construction, except for the 5-meter buffer strip. The 5-meter buffer strip can be seeded once work in the working area has been completed.

The seed mixture (or an alternate reviewed by the Drainage Engineer) is to be as follows:

Sow Rate (minimum)	100 kg/ha
Creeping Red Fescue	60%
Canada Bluegrass	20%
White Clover	3%
Perennial Rye	12%
Red Top	5%

Canada Bluegrass establishes a deep creeping root system and tough sod ideal for stabilizing low-fertile rocky or clay soils and is drought, flood, and salt tolerant. Perennial rye will encourage quick establishment of a ground cover, while red fescue provides deeper rooting vegetation that is shade and water tolerant with limited requirement for seed bed preparation. White clover provides quick cover and produces nitrogen to aid in the establishment of other vegetation and red top's root system is well suited for holding soils on wetlands, waterways, and ditch banks.

6.2 Buffer Strips

It is recognized that buffer strips have a role in reducing bank erosion, reducing pollution (pesticides and nutrient runoff), and improving fish and wildlife habitat by providing shading and habitable areas, as well as reducing water temperatures. The provision and maintenance of adequate buffer strips is environmentally friendly and reduces long term costs associated with drain maintenance for all properties assessed on the drain and is a benefit to all. As such, it is strongly recommended that where the drain passes through cropland, where soil erosion is now occurring, or land where the farmer indicates the intention of tilling the soil for continuous field crop production, a strip of uncultivated land at least 5 m wide along the edge of the drain be retained. It is recommended that the property owners take hay off this buffer strip, but that the soil not to be tilled.

6.3 Fencing

Where fences are encountered which impede construction, or where the removal of fences is required for access to the drain or designated working area, it will be the Contractor's responsibility to remove the existing fence and reinstate the fence in a condition equal to or better than the condition of the fence prior to the commencement of the work. Fences are installed in conformance with the standards associated with the type of fence. Where fence crosses the drain, fence is to be installed in conformance with RCI Std. Dwg. H, provided in **Appendix A**.

6.4 Rock Protection

Associated with the drain improvements, Rock Protection with filter cloth will be placed at typical areas as per Dwg. Nos. 19060-A2.1, 19060-A2.2, and 19060-P1 through 19060-P6 (inclusive), and Standard Drawings as provided in **Appendix A**. In general, Rock Protection will be installed at all locations as indicated below (at the discretion of the Drainage Engineer) and may not necessarily be indicated on plans and profiles.

- Rock Protection at significant bends (RCI Std. Dwg. D)
- Rock Protection at storm sewer outlets (OPSD 810.010)
- Rock Protection at tile drain outlets (RCI Std. Dwg. F)
- Rock Protection at culverts and concrete structures (RCI Std. Dwg. C)
- Rock Protection at confluence of branch drains (RCI Std. Dwg. E)
- Rock Protection at areas of current or on-going erosion (RCI Std. Dwg. D)

6.5 Flow Checks and Sediment Traps

6.5.1 Excavation

Sediment trap excavation shall be 15 m in length and 0.5 m below the proposed grade (drain bottom), constructed as per RCI Std. Dwg. I (a modified version of OPSD 219.220). Flow Check Dams, installed to the relevant Ontario Provincial Standard (Straw Bale Check Dam – OPSD 219.180 or Rock Check Dam – OPSD 219.211) are constructed directly upstream in conjunction with sediment traps.

Where sediment control features are proposed for rock-cut areas, sediment trap excavation is only completed to the extent of existing rock (no rock removal for sediment traps) and the check dam control feature is installed as scheduled.

Standard Drawings are provided in **Appendix A**.

6.5.2 Sediment Removal

For construction, accumulated sediment in sediment traps shall be removed as necessary to affect maintenance repairs. Sediment shall also be removed immediately prior to the removal of the flow checks.

6.5.3 Locations

Flow Check Dams, installed to the relevant Ontario Provincial Standard (Straw Bale Check Dam – OPSD 219.180 or Rock Check Dam – OPSD 219.211) shall be installed as indicated to prevent sediment passage from the upstream to the downstream side of the flow check at all locations as specified on Dwg. Nos. 19060-A2.1, 19060-A2.2, and 19060-P1 through 19060-P6 (inclusive). Standard Drawings are provided in **Appendix A**.

6.5.4 Long-Term Use

Excavated sediment basins will remain in place following removal of the flow check. It is anticipated that these basins will continue to serve as localized concentrated cleanout areas, and possible interim pool refuge fish habitat. Removal of sediment in these cleanout areas is expected to have long term fish habitat benefits by reducing the need for full scale maintenance along the length of the drain.

7.0 ASSESSMENTS

7.1 General

The Drainage Act, RSO 1990, c D.17 requires that the total estimated cost be assessed against the affected lands and roads under the categories of benefit (Section 22), outlet liability (Section 23), injuring liability (Section 23), special benefit (Section 24) and special assessment of public utility or road authority (Section 26). Definitions of each of the above noted considerations are provided along with additional details in **Appendix E**.

The primary considerations for the calculation of assessments are as follows:

- ***Benefit*** - Consideration for the advantages provided to any lands or roads by the Municipal Drain. Typically, these advantages may include (but are not limited to) a higher market value, increased crop production, improved appearance, or better control of surface or subsurface water, etc. Assessment for Benefit is typically made to all properties directly adjacent to the Municipal Drain.

- ***Outlet*** - All lands and roads that ultimately use the Municipal Drain (by direct or indirect contribution of flow) as an outlet are assessed a portion of the cost for Outlet. Assessment for Outlet is based on location, area, and rate of flow which are given consideration via modifying factors (see "Factors Affecting Assessment," below).

- ***Special Benefit*** - Special Benefit is typically considered where a special feature or consideration is required for a property that is not otherwise required for the function of the drain. This may include (but is not limited to) additional culverts or improved culvert length, ornamental features, special alignment considerations, improvements to accommodate land use changes, etc. The cost of the special feature is assessed as a Special Benefit to the property where it is provided.

- ***Injuring Liability*** – Injuring Liability is typically considered where there is no other reasonable means to provide sufficient outlet. An allowance is given to the properties that are "injured" by the insufficient outlet and an assessment made against all other properties that contribute flow.

- ***Block Assessment*** – A block assessment is typically considered where there is a significant number of small properties in an area (villages, subdivisions, etc.). For the purpose of assessment, properties are combined for one overall assessment to the block. Costs are then distributed proportionally on the basis of the assessed value of the land and buildings.

7.2 Factors Affecting Assessment

Assessments are based on location, area, and rate of flow for each property within the overall drainage area. To account for these considerations the following modifying factors are applied:

- ***Maintenance Section(s)*** – The Municipal Drain may be split into one or more "Maintenance Sections." This consideration allows for factors to be adjusted where work for construction and future maintenance is completed. This factor accounts for how much of the drain each property uses and allows for other factors such as the Distance Factor to be applied (reducing assessments the further away from the drain that the property is located). Maintenance Sections and Distance Factors are indicated on **Figure 7.1** and **Figure 7.2** following this page.

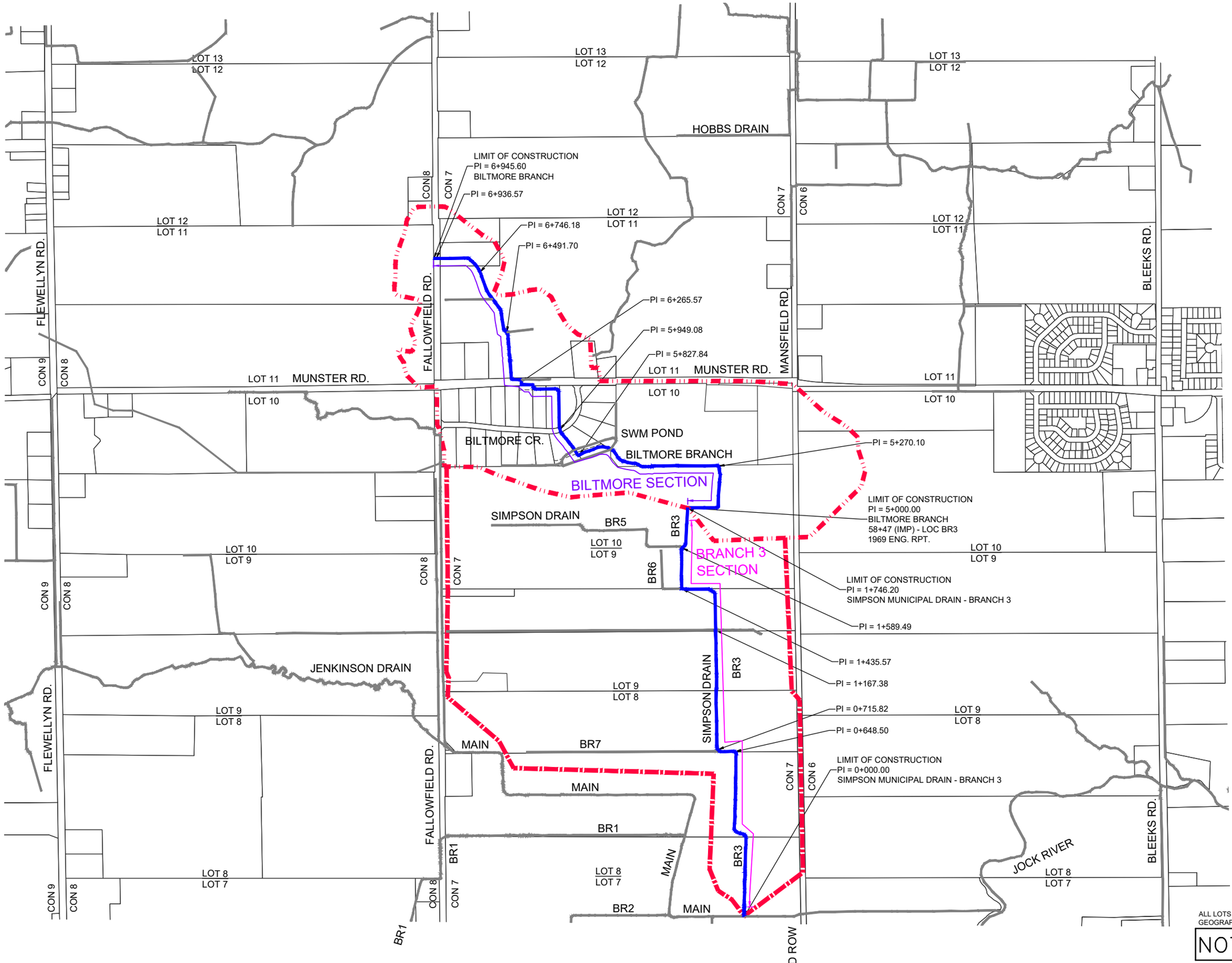
- ***Sub-Section*** – Each Maintenance Section is further divided into sub-sections to account for where flow from an individual property or group of properties enters the Maintenance Section. This factor ensures that a property is not assessed for the portion of the Maintenance Section upstream of where the property enters the drain, therefore, is not utilized by the property.

- ***Land Use Factor*** - A land use factor is provided to account for the varying use and nature of the land. Lands considered typical or standard throughout the drainage area (agricultural or other rural land use) are applied a LUF of 1.0 where lands considered to have a lower runoff are applied at a factor of less than 1.0 (reducing assessment) and lands with greater runoff are applied a factor of greater than 1.0 (increasing assessment) to account for the increased or decreased flow and usage of the drain.

- ***Grants*** – Grants for eligible agricultural properties may be offered by the Ontario Ministry of Agriculture Food and Rural Affairs (OMAFRA) under the Agricultural Drainage Infrastructure Program (ADIP). Program availability and property eligibility requirements are dynamic and subject to change.

- ***Allowances*** – Allowances may be offered to affected properties for land lost due to the widening of the existing drain/watercourse and/or for crops lost due to construction. Allowances are not provided for future maintenance.

Additional details of these Factors Affecting Assessment are provided in **Appendix E**.



ALL LOTS AND CONCESSIONS ARE WITHIN THE GEOGRAPHIC TOWNSHIP OF GOULBOURN

NOT FOR CONSTRUCTION

No.	DATE dd.mm.yy	REVISION	BY
1	15.06.22	ISSUED FOR CITY REVIEW	AJR
2	28.10.22	ISSUED FOR CITY REVIEW 2	AJR
3	11.11.22	ISSUED FOR AGENCY REVIEW	AJR
4	28.04.23	ISSUED FOR CITY REVIEW 3	AJR
5	11.08.23	ISSUED FOR DISTRIBUTION	AJR

REGISTERED PROFESSIONAL ENGINEER A. J. ROBINSON PROVINCE OF ONTARIO 23/08/11

Professional Engineers Ontario
Licensed Engineering Technologist
23/08/11
Name: L. FRANKLIN
Number: 100501335
Limitations: Providing p ans, non technica content of reports and other non technica advice for submission under the Ontario Drainage Act.
Association of Professional Engineers of Ontario

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HORIZONTAL

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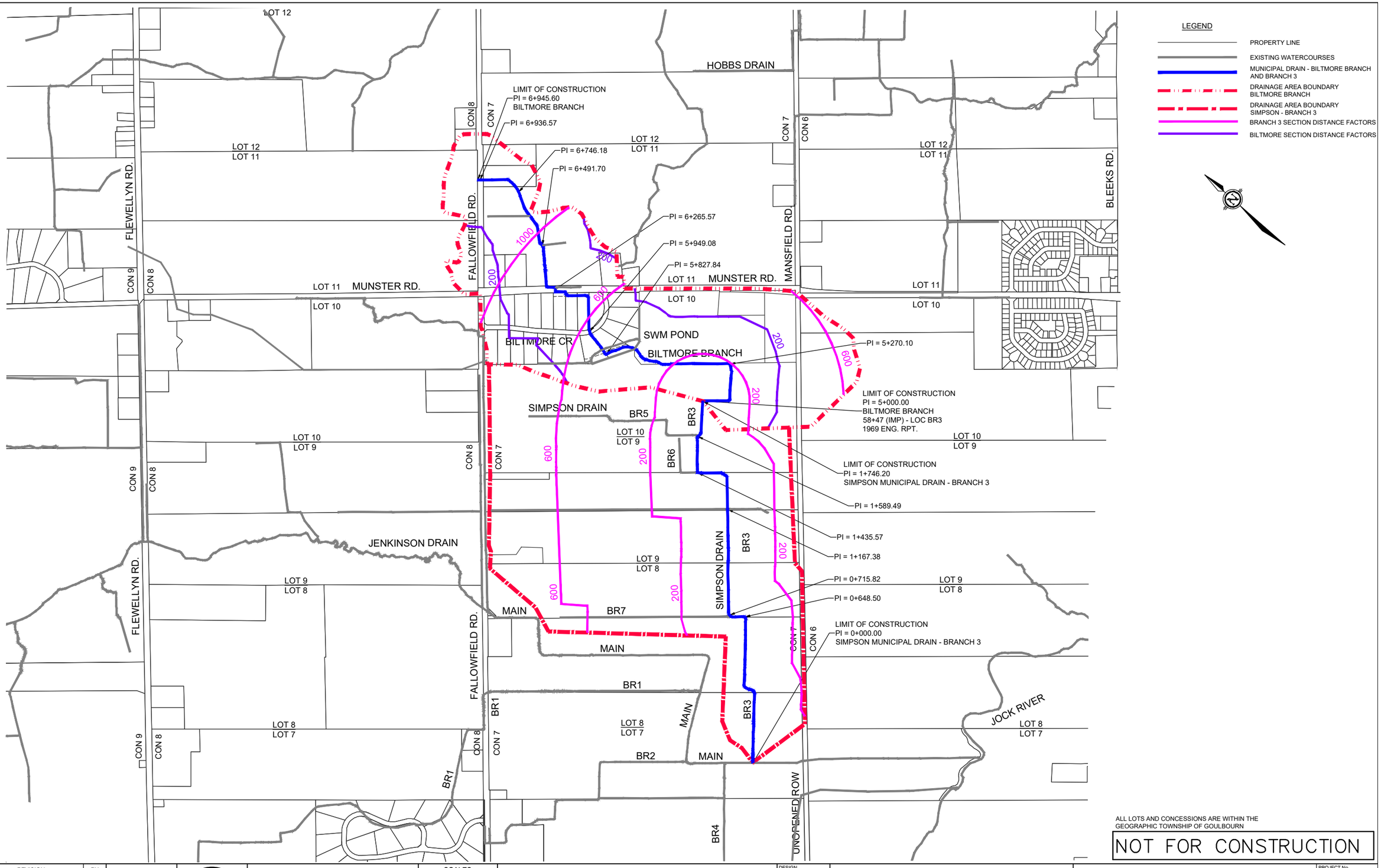
DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF OTTAWA

SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH AND BRANCH 3

MAINTENANCE SECTIONS and SECTION DRAINAGE AREAS
BILTMORE BRANCH AND BRANCH 3

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	FIG-7.1



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DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF OTTAWA

SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH AND BRANCH 3

DISTANCE FACTORS
BILTMORE BRANCH AND BRANCH 3

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	FIG-7.2

7.3 Injuring Liability

There are no Injuring Liability Assessments for this Municipal Drain.

7.4 Assessment for Special Benefit

A Special Benefit is assessed to:

- The City of Ottawa Road Authority for engineering and construction related to road drainage,
- The City of Ottawa for the Engineer's Report, and
- The City of Ottawa SWM facilities for consideration of engineering, and associated construction costs related to the Stormwater Management Pond and Easements.

No private property owner Special Benefits are anticipated for this project.

Any assessment for Special Benefit for initial construction is shown on the Schedules of Assessment **(Appendix C)** as "Assessment for Special Benefit" and is calculated in the Detailed Cost Estimate **(Appendix D)**.

7.5 Block Assessment

There are no Block Assessments for this Municipal Drain.

7.6 Assessments – SWM Facilities

The Benefit and Outlet assessment associated with the Storm Water Management Facilities (SWM) including the storm water management pond, drain/ditches and their associated easements are excluded from individual (private) property assessments and are assessed to the City of Ottawa.

7.7 Assessments to Landowners

7.7.1 Initial Construction

Costs associated with this report, the initial design, allowances, other costs, and construction are considered to be primarily associated with special considerations required by the City of Ottawa for the special benefit of the Road Authority and the correction of other (legacy) drainage issues. As such, a significant portion of the initial costs are assessed to the City of Ottawa in the form of Special Benefit. The remainder of the associated costs are assessed to all landowners in the drainage basin of the Simpson Municipal Drain – Branch 3 and the Biltmore Branch, in accordance with the Assessment Schedules included in **Appendix C** and shown on Dwg. Nos. 19060-A3.1 and 19060-A3.2.

7.7.2 Future Maintenance

Following the completion of the initial construction, the cost for any future maintenance is to be assessed in proportion to the Benefit and Outlet costs defined in the Assessment Schedules (excluding Special Benefit). However, Road Authority specific items, including future roadway culvert replacement, remain the full responsibility of the Road Authority as shown in the as shown in the Schedule of Assessment for Future Maintenance. As part of this Engineer's Report an assessment schedule has been developed for the Biltmore Branch of the Simpson Municipal Drain that reflects an equitable distribution of costs for initial construction, including the Engineer's Report and related costs, and for future maintenance. The Schedule of Assessment for Initial Construction and Future Maintenance is provided in **Appendix C**.

7.8 Maintenance Sections

For consideration of the assessments, this drain is divided into two (2) maintenance sections. The land area, land use factor, section or subsection factor and distance factor have been entered into an Excel spreadsheet for each section of the drain.
In developing the Assessment Schedule for future maintenance, the cost for outlet and benefit has been set to reflect the relative use of the drain by property owners in the watershed. The Assessment Schedules have been developed with the percentage split between Outlet Assessment and Benefit Assessment as follows:

Summary Schedule of Assessment

Section 1 Branch 3 – Station 0+000 to Station 1+746.20

Outlet Assessment	-	90%
Benefit Assessment	-	10%

Section 2 Biltmore Branch – Station 5+000 to Station 6+936.60

Outlet Assessment	-	90%
Benefit Assessment	-	10%

Details with regard to the consideration of maintenance sections are provided in **Appendix E**.

7.9 Grants

Properties currently eligible (at the time of this report) for grants are marked with a "*" notation in the "ADIP (Grant) Eligibility" column of the Schedules of Assessment.

Details with regard to grant eligibility are provided in **Appendix E**.

7.10 Allowances

Properties eligible for allowances are marked with a "**" notation in the "Allowance Eligibility" column of the Schedules of Assessment.

The parcels of land that have been granted allowances associated with the initial construction are outlined in the Schedule of Allowances provided in **Appendix D**.

Details with regard to the calculation of allowances are provided in **Appendix E**.

8.0 COST ESTIMATE

8.1 General

The total estimated cost associated with the construction, engineering, contract administration, allowances, report, and contingencies will be charged to the property owners in the drainage basin in accordance with Schedule A, Summary Schedule of Assessment. The total allowance that must be paid directly to the affected property owners and a description for the purpose of the allowances is contained in Section 8.2. The amount of the allowances is included in **Appendix D**. The total cost of the improvements to the Simpson Municipal Drain – Biltmore Branch is included in **Table 8.1**. A detailed cost estimate is included in **Appendix D**.

Table 8.1
Cost Estimate Summary
Branch 3 And Biltmore Branch

Item	Simpson Branch 3	Biltmore Branch	Total
Routine			
Construction	$114,201.05	$61,644.35	$175,845.40
Contingency	$12,000.00	$5,000.00	$17,000.00
Engineering/Administration	$31,000.00	$94,000.00	$125,000.00
Other (Incl. Allowances)	$26,011.70	$15,383.46	$41,395.16
Sub-Total - Routine	**$183,212.75**	**$176,027.81**	**$359,240.56**
Special Benefit			
City - Road Authority	NO EST**	NO EST**	NO EST**
City – Special Benefit	$137,409.56	$132,020.86	$269,430.42
City – SWM Facilities	$0.00	$21,632.35	$21,632.35
Sub-Total - Special Benefit	$137,409.56	$153,653.20	$291,062.76
Net Total (Assessed to Properties)	**$45,803.19**	**$22,374.61**	**$68,177.79**

*Note**: It is assumed for the purpose of this estimate that the Road Authority will exercise the option to construct roadway culverts. As such, the items required to complete the Road Authority works have been excluded from this estimate (NOT ESTIMATED).*

8.2 Allowances

Where applicable, allowances as outlined in Section 7 of this report are provided to affected properties. The properties which have been granted allowances are outlined in the Schedule of Allowances provided in **Appendix D.**

Allowances are deducted from the total assessment. Payment to a property owner may be made where the amount of the allowance exceeds the value of the assessment.

8.3 ADIP Grants

Where applicable, at the time of assessment, grants (subject to program availability and property eligibility) as prescribed by the Ontario Ministry of Agriculture Food and Rural Affairs (OMAFRA) within the Agricultural Drainage Infrastructure Program (ADIP) policies and outlined in Section 7 of this report will be applied to the assessment of affected properties.

9.0 LOCATION OF TILE DRAIN OUTLETS

Tile drainage and tile outlets are anticipated to be encountered along the alignment of the proposed Biltmore Branch and Branch 3 of the Simpson Municipal Drain. Where they exist, property owners are requested to mark the location of any tile outlets prior to the commencement of construction. Future maintenance of tile outlets shall be the responsibility of the individual property owners.

It is expected that the Contractor will find unmarked tile outlets during construction. The Contractor will be responsible for adjusting and repairing all tile outlets found, including CSP outlet (or alternative approved product), rodent grate and Rock Protection in accordance with RCI Std. Dwg. F.

10.0 WORKING SPACE

As per S.63(1) of the Ontario Drainage Act, R.S.O. 1990, c. D.17 (provided below) a "Working Space" must be available for the purpose of construction and future maintenance.

> 63 (1) The contractor and the contractor's assistants when engaged in the construction, maintenance, improvement, or repair of a drainage works may, with their equipment, enter upon whatever lands are necessary to complete the work within the working space designated in the engineer's report. R.S.O. 1990, c. D.17, s. 63 (1).

For the purpose of construction, the standard Working Space adjacent to the drain must be available along the side that is best suited for construction. In some sections of the drain, it may be necessary to complete construction or maintenance from both sides of the drain. The designated Working Space is set at 25 m from the top of bank and is necessary to allow construction to be carried out and excavated material to be spread.

Where the "Working Space" impacts small (residential) lots, less than 2.0ha in size, the Construction Working Space is reduced to 6.0m and is understood to be in conformance with existing zoning/official plan and other regulatory set-backs. Where the "Working space impacts the "Biltmore Estates" lots, the Construction Working Space is set at 6m between Station 5+825 and 6+100 and 15m between Station 6+100 and 6+200.

For the purpose of future maintenance, the standard Working Space adjacent to the drain must be available along the side of the drain where maintenance is required (either or both sides). The designated Working Space is set at 25 m from the top of bank and is necessary to allow maintenance to be carried out and excavated material spread. Where the "Working Space" impacts small (residential) lots, less than 2.0ha in size, the Maintenance Working Space is reduced to 5.0m.

As per SP3.2 of the Engineer's Report all excavated material from small lots is to be removed off-site.

It is recommended that the working space be kept free of permanent obstructions including (but not limited to), plantings (trees), non-removable fences, structures and/or other permanent landscaping features.

Access to the Working Space for the purpose of construction, inspection or maintenance is restricted to persons prescribed under the authority of the Ontario Drainage Act, R.S.O. 1990, c. D.17 being the Drainage Engineer (or assistants) – S.12(1), the Contractor (or assistants) – S.63(1) and/or the Drainage Superintendent (or assistants) – S.95(3). Where possible (excluding emergencies) it is required that a minimum 48 hours advance notice (in writing) or direct communication with the affected property owner be provided before accessing the drain working space.

11.0 CHANGING THE SCOPE OF WORK

Should changes, deletions or extensions in construction be requested or required after the bylaw is passed, the report must be amended, and a revised bylaw must be passed. Since this project will be constructed through provisions of the Drainage Act, R.S.O. 1990, c D.17, a bylaw must first be passed to authorize the work. Changes to the work are not to be undertaken without a change in the bylaw unless the changes can generally be completed for less than the contingency estimate or 10% of the construction costs. If it is desired to make any substantial increase or decrease in the scope of work as designed it will be necessary that either a revised report be prepared and processed, or if the desired works are considered to be a gross error in accordance with the Drainage Act, R.S.O. 1990, c D.17 ,that an application be made to the Agricultural, Food and Rural Affairs Appeal Tribunal (Drainage Tribunal) pursuant to Section 58(4) of the Drainage Act, R.S.O. 1990, c. D17 to obtain approval for such change. If unforeseen obstacles are encountered and can be completed for the amount within the contingency allowance, the bylaw does not require modification. If any individual or group of property

owners require additional work and are prepared to apply for such and do not wish to be part of the Drainage Works, they may make their own arrangements with the Contractor, but the Drainage Engineer must approve such in order that no detrimental effect to the drain or its maintenance results.

12.0 MAINTENANCE

Future maintenance of the Drain including the Biltmore Branch and modified Branch 3 shall be the responsibility of the City of Ottawa, although the individual property owners shall be responsible for periodic inspection of the drain and reporting maintenance problems to the City.

The cost of future maintenance for the Biltmore Branch and Branch 3 is to be assessed in proportion to the Schedule of Assessment for the Construction and Future Maintenance of the Simpson Municipal Drain – Biltmore Branch and Branch 3, excluding allowances and special benefits. Maintenance costs are to be assessed on a pro rata basis for the subsection where maintenance is completed (summarized in Schedule A and shown in Schedule B) provided in **Appendix C** of this report.

The maintenance costs for the remainder of the drain and branches will continue to be governed by the 1969 Engineer's Report (and accompanying by-law 3-70)

Therefore, maintenance costs are to be levied against the lands upstream from the location of the maintenance work pro rata with the assessments for Benefit and Outlet (excluding Special Benefits) in the Schedules for Construction and Future Maintenance, all of which is in accordance with the Drainage Act.

The Contractor shall be responsible for making good any construction defects found in the works for a period of one year from the date of final acceptance of the work. This obligation shall include such items as culvert crossings, fencing, grass (seeding), abnormal erosion/ sedimentation, and rock protection but shall not include for normal erosion or sedimentation of the drain.

The maintenance of the Simpson Municipal Drain – new Biltmore Branch and modified Branch 3 considered under the terms of this report, including channel and erosion control maintenance, shall be the responsibility of the City of Ottawa as previously noted.

Maintenance of public road culverts shall be the responsibility of the Road Authority; however, if the Road Authority does not complete the maintenance, then the City will complete the maintenance and charge the cost to the Road Authority.

As per the conditions of the Drainage Act and the Agricultural Drainage Infrastructure Program (ADIP/Grants), property owners are entitled to one standard crossing per property dissected by the drain. Culverts identified and prescribed by this Report form part of the drain for construction and future maintenance. At the discretion of the Drainage Superintendent, property owners may seek approval for additional or non-standard crossings (increased length, decorative headwalls, etc.). Where approved

these items do not form part of the report and are the responsibility of the associated property owner. Additional features installed without written approval may be removed as necessary during maintenance (at the cost of the property owner) and will not be replaced.

Future maintenance of tile outlets and culvert crossings shall be the responsibility of and shall be at the cost of the affected property owners.

13.0 MINISTRY OF ENVIRONMENT CONSERVATION AND PARKS - SPECIES AT RISK

The Ministry of the Environment, Conservation and Parks (MECP) – Ontario is responsible for review with regard to the Endangered Species Act (ESA) Legislation. The draft "Engineer's Report – Amendments to the Simpson Municipal Drain – Construction of the Biltmore Branch and Modification of Branch 3" was circulated to Ministry of Environment Conservation and Parks (MECP) for review and screening with regard to the Endangered Species Act. Where received, a copy of the screening report and any associated advice is provided in **Appendix F** of this Report.

In advance of consultation, the MECP recommends self-screening of the project area using data available on the Ontario Natural Heritage Information Centre (NHIC). The NHIC provides documentation for Species at Risk (SAR) in 1km square grids.

The self-screening process found reports for four (4) specific SAR for grids along the alignment of the drain. Endangered Species are dynamic and subject to change. Typical species associated and anticipated to be found within the general vicinity of Municipal Drains, specific SAR found through the self-screening process, and a general categorization of species and standard mitigation measures, are provided in **Appendix F** of this Report.

14.0 RIDEAU VALLEY CONSERVATION AUTHORITY PERMIT

The "Engineer's Report – Amendments to the Simpson Municipal Drain – Construction of the Biltmore Branch and Modification of existing Branch 3" was circulated to Rideau Valley Conservation Authority (RVCA) for review and permit. The RVCA provides permission under the Conservation Authorities Act, O. Reg. 174/06, for the "Development, Interference with Wetlands and Alterations to Shorelines and Watercourses".

Where received, a copy of the Permit under O. Reg. 174/06 including conditions is attached as **Appendix G.**

15.0 DEPARTMENT OF FISHERIES AND OCEANS – CLASS AUTHORIZATION

Review of the proposed work area regarding Fisheries Act Regulations is completed in conjunction with draft circulation for agency review. The Federal Department of Fisheries and Oceans (DFO) provides review of projects where additional review is required by the completion of a self-screening process. Authorization under the Fisheries Act may be required as an outcome of the review process.

Consultation was conducted with the DFO to determine suitable mitigation measures such that work may be completed with no net impact on fish and fish habitat.

Robinson Consultants proposed the implementation of modified Class Authorization measures, typical of a "Class F" Municipal Drain. Implementation of these measures will minimize or eliminate the impact on this or adjacent watercourses, fish or fish habitat and have been incorporated into this report and the related plans and specifications.

Where received, a copy of the Authorization under the Fisheries Act including conditions is included in **Appendix H.**

16.0 MINISTRY OF ENVIRONMENT CONSERVATION AND PARKS - STORM WATER - CERTIFICATE OF APPROVAL

In conjunction with circulation of the Draft Engineer's Report, consultation was conducted with the Ministry of Environment Conservation and Parks (MECP) to determine if standard MECP Stormwater Certificate of Approval was required. Typical Municipal Drain projects are exempt from this requirement; however, the exemption does not apply to projects where the primary purpose is to provide drainage for urban development.

Confirmation was received on April 22, 2022, that an ECA was not required for this project. A copy of the correspondence is provided in **Appendix F**.

17.0 MINISTRY OF NATURAL RESOURCES AND FORESTRY

In conjunction with the circulation of the Draft Engineer's Report, consultation was conducted with the Ministry of Natural Resources and Forestry (MNRF) for the purpose of environmental legislation (as directed by the MNRF). Additional requirements and legislation is not anticipated for this Municipal Drain project.

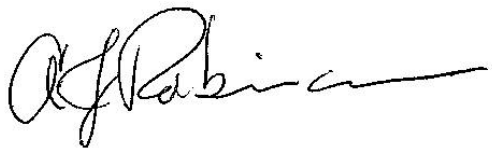
Where applicable, a copy of the legislation is provided in **Appendix F.**

18.0 PERMITS AND AUTHORIZATIONS

All required permits and authorizations required for the initial construction, including, but not limited to, Department of Fisheries and Oceans (DFO), the Rideau Valley Conservation Authority (RVCA) and Ontario Ministry of the Environment Conservation and Parks (MECP-SAR) have been applied for in conjunction with the preparation of the Engineer's Report, and, where applicable, are provided in **Appendix F, G and H**.

All of which is respectfully submitted,

ROBINSON CONSULTANTS INC.



A.J. Robinson, P. Eng.
Drainage Engineer

Professional Engineers Ontario
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Number: 100501335
Limitations: **Providing plans, non-technical content of reports and other non-technical advice for submission under the Ontario Drainage Act.**
Association of Professional Engineers of Ontario

Lorne Franklin, L.E.T, C.E.T., rcca, CISEC
Licensed Engineering Technologist

Appendix A

Plans, Profiles, Cross-Sections, and Details

- Drainage Area Plan
  - Simpson Municipal Drain and Biltmore Branch
  - Biltmore Branch and Branch 3
- Culvert and Sediment and Erosion Control Plan
- Property Ownership Plan
- Drain Profiles
- Standard Detail Drawings
- OPSD Drawings

LEGEND

- PROPERTY LINE
- EXISTING WATERCOURSES
- MUNICIPAL DRAIN - BILTMORE BRANCH AND BRANCH 3
- ORIGINAL DRAINAGE AREA BOUNDARY - SIMPSON DRAIN (1969 ENGINEER'S BOUNDARY)
- MODIFIED DRAINAGE AREA BOUNDARY - SIMPSON DRAIN

HOBBS DRAIN
LIMIT OF CONSTRUCTION
PI = 6+945.60
BILTMORE BRANCH
PI = 6+936.57
PI = 6+746.18
PI = 6+491.70
PI = 6+265.57
PI = 5+949.08
PI = 5+827.84
SWM POND
BILTMORE BRANCH
PI = 5+270.10
LIMIT OF CONSTRUCTION
PI = 5+000.00
BILTMORE BRANCH
58+47 (IMP) - LOC BR3
1969 ENG. RPT.
LIMIT OF CONSTRUCTION
PI = 1+746.20
SIMPSON MUNICIPAL DRAIN - BRANCH 3
PI = 1+589.49
PI = 1+435.57
PI = 1+167.38
PI = 0+715.82
PI = 0+648.50
LIMIT OF CONSTRUCTION
PI = 0+000.00
SIMPSON MUNICIPAL DRAIN - BRANCH 3
JENKINSON DRAIN
DWYER HILL RD.
MUNSTER RD.
BILTMORE CR.
FERNBANK RD.
FLEWELLYN RD.
FALLOWFIELD RD.
MANSFIELD RD.
BLEEKS RD.
TRANS CANADA TRAIL
JOCK RIVER
SIMPSON DRAIN
UNOPENED ROW
MAIN
BR1
BR2
BR3
BR4
BR5
BR6
CON 6
CON 7
CON 8
CON 9
CON 10
CON 11
LOT 12
LOT 11
LOT 10
LOT 9
LOT 8
LOT 7
LOT 6
LOT 5

ALL LOTS AND CONCESSIONS ARE WITHIN THE GEOGRAPHIC TOWNSHIP OF GOULBOURN

NOT FOR CONSTRUCTION

No.	DATE dd.mm.yy	REVISION	BY
1	15.06.22	ISSUED FOR CITY REVIEW	AJR
2	28.10.22	ISSUED FOR CITY REVIEW 2	AJR
3	11.11.22	ISSUED FOR AGENCY REVIEW	AJR
4	28.04.23	ISSUED FOR CITY REVIEW 3	AJR
5	11.08.23	ISSUED FOR DISTRIBUTION	AJR

REGISTERED PROFESSIONAL ENGINEER
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23/08/11
PROVINCE OF ONTARIO

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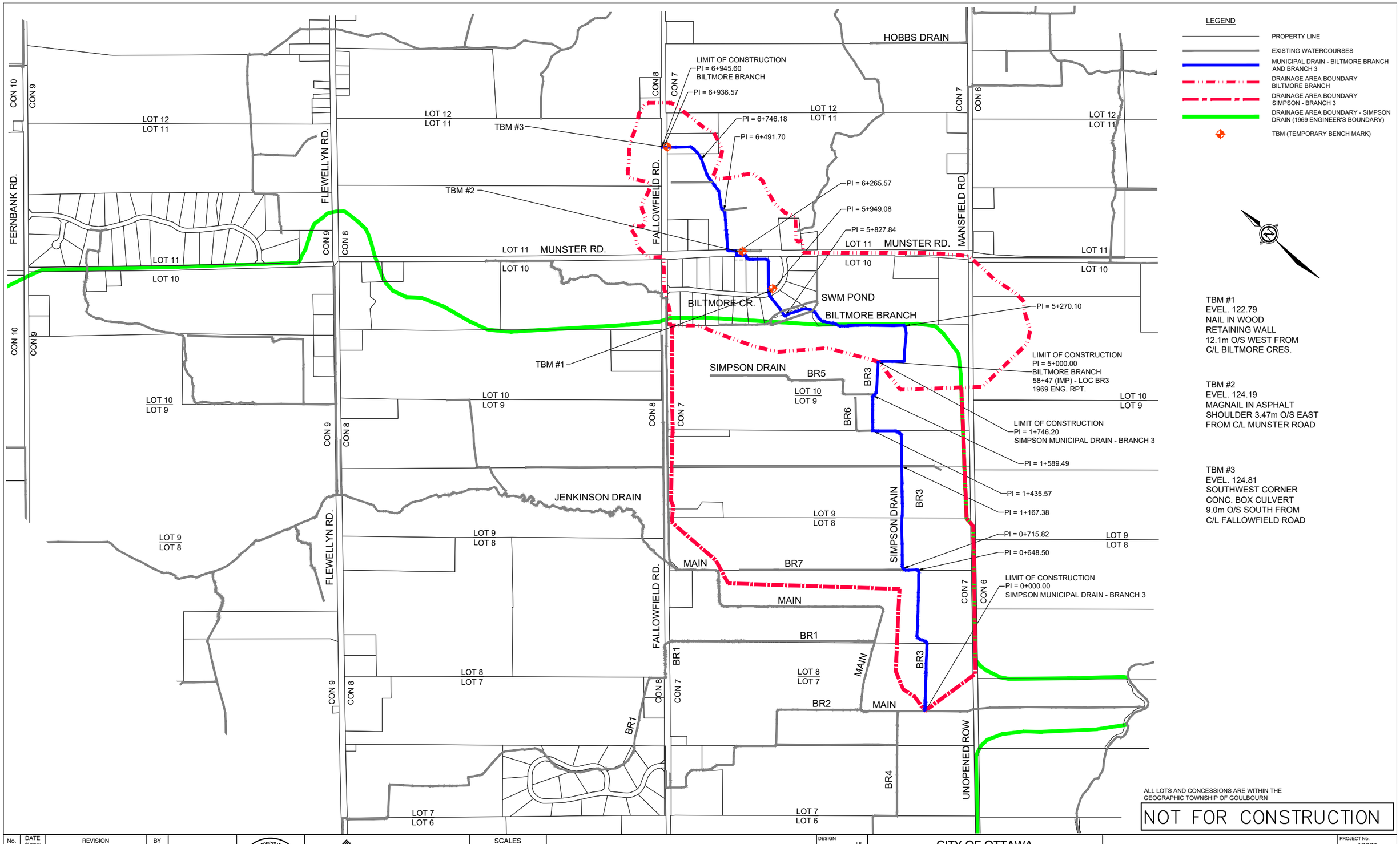
DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF OTTAWA

SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH AND BRANCH 3

DRAINAGE AREA PLAN

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	19060-A1



LEGEND

- PROPERTY LINE
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- MUNICIPAL DRAIN - BILTMORE BRANCH AND BRANCH 3
- DRAINAGE AREA BOUNDARY BILTMORE BRANCH
- DRAINAGE AREA BOUNDARY SIMPSON - BRANCH 3
- DRAINAGE AREA BOUNDARY - SIMPSON DRAIN (1969 ENGINEER'S BOUNDARY)
- TBM (TEMPORARY BENCH MARK)

TBM #1
EVEL. 122.79
NAIL IN WOOD
RETAINING WALL
12.1m O/S WEST FROM
C/L BILTMORE CRES.

TBM #2
EVEL. 124.19
MAGNAIL IN ASPHALT
SHOULDER 3.47m O/S EAST
FROM C/L MUNSTER ROAD

TBM #3
EVEL. 124.81
SOUTHWEST CORNER
CONC. BOX CULVERT
9.0m O/S SOUTH FROM
C/L FALLOWFIELD ROAD

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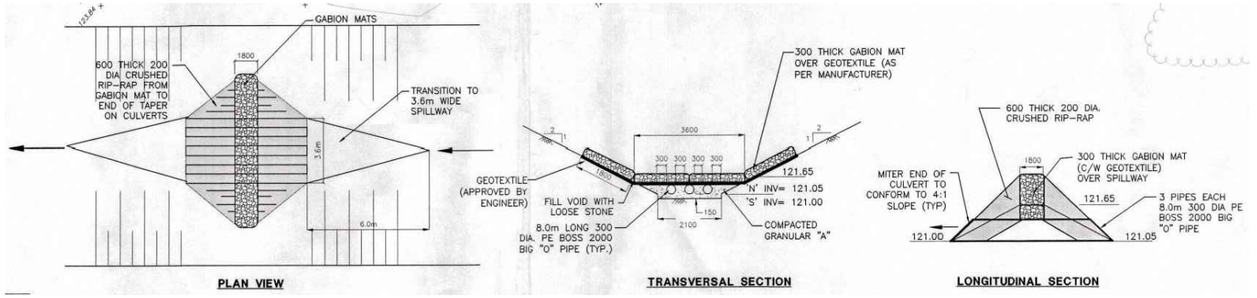
APPROVED	AJR

CITY OF OTTAWA

SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH AND BRANCH 3

DRAINAGE AREA PLAN

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	19060-A1.1



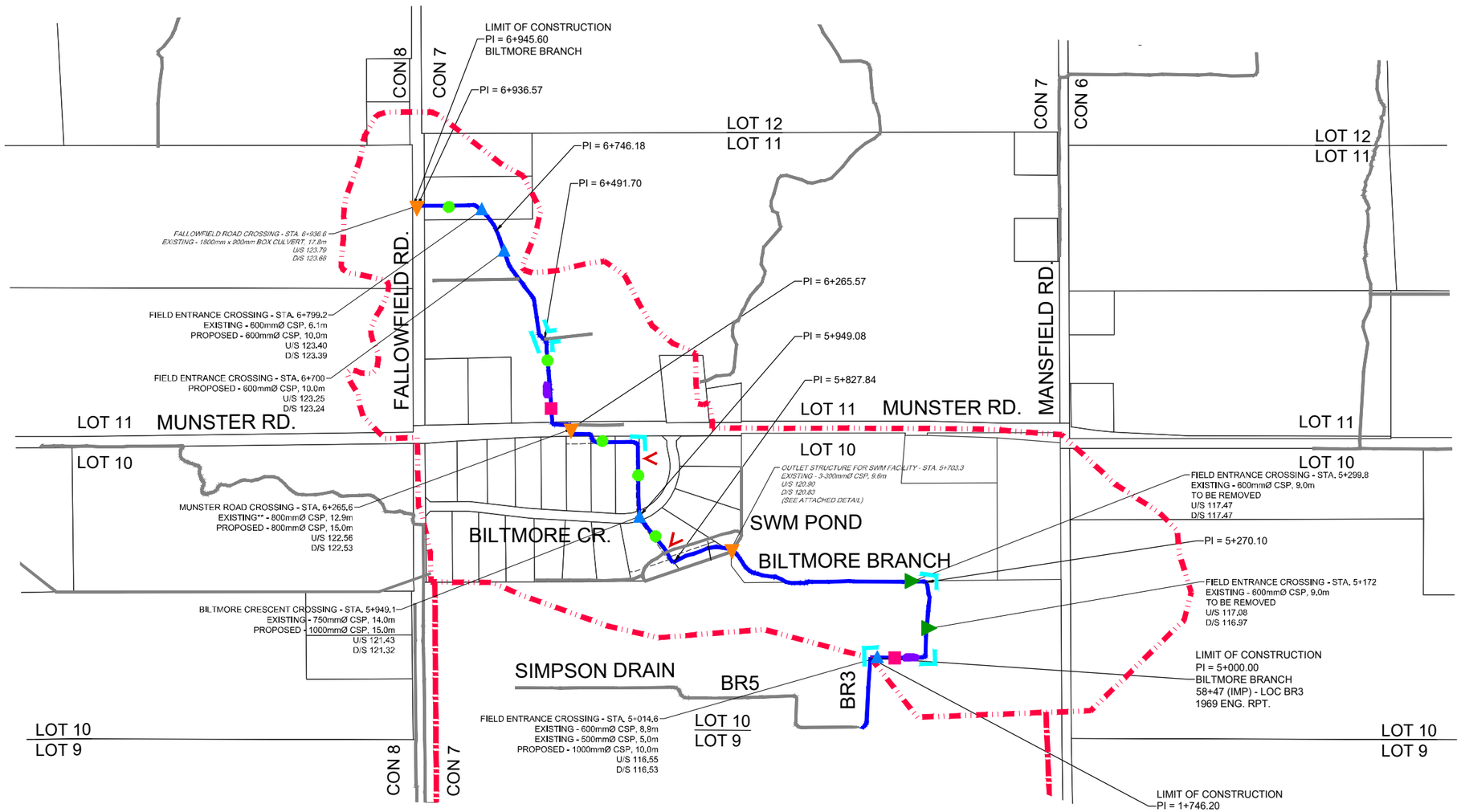
OUTLET STRUCTURE FOR SWM FACILITY DETAILS

OUTLET STRUCTURE FOR SWM FACILITY DETAILS - SOURCE:

Site and Grading Plan R6
Biltmore Estates Ltd.
Trow Consulting Engineers Ltd.
July 13, 2001

LEGEND

- PROPERTY LINE
- EXISTING WATERCOURSES
- MUNICIPAL DRAIN - BILTMORE BRANCH AND BRANCH 3
- DRAINAGE AREA BOUNDARY BILTMORE BRANCH
- DRAINAGE AREA BOUNDARY SIMPSON - BRANCH 3
- STRAW CHECK DAM
- ROCK CHECK DAM
- SEDIMENT TRAP WITH ROCK CHECK DAM
- PROPOSED ROCK PROTECTION/EROSION CONTROL
- CROSSING LOCATION (WITH CULVERT END TREATMENT AS PER RCI STD. DWG. C)
- CROSSING LOCATION (NO WORK REQUIRED)
- CROSSING LOCATION (TO BE REMOVED)
- TILE OUTLET LOCATION (WITH TILE OUTLET PROTECTION AS PER RCI STD. DWG. F)



NOTE:

ONLY TILE OUTLETS FOUND AT THE TIME OF SURVEY ARE IDENTIFIED. OTHER LOCATIONS MAY EXIST AND ALSO REQUIRE RESTORATION AND PROTECTION

NOTE:

EXISTING CULVERTS DENOTED WITH (**) ARE UNDERSIZED AND/OR OFF GRADE BUT WITHIN ACCEPTABLE TOLERANCES AND AS SUCH MAY REMAIN UNTIL SUCH TIME AS THEY ARE REQUIRED TO BE REPLACED (POOR CONDITION) UNDER FUTURE MAINTENANCE OR OTHERWISE AT THE DISCRETION OF THE DRAINAGE SUPERINTENDENT.

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APPROVED	AJR

CITY OF OTTAWA

SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH

CULVERT, SEDIMENT, AND EROSION CONTROL PLAN
BILTMORE BRANCH

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	19060-A2.1

LEGEND

- PROPERTY LINE
- EXISTING WATERCOURSES
- MUNICIPAL DRAIN - BILTMORE BRANCH AND BRANCH 3
- DRAINAGE AREA BOUNDARY BILTMORE BRANCH
- DRAINAGE AREA BOUNDARY SIMPSON - BRANCH 3
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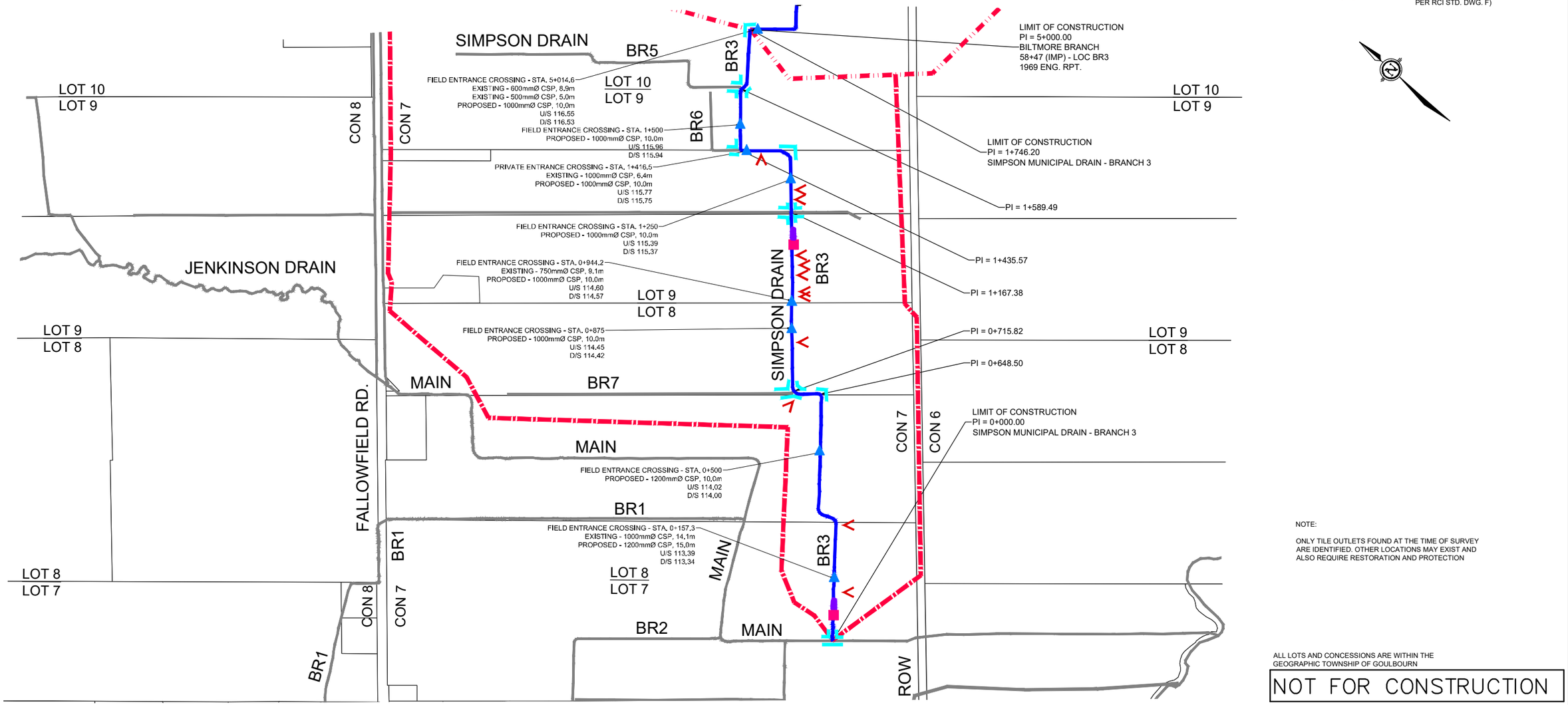
- TILE OUTLET LOCATION (WITH TILE OUTLET PROTECTION AS PER RCI STD. DWG. F)



NOTE:

ONLY TILE OUTLETS FOUND AT THE TIME OF SURVEY ARE IDENTIFIED. OTHER LOCATIONS MAY EXIST AND ALSO REQUIRE RESTORATION AND PROTECTION

ALL LOTS AND CONCESSIONS ARE WITHIN THE GEOGRAPHIC TOWNSHIP OF GOULBOURN

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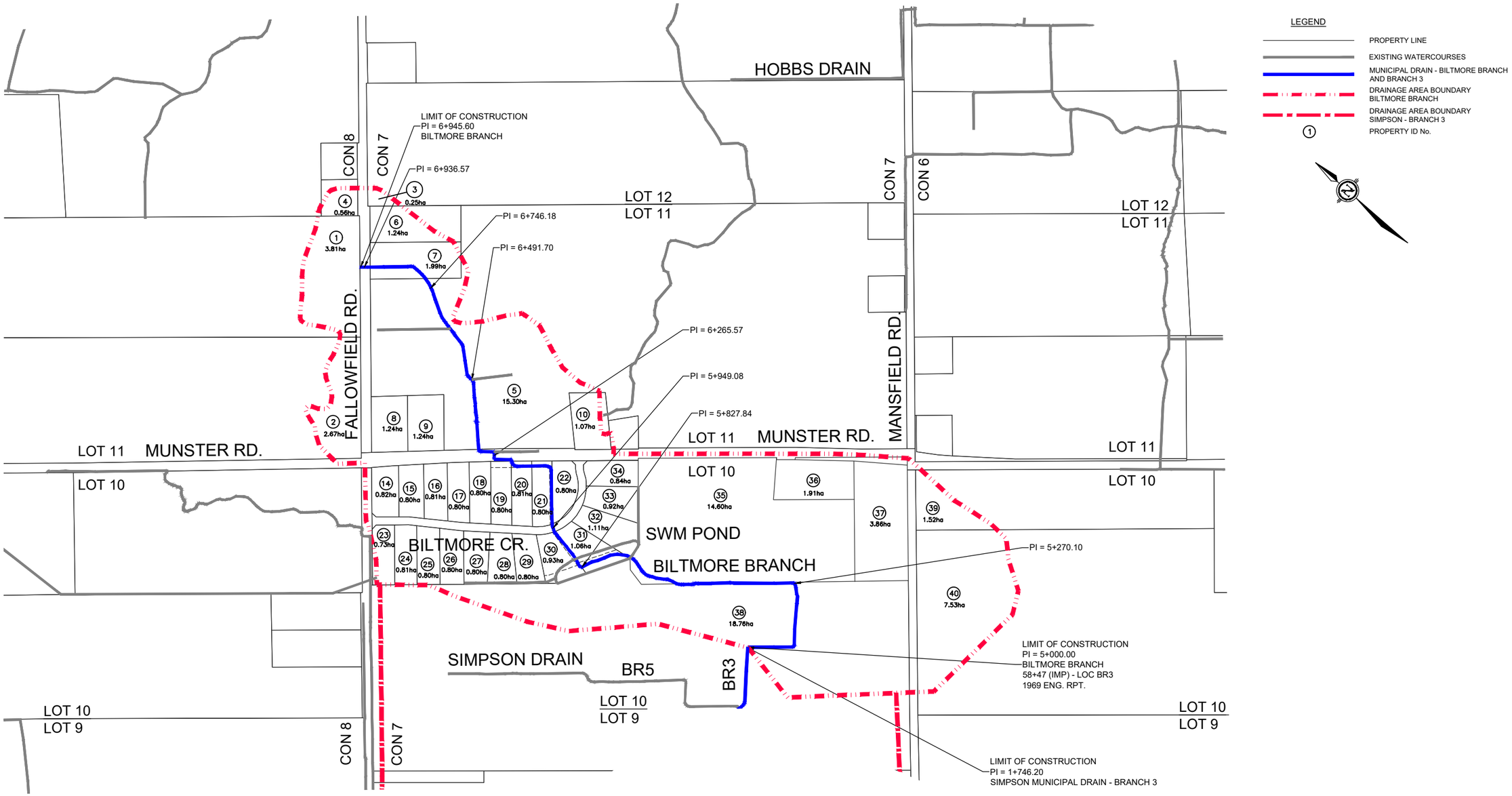
APPROVED	AJR

CITY OF OTTAWA

SIMPSON MUNICIPAL DRAIN
BRANCH 3

CULVERT, SEDIMENT, AND EROSION CONTROL PLAN
SIMPSON BRANCH 3

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	19060-A2.2



ALL LOTS AND CONCESSIONS ARE WITHIN THE GEOGRAPHIC TOWNSHIP OF GOULBOURN

NOT FOR CONSTRUCTION

No.	DATE dd.mm.yy	REVISION	BY
1	15.06.22	ISSUED FOR CITY REVIEW	AJR
2	28.10.22	ISSUED FOR CITY REVIEW 2	AJR
3	11.11.22	ISSUED FOR AGENCY REVIEW	AJR
4	28.04.23	ISSUED FOR CITY REVIEW 3	AJR
5	11.08.23	ISSUED FOR DISTRIBUTION	AJR

REGISTERED PROFESSIONAL ENGINEER A. J. ROBINSON 23/08/11 PROVINCE OF ONTARIO

Professional Engineers Ontario
23/08/11
Licensed Engineering Technologist
Name: L. FRANKLIN
Number: 100501335
Limitations: Providing plans, non-technical content of reports and other non-technical advice for submission under the Ontario Drainage Act.
Association of Professional Engineers of Ontario

SCALES
50 0 100
HORIZONTAL

Robinson Consultants
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

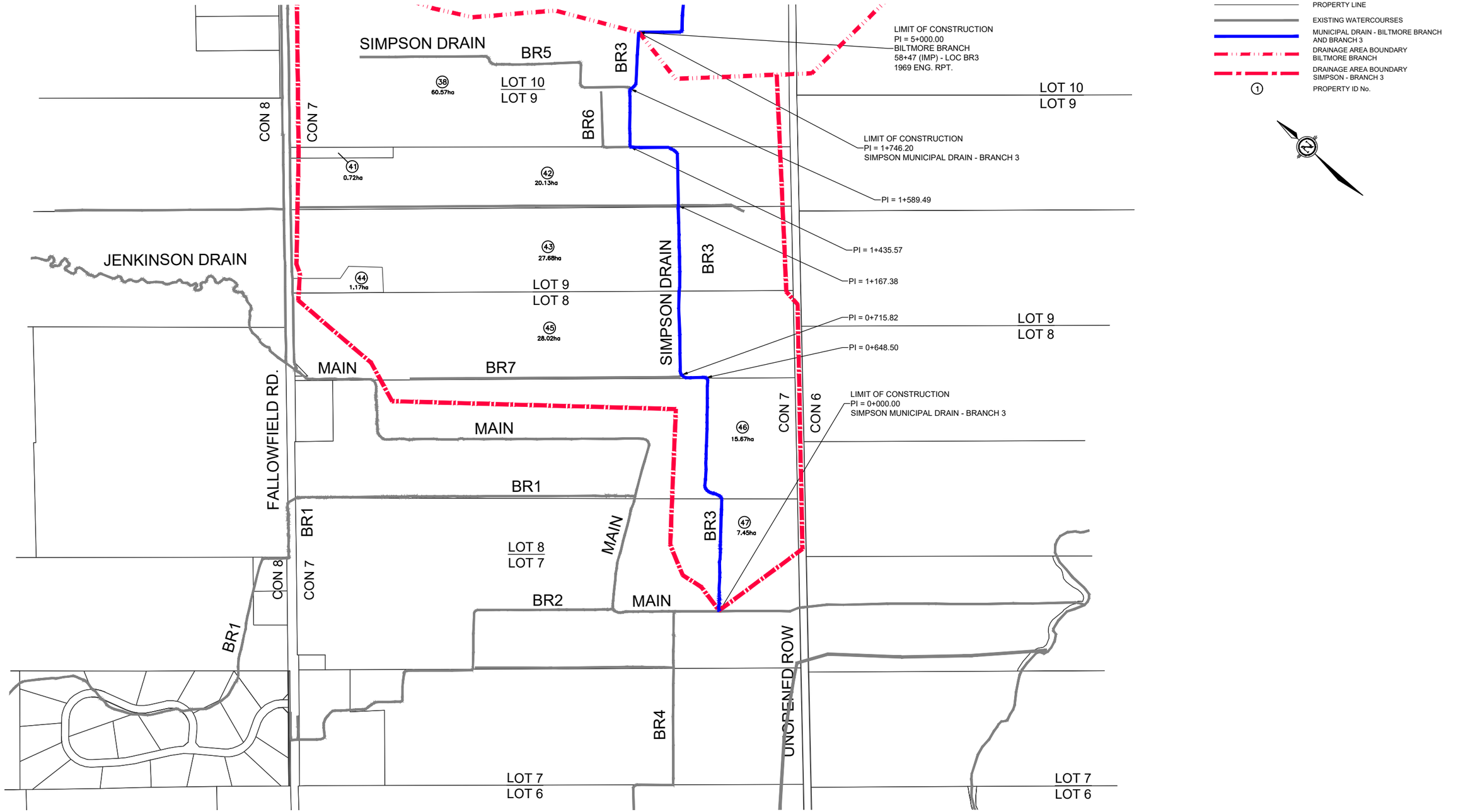
DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF OTTAWA

SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH

PROPERTY OWNERSHIP PLAN
BILTMORE BRANCH

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	19060-A3.1



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A. J. ROBINSON
23/08/11
PROVINCE OF ONTARIO

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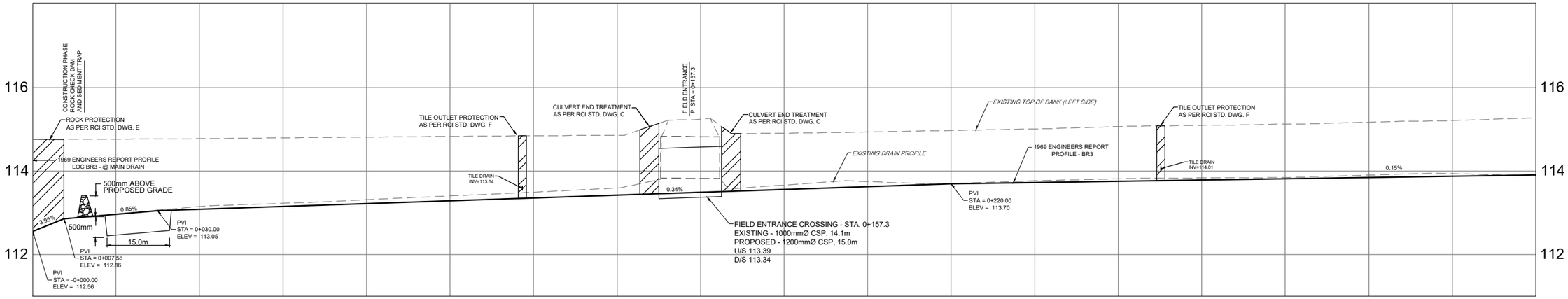
CITY OF OTTAWA

SIMPSON MUNICIPAL DRAIN
BRANCH 3

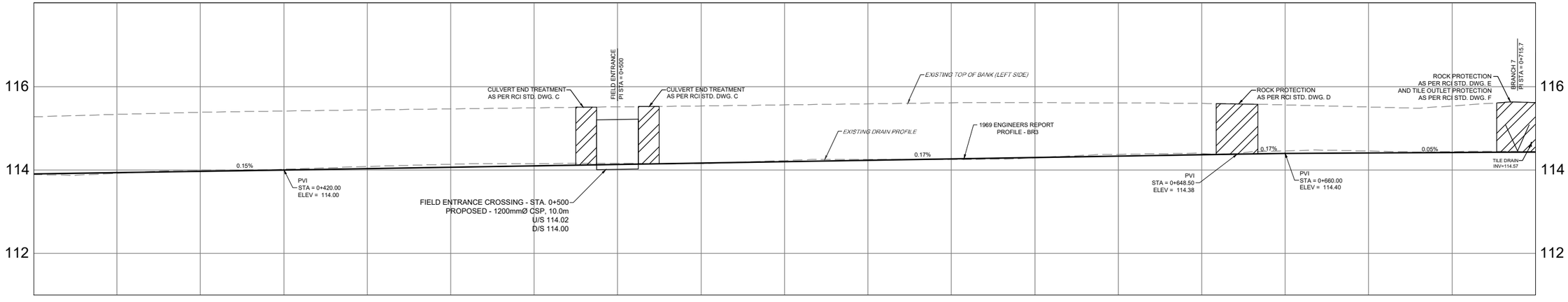
PROPERTY OWNERSHIP PLAN
SIMPSON BRANCH 3

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	19060-A3.2

SIMPSON MUNICIPAL DRAIN - BRANCH 3



PROPOSED GRADE	112.56	112.97	113.08	113.15	113.22	113.29	113.36	113.42	113.49	113.56	113.63	113.70	113.73	113.76	113.79	113.82	113.85	113.88	113.91
EXISTING BOTTOM	*112.56*	*112.97*	*113.15*	*113.23*	*113.31*	*113.41*	*113.49*	*113.60*	*115.24*	*113.67*	*113.75*	*113.70*	*113.77*	*113.81*	*113.84*	*113.85*	*113.90*	*113.94*	*113.86*
STATION	0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+180	0+200	0+220	0+240	0+260	0+280	0+300	0+320	0+340	0+360



PROPOSED GRADE	113.91	113.94	113.97	114.00	114.03	114.07	114.10	114.13	114.17	114.20	114.23	114.27	114.30	114.33	114.37	114.40	114.41	114.42	114.43
EXISTING BOTTOM	*113.89*	*113.92*	*114.00*	*114.02*	*114.09*	*114.14*	*114.15*	*114.16*	*114.15*	*114.23*	*114.25*	*114.25*	*114.29*	*114.38*	*114.40*	*114.46*	*114.45*	*114.44*	*114.44*
STATION	0+360	0+380	0+400	0+420	0+440	0+460	0+480	0+500	0+520	0+540	0+560	0+580	0+600	0+620	0+640	0+660	0+680	0+700	0+720

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SCALES
5 0 10
HORIZONTAL
0.5 0 1
VERTICAL

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350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

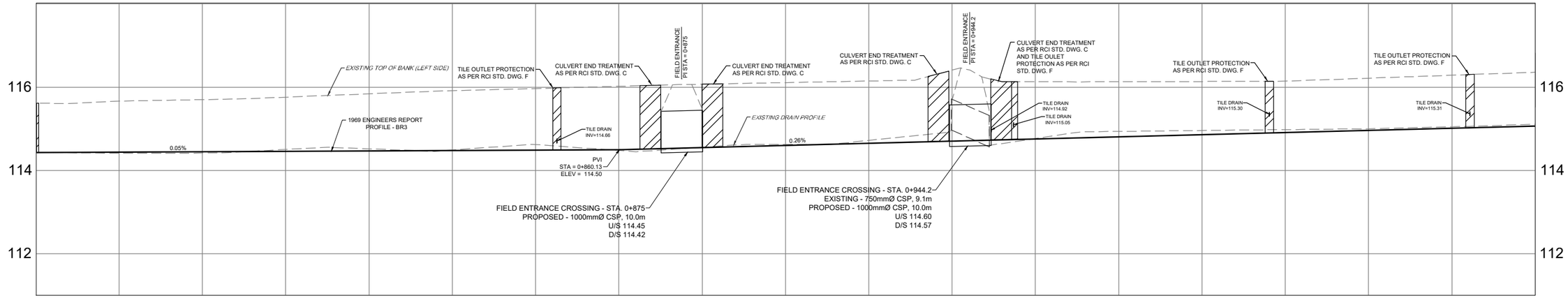
CITY OF OTTAWA

SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH AND BRANCH 3

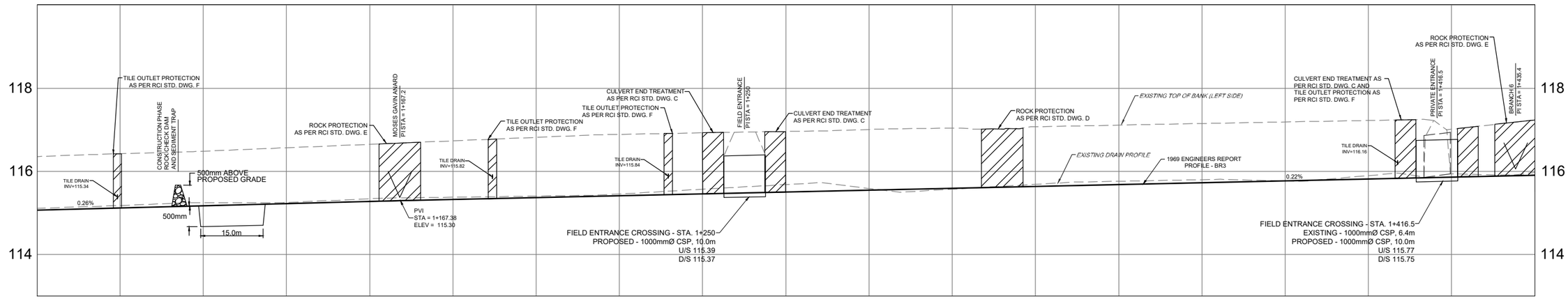
DRAIN PROFILE
STA. 0+000 TO STA. 0+720
BRANCH 3

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	19060-P1

SIMPSON MUNICIPAL DRAIN - BRANCH 3



STATION	PROPOSED GRADE	EXISTING BOTTOM
0+720	114.43	114.44
0+740	114.44	114.41
0+760	114.45	114.42
0+780	114.46	114.51
0+800	114.47	114.52
0+820	114.48	114.49
0+840	114.49	114.52
0+860	114.50	114.49
0+880	114.55	114.56
0+900	114.60	114.63
0+920	114.66	114.72
0+940	114.71	115.54
0+960	114.76	114.77
0+980	114.81	114.84
1+000	114.86	114.96
1+020	114.91	114.89
1+040	114.97	115.00
1+060	115.02	115.05
1+080	115.07	115.11



STATION	PROPOSED GRADE	EXISTING BOTTOM
1+080	115.07	115.11
1+100	115.12	115.18
1+120	115.17	115.25
1+140	115.22	115.25
1+160	115.28	115.34
1+180	115.32	115.38
1+200	115.37	115.41
1+220	115.41	115.46
1+240	115.46	115.57
1+260	115.50	115.68
1+280	115.55	115.69
1+300	115.59	115.57
1+320	115.64	115.69
1+340	115.69	115.76
1+360	115.73	115.80
1+380	115.78	115.77
1+400	115.82	115.90
1+420	115.87	115.94
1+440	115.91	115.97

NOT FOR CONSTRUCTION

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Professional Engineers Ontario
23/08/11
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SCALES
5 0 10
HORIZONTAL
0.5 0 1
VERTICAL

Robinson Consultants
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

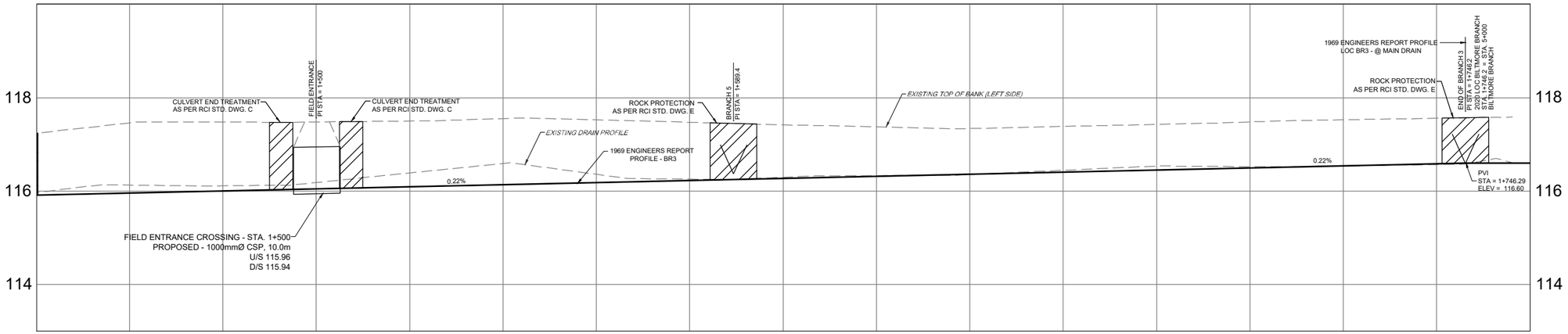
CITY OF OTTAWA

SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH AND BRANCH 3

DRAIN PROFILE
STA. 0+720 TO STA. 1+440
BRANCH 3

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	19060-P2

SIMPSON MUNICIPAL DRAIN - BRANCH 3



PROPOSED GRADE	115.91	115.96	116.00	116.05	116.09	116.14	116.18	116.23	116.27	116.32	116.36	116.41	116.45	116.50	116.54	116.59	116.60
EXISTING BOTTOM	*115.97*	*116.13*	*116.11*	*116.16*	*116.39*	*116.59*	*116.36*	*116.26*	*116.30*	*116.33*	*116.36*	*116.45*	*116.54*	*116.53*	*116.54*	*116.57*	
STATION	1+440	1+460	1+480	1+500	1+520	1+540	1+560	1+580	1+600	1+620	1+640	1+660	1+680	1+700	1+720	1+740	1+760

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5 0 10
HORIZONTAL
0.5 0 1
VERTICAL

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DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

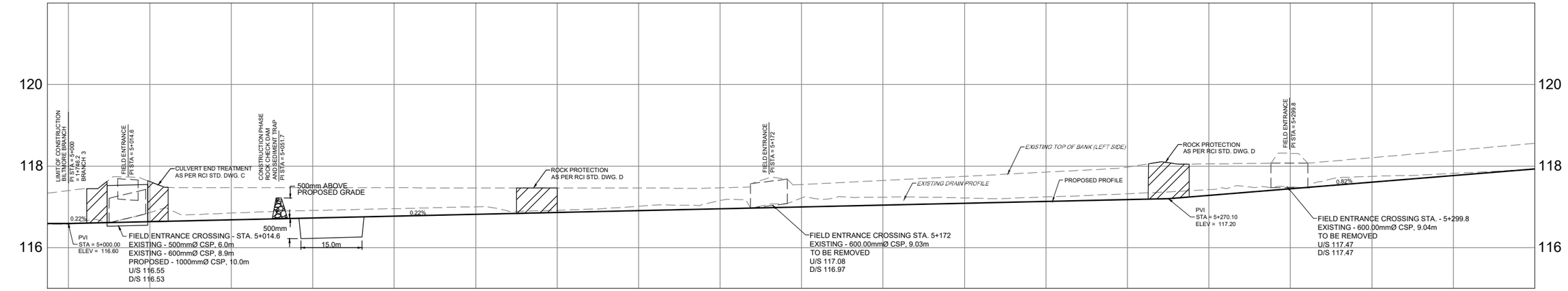
CITY OF OTTAWA

SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH AND BRANCH 3

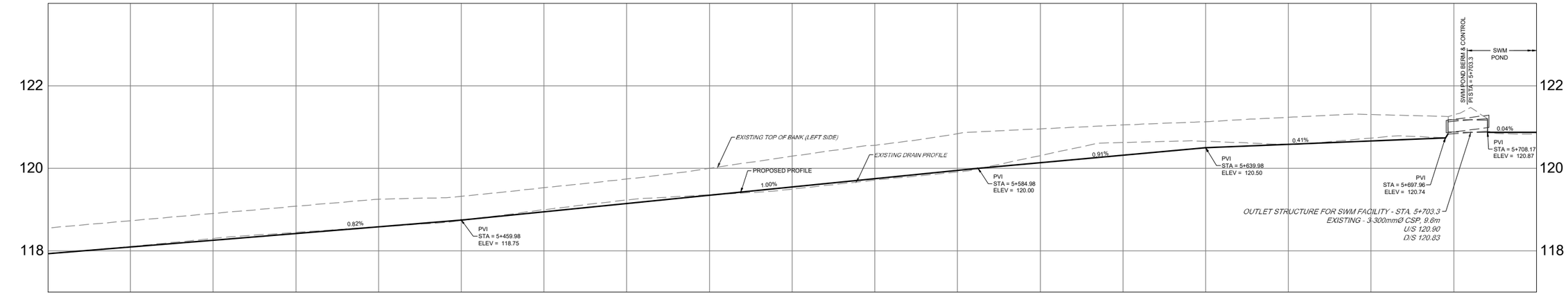
DRAIN PROFILE
STA. 1+440 TO STA. 1+746.2
BRANCH 3

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	19060-P3

SIMPSON MUNICIPAL DRAIN - BILTMORE BRANCH



PROPOSED GRADE	116.60	116.64	116.69	116.73	116.78	116.82	116.86	116.91	116.95	117.00	117.04	117.09	117.13	117.18	117.20	117.28	117.44	117.61	117.77	117.93
EXISTING BOTTOM	*116.38*	*116.86*	*116.85*	*116.81*	*116.96*	*117.00*	*116.92*	*117.02*	*117.15*	*117.22*	*117.24*	*117.22*	*117.24*	*117.32*		*117.42*	*117.49*	*117.75*	*117.82*	*117.93*
STATION	5+000	5+020	5+040	5+060	5+080	5+100	5+120	5+140	5+160	5+180	5+200	5+220	5+240	5+260	5+280	5+300	5+320	5+340	5+360	



PROPOSED GRADE	117.93	118.10	118.26	118.42	118.59	118.75	118.95	119.15	119.35	119.55	119.75	119.95	120.00	120.14	120.32	120.50	120.58	120.66	120.74	120.87
EXISTING BOTTOM	*117.83*	*118.11*	*118.20*	*118.45*	*118.59*	*118.74*	*119.00*	*119.24*	*119.36*	*119.50*	*119.72*	*119.91*		*120.31*	*120.63*	*120.66*	*120.57*	*120.73*	*121.29*	*120.84*
STATION	5+360	5+380	5+400	5+420	5+440	5+460	5+480	5+500	5+520	5+540	5+560	5+580		5+600	5+620	5+640	5+660	5+680	5+700	5+720

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23/08/11
PROVINCE OF ONTARIO

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SCALES
5 0 10
HORIZONTAL
0.5 0 1
VERTICAL

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(613) 592-6060 rcii.com

DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

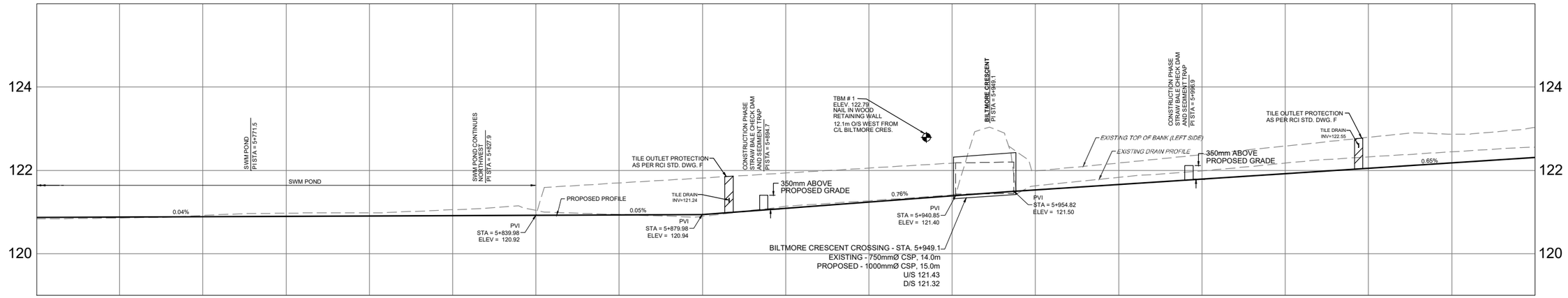
CITY OF OTTAWA

SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH AND BRANCH 3

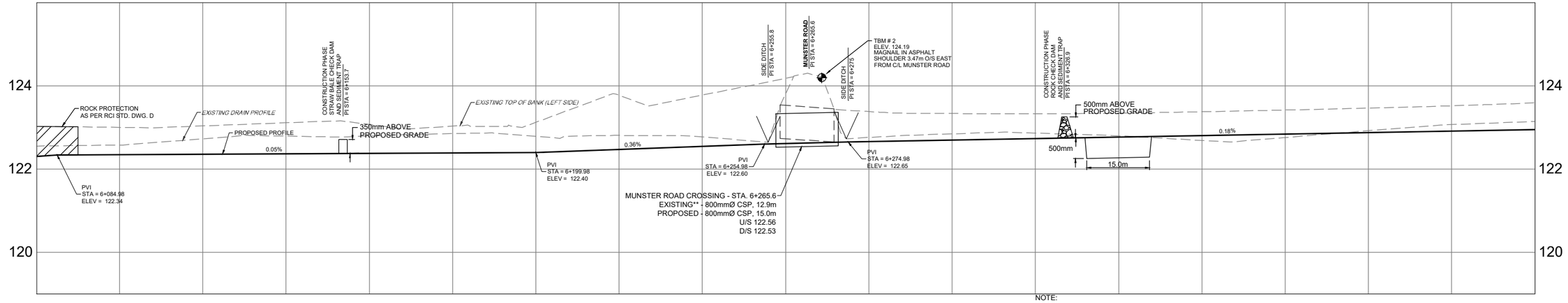
DRAIN PROFILE
STA. 5+000 TO STA. 5+720
BILTMORE BRANCH

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	19060-P4

SIMPSON MUNICIPAL DRAIN - BILTMORE BRANCH



PROPOSED GRADE	120.87	120.88	120.89	120.90	120.91	120.92	120.92	120.93	120.94	121.09	121.24	121.39	121.53	121.66	121.79	121.92	122.05	122.18	122.31
EXISTING BOTTOM	*120.84*	*120.86*	*120.92*	*120.97*	*120.88*	*121.06*	*121.04*	*120.94*	*120.90*	*121.14*	*121.27*	*121.42*	*121.63*	*121.83*	*121.99*	*122.17*	*122.32*	*122.45*	*122.56*
STATION	5+720	5+740	5+760	5+780	5+800	5+820	5+840	5+860	5+880	5+900	5+920	5+940	5+960	5+980	6+000	6+020	6+040	6+060	6+080



PROPOSED GRADE	122.31	122.35	122.36	122.37	122.38	122.39	122.40	122.47	122.55	122.61	122.66	122.70	122.73	122.77	122.80	122.84	122.88	122.91	122.95
EXISTING BOTTOM	*122.55*	*122.58*	*122.73*	*122.79*	*122.80*	*122.85*	*122.79*	*122.61*	*122.77*	*123.81*	*122.78*	*122.85*	*123.07*	*122.80*	*122.69*	*122.78*	*122.92*	*123.07*	*123.14*
STATION	6+080	6+100	6+120	6+140	6+160	6+180	6+200	6+220	6+240	6+260	6+280	6+300	6+320	6+340	6+360	6+380	6+400	6+420	6+440

NOTE:

EXISTING CULVERTS DENOTED WITH (**) ARE UNDERSIZED AND/OR OFF GRADE BUT WITHIN ACCEPTABLE TOLERANCES AND AS SUCH MAY REMAIN UNTIL SUCH TIME AS THEY ARE REQUIRED TO BE REPLACED (POOR CONDITION) UNDER FUTURE MAINTENANCE OR OTHERWISE AT THE DISCRETION OF THE DRAINAGE SUPERINTENDENT.

NOT FOR CONSTRUCTION

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PROVINCE OF ONTARIO

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5 0 10
HORIZONTAL
0.5 0 1
VERTICAL

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DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

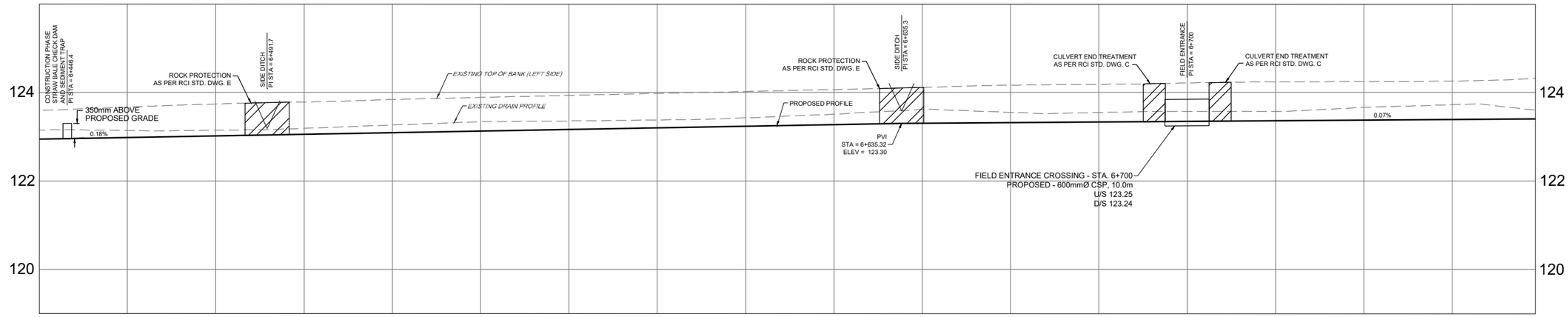
CITY OF OTTAWA

SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH AND BRANCH 3

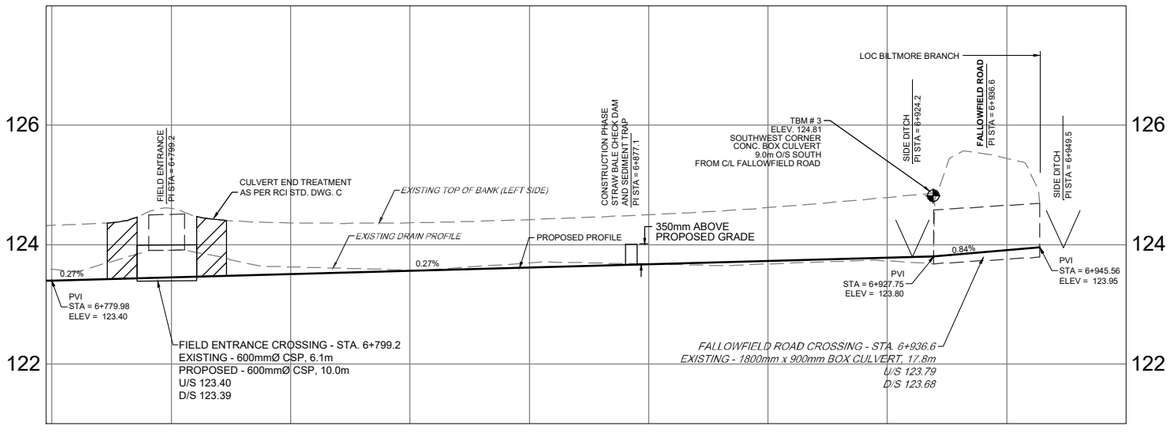
DRAIN PROFILE
STA. 5+720 TO STA. 6+440
BILTMORE BRANCH

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	19060-P5

SIMPSON MUNICIPAL DRAIN - BILTMORE BRANCH



STATION	PROPOSED GRADE	EXISTING BOTTOM
6+440	122.95	123.14
6+460	122.98	123.14
6+480	123.02	123.15
6+500	123.06	123.19
6+520	123.09	123.26
6+540	123.13	123.34
6+560	123.16	123.36
6+580	123.20	123.39
6+600	123.24	123.43
6+620	123.27	123.51
6+640	123.30	123.61
6+660	123.32	123.55
6+680	123.33	123.55
6+700	123.34	123.57
6+720	123.36	123.57
6+740	123.37	123.60
6+760	123.39	123.72



STATION	PROPOSED GRADE	EXISTING BOTTOM
6+780	123.40	123.56
6+800	123.45	123.91
6+820	123.51	123.63
6+840	123.56	123.57
6+860	123.62	123.69
6+880	123.67	123.67
6+900	123.72	123.68
6+920	123.78	123.73
6+940	123.90	125.44
6+960		

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Name: L. FRANKLIN
Number: 100501335
Limitations: Providing plans, non-technical content of reports and other non-technical advice for submission under the Ontario Drainage Act.
Association of Professional Engineers of Ontario

SCALES
5 0 10
HORIZONTAL
0.5 0 1
VERTICAL

Robinson Consultants
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF OTTAWA

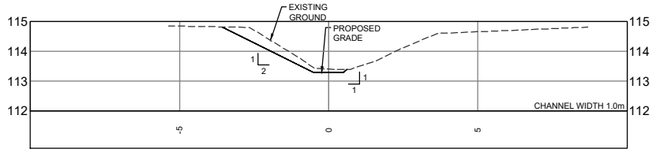
SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH AND BRANCH 3

DRAIN PROFILE
STA. 6+440 TO STA. 6+960
BILTMORE BRANCH

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	19060-P6

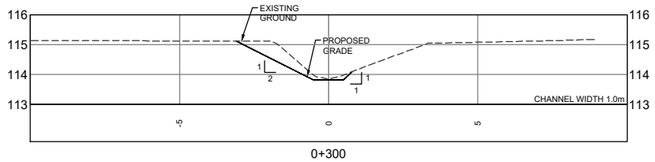
SIMPSON MUNICIPAL DRAIN - BRANCH 3

TYPICAL SECTION
STA. 0+000 TO STA. 0+150



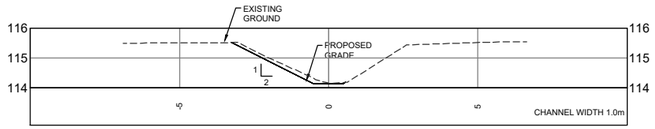
0+100

TYPICAL SECTION
STA. 0+150 TO STA. 0+350



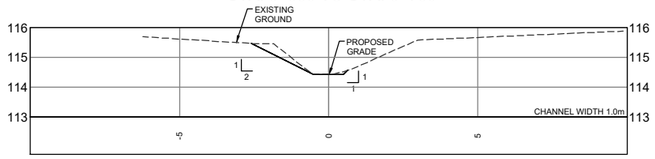
0+300

TYPICAL SECTION
STA. 0+350 TO STA. 0+550



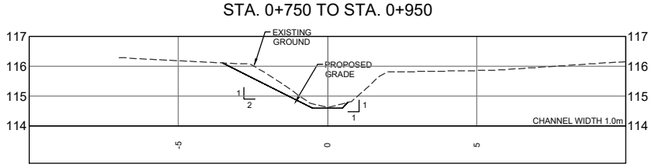
0+500

TYPICAL SECTION
STA. 0+550 TO STA. 0+750



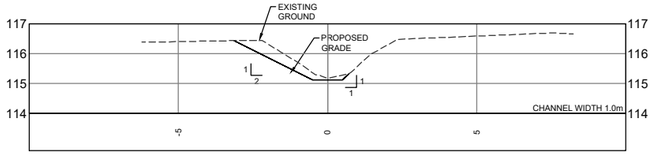
0+700

TYPICAL SECTION
STA. 0+750 TO STA. 0+950



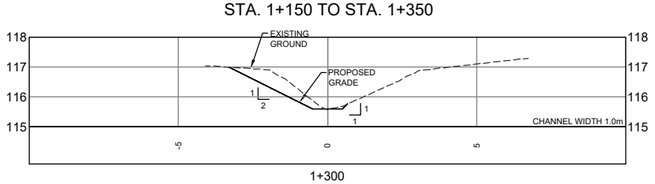
0+900

TYPICAL SECTION
STA. 0+950 TO STA. 1+150



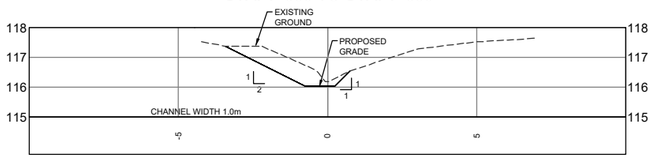
1+100

TYPICAL SECTION
STA. 1+150 TO STA. 1+350



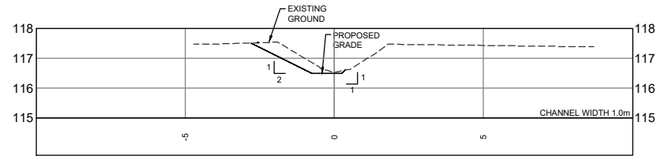
1+300

TYPICAL SECTION
STA. 1+350 TO STA. 1+550



1+500

TYPICAL SECTION
STA. 1+550 TO STA. 1+746.16
LOC BR3 / BILTMORE BR.



1+700

NOTE: THE CONSTRUCTION WORKING SPACE IS DEFINED IN SP1.0 -WORKING SPACE AND SP3.1 EXCAVATION OF THE ENGINEER'S REPORT. IT IS THE INTENTION OF THE ENGINEER TO COMPLETE WORK FROM THE LEFT (NORTH/WEST) SIDE OF THE DRAIN. THE WORKING SPACE WILL VARY FOR FUTURE MAINTENANCE

NOT FOR CONSTRUCTION

No.	DATE dd.mm.yy	REVISION	BY
1	15.06.22	ISSUED FOR CITY REVIEW	AJR
2	28.10.22	ISSUED FOR CITY REVIEW 2	AJR
3	11.11.22	ISSUED FOR AGENCY REVIEW	AJR
4	28.04.23	ISSUED FOR CITY REVIEW 3	AJR
5	11.08.23	ISSUED FOR DISTRIBUTION	AJR

REGISTERED PROFESSIONAL ENGINEER
A. J. ROBINSON
23/08/11
PROVINCE OF ONTARIO

Professional Engineers Ontario
23/08/11
Licensed Engineering Technologist
Name: L. FRANKLIN
Number: 100501335
Limitations: Providing plans, non-technical content of reports and other non-technical advice for submission under the Ontario Drainage Act.
Association of Professional Engineers of Ontario

SCALES
1 0 2
HORIZONTAL
1 0 2
VERTICAL

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Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF OTTAWA

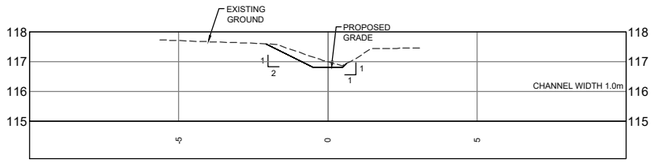
SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH AND BRANCH 3

CROSS-SECTIONS
BRANCH 3

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	19060-C1

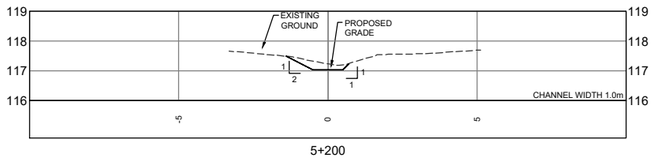
SIMPSON MUNICIPAL DRAIN - BILTMORE BRANCH

TYPICAL SECTION
STA. 5+000 TO STA. 5+150



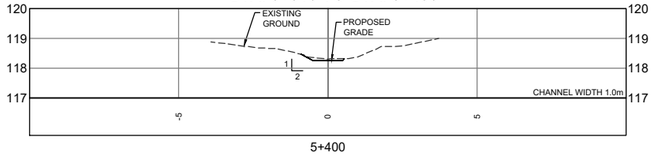
5+100

TYPICAL SECTION
STA. 5+150 TO STA. 5+310



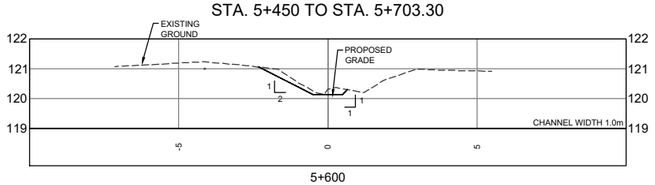
5+200

TYPICAL SECTION
STA. 5+310 TO STA. 5+450



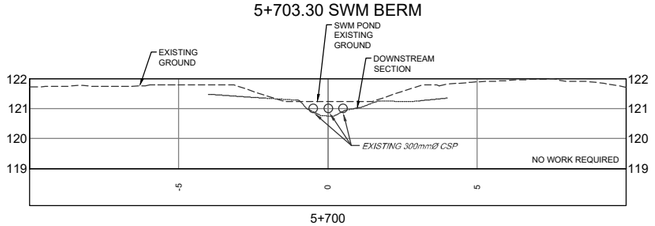
5+400

TYPICAL SECTION
STA. 5+450 TO STA. 5+703.30



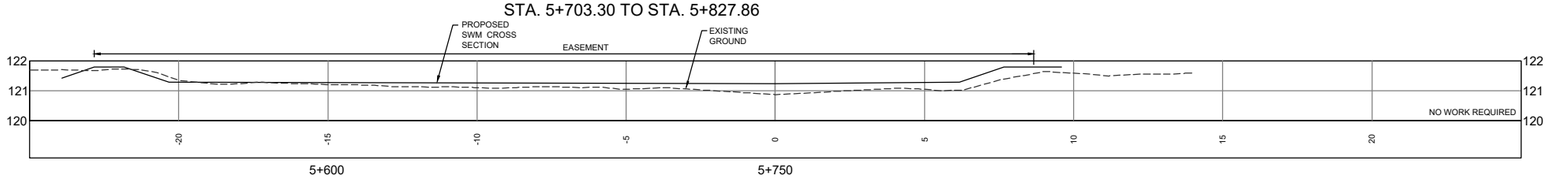
5+600

5+703.30 SWM BERM



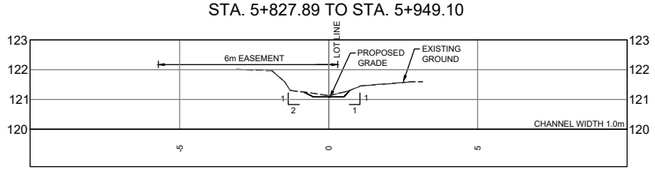
5+700

TYPICAL SECTION (WITHIN EXISTING SWM FACILITY)
STA. 5+703.30 TO STA. 5+827.86



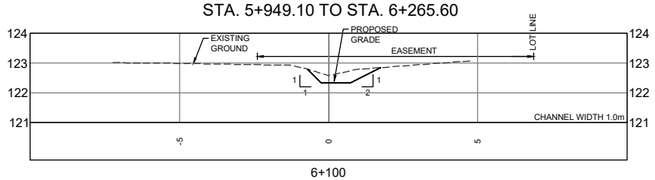
5+600 5+750

TYPICAL SECTION
STA. 5+827.89 TO STA. 5+949.10



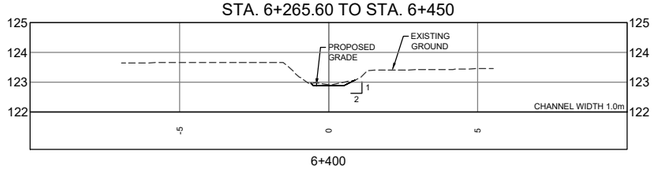
5+900

TYPICAL SECTION
STA. 5+949.10 TO STA. 6+265.60



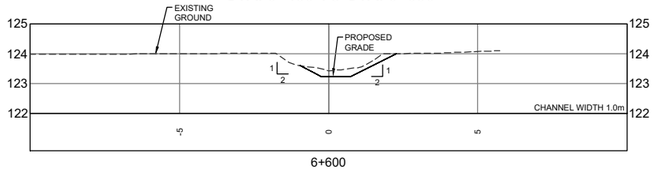
6+100

TYPICAL SECTION
STA. 6+265.60 TO STA. 6+450



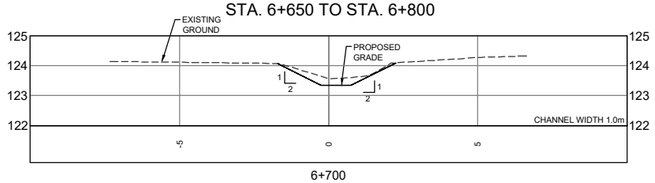
6+400

TYPICAL SECTION
STA. 6+450 TO STA. 6+650



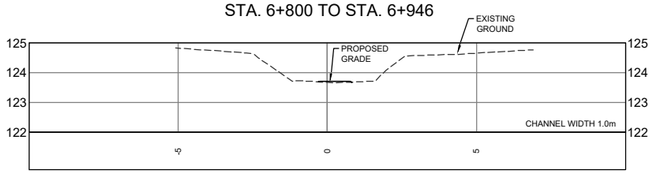
6+600

TYPICAL SECTION
STA. 6+650 TO STA. 6+800



6+700

TYPICAL SECTION
STA. 6+800 TO STA. 6+946



6+900

NOTE: THE CONSTRUCTION WORKING SPACE IS DEFINED IN SP1.0 -WORKING SPACE AND SP3.1 EXCAVATION OF THE ENGINEER'S REPORT. IT IS THE INTENTION OF THE ENGINEER TO COMPLETE WORK FROM THE LEFT (NORTH/WEST) SIDE OF THE DRAIN FROM STATION 5+000.00 TO STATION 5+949.10 AND FROM THE RIGHT (SOUTH/EAST) SIDE OF THE DRAIN FROM STATION 5+949.10 TO STATION 6+946.00. THE WORKING SPACE WILL VARY FOR FUTURE MAINTENANCE

OUTLET STRUCTURE FOR

SWM FACILITY DETAILS - SOURCE:

Site and Grading Plan R6
Biltmore Estates Ltd.
Trow Consulting Engineers Ltd.
July 13, 2001

NOT FOR CONSTRUCTION

No.	DATE dd.mm.yy	REVISION	BY
1	15.06.22	ISSUED FOR CITY REVIEW	AJR
2	28.10.22	ISSUED FOR CITY REVIEW 2	AJR
3	11.11.22	ISSUED FOR AGENCY REVIEW	AJR
4	28.04.23	ISSUED FOR CITY REVIEW 3	AJR
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REGISTERED PROFESSIONAL ENGINEER A. J. ROBINSON 23/08/11 PROVINCE OF ONTARIO

Professional Engineers Ontario
Licensed Engineering Technologist
23/08/11
Name: L. FRANKLIN
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SCALES
1 0 2
HORIZONTAL
1 0 2
VERTICAL

Robinson Consultants
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

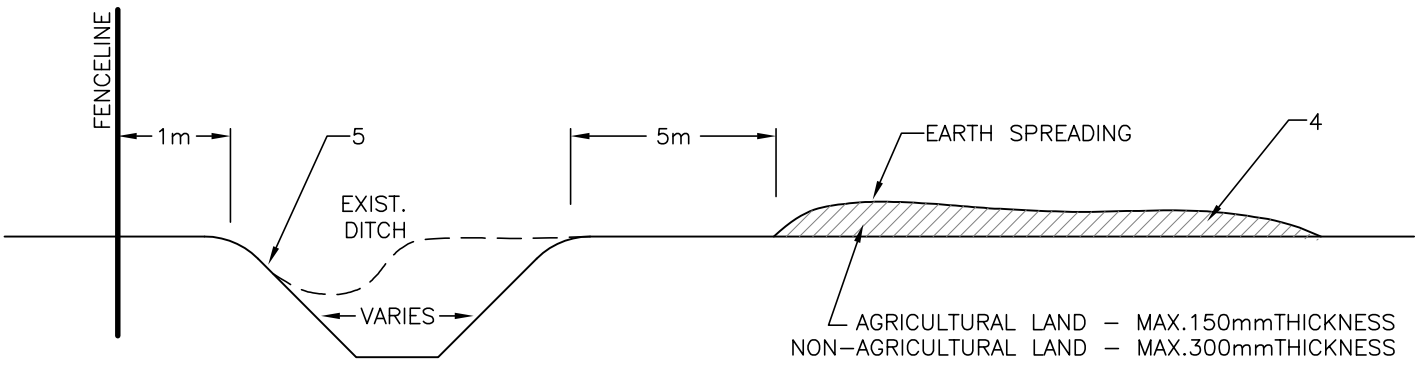
DESIGN	LF
CHECKED	AJR
DRAWN	JHB
CHECKED	LF
APPROVED	AJR

CITY OF OTTAWA

SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH AND BRANCH 3

CROSS-SECTIONS
BILTMORE BRANCH

PROJECT No.	19060
CONTRACT No.	
DATED	AUG 2023
DWG. No:	19060-C2



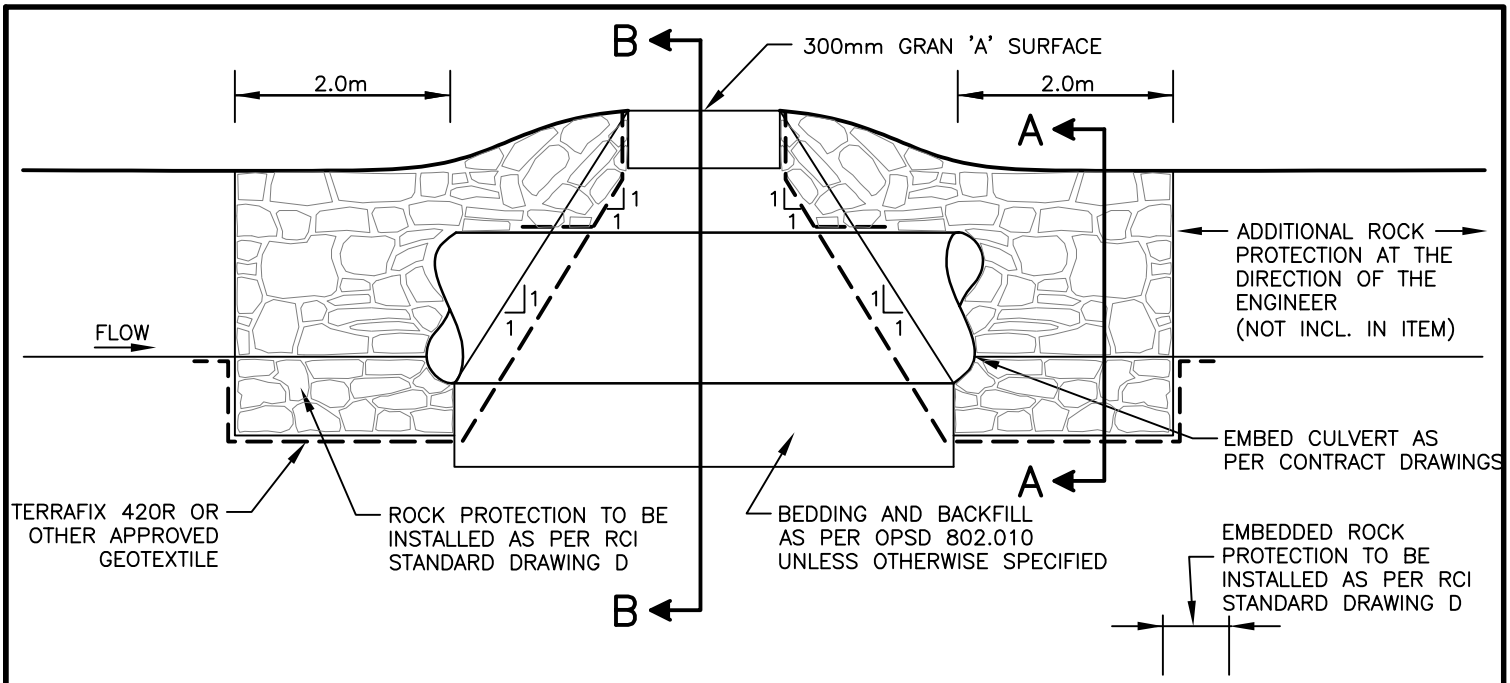
NOTES:

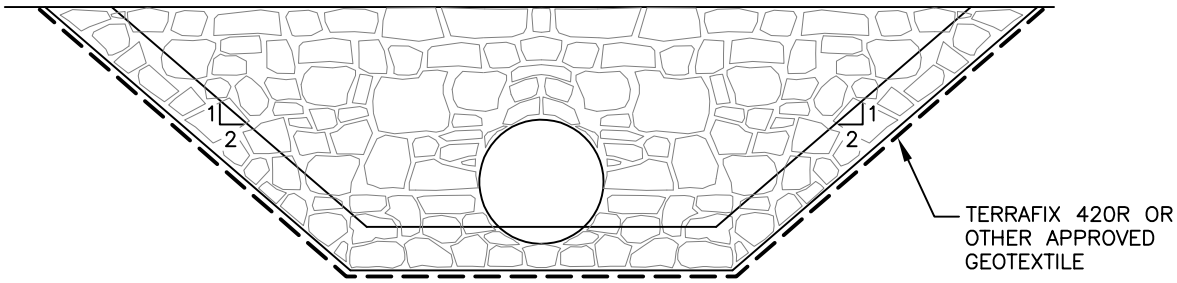
1. NO EXCAVATION WITHIN 1 METRE OF EXISTING FENCELINE.
2. SIDE SLOPES AND CHANNEL DIMENSIONS AS PER CONTRACT DRAWINGS.
3. NO SPOIL OR SPREADING WITHIN 5 METRES OF TOP OF BANK.
4. SPOIL THICKNESS, WIDTH, DRAINAGE OPENINGS AND SPREADING LOCATION AS NOTED IN THE SPECIAL PROVISIONS OR THE CONTRACT DOCUMENTS.
5. WHERE ONE–SIDED CONSTRUCTION IS SPECIFIED, THE EXISTING GRASSED SLOPE SHALL BE PRESERVED WHERE POSSIBLE.
6. SEEDING TO BE COMPLETED WITHIN 48 HOURS OF CONSTRUCTION.

DATED: FEB/21

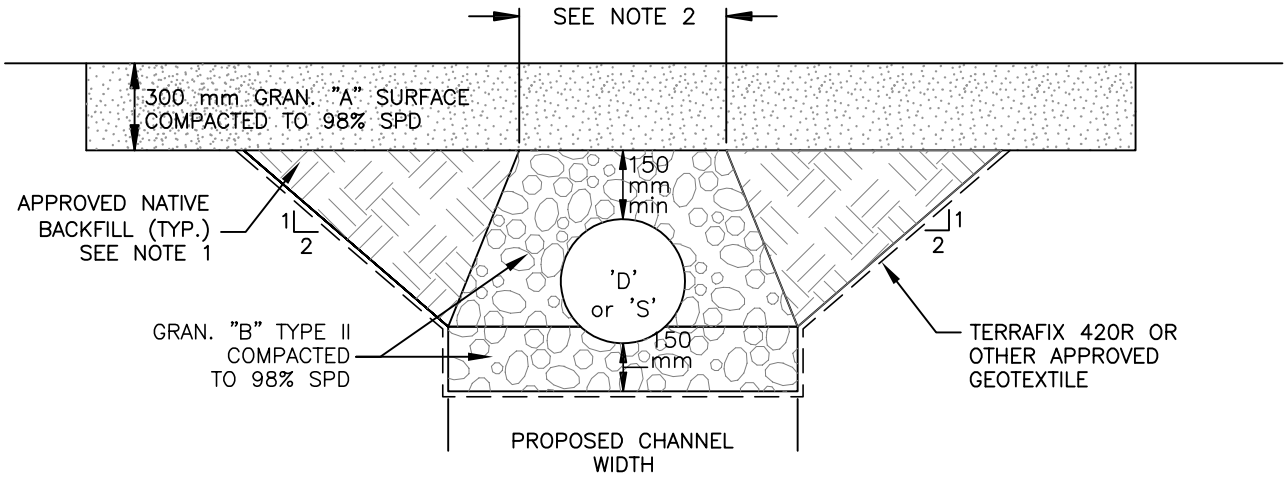
Robinson Consultants
CONSULTING ENGINEERS
350 Palladium Dr.,Suite 210
Kanata, Ontario, K2V 1A8
Telephone (613) 592–6060

SCALE	MUNICIPAL DRAIN	PROJECT NO.
HORIZONTAL N.T.S.	OPEN CHANNEL SYSTEMS EARTH CUT CHANNEL	STD.DWG.No. A
VERTICAL N.T.S.		





END SECTION A–A



SECTION B–B

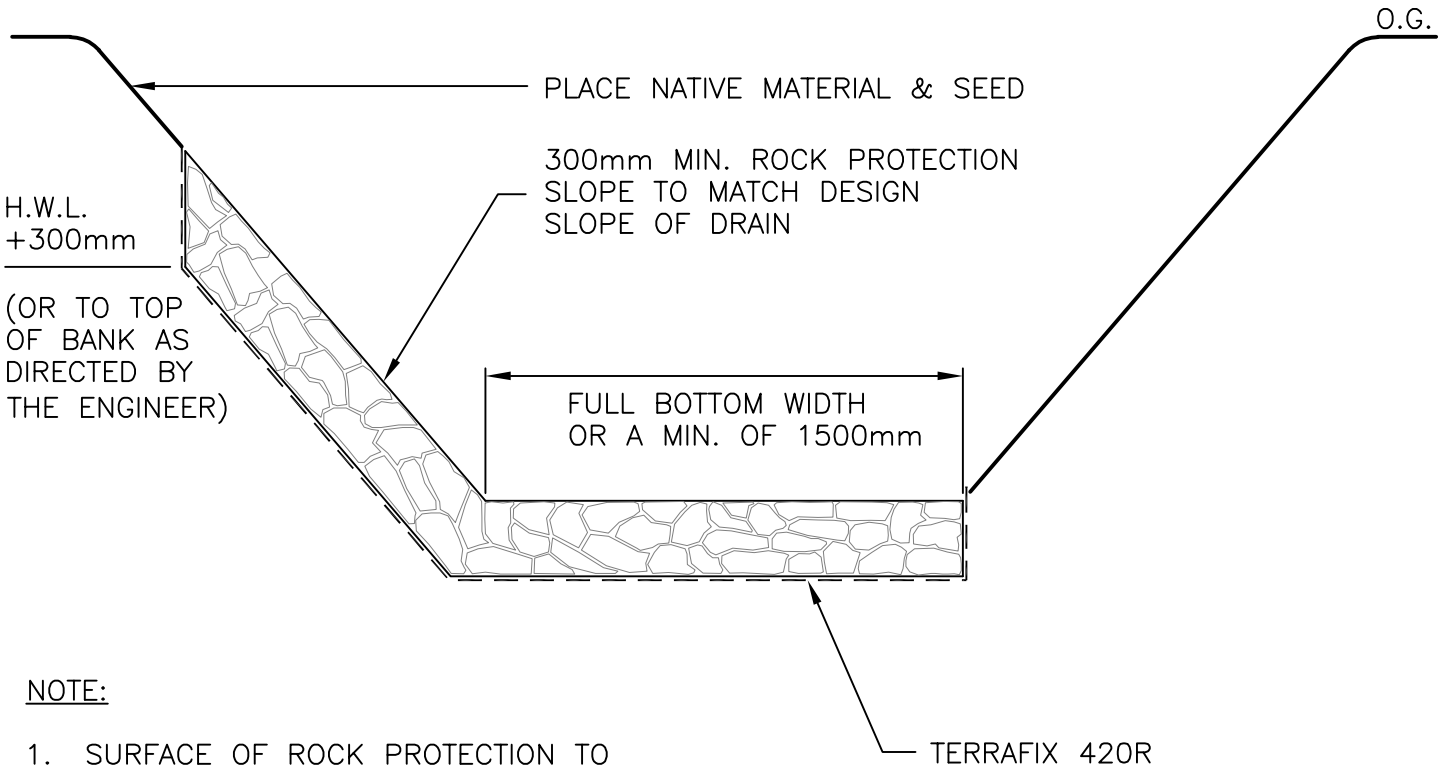
NOTES:

1. "Approved Native Backfill" material may consist of dry clay, sand or granular material with no large stones, boulders, debris, or organic material. Backfill must be placed in lifts not exceeding 300mm thick and compacted. All requirements for granular bedding, cover and surface course must be met prior to placing any backfill.
2. For circular culverts, the top–width of cover material shall be a minimum of the diameter of the pipe ('D') plus 0.5 x 'D' each way for a total of 2.0 x 'D'. For arch culverts, the top–width of cover material shall be a minimum of the span of the pipe ('S') plus 0.75 x 'S' each way for a total of 2.5 x 'S'. The minimum bottom width shall conform with the proposed channel width upstream/downstream of the culvert.
3. Follow manufacturers installation instructions for all pipes.

DATED: FEB/22

Robinson Consultants
CONSULTING ENGINEERS
350 Palladium Dr.,Suite 210
Kanata, Ontario, K2V 1A8
Telephone (613) 592–6060

SCALE	MUNICIPAL DRAIN	PROJECT NO.
HORIZONTAL N.T.S.	STANDARD FARM CROSSING AND CULVERT END TREATMENT DETAIL	STD.DWG.No. C
VERTICAL N.T.S.		



NOTE:

1. SURFACE OF ROCK PROTECTION TO BE FLUSH WITH FINISHED SURFACE OF DRAIN UPSTREAM AND DOWNSTREAM OF THE EROSION CONTROL. MIN. SIDE SLOPE IS 1 VERT TO 1 HOR. OR AS SPECIFIED IN ENGINEER'S REPORT OR THE CONTRACT DRAWINGS.

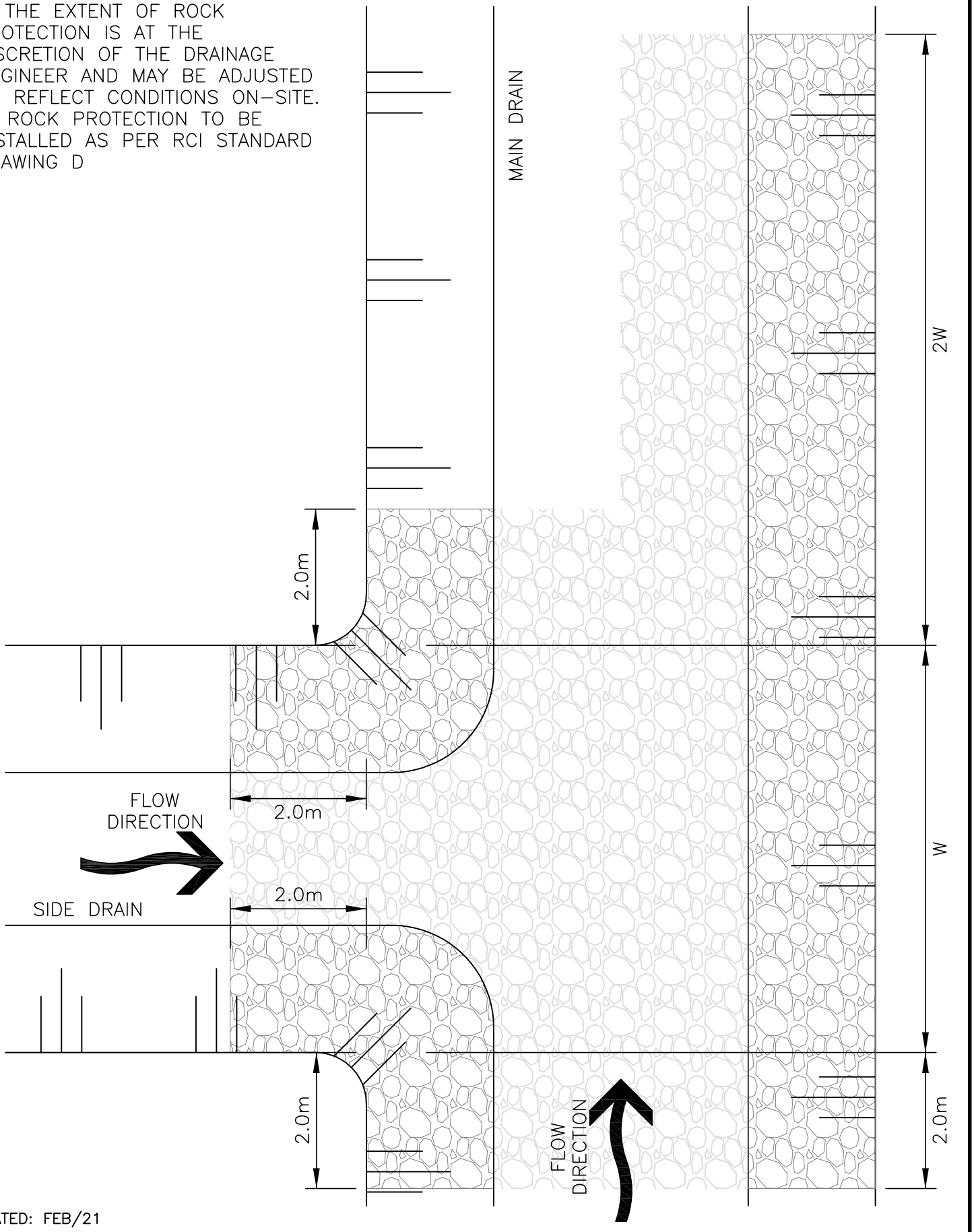
2. FOR ROCK PROTECTION, USE R–50 AS PER OPSS 1004.05.05.02 OR ROCK PROTECTION AS PER OPSS 1004.05.05.03.

DATED: FEB/21

Robinson Consultants
CONSULTING ENGINEERS
350 Palladium Dr.,Suite 210
Kanata, Ontario, K2V 1A8
Telephone (613) 592–6060

SCALE	MUNICIPAL DRAIN	PROJECT NO.
HORIZONTAL N.T.S.	TYPICAL ROCK PROTECTION EROSION CONTROL	STD.DWG.No. D
VERTICAL N.T.S.		

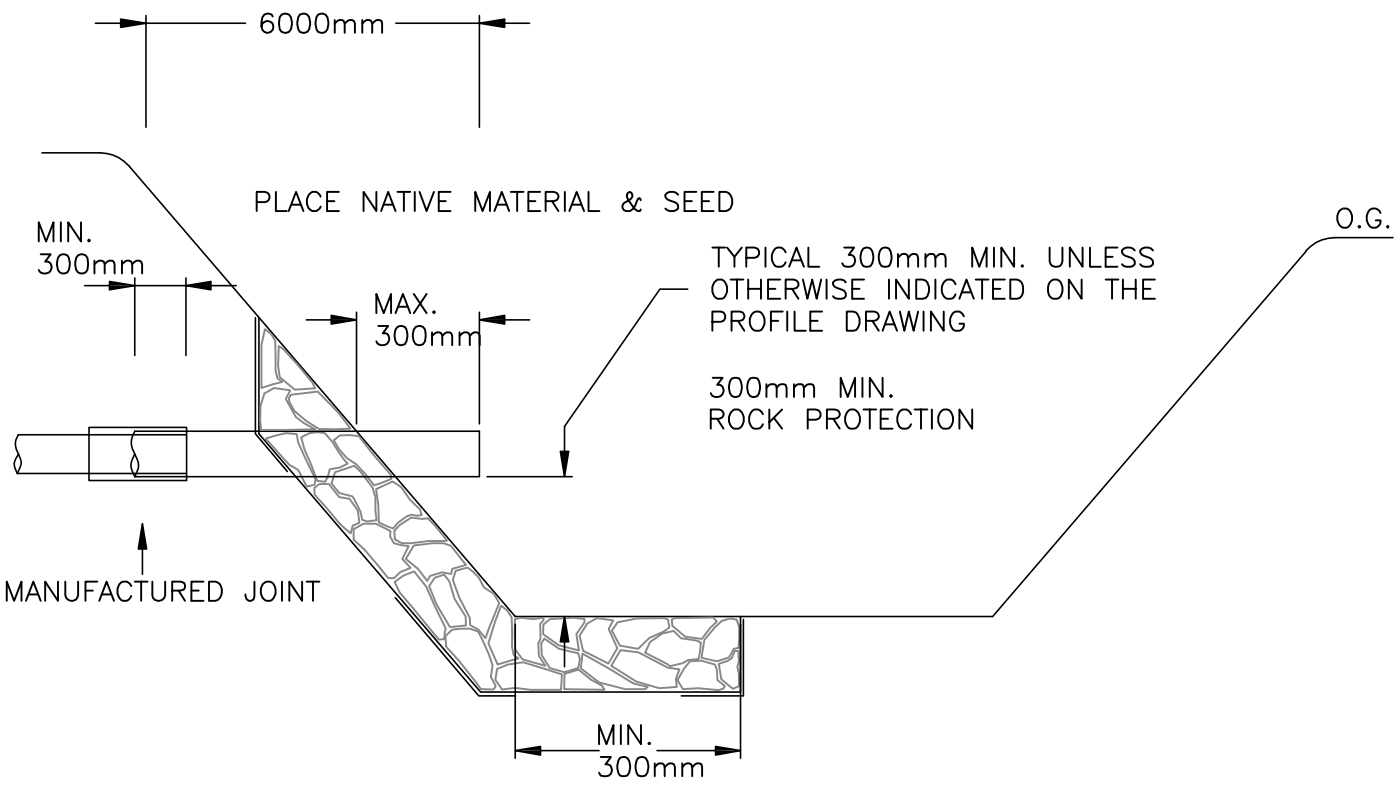
NOTE:
1. THE EXTENT OF ROCK PROTECTION IS AT THE DISCRETION OF THE DRAINAGE ENGINEER AND MAY BE ADJUSTED TO REFLECT CONDITIONS ON–SITE.
2. ROCK PROTECTION TO BE INSTALLED AS PER RCI STANDARD DRAWING D



DATED: FEB/21

Robinson Consultants CONSULTING ENGINEERS 350 Palladium Dr.,Suite 210 Kanata, Ontario, K2V 1A8 Telephone (613) 592–6060	SCALE HORIZONTAL N.T.S. VERTICAL N.T.S.	MUNICIPAL DRAIN STANDARD SIDE DITCH ROCK PROTECTION	PROJECT NO. STD.DWG.No. E

TILE OUTLET



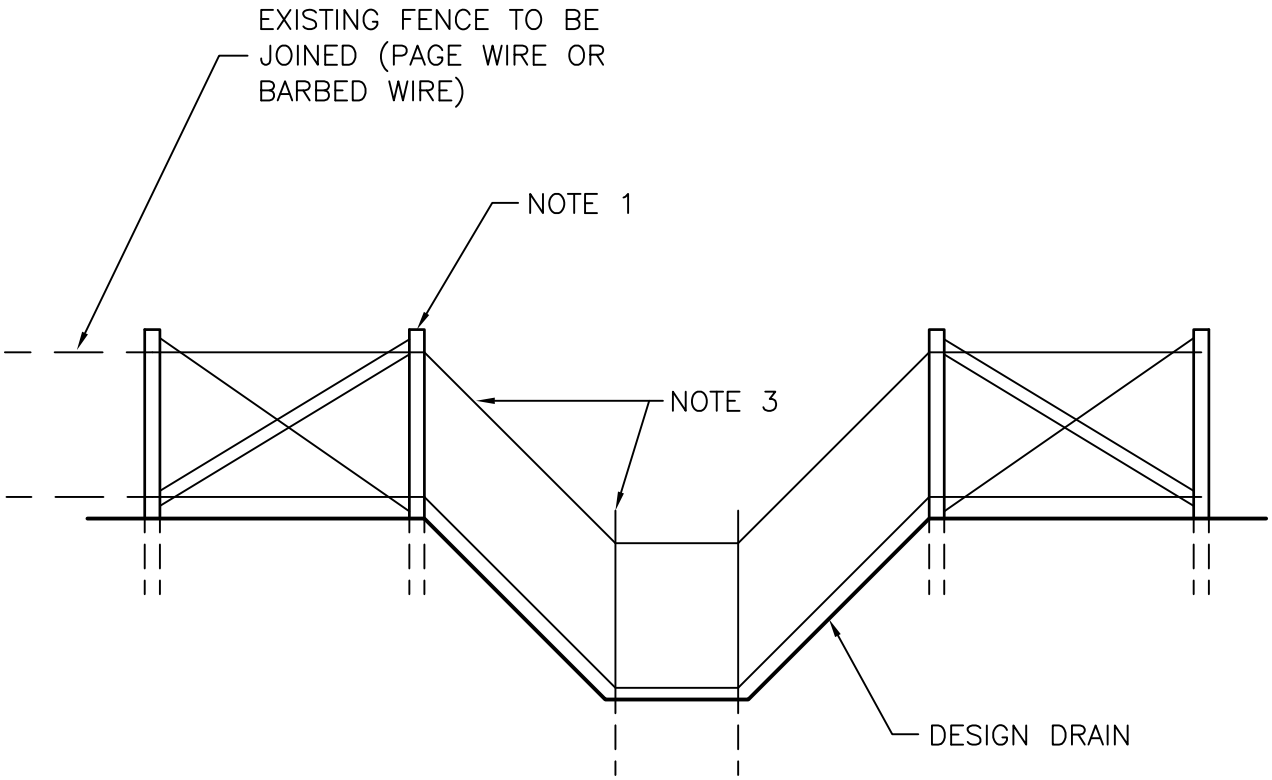
NOTES:

1. OUTLET TO BE CONTINUOUS HDPE (SMOOTHWALL – MIN. STIFFNESS OF 320KPa) AND A MIN. LENGTH OF 8.0m
2. ROCK PROTECTION TO BE PLACED AS REQUIRED TO PREVENT EROSION. THE SURFACE TO BE FLUSH WITH THE STREAM BED AND BANK. ROCK PROTECTION TO EXTEND A MINIMUM OF 1000mm UPSTREAM AND 1000mm DOWNSTREAM OF THE TILE OUTLET
3. THE PREFERRED CONNECTION BETWEEN THE OUTLET AND THE FIELD TILE IS TO BE A LOCKING MANUFACTURED JOINT, OTHER METHODOLOGY INCLUDES A TAPE SEALED JOINT ENCASED IN CONCRETE OR OVERLAP JOINT (MIN. 300mm) ENCASED IN CONCRETE.
4. A RODENT GRATE IS TO BE INSTALLED AT THE END OF THE TILE OUTLET
5. MIN. SIDE SLOPE IS 1 VERT TO 2 HOR OR AS SPECIFIC IN THE ENGINEER'S REPORT
6. FOR ROCK PROTECTION, USE R–50 RIP–RAP AS PER OPSS MUNI 1004.05.05.02

DATED: JUL/22

Robinson Consultants
CONSULTING ENGINEERS
350 Palladium Dr.,Suite 210
Kanata, Ontario, K2V 1A8
Telephone (613) 592–6060

SCALE	MUNICIPAL DRAIN	PROJECT NO.
HORIZONTAL N.T.S.		
VERTICAL N.T.S.	STANDARD TILE OUTLET	STD.DWG.No. F



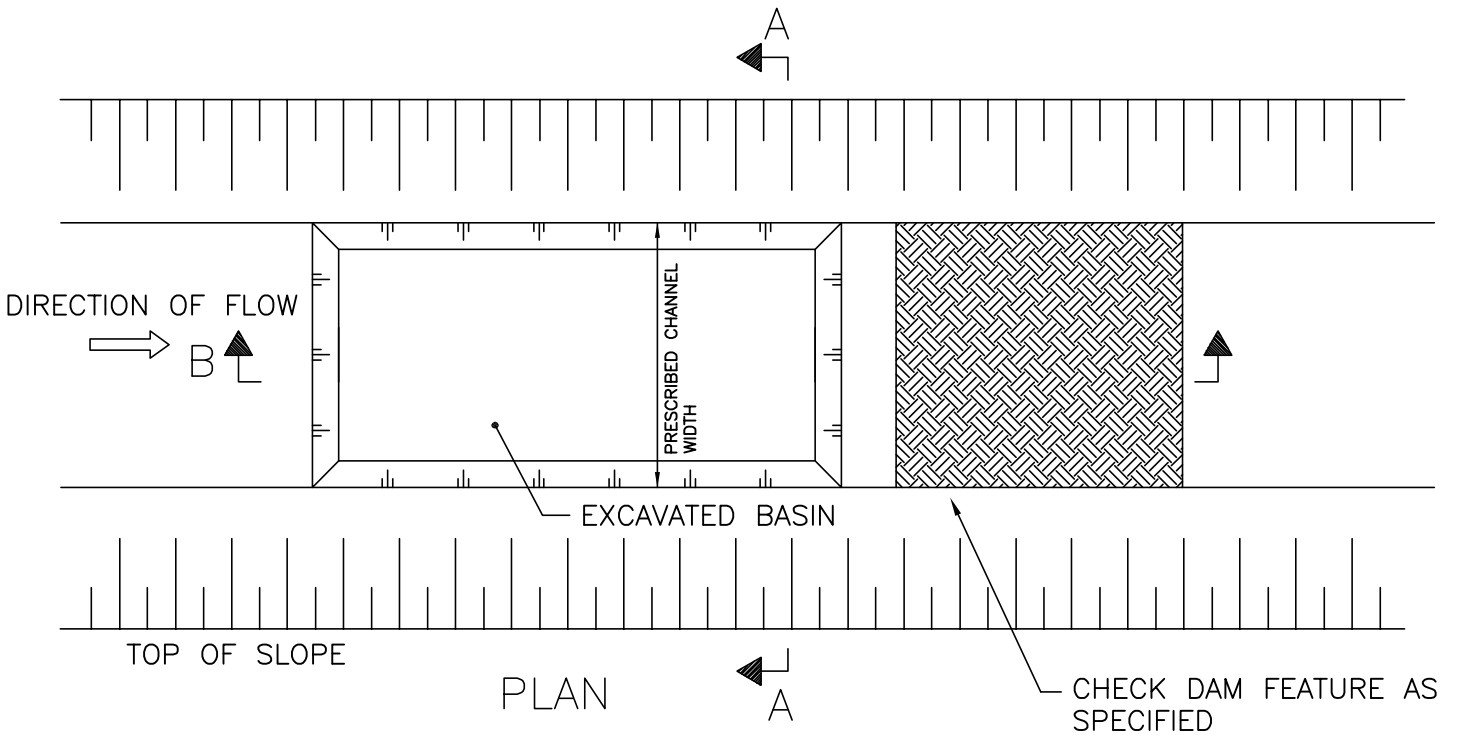
NOTES:

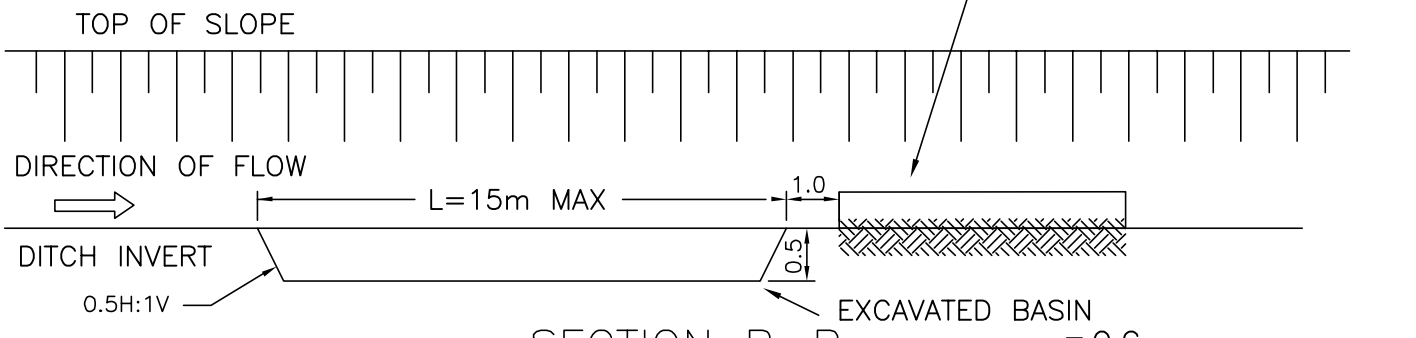
1. REFER TO OPSD DWG. No. 971.101 FOR BRACE PANEL DETAIL
2. USE OPSD 971.101 FOR REINSTATEMENT OF FENCE WHERE REQUIRED
3. T–RAILS SHALL BE NEW STEEL, MINIMUM LENGTH 2.4m.
4. CROSS–FENCE WIRE SHALL BE HEAVY GAUGE BARBED WIRE, MINIMUM 6 STRANDS AT EVEN SPACING

DATED: FEB/21

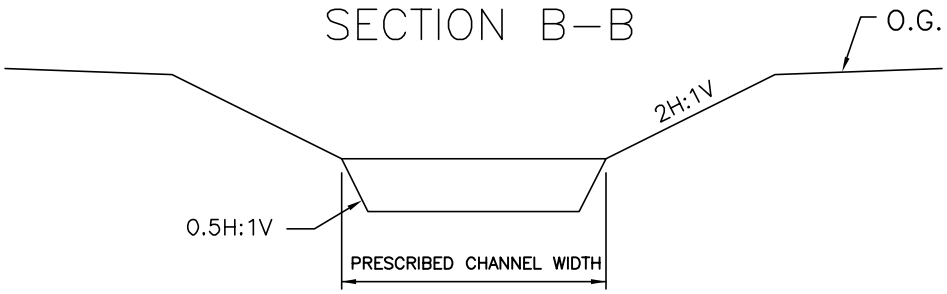
Robinson Consultants
CONSULTING ENGINEERS
350 Palladium Dr.,Suite 210
Kanata, Ontario, K2V 1A8
Telephone (613) 592–6060

SCALE	MUNICIPAL DRAIN	PROJECT NO.
HORIZONTAL N.T.S.	FENCE REINSTATEMENT AND CROSSING DETAIL	STD.DWG.No. H
VERTICAL N.T.S.		





SECTION B–B



SECTION A–A

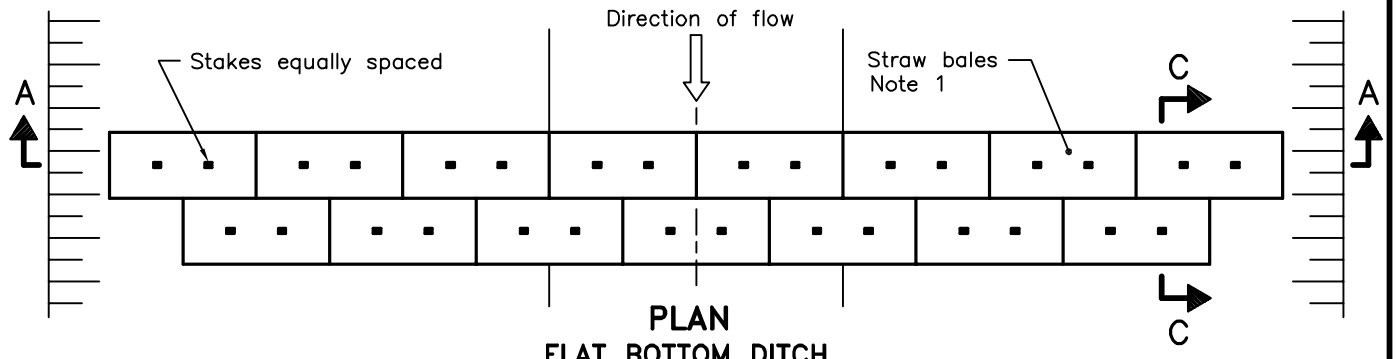
NOTES:

1. THIS DRAWING MODIFIES OPSD 219.220
2. DITCH CROSS–SECTION UPSTREAM OR DOWNSTREAM OF SEDIMENT TRAP MAY BE FLAT BOTTOM OR V–SHAPED, FLAT BOTTOM SHOWN.
3. THIS STANDARD DRAWING SHALL BE READ IN CONJUNCTION WITH OPSD 219.180 OR 219.191 OR 219.211 FOR THE SPECIFIED CHECK DAM FEATURE.
4. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.

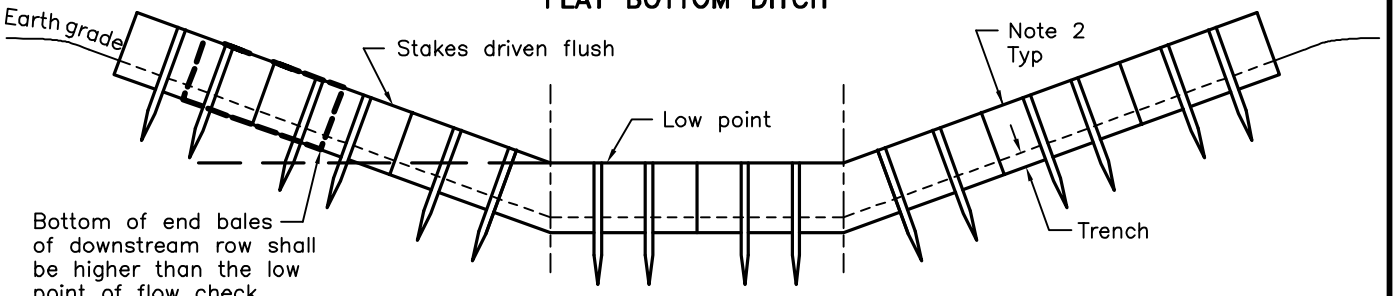
DATED: FEB/21

Robinson Consultants
CONSULTING ENGINEERS
350 Palladium Dr.,Suite 210
Kanata, Ontario, K2V 1A8
Telephone (613) 592–6060

SCALE	MUNICIPAL DRAIN	PROJECT NO.
HORIZONTAL N.T.S.		
VERTICAL N.T.S.	SEDIMENT TRAP	STD.DWG.No. 1

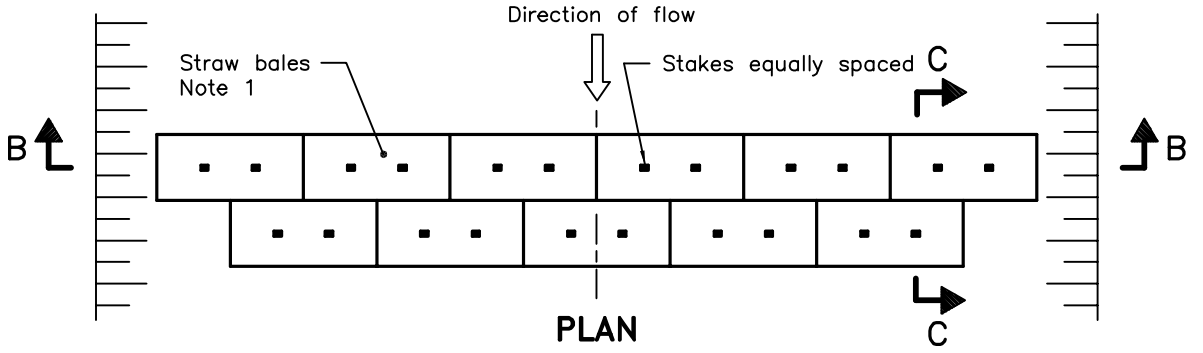


PLAN
FLAT BOTTOM DITCH

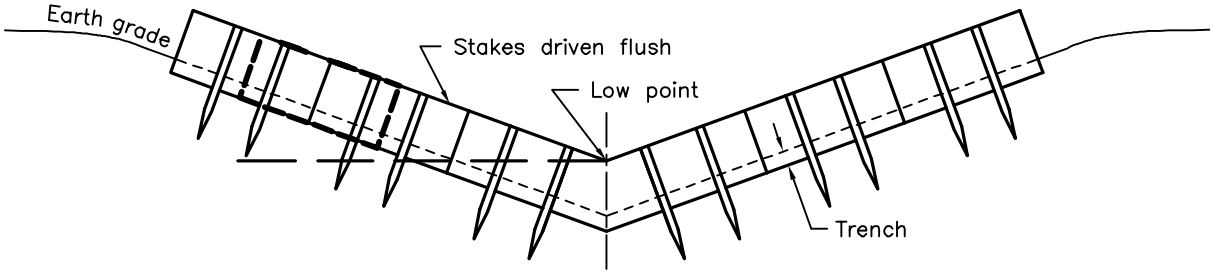


Bottom of end bales of downstream row shall be higher than the low point of flow check. Downstream bale position outlined. Typ

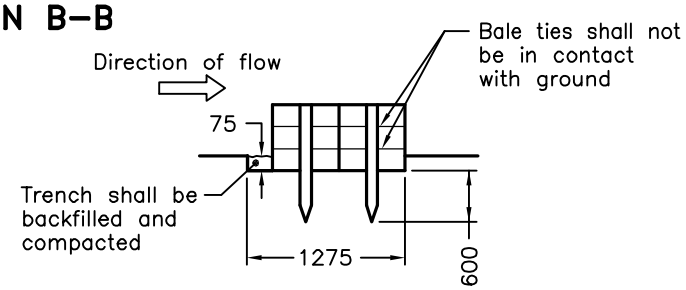
SECTION A–A



PLAN
V–DITCH



SECTION B–B



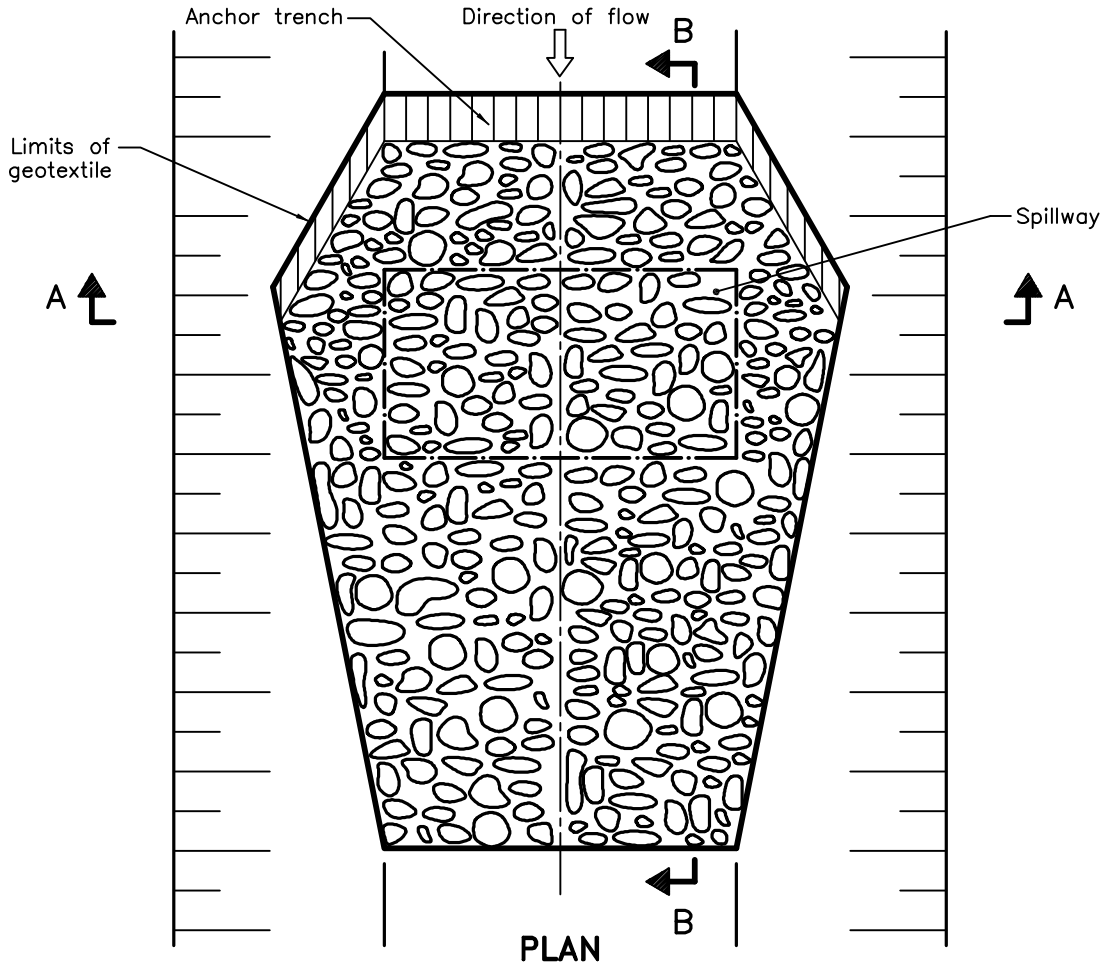
SECTION C–C

NOTES:

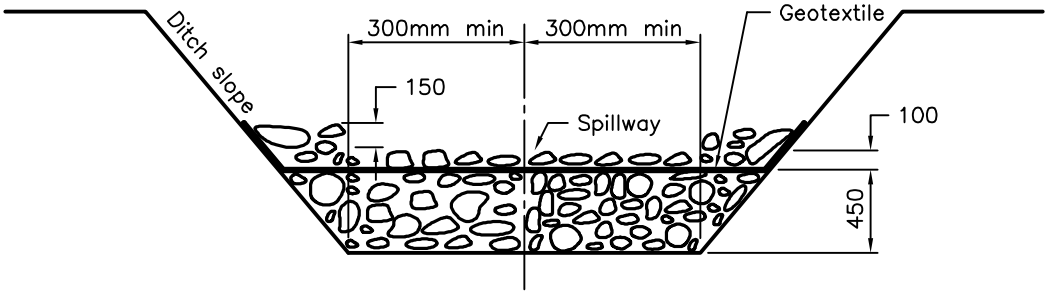
1 Number of bales varies and shall suit ditch.
2 Straw bales shall be butted tightly against adjoining bales and shaped to conform to the sides of the ditch to prevent water flow through barrier.

A All dimensions are in millimetres unless otherwise shown.

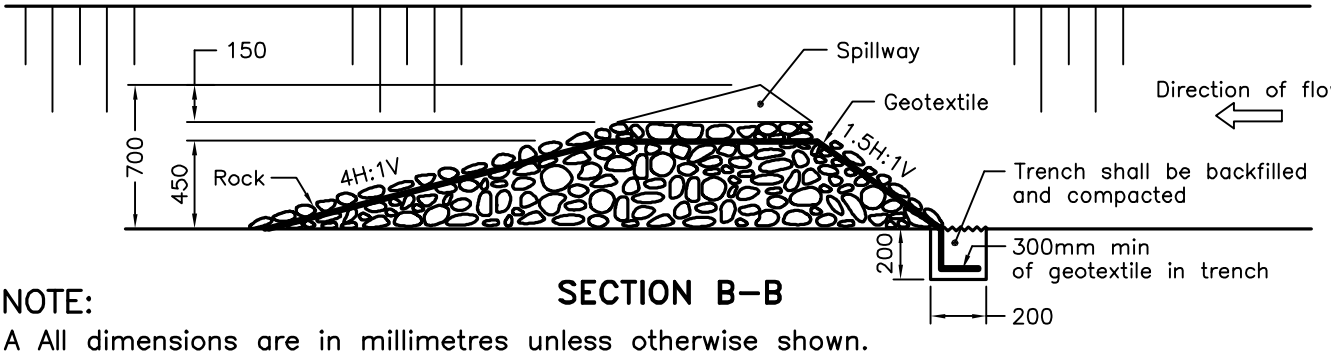
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	2
STRAW BALE FLOW CHECK DAM			
	OPSD 219.180		



PLAN
SPILLWAY



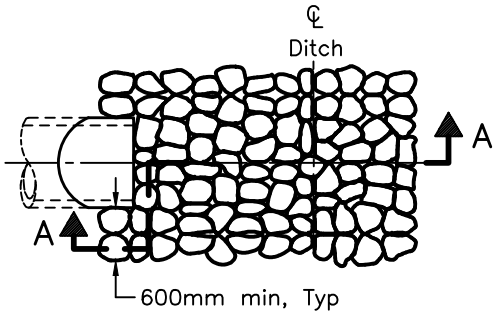
SECTION A–A



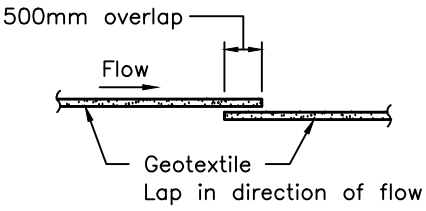
SECTION B–B

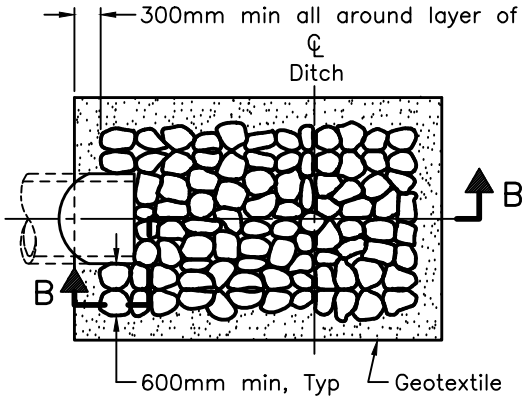
NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	2
TEMPORARY ROCK FLOW CHECK DAM FLAT BOTTOM DITCH			
			OPSD 219.211

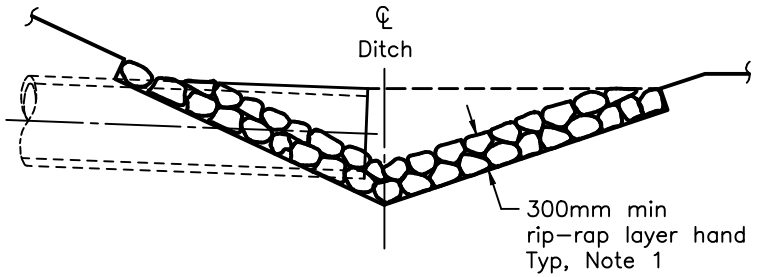


PLAN
CUT OR FILL

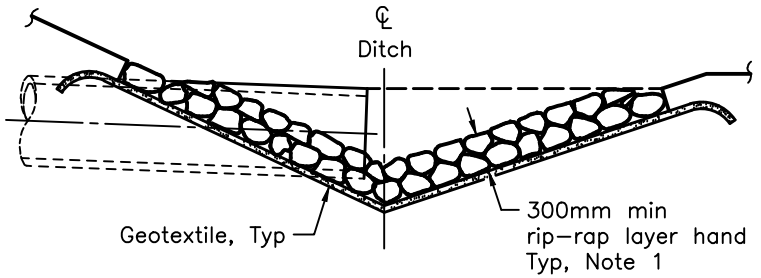




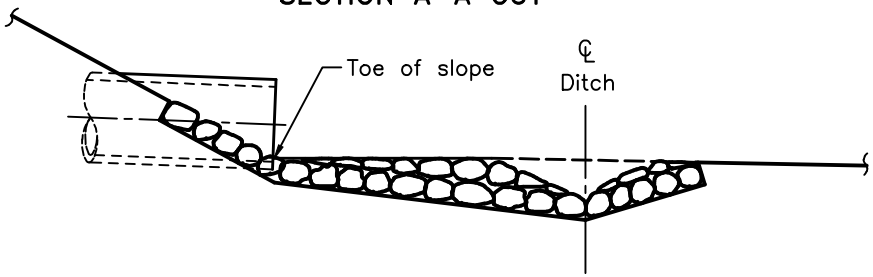
PLAN
CUT OR FILL



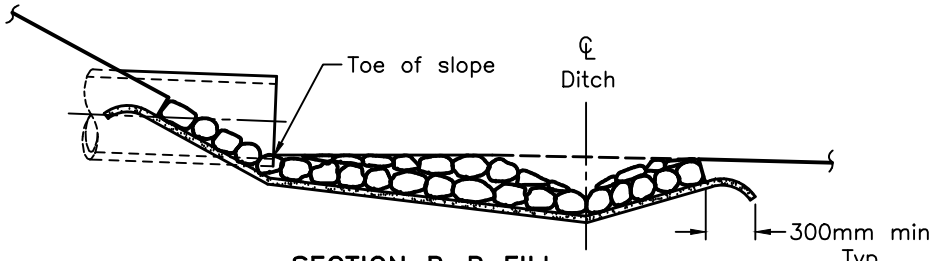
SECTION A–A CUT



SECTION B–B CUT



SECTION A–A FILL



SECTION B–B FILL

TYPE A – WITHOUT GEOTEXTILE

TYPE B – WITH GEOTEXTILE

NOTES:

1 The thickness of the rip–rap layer shall be at least 1.5 times the rip–rap mean diameter.

A All dimensions are in millimetres unless otherwise shown.

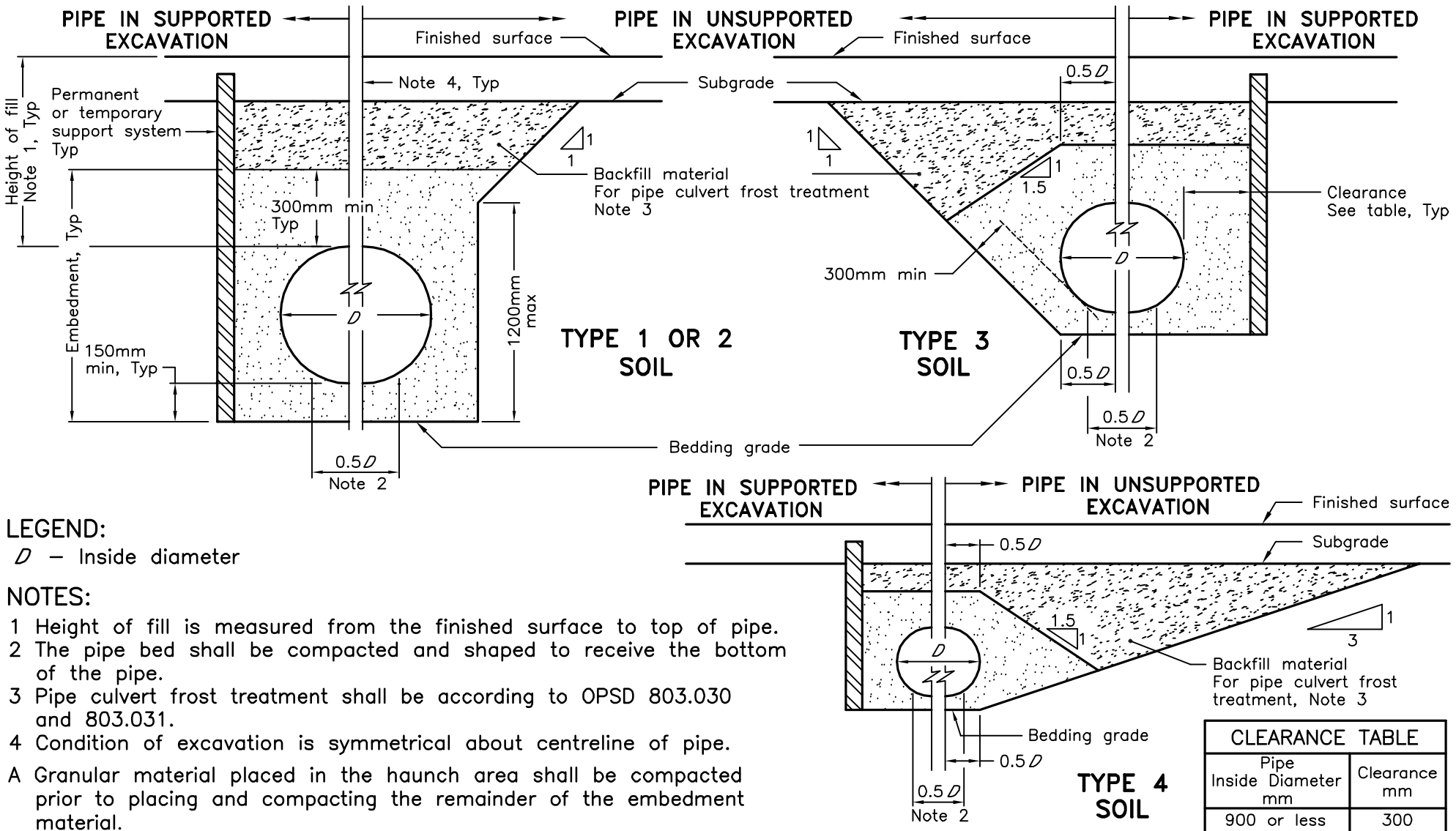
ONTARIO PROVINCIAL STANDARD DRAWING

GENERAL RIP–RAP LAYOUT FOR SEWER AND CULVERT OUTLETS

Nov 2018 | Rev 3

ONTARIO STANDARDS • MUNICIPAL – PROVINCIAL •

OPSD 810.010



LEGEND:

D – Inside diameter

NOTES:

1 Height of fill is measured from the finished surface to top of pipe.
2 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
3 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
4 Condition of excavation is symmetrical about centreline of pipe.

A Granular material placed in the haunch area shall be compacted prior to placing and compacting the remainder of the embedment material.

B Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.

C All dimensions are in metres unless otherwise shown.

CLEARANCE TABLE	
Pipe Inside Diameter mm	Clearance mm
900 or less	300
Over 900	500

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2014 | Rev 3

FLEXIBLE PIPE EMBEDMENT AND BACKFILL EARTH EXCAVATION

OPSD 802.010

Appendix B

Special Provisions

SPECIAL PROVISIONS

INDEX

SP1.0 WORKING SPACE

As per S.63(1) of the Ontario Drainage Act, R.S.O. 1990, c. D.17 (provided below) a "Working Space" must be available for the purpose of construction and future maintenance.

> 63 (1) The contractor and the contractor's assistants when engaged in the construction, maintenance, improvement, or repair of a drainage works may, with their equipment, enter upon whatever lands are necessary to complete the work within the working space designated in the engineer's report. R.S.O. 1990, c. D.17, s. 63 (1).

For the purpose of construction, the standard Working Space adjacent to the drain must be available along the side that is best suited for construction. In some sections of the drain, it may be necessary to complete construction or maintenance from both sides of the drain. The designated Working Space is set at 25 m from the top of bank and is necessary to allow construction to be carried out and excavated material to be spread. Where the "Working Space" impacts small (residential) lots, less than 2.0ha in size, the Construction Working Space is reduced to 6.0m and is understood to be in conformance with existing zoning/official plan and other regulatory set-backs. Where the "Working space impacts the "Biltmore Estates" lots, the Construction Working Space is set at 6m between Station 5+825 and 6+100 and 15m between Station 6+100 and 6+200.

For the purpose of future maintenance, the standard Working Space adjacent to the drain must be available along the side of the drain where maintenance is required (either or both sides). The designated Working Space is set at 25 m from the top of bank and is necessary to allow maintenance to be carried out and excavated material spread. Where the "Working Space" impacts small (residential) lots, less than 2.0ha in size, the Maintenance Working Space is reduced to 5.0m.

As per SP3.2 of the Engineer's Report all excavated material from small lots is to be removed off-site.

It is recommended that the working space be kept free of permanent obstructions including (but not limited to), plantings (trees), non-removable fences, structures and/or other permanent landscaping features.

Access to the Working Space for the purpose of construction, inspection or maintenance is restricted to persons prescribed under the authority of the Ontario Drainage Act, R.S.O. 1990, c. D.17 being the Drainage Engineer (or assistants) – S.12(1), the Contractor (or assistants) – S.63(1) and/or the Drainage Superintendent (or assistants) – S.95(3). Where possible (excluding emergencies) it is required that a minimum 48 hours advance notice (in writing) or direct communication with the affected property owner be provided before accessing the drain working space.

SP1.1 Alignment

The constructed channel alignment shall be in general conformity with the existing alignment and Dwg. No. 19060-A1.1. Where necessary, the alignment shall be set out by the Drainage Engineer prior to the commencement of construction on this project. The Contractor is to coordinate with the Drainage Engineer to verify the coordinate and datum information.

The centerline alignment of the Municipal Drain will be provided to the contractor for the purpose of layout. The Contractor may utilize this information as necessary (including, but not limited to, the generation of a model for the purpose of using GPS guided equipment). However, it is noted that this information should not be solely relied upon and is not intended to override the specified intent defined on the plan, profile, and cross-section information. In general, it is noted that natural meanders will occur along the Municipal Drain, which may not be fully accommodated/incorporated into the alignment provided to the Contractor or any generated model. The contractor is responsible for ensuring that excavation is completed in general conformance with the intent of the work as indicated on the plan, profile, and cross-sections.

SP2.0 CLEARING AND GRUBBING

For the purpose of construction and future maintenance, clearing and grubbing shall consist of the removal of all trees, brush, and windfalls from the following areas:

- Between the top of the North/East bank and the top of the South/West bank (bank to bank - including all material within the drain).
- The area required for machine access to allow for clean out of the drain and spreading of excavated material.
- All dead trees located near the drain that would in time fall into the drain.

When clearing is undertaken in an area of tillable land, all stumps shall be removed. In all other areas, stumps shall be cut flush with the ground.

Brush removal (grubbing) shall include the removal of brush which has grown up in previously cleared areas.

SP2.1 Disposal of Material

Property owners are advised that the Contractor will clear only those trees, which may affect its operation within the working space. All trees having a diameter of 150 mm or greater shall be cleared of limbs and cut in reasonable lengths (to a maximum of 5m) and neatly piled clear of the drain so that the wood may be salvaged by the property owners.

The Contractor and the property owner may make agreements for the removal/disposal of the wood, which would otherwise be left on the property, at a location on the property, chosen by the property owner subject to review by the Drainage Engineer.

SP2.1.1 Construction Phase

All brush, limbs, and other debris resulting from the clearing operation shall be chipped and buried beneath spread excavated materials, except in agricultural fields.

Where chipped in agricultural fields, materials are to be disposed of off-site at a location provided by the Contractor and reviewed by the Drainage Engineer (at the Contractor's expense).

Large stones, stumps, tree roots, and other debris shall be disposed of at a location on the property chosen by the property owner and reviewed by the Drainage Engineer, except in agricultural fields.

In agricultural fields, all large stones, stumps, tree roots, and other debris shall be disposed of off-site at a location provided by the Contractor and reviewed by the Drainage Engineer.

SP2.1.2 Future Maintenance Phase

All brush, limbs and other debris resulting from the clearing operation shall be chipped and buried beneath spread excavated materials, except in agricultural fields.

Where chipped in agricultural fields, material shall be disposed of off-site at a location provided by the Contractor and reviewed by the Drainage Superintendent

Large stones, stumps, tree roots, and other debris are to be disposed of at a location on the property chosen by the property owner and reviewed by the Drainage Superintendent.

SP2.2 Payment

The cost of all labor, materials, and equipment for clearing and grubbing and disposing of material as discussed herein shall be deemed to have been included in the lump sum or unit price tendered for this item.

SP3.0 EXCAVATION AND DISPOSAL

SP3.1 Excavation

The construction of the Municipal Drain will be an open channel drain with side slopes and ditch bottom widths as specified on the design profiles and cross-sections.

Where possible, excavation will be limited to the bottom and/or one side of the drain (North or East, except where otherwise specified), leaving the one side of the drain intact, while providing the required additional channel width on the opposite side (construction side). This is anticipated to minimize impacts of full riparian zone removal. Clean-out of the bottom only may be specified where additional channel width is not required.

Where necessary, zones of current and/or anticipated bank instability on the non-construction side banks will be repaired and/or protected. In these areas efforts shall be made to maintain as much of the natural conditions as possible.

For this project, excavation is in general described as following:

Using the alignment provided, from Sta. 0+000 to 1+746.16 (Branch 3) and Sta. 5+000 to 5+949.10 (Biltmore Branch) the South/East bank is to remain untouched, except where repair and/or protection is required. Excavation is to be completed from the North/West bank, except where otherwise specified or authorized by the Drainage Engineer. Excavation commences from the toe of the South/East bank to the invert of the proposed profile, across the channel to the width specified by the cross-section with the bank constructed at a 2h:1v slope.

Using the alignment provided, from Sta. 5+949.10 to 6+946 (Biltmore Branch) the North/West bank is to remain untouched. Excavation is to be completed from the South/East bank, except where otherwise specified or authorized by the Drainage Engineer. Excavation commences from the toe of the North/ West bank to the invert of the proposed profile, across the channel to the width specified by the cross-section with the bank constructed at a 2h:1v slope.

SP3.2 Disposal of Excavated Earth Material

For the purpose of construction and future maintenance, the excavation of the drain shall be completed along all sections as previously described and all materials including silt, debris, etc. shall be removed from the drain.

In the non-agricultural land, all material shall be spread on the adjacent lands no closer than 5 meters to the top of slope and to a maximum depth of 300 mm. Drainage openings shall be constructed wherever required throughout the disposal area but at a maximum spacing of 100 meters.

All drainage openings shall be maintained, and the soil spread to accommodate these drainage openings to ensure that the drainage from adjacent land is not impeded. Spreading is to be completed in conformance with RCI Std. Dwg. A, provided in **Appendix A**.

In areas of agricultural land, all suitable earth material shall be spread no closer than 5 m to the top of the slope and to a maximum depth of 150 mm on the adjacent land with drainage openings provided wherever required, but at a maximum spacing of 50 metres along the top of drain.

Between Station 5+703 and 6+265 and on areas of small (residential) lots with areas of 2.0 Ha or less, all excavated material shall be disposed of off-site at the expense of the Contractor.

SP3.2.1 Off-Site Disposal of Excavated Earth Material

For off-site removal of excavated earth material, the Contractor is advised to comply with O. Reg. 406/19 On-Site and Excess Soil Management.

The Contractor is responsible for the management of all excavated earth material that is disposed of off-site, including, but not limited to, handling, storage, sampling and analysis, transportation, placement, and disposal, whether it is reused on-site, removed off-site, or used as fill material. It is recommended that the Contractor re-use the excavated earth material as fill material where applicable within the project area.

The Contractor is responsible for designating the Receiver Sites for the management of excess soil generated from the project, subject to review by the Drainage Engineer.

The Contractor will ensure that all excess soil is collected and transported by retained haulers in vehicles satisfying the requirements of O.Reg. 406/19

SP3.3 Hardpan Excavation and Disposal

Hardpan is considered to be densely compacted clay material (similar in nature to shale) that requires the use of specialized equipment for the removal – typically a singular ripping tooth.

The Contractor is required to excavate hardpan and dispose of the material off-site at a location arranged for by the Contractor and agreed to by the Drainage Engineer.

SP3.4 Rock Excavation & Disposal

Rock Excavation is considered for areas of bedrock and boulders in excess of $1m^3$ where the use of specialized equipment (hoe-ram) is required for the removal.

The Contractor is required to excavate rock and dispose of the material off-site at a location arranged for by the Contractor and agreed to by the Drainage Engineer.

SP3.5 Other Unsuitable Material

Other Unsuitable Material is considered to be any other material that is not suitable for spreading, including (but not limited to) boulders (less than $1m^3$), garbage or other debris. This material does not require the use of specialized equipment for the purpose of excavation,

The Contractor is required to excavate all unsuitable material. Excavation of this material and separation of the material from the excavation is considered to form part of the standard excavation item. Garbage, rocks, wood, and other debris (at the discretion of the Drainage Engineer) are to be disposed of off-site at a location arranged for by the Contractor and reviewed by the Drainage Engineer.

Boulders (less than $1m^3$) are to be disposed of by the Contractor on the adjacent property, in an area of the property designated by the owner and reviewed by the Drainage Engineer.

SP3.6 Payment

Payment for earth excavation shall be by the unit price tendered per cubic metre or linear metre and shall be full compensation for all work required to excavate in the manner described previously.

Payment for spreading of earth excavation shall be by the unit price tendered per cubic meter or linear meter and shall be full compensation for all work required to spread the spoil in the manner described previously. Two (2) equal payments shall be made, 50% at the time of completion of the spreading operation, and 50% following verification by the Drainage Engineer that all material has been spread in conformance with standards and specifications, all unsuitable material has been removed and all drainage openings have been constructed.

Where incurred, payment for hardpan excavation shall be by the unit price tendered per cubic metre and shall be full compensation for all work required to excavate, move on-site, and dispose of the material in the manner described previously. Measurement for payment shall be from the calculated quantity using the measured depth of material to the theoretical trench width and proposed channel grade.

Where incurred, payment for rock excavation shall be by the unit price tendered per cubic metre and shall be full compensation for all work required to excavate, remove off-site and dispose of the material in the manner described previously. Measurement for payment shall be from the calculated quantity using the surveyed top of rock (as exposed) to the theoretical trench width and proposed channel grade.

The excavation and separation of materials are considered to form part of the standard excavation item. However, where incurred, payment for the off-site disposal of unsuitable material shall be by the unit price tendered per cubic metre and shall be full compensation for all work required to remove off-site and dispose of the material in the manner described previously. Measurement for payment shall be by the estimated truck box volume (cubic meter) as defined for each truck utilized. The truck box volume is to be calculated by the Contract Administrator.

SP3.7 Disposal Off-Site at Property Owner's Expense

Property owners who wish to pay the Contractor to have the Contractor dispose of the excavated material off-site, which would otherwise be spread or deposited on the property, may make arrangements through the Contractor, subject to a signed agreement between the property owner and the Contractor, and review by the Drainage Engineer. If paid to the Contractor through the Contract, it will be charged as a special benefit, assessed to the requesting property owners.

Note that off-site removal may require consideration of Excess Soil Regulations, please refer to SP3.2.1 for excess soil provisions to be met.

SP4.0 PRIVATE CULVERT CROSSINGS

SP4.1 Supply and Placement or Lowering of Private Farm Culvert Crossings

The culverts shall be installed so that the culvert invert is embedded 150mm below the invert of the drain for culverts with a height or diameter up to 1500 mm. For culverts with a height or diameter greater than 1500 mm the culvert shall be embedded by 10% of the height or diameter below the invert of the drain. The farm culvert bedding, backfill, surface course and rock protection end-treatment shall be as shown on RCI Std. Dwg. C. The standard length for supplied culverts shall be 10 meters, unless otherwise specified.

SP4.2 Culvert Crossings Location

Culvert crossings that must be installed or lowered and reinstalled are shown on Dwg Nos. 19060-A2.1, 19060-A2.2 and 19060-P1 through 19060-P6 (inclusive).

SP4.3 Payment

Payment at the per metre or lump-sum unit price bid for each culvert crossing shall include for all excavation and disposal of materials and for the supply and installation of a new culvert or the reinstallation of the old culvert respectively and shall include backfill and Granular "A" material for the driving surface.

Payment at the unit price bid for removing existing structures shall include for all excavation and disposal of materials.

Rock protection with filter cloth at both ends of the culvert shall be paid under the item for culvert end treatments by the item unit price.

SP5.0 FENCING

Where fences are encountered which impede construction, or where the removal of fences is required for access to the drain or designated working area, it will be the Contractor's responsibility to remove the existing fence and reinstate the fence in a condition equal to or better than the condition of the fence prior to the commencement of the work. Fences are installed in conformance with the standards associated with the type of fence. Where fence crosses the drain, fence is to be installed in conformance with RCI Std. Dwg. H, provided in **Appendix A**.

SP5.1 Fencing - Replacement

Where fences are encountered which impede construction, or where the removal of fences is required for access to the drain or designated working area, the on-site representative of the Drainage Engineer shall determine if a fence is not in reasonable condition to be reinstated. If a fence is not in reasonable condition to be reinstated, the Contractor shall supply and install a similar fence to the OPSD that governs that type of fence, and to the satisfaction of the Drainage Engineer.

SP5.2 Payment

SP5.2.1 Payment – Fences in Good Condition

Fences encountered, which are in reasonable condition, are to be reinstalled in a condition equal to or better than the condition of the fence prior to the commencement of the work, at the Contractor's expense.

SP5.2.2 Payment – Fences Poor Condition (to be replaced)

Payment for fences to be replaced (as per SP 5.1) will be made, as per the tendered amount for the Provisional Item, on a per location basis.

SP6.0 SEEDING

SP6.1 Branch Drain Seeding

For agricultural areas all disturbed banks and a 5 metres buffer strip adjacent to the drain shall be hand seeded. Beyond the 5-meter buffer strip, spoils are not to be seeded. It is anticipated that property owners will till these areas and return to normal crop production.

For non-agricultural areas, seeding is placed on the disturbed banks, 5m buffer area and in all fully cleared and grubbed areas. Seeding is not typically required in forest or brush lands (not fully cleared) where spreading may occur around trees and over brush (typically razored) as these areas are anticipated to naturally regenerate.

Additional areas of seeding or additional seeding requirements may be identified by the Drainage Engineer.

All identified areas are to be seeded a maximum of 48 hours after construction, except for the 5-meter buffer strip. The 5-meter buffer strip can be seeded once work in the area has been completed.

The seed mixture (or an alternate reviewed by the Drainage Engineer) is to be as follows:

Sow Rate (minimum)	100 kg/ha
Creeping Red Fescue	60%
Canada Bluegrass	20%
White Clover	3%
Perennial Rye	12%
Red Top	5%

Canada Bluegrass establishes a deep creeping root system and tough sod ideal for stabilizing low-fertile rocky or clay soils and is drought, flood, and salt tolerant. Perennial rye will encourage quick establishment of a ground cover, while red fescue provides deeper rooting vegetation that is shade and water tolerant with limited requirement for seed bed preparation. White clover provides quick cover and produces nitrogen to aid in the establishment of other vegetation and red top's root system is well suited for holding soils on wetlands, waterways, and ditch banks.

SP6.2 Timing Restrictions

Seed shall not be placed from November 1st through April 30. Where excavation occurs between November 1st and April 30, seeding shall be completed as soon as possible after April 30, or as directed by the Drainage Engineer.

The Contractor is required to ensure a seed catch and may be required to re-seed areas as directed by the Drainage Engineer.

SP6.3 Measurement for Payment

Measurement for payment for the placement of the seed shall be by the square metre in place on the prescribed areas seeded. Payment will not be made for any area seeded beyond the prescribed area unless reviewed by the Drainage Engineer prior to placing the seed. The Contractor will not be paid for reinstatement of other areas disturbed by construction activities.

SP6.4 Payment

Payment for seeding shall be by the unit price tendered and shall be full compensation for all labour, materials and equipment required to complete the work as described above, and for any required reseeding during the maintenance period. Two (2) equal payments shall be made, 50% at the time of completion of the seeding operation, and 50% at the end of the Maintenance Period provided satisfactory seed growth has been established.

The Maintenance Period shall be six (6) months, beginning immediately following the seeding operation. The duration of the maintenance period shall be suspended during the winter dormant period, from October 30th to May 1st of the following year.

SP7.0 ROCK PROTECTION EROSION CONTROL

Rock Protection Erosion Control shall consist of quarried rock fragments which meet the standards as specified in the OPSS 1004.05.05.02 for R-50 Rip-Rap, and/or the standards for Rock Protection, OPSS 1004.05.05.03.

Fieldstones will not be accepted for rock protection unless they are enclosed in gabion baskets or other materials to be reviewed by the Drainage Engineer, at no extra cost to the drain or project.

Excavated rock from the site which meets the standards as specified above, and is reviewed by the Drainage Engineer for use, may, at the contractor's discretion, be used in place of imported Rock Protection.

The rock protection shall be inset into the bank and the bed of the drain so that the finished surface will be of the same cross-section and will be flush with upstream and downstream sections. Terrafix 420R (or approved equivalent) as indicated on the Standard Drawing. Rock protection shall be installed in accordance with Std. Dwg. D and F (provided in **Appendix A**).

SP7.1 Rock Protection Erosion Control Location

Refer to Dwg Nos. 19060-A2.1, 19060-A2.2, and 19060-P1 through 19060-P6 (inclusive) for Rock Protection locations. Other locations may be identified in the field during construction.

SP7.2 Measurement for Payment

Measurement for placement of rock protection with filter cloth shall be by the square metre and measurement shall be made in place. Payment will only be made for the area of rock protection agreed to in advance by the Drainage Engineer.

SP7.3 Payment

Payment for rock protection shall be by the unit price tendered and shall be full compensation for all labour, material and equipment required to complete the work as described above.

SP8.0 UTILITIES

The Contractor shall be required to arrange with all Utilities to obtain field locates, to mark all underground cables or pipelines in the field prior to commencing construction, and to review any private utilities installed by the property owners. The Contractor shall be responsible for protecting the utilities during construction and repair of any damaged utilities.

SP9.0 FLOW CHECKS & SEDIMENT TRAPS

SP9.1 Straw Bale Flow Check

SP9.1.1 Straw Bales

Straw bales shall consist of oat or wheat straw, shall be dry, firm, tightly tied in at least two places, show no evidence of straw or tie decay, and be free of sediment. They shall be of standard agricultural rectangular conformation and dimensions, approximately 600 mm x 600 mm x 1200 mm.

SP9.1.2 Stakes

Stakes shall be of sufficient strength to satisfy straw bale flow check performance and maintenance requirements and shall be a minimum of 1200 mm in length and each bale shall be firmly anchored in place by two stakes spaced and driven firmly 150 mm from each end of each bale.

SP9.1.3 Installation

Straw bale flow checks shall be installed as indicated in the Standard Drawing to prevent sediment passage from the upstream to the downstream side of the flow check and shall be installed at all specified locations on Dwg. Nos. 19060-A2., 19060-A2.2, and 19060-P1 through 19060-P6 (inclusive), all in accordance with OPSD 219.180 (provided in **Appendix A**).

Straw bale flow checks shall consist of a double row of bales in compliance with the following:

a) The two rows of bales shall be butted tightly beside one another without gaps.

b) The bales in the two rows shall be uniformly staggered, so that the ends of the upstream row of bales are adjacent to the centre of the downstream row of bales.

c) The upstream row of bales shall be one bale longer than the downstream row.

SP9.2 Rock Flow Checks

SP9.2.1 Rock

The rock flow check shall be constructed using clean quarried rock fragments which meet the standards as specified in the OPSS 1004.05.05.02 for R-50 Rip-Rap, and/or the standards for Rock Protection, OPSS 1004.05.05.03.

SP9.2.2 Geotextile

Geotextile shall be placed under the rock protection on the banks of the drain and over the rock check as shown on OPSD 219.211.

SP9.2.3 Installation

Rock flow checks shall be installed as shown on OPSD 219.211 (provided in **Appendix A**).

SP9.3 Excavation

Sediment trap excavation shall be 15 m in length and 500 mm below the proposed grade (drain bottom), for the full width of the channel directly upstream of the straw bale or rock flow checks.

SP9.4 Sediment Removal

Accumulated sediment in the sediment trap shall be removed as necessary to affect maintenance repairs and immediately prior to the removal of the flow check.

SP9.5 Flow Check Removal

The straw bale and rock flow checks shall be removed after all construction is complete on the drainage works.

SP9.6 Measurement for Payment

Measurement will be by the number of sediment trap and straw bale, or rock flow checks installed. Alternatively, erosion and sediment control items including flow checks may be combined into an overall lump-sum item for an all-inclusive erosion and sediment control plan and implementation item within the final contract.

SP9.7 Payment

Payment at the Contract price for the tender item "Sediment Traps" shall be full compensation for all labour, equipment and material required to complete the installation and removal of the sediment traps and straw bale or rock flow checks and sediment removal from the traps upon completion of the project. Alternatively, erosion and sediment control items including flow checks may be combined into an overall lump-sum item for an all-inclusive erosion and sediment control plan and implementation item within the final contract.

SP10.0 TILE OUTLET PROTECTION

Existing tile outlets shall be located by the Contractor and protected during construction. Where existing tile outlets are affected by the construction, they shall be restored by installing a CSP outlet pipe complete with a rodent grate (or alternative approved product). Rock protection, complete with geotextile filter cloth, shall be installed at the tile outlet to prevent erosion.

Restoration of the tile outlets shall be completed in accordance with RCI Std. Dwg. F (provided in **Appendix A**).

SP10.1 Material Specification

Rock protection and geotextile materials shall be in accordance with the specification for rock protection in these Special Provisions.

SP10.2 Measurement for Payment

Measurement will be by the unit price for each tile outlet restoration completed.

SP10.3 Payment

Payment for tile outlet restoration shall include for all materials, excavation, and installation, including CSP end piece, rodent grate, rock protection and geotextile in accordance with RCI Std. Dwg. F.

SP11.0 CULVERT END TREATMENTS

Culvert End Treatments shall be installed as indicated in the Standard Drawing to prevent erosion and scour from the upstream and downstream culvert ends. End treatments shall be installed on the upstream and downstream end of each culvert shown on Dwg. Nos. 19060-A2.1 and 19060-A2.2, all in accordance with RCI Std. Dwg. C (provided in **Appendix A**).

SP11.1 Payment

Payment for culvert end treatments shall include for all materials, excavation, and installation, including rock protection and geotextile in accordance with RCI Std. Dwg. C.

SP12.0 GUARANTEED MAINTENANCE

Upon completion of the work the Contractor will be required to post a guaranteed maintenance security for a period of 12 months, in the amount of 10% of the value of the work completed.

This amount will guarantee workmanship of such items as fencing, rock protection, seeding and culvert crossing installation.

Should the Contractor schedule the work during months when seeding cannot be carried out, or should a seed catchment not be satisfactorily established, then subsequent repair of sloughed areas and excavation of the drains due to erosion of unseeded or inadequately seeded banks shall be carried out by the Contractor without any extra payment for such repair work.

SP13.0 MINISTRY OF ENVIRONMENT CONSERVATION AND PARK – SPECIES AT RISK

The Ministry of the Environment, Conservation and Parks (MECP) – Ontario is responsible for review with regard to the Endangered Species Act (ESA) Legislation.

The Contractor is responsible to ensure all necessary measures are taken to ensure no harm to any SAR or its habitat (if protected). The Contractor must be aware that the ESA Act and the individual species at risk are dynamic and subject to change. The Contractor is responsible to ensure all necessary measures are taken to ensure no harm to any SAR or its habitat (if protected).

Endangered Species are dynamic and subject to change. Typical species associated and anticipated to be found within the general vicinity of Municipal Drains, and a general categorization of species and standard mitigation measures, are provided in **Appendix F** of this Report.

SP13.1 Specific Mitigation Measures (No Payment)

In review of the SAR within the project area, the following SAR do not require any specific mitigation measures:

- Bobolink (Bird)
- Eastern Meadowlark (Bird)
- Wood Thrush (Bird)
- Gypsy Cuckoo Bumble Bee (Insect)

SP13.1.1 Birds

Where possible, it is preferred that tree clearing be completed during the winter months. It is recommended that the Contractor take all necessary precautions to avoid potential impacts to breading birds, however, no additional payment shall be considered beyond normal brush removal costs for the completion of this task.

SP13.1.2 Aquatic Species

While turtles and aquatic species at risk may exist within the general vicinity, the impact of the proposed work will be limited through adherence to timing windows and conditions prescribed by the Department of Fisheries and Oceans for the exclusion and relocation of fish.

Where necessary (where fish species are found to be present) de-fishing of the work area will be completed utilizing standard best management practices with all work completed with applicable timing windows.

SP13.1.3 General Mitigation

General mitigation measures include the following:

- Avoidance – Work on Municipal Drains is limited by prescribed in-water work timing windows to be within the period from July 15th to October 15th of any year. While protecting aquatic species, this timing window also affords general protection to breeding birds and nesting turtles.
- Avoidance – a general sweep of the work area is prescribed by contract conditions for each workday in the proposed work area. Where active nests or SAR are found, additional measures are implemented.
- Awareness – contractors are required to be aware of potential SAR and to stop all work when the presence of SAR is suspected.

SP13.2 Specific Mitigation Measures

SP13.2.1 Butternut Tress

SP13.2.1.1 Butternut Trees – Procedures

Should a butternut tree be identified within 25 m of the closest construction, the tree will be documented and reviewed by a certified Butternut Health Assessor (BHA).

Should the tree be considered non retainable, the tree will remain in place should it not impede construction progress or be removed if it impedes construction progress. Note that butternut trees may not be transported from the site, nor processed.

Should the tree be considered retainable, work may not proceed within a 25m radius of the tree. In this case, the tree will be protected at the 25m radius using standard tree protection measures (snow fence or equivalent). Work may continue outside of the fenced radius. All reasonable measures to eliminate or alter the work such that no work would be completed within 25 m of the tree should be considered and implemented if possible.

Should alternative measures not be possible, a Ministry of the Environment, Conservation and Parks (MECP) permit for the removal of (or work within the 25m radius of) a retainable butternut will be applied for by the Contract Administrator on behalf of the Municipality. Typical permit remediation measures for the removal of a retainable butternut tree is the planting of butternut trees at a ratio of 20:1.

SP13.2.1.2 Butternut Trees – Payment

The removal of non-retainable butternut tree(s), following assessment, shall be considered part of the standard clearing operation (SP 2.0), with no additional payment. No additional payment will be considered for any delay associated with the review and consideration of the retainability of butternut trees, the permitting process, or progressing with work beyond a tree under consideration and returning to complete works following consideration.
Tree protection, remediation planting and any additional specific task assigned to the Contractor will, upon notice of intent to claim by the Contractor, be considered for additional payment as per the General Conditions of the Contract.

SP13.2.2 Turtles

SP 13.2.2.1 Turtles – Procedures

Where work is conducted after October 15 of any given year, the Contractor will be responsible for fencing off the work area to prevent turtles from entering the drain.

SP 13.2.2.2 Turtles – Payment

Payment for increased fencing shall be by the unit price tendered per linear meter and shall be in full compensation for all work required to construct and remove the fencing.

SP14.0 RIDEAU VALLEY CONSERVATION AUTHORITY– PERMISSION (O.REG. 174/06)

The Permit with regard to the "Development, Interference with Wetlands and Alterations to Shorelines and Watercourses" (O.Reg. 174/06) for works to be completed on the Simpson Municipal Drain – Biltmore Branch and Branch 3 by RVCA is contained in **Appendix F** of the Engineer's Report. The Contractor shall insure that any conditions are adhered to.

SP15.0 DEPARTMENT OF FISHERIES AND OCEANS – CLASS AUTHORIZATION

The class authorization letter and associated advice regarding the Fisheries Act for works to be completed on the Simpson Municipal Drain – Biltmore Branch and Branch 3 by the Department of Fisheries and Oceans (DFO) is contained in **Appendix F** of the Engineer's Report. The Contractor shall insure that any advice/conditions are adhered to.

Appendix C

Schedules of Assessment

Schedule of Assessment for Construction and Future Maintenance

SCHEDULE A - SUMMARY
FOR CONSTRUCTION AND FUTURE MAINTENANCE - SIMPSON MUNICIPAL DRAIN
BRANCH 3 AND BILTMORE BRANCH

Robinson Consultants

Project No.: B19060
Date: 11-Aug-23

ID	Roll No.	Property (located in)			Area	Benefit Cost	Outlet Cost	Sub-total Costs	Special Benefit & Utilities	ADIP ELIGIBILITY	ALLOWANCE ELIGIBILITY	Total Net Costs
		TWP	Lot	Con	Total	Total	Total		Total			Total
City of Ottawa -- Individual Landowners												
1	271 820 08300 0000	Goulbourn	11	8	3.81	$ -	$ 1,199.24	$ 1,199.24	$ -			$ 1,199.24
2	271 820 08100 0000	Goulbourn	11	8	2.67	$ -	$ 688.44	$ 688.44	$ -			$ 688.44
3	271 820 03004 0000	Goulbourn	11	7	0.25	$ -	$ 78.97	$ 78.97	$ -			$ 78.97
4	271 820 08403 0000	Goulbourn	11	8	0.57	$ -	$ 181.02	$ 181.02	$ -			$ 181.02
5	271 820 02900 0000	Goulbourn	11	7	15.29	$ 515.97	$ 5,194.44	$ 5,710.41	$ -		**	$ 5,710.41
6	271 820 02902 0000	Goulbourn	11	7	1.24	$ -	$ 782.43	$ 782.43	$ -			$ 782.43
7	271 820 02901 0000	Goulbourn	11	7	1.99	$ 135.67	$ 1,252.23	$ 1,387.91	$ -		**	$ 1,387.91
8	271 820 02801 0000	Goulbourn	11	7	1.24	$ -	$ 693.45	$ 693.45	$ -			$ 693.45
9	271 820 02802 0000	Goulbourn	11	7	1.24	$ -	$ 879.64	$ 879.64	$ -			$ 879.64
10	271 820 02803 0000	Goulbourn	11	7	1.09	$ -	$ 615.53	$ 615.53	$ -			$ 615.53
14	271 820 02701 0000	Goulbourn	10	7	0.82	$ -	$ 386.76	$ 386.76	$ -			$ 386.76
15	271 820 02702 0000	Goulbourn	10	7	0.80	$ -	$ 432.17	$ 432.17	$ -			$ 432.17
16	271 820 02703 0000	Goulbourn	10	7	0.81	$ -	$ 458.60	$ 458.60	$ -			$ 458.60
17	271 820 02704 0000	Goulbourn	10	7	0.80	$ -	$ 455.37	$ 455.37	$ -			$ 455.37
18	271 820 02705 0000	Goulbourn	10	7	0.81	$ -	$ 458.14	$ 458.14	$ -			$ 458.14
19	271 820 02706 0000	Goulbourn	10	7	0.80	$ -	$ 456.02	$ 456.02	$ -			$ 456.02
20	271 820 02707 0000	Goulbourn	10	7	0.73	$ -	$ 413.47	$ 413.47	$ -			$ 413.47
21	271 820 02708 0000	Goulbourn	10	7	0.64	$ -	$ 372.51	$ 372.51	$ -			$ 372.51
22	271 820 02709 0000	Goulbourn	10	7	0.80	$ -	$ 503.99	$ 503.99	$ -			$ 503.99
23	271 820 02721 0000	Goulbourn	10	7	0.73	$ -	$ 354.20	$ 354.20	$ -			$ 354.20
24	271 820 02720 0000	Goulbourn	10	7	0.81	$ -	$ 397.15	$ 397.15	$ -			$ 397.15
25	271 820 02719 0000	Goulbourn	10	7	0.81	$ -	$ 406.31	$ 406.31	$ -			$ 406.31
26	271 820 02718 0000	Goulbourn	10	7	0.80	$ -	$ 403.36	$ 403.36	$ -			$ 403.36
27	271 820 02717 0000	Goulbourn	10	7	0.80	$ -	$ 434.49	$ 434.49	$ -			$ 434.49
28	271 820 02716 0000	Goulbourn	10	7	0.80	$ -	$ 455.67	$ 455.67	$ -			$ 455.67
29	271 820 02715 0000	Goulbourn	10	7	0.80	$ -	$ 522.16	$ 522.16	$ -			$ 522.16
30	271 820 02714 0000	Goulbourn	10	7	0.63	$ -	$ 431.20	$ 431.20	$ -			$ 431.20
31	271 820 02713 0000	Goulbourn	10	7	0.73	$ -	$ 505.91	$ 505.91	$ -			$ 505.91
32	271 820 02712 0000	Goulbourn	10	7	0.93	$ -	$ 642.48	$ 642.48	$ -			$ 642.48
33	271 820 02711 0000	Goulbourn	10	7	0.93	$ -	$ 642.07	$ 642.07	$ -			$ 642.07
34	271 820 02710 0000	Goulbourn	10	7	0.84	$ -	$ 574.10	$ 574.10	$ -			$ 574.10
35	271 820 02600 0000	Goulbourn	10	7	13.65	$ 437.78	$ 3,576.48	$ 4,014.26	$ -	*	**	$ 4,014.26
36	271 820 02601 0000	Goulbourn	10	7	1.92	$ -	$ 937.89	$ 937.89	$ -			$ 937.89
37	271 820 02500 0000	Goulbourn	10	7	3.91	$ -	$ 961.35	$ 961.35	$ -			$ 961.35
38	271 820 02400 0000	Goulbourn	9/10	7	60.52	$ 1,921.82	$ 12,932.83	$ 14,854.65	$ -	*	**	$ 14,854.65
39	271 815 22800 0000	Goulbourn	10	6	1.52	$ -	$ 331.03	$ 331.03	$ -			$ 331.03
40	271 815 22800 0000	Goulbourn	10	6	7.53	$ -	$ 1,718.70	$ 1,718.70	$ -	*		$ 1,718.70
41	271 820 02200 0000	Goulbourn	9	7	0.72	$ -	$ 116.39	$ 116.39	$ -			$ 116.39
42	271 820 02100 0000	Goulbourn	9	7	18.80	$ 612.70	$ 3,717.65	$ 4,330.35	$ -	*	**	$ 4,330.35
43	271 820 02000 0000	Goulbourn	9	7	27.67	$ 880.08	$ 3,524.42	$ 4,404.50	$ -	*	**	$ 4,404.50
44	271 820 02002 0000	Goulbourn	9	7	1.17	$ -	$ 189.39	$ 189.39	$ -			$ 189.39
45	271 820 01900 0000	Goulbourn	8	7	28.02	$ 901.84	$ 3,611.55	$ 4,513.39	$ -	*	**	$ 4,513.39
46	271 820 01800 0000	Goulbourn	8	7	15.66	$ 575.68	$ 1,152.71	$ 1,728.39	$ -	*	**	$ 1,728.39
47	271 820 01700 0000	Goulbourn	7/8	7	7.44	$ 300.95	$ 602.61	$ 903.56	$ -	*	**	$ 903.56
City of Ottawa -- Roads/Other												
Biltmore Cr		Goulbourn	10	7	1.31	$ 171.82	$ 1,565.17	$ 1,736.99	$ -			$ 1,736.99
Fallowfield Rd.		Goulbourn	10-12	7/8	1.89	$ 228.31	$ 2,189.70	$ 2,418.01	$ -			$ 2,418.01
Munster Rd.		Goulbourn	10/11	7/8	2.74	$ 84.68	$ 967.62	$ 1,052.29	$ -			$ 1,052.29
ROW C6/7		Goulbourn	7-10	6/7	1.83	$ -	$ 1,624.67	$ 1,624.67	$ -			$ 1,624.67
SWM Facilities		Goulbourn	7-10	6/7	0.74	$ 50.47	$ 368.35	$ 418.82	$ 21,632.35			$ 22,051.17
City of Ottawa Special Benefit					0.00	$ -	$ -	$ -	$ 269,430.42			$ 269,430.42
TOTAL					243.08	$ 6,817.78	$ 61,360.01	$ 68,177.79	$ 291,062.76			$ 359,240.56

Note: The area of all dedicated SWM facility and associated easments have deen deducted from individual properties and assessed to the City of Ottawa

SCHEDULE B
FOR CONSTRUCTION AND FUTURE MAINTENANCE - SIMPSON MUNICIPAL DRAIN
BRANCH 3

Robinson Consultants

Project No.: B19060
Date: 11-Aug-23

ID	Roll No.	Property (located in)			Area	Land Use Factor	Factored Area	Backs on Drain	Distance Factor	Benefit Factored Area	Benefit Cost	Distance Factor	Sub-Section Factor	Outlet Factored Area	Outlet Cost	Sub-Total Cost	ADIP ELIGIBILITY	ALLOWANCE ELIGIBILITY	Special Benefit & Utilities	Total Net Cost
		TWP	Lot	Con	SB3 Total		SB3 Total	SB3	SB3			SB3	SB3							
City of Ottawa -- Individual Landowners																				
1	271 820 08300 0000	Goulbourn	11	8	3.81	1.00	3.81		0.30		$ -	0.30	1.00	1.14	$ 280.64	$ 280.64			$ -	$ 280.64
2	271 820 08100 0000	Goulbourn	11	8	2.67	1.00	2.67		0.30		$ -	0.30	1.00	0.80	$ 196.93	$ 196.93			$ -	$ 196.93
3	271 820 03004 0000	Goulbourn	11	7	0.25	1.00	0.25		0.30		$ -	0.30	1.00	0.08	$ 18.48	$ 18.48			$ -	$ 18.48
4	271 820 08403 0000	Goulbourn	11	8	0.57	1.00	0.57		0.30		$ -	0.30	1.00	0.17	$ 42.36	$ 42.36			$ -	$ 42.36
5	271 820 02900 0000	Goulbourn	11	7	15.29	1.00	15.29		0.41		$ -	0.41	1.00	6.30	$ 1,546.62	$ 1,546.62			$ -	$ 1,546.62
6	271 820 02902 0000	Goulbourn	11	7	1.24	2.00	2.48		0.30		$ -	0.30	1.00	0.75	$ 183.10	$ 183.10			$ -	$ 183.10
7	271 820 02901 0000	Goulbourn	11	7	1.99	2.00	3.98		0.30		$ -	0.30	1.00	1.19	$ 293.04	$ 293.04			$ -	$ 293.04
8	271 820 02801 0000	Goulbourn	11	7	1.24	2.00	2.48		0.32		$ -	0.32	1.00	0.79	$ 193.06	$ 193.06			$ -	$ 193.06
9	271 820 02802 0000	Goulbourn	11	7	1.24	2.00	2.48		0.46		$ -	0.46	1.00	1.15	$ 282.17	$ 282.17			$ -	$ 282.17
10	271 820 02803 0000	Goulbourn	11	7	1.09	2.00	2.18		0.50		$ -	0.50	1.00	1.10	$ 269.06	$ 269.06			$ -	$ 269.06
14	271 820 02701 0000	Goulbourn	10	7	0.82	2.00	1.64		0.47		$ -	0.47	1.00	0.77	$ 189.22	$ 189.22			$ -	$ 189.22
15	271 820 02702 0000	Goulbourn	10	7	0.80	2.00	1.61		0.50		$ -	0.50	1.00	0.80	$ 197.31	$ 197.31			$ -	$ 197.31
16	271 820 02703 0000	Goulbourn	10	7	0.81	2.00	1.62		0.50		$ -	0.50	1.00	0.81	$ 198.70	$ 198.70			$ -	$ 198.70
17	271 820 02704 0000	Goulbourn	10	7	0.80	2.00	1.61		0.50		$ -	0.50	1.00	0.80	$ 197.30	$ 197.30			$ -	$ 197.30
18	271 820 02705 0000	Goulbourn	10	7	0.81	2.00	1.62		0.50		$ -	0.50	1.00	0.81	$ 198.50	$ 198.50			$ -	$ 198.50
19	271 820 02706 0000	Goulbourn	10	7	0.80	2.00	1.61		0.50		$ -	0.50	1.00	0.80	$ 197.58	$ 197.58			$ -	$ 197.58
20	271 820 02707 0000	Goulbourn	10	7	0.73	2.00	1.46		0.50		$ -	0.50	1.00	0.73	$ 179.15	$ 179.15			$ -	$ 179.15
21	271 820 02708 0000	Goulbourn	10	7	0.64	2.00	1.28		0.53		$ -	0.53	1.00	0.68	$ 166.81	$ 166.81			$ -	$ 166.81
22	271 820 02709 0000	Goulbourn	10	7	0.80	2.00	1.60		0.63		$ -	0.63	1.00	1.00	$ 246.37	$ 246.37			$ -	$ 246.37
23	271 820 02721 0000	Goulbourn	10	7	0.73	2.00	1.46		0.50		$ -	0.50	1.00	0.73	$ 178.80	$ 178.80			$ -	$ 178.80
24	271 820 02720 0000	Goulbourn	10	7	0.81	2.00	1.63		0.50		$ -	0.50	1.00	0.81	$ 199.63	$ 199.63			$ -	$ 199.63
25	271 820 02719 0000	Goulbourn	10	7	0.81	2.00	1.61		0.50		$ -	0.50	1.00	0.81	$ 197.87	$ 197.87			$ -	$ 197.87
26	271 820 02718 0000	Goulbourn	10	7	0.80	2.00	1.61		0.50		$ -	0.50	1.00	0.80	$ 197.15	$ 197.15			$ -	$ 197.15
27	271 820 02717 0000	Goulbourn	10	7	0.80	2.00	1.61		0.50		$ -	0.50	1.00	0.80	$ 197.25	$ 197.25			$ -	$ 197.25
28	271 820 02716 0000	Goulbourn	10	7	0.80	2.00	1.61		0.50		$ -	0.50	1.00	0.81	$ 198.33	$ 198.33			$ -	$ 198.33
29	271 820 02715 0000	Goulbourn	10	7	0.80	2.00	1.60		0.67		$ -	0.67	1.00	1.08	$ 264.78	$ 264.78			$ -	$ 264.78
30	271 820 02714 0000	Goulbourn	10	7	0.63	2.00	1.25		0.75		$ -	0.75	1.00	0.94	$ 230.34	$ 230.34			$ -	$ 230.34
31	271 820 02713 0000	Goulbourn	10	7	0.73	2.00	1.47		0.75		$ -	0.75	1.00	1.10	$ 270.25	$ 270.25			$ -	$ 270.25
32	271 820 02712 0000	Goulbourn	10	7	0.93	2.00	1.86		0.75		$ -	0.75	1.00	1.40	$ 343.21	$ 343.21			$ -	$ 343.21
33	271 820 02711 0000	Goulbourn	10	7	0.93	2.00	1.86		0.75		$ -	0.75	1.00	1.40	$ 342.99	$ 342.99			$ -	$ 342.99
34	271 820 02710 0000	Goulbourn	10	7	0.84	2.00	1.68		0.75		$ -	0.75	1.00	1.25	$ 308.22	$ 308.22			$ -	$ 308.22
35	271 820 02600 0000	Goulbourn	10	7	13.65	1.00	13.65		0.76		$ -	0.76	1.00	10.40	$ 2,555.10	$ 2,555.10	*		$ -	$ 2,555.10
36	271 820 02601 0000	Goulbourn	10	7	1.92	2.00	3.84		0.75		$ -	0.75	1.00	2.88	$ 708.35	$ 708.35			$ -	$ 708.35
37	271 820 02500 0000	Goulbourn	10	7	3.91	1.00	3.91		0.75		$ -	0.75	1.00	2.93	$ 718.72	$ 718.72			$ -	$ 718.72
38	271 820 02400 0000	Goulbourn	9/10	7	60.52	1.00	60.52	Y	0.77	32.33	$ 1,309.06	0.77	1.00	46.82	$ 11,503.24	$ 12,812.29	*	**	$ -	$ 12,812.29
39	271 815 22800 0000	Goulbourn	10	6	1.52	1.00	1.52		0.64		$ -	0.64	1.00	0.98	$ 240.34	$ 240.34			$ -	$ 240.34
40	271 815 22800 0000	Goulbourn	10	6	7.53	1.00	7.53		0.69		$ -	0.69	1.00	5.17	$ 1,269.18	$ 1,269.18	*		$ -	$ 1,269.18
41	271 820 02200 0000	Goulbourn	9	7	0.72	2.00	1.44		0.50		$ -	0.50	0.66	0.47	$ 116.39	$ 116.39			$ -	$ 116.39
42	271 820 02100 0000	Goulbourn	9	7	18.80	1.00	18.80	Y	0.80	15.13	$ 612.70	0.80	1.00	15.13	$ 3,717.65	$ 4,330.35	*	**	$ -	$ 4,330.35
43	271 820 02000 0000	Goulbourn	9	7	27.67	1.00	27.67	Y	0.79	21.74	$ 880.08	0.79	0.66	14.35	$ 3,524.42	$ 4,404.50	*	**	$ -	$ 4,404.50
44	271 820 02002 0000	Goulbourn	9	7	1.17	2.00	2.34		0.50		$ -	0.50	0.66	0.77	$ 189.39	$ 189.39			$ -	$ 189.39
45	271 820 01900 0000	Goulbourn	8	7	28.02	1.00	28.02	Y	0.79	22.27	$ 901.84	0.79	0.66	14.70	$ 3,611.55	$ 4,513.39	*	**	$ -	$ 4,513.39
46	271 820 01800 0000	Goulbourn	8	7	15.66	1.00	15.66	Y	0.91	14.22	$ 575.68	0.91	0.33	4.69	$ 1,152.71	$ 1,728.39	*	**	$ -	$ 1,728.39
47	271 820 01700 0000	Goulbourn	7/8	7	7.44	1.00	7.44	Y	1.00	7.43	$ 300.95	1.00	0.33	2.45	$ 602.61	$ 903.56	*	**	$ -	$ 903.56
City of Ottawa -- Roads/Other																				
Biltmore Cr					1.31	4.00	5.25		0.58		$ -	0.58	1.00	3.06	$ 751.27	$ 751.27			$ -	$ 751.27
Fallowfield Rd.					1.89	4.00	7.57		0.31		$ -	0.31	1.00	2.34	$ 575.58	$ 575.58			$ -	$ 575.58
Munster Rd.					2.74	1.00	2.74		0.55		$ -	0.55	1.00	1.50	$ 368.95	$ 368.95			$ -	$ 368.95
ROW C6/7					1.83	4.00	7.32		0.76		$ -	0.76	1.00	5.54	$ 1,361.61	$ 1,361.61			$ -	$ 1,361.61
SWM Facilities					0.74	2.00	1.48		0.69		$ -	0.69	1.00	1.02	$ 250.60	$ 250.60			$ -	$ 250.60
City of Ottawa Special Benefit											$ -	0.00	0.00	0.00	$ -	$ -			$ 137,409.56	$ 137,409.56
Total					**243.08**		**286.17**			**113.13**	**$ 4,580.32**			**167.80**	**$ 41,222.87**	**$ 45,803.19**			**$ 137,409.56**	**$ 183,212.75**

Note: The area of all dedicated SWM facility and associated easments have deen deducted from individual properties and assessed to the City of Ottawa

SCHEDULE C
FOR CONSTRUCTION AND FUTURE MAINTENANCE - SIMPSON MUNICIPAL DRAIN
BILTMORE BRANCH

Robinson Consultants

Project No.: B19060
Date: 11-Aug-23

ID	Roll No.	Property (located in)			Area	Land Use Factor	Factored Area	Backs on Drain	Distance Factor	Benefit Factored Area	Benefit Cost	Distance Factor	Sub-Section Factor	Outlet Factored Area	Outlet Cost	Sub-Total Cost	ADIP ELIGIBILITY	ALLOWANCE ELIGIBILITY	Special Benefit & Utilities	Total Net Cost
		TWP	Lot	Con	BB Total		BB Total	BB	BB			BB	BB							
City of Ottawa -- Individual Landowners																				
1	271 820 08300 0000	Goulbourn	11	8	3.81	1.00	3.81		1.00		$ -	1.00	1.00	3.81	$ 918.60	$ 918.60			$ -	$ 918.60
2	271 820 08100 0000	Goulbourn	11	8	2.67	1.00	2.67		0.76		$ -	0.76	1.00	2.04	$ 491.51	$ 491.51			$ -	$ 491.51
3	271 820 03004 0000	Goulbourn	11	7	0.25	1.00	0.25		1.00		$ -	1.00	1.00	0.25	$ 60.49	$ 60.49			$ -	$ 60.49
4	271 820 08403 0000	Goulbourn	11	8	0.57	1.00	0.57		1.00		$ -	1.00	1.00	0.57	$ 138.66	$ 138.66			$ -	$ 138.66
5	271 820 02900 0000	Goulbourn	11	7	15.29	1.00	15.29	Y	0.99	15.12	$ 515.97	0.99	1.00	15.12	$ 3,647.82	$ 4,163.79		**	$ -	$ 4,163.79
6	271 820 02902 0000	Goulbourn	11	7	1.24	2.00	2.48		1.00		$ -	1.00	1.00	2.48	$ 599.33	$ 599.33			$ -	$ 599.33
7	271 820 02901 0000	Goulbourn	11	7	1.99	2.00	3.98	Y	1.00	3.98	$ 135.67	1.00	1.00	3.98	$ 959.19	$ 1,094.87		**	$ -	$ 1,094.87
8	271 820 02801 0000	Goulbourn	11	7	1.24	2.00	2.48		0.84		$ -	0.84	1.00	2.07	$ 500.39	$ 500.39			$ -	$ 500.39
9	271 820 02802 0000	Goulbourn	11	7	1.24	2.00	2.48		1.00		$ -	1.00	1.00	2.48	$ 597.47	$ 597.47			$ -	$ 597.47
10	271 820 02803 0000	Goulbourn	11	7	1.09	2.00	2.18		0.99		$ -	0.99	0.67	1.44	$ 346.47	$ 346.47			$ -	$ 346.47
14	271 820 02701 0000	Goulbourn	10	7	0.82	2.00	1.64		0.75		$ -	0.75	0.67	0.82	$ 197.54	$ 197.54			$ -	$ 197.54
15	271 820 02702 0000	Goulbourn	10	7	0.80	2.00	1.61		0.91		$ -	0.91	0.67	0.97	$ 234.87	$ 234.87			$ -	$ 234.87
16	271 820 02703 0000	Goulbourn	10	7	0.81	2.00	1.62		1.00		$ -	1.00	0.67	1.08	$ 259.90	$ 259.90			$ -	$ 259.90
17	271 820 02704 0000	Goulbourn	10	7	0.80	2.00	1.61		1.00		$ -	1.00	0.67	1.07	$ 258.07	$ 258.07			$ -	$ 258.07
18	271 820 02705 0000	Goulbourn	10	7	0.81	2.00	1.62		1.00		$ -	1.00	0.67	1.08	$ 259.64	$ 259.64			$ -	$ 259.64
19	271 820 02706 0000	Goulbourn	10	7	0.80	2.00	1.61		1.00		$ -	1.00	0.67	1.07	$ 258.44	$ 258.44			$ -	$ 258.44
20	271 820 02707 0000	Goulbourn	10	7	0.73	2.00	1.46		1.00		$ -	1.00	0.67	0.97	$ 234.32	$ 234.32			$ -	$ 234.32
21	271 820 02708 0000	Goulbourn	10	7	0.64	2.00	1.28		1.00		$ -	1.00	0.67	0.85	$ 205.70	$ 205.70			$ -	$ 205.70
22	271 820 02709 0000	Goulbourn	10	7	0.80	2.00	1.60		1.00		$ -	1.00	0.67	1.07	$ 257.62	$ 257.62			$ -	$ 257.62
23	271 820 02721 0000	Goulbourn	10	7	0.73	2.00	1.46		0.75		$ -	0.75	0.67	0.73	$ 175.40	$ 175.40			$ -	$ 175.40
24	271 820 02720 0000	Goulbourn	10	7	0.81	2.00	1.63		0.76		$ -	0.76	0.67	0.82	$ 197.52	$ 197.52			$ -	$ 197.52
25	271 820 02719 0000	Goulbourn	10	7	0.81	2.00	1.61		0.81		$ -	0.81	0.67	0.86	$ 208.43	$ 208.43			$ -	$ 208.43
26	271 820 02718 0000	Goulbourn	10	7	0.80	2.00	1.61		0.80		$ -	0.80	0.67	0.85	$ 206.21	$ 206.21			$ -	$ 206.21
27	271 820 02717 0000	Goulbourn	10	7	0.80	2.00	1.61		0.92		$ -	0.92	0.67	0.98	$ 237.24	$ 237.24			$ -	$ 237.24
28	271 820 02716 0000	Goulbourn	10	7	0.80	2.00	1.61		1.00		$ -	1.00	0.67	1.07	$ 257.34	$ 257.34			$ -	$ 257.34
29	271 820 02715 0000	Goulbourn	10	7	0.80	2.00	1.60		1.00		$ -	1.00	0.67	1.07	$ 257.38	$ 257.38			$ -	$ 257.38
30	271 820 02714 0000	Goulbourn	10	7	0.63	2.00	1.25		1.00		$ -	1.00	0.67	0.83	$ 200.86	$ 200.86			$ -	$ 200.86
31	271 820 02713 0000	Goulbourn	10	7	0.73	2.00	1.47		1.00		$ -	1.00	0.67	0.98	$ 235.66	$ 235.66			$ -	$ 235.66
32	271 820 02712 0000	Goulbourn	10	7	0.93	2.00	1.86		1.00		$ -	1.00	0.67	1.24	$ 299.27	$ 299.27			$ -	$ 299.27
33	271 820 02711 0000	Goulbourn	10	7	0.93	2.00	1.86		1.00		$ -	1.00	0.67	1.24	$ 299.08	$ 299.08			$ -	$ 299.08
34	271 820 02710 0000	Goulbourn	10	7	0.84	2.00	1.68		0.98		$ -	0.98	0.67	1.10	$ 265.88	$ 265.88			$ -	$ 265.88
35	271 820 02600 0000	Goulbourn	10	7	13.65	1.00	13.65	Y	0.94	12.83	$ 437.78	0.94	0.33	4.23	$ 1,021.37	$ 1,459.16	*	**	$ -	$ 1,459.16
36	271 820 02601 0000	Goulbourn	10	7	1.92	2.00	3.84		0.75		$ -	0.75	0.33	0.95	$ 229.54	$ 229.54			$ -	$ 229.54
37	271 820 02500 0000	Goulbourn	10	7	3.91	1.00	3.91		0.78		$ -	0.78	0.33	1.01	$ 242.63	$ 242.63			$ -	$ 242.63
38	271 820 02400 0000	Goulbourn	9/10	7	18.73	1.00	18.73	Y	0.96	17.96	$ 612.76	0.96	0.33	5.93	$ 1,429.60	$ 2,042.36	*	**	$ -	$ 2,042.36
39	271 815 22800 0000	Goulbourn	10	6	1.52	1.00	1.52		0.75		$ -	0.75	0.33	0.38	$ 90.69	$ 90.69			$ -	$ 90.69
40	271 815 22800 0000	Goulbourn	10	6	7.53	1.00	7.53		0.75		$ -	0.75	0.33	1.86	$ 449.52	$ 449.52	*		$ -	$ 449.52
City of Ottawa -- Roads/Other																				
Biltmore Cr					1.31	4.00	5.25	Y	0.96	5.04	$ 171.82	0.96	0.67	3.37	$ 813.90	$ 985.72			$ -	$ 985.72
Fallowfield Rd.					1.89	4.00	7.57	Y	0.88	6.69	$ 228.31	0.88	1.00	6.69	$ 1,614.12	$ 1,842.43			$ -	$ 1,842.43
Munster Rd.					2.74	1.00	2.74	Y	0.90	2.48	$ 84.68	0.90	1.00	2.48	$ 598.66	$ 683.34			$ -	$ 683.34
ROW C6/7					1.10	4.00	4.41		0.75		$ -	0.75	0.33	1.09	$ 263.06	$ 263.06			$ -	$ 263.06
SWM Facilities					0.74	2.00	1.48	Y	1.00	1.48	$ 50.47	1.00	0.33	0.49	$ 117.75	$ 168.22			$ 21,632.35	$ 21,800.57
City of Ottawa Special Benefit											$ -	0.00	0.00	0.00	$ -	$ -			$ 132,020.86	$ 132,020.86
Total					**101.08**		**140.10**			**65.57**	**$ 2,237.46**			**83.47**	**$ 20,137.15**	**$ 22,374.61**			**$ 153,653.20**	**$ 176,027.81**

Note: The area of all dedicated SWM facility and associated easments have deen deducted from individual properties and assessed to the City of Ottawa

Appendix D

Cost Estimate and Allowance

- Detailed Cost Estimate
- Schedule of Allowances

Robinson Consultants

SCHEDULE D
ALLOWANCES FOR LANDS USED IN THE CONSTRUCTION OF THE SIMPSON MUNICIPAL DRAIN - - BRANCH 3 AND BILTMORE BRANCH

Project No.: B19060
Date: 11-Aug-23

ID	Roll No.	Property			Land Allowance				Total Value
		TWP	Lot	Con	SB3		BB		
					Area	Value	Area	Value	
City of Ottawa -- Individual Landowners									
5	271 820 02900 0000	Goulbourn	11	7	0.00	$ -	0.04	$ 495.62	$ 495.62
7	271 820 02901 0000	Goulbourn	11	7	0.00	$ -	0.03	$ 349.03	$ 349.03
35	271 820 02600 0000	Goulbourn	10	7	0.00	$ -	0.01	$ 195.46	$ 195.46
38	271 820 02400 0000	Goulbourn	9/10	7	0.10	$ 1,340.28	0.06	$ 781.83	$ 2,122.11
42	271 820 02100 0000	Goulbourn	9	7	0.06	$ 767.87	0.00	$ -	$ 767.87
43	271 820 02000 0000	Goulbourn	9	7	0.02	$ 307.15	0.00	$ -	$ 307.15
45	271 820 01900 0000	Goulbourn	8	7	0.03	$ 404.88	0.00	$ -	$ 404.88
46	271 820 01800 0000	Goulbourn	8	7	0.07	$ 977.29	0.00	$ -	$ 977.29
47	271 820 01700 0000	Goulbourn	7/8	7	0.03	$ 418.84	0.00	$ -	$ 418.84
Total					**0.30**	**$ 4,216.29**	**0.13**	**1,821.94**	**$ 6,038.23**

Robinson Consultants

SCHEDULE E
ALLOWANCES FOR CROPS LOST IN THE CONSTRUCTION OF
THE SIMPSON MUNICIPAL DRAIN - - BRANCH 3 AND BILTMORE BRANCH

Project No.: B19060
Date: 11-Aug-23

ID	Roll No.	Property			Land Allowance										Total Value
					Simpson Branch 3					Biltmore Branch					
		TWP	Lot	Con	W (Y1)	W (Y2/3)	Area (Y1)	Area (Y2/3)	Value	W (Y1)	W (Y2/3)	Area (Y1)	Area (Y2/3)	Value	
City of Ottawa -- Individual Landowners															
5	271 820 02900 0000	Goulbourn	11	7			0.00	0.00	$ -	25.00	7.73	0.89	0.27	$ 3,527.13	$ 3,527.13
35	271 820 02600 0000	Goulbourn	10	7			0.00	0.00	$ -	25.00	7.00	0.35	0.10	$ 1,359.82	$ 1,359.82
38	271 820 02400 0000	Goulbourn	9/10	7	25.00	9.40	0.80	0.30	$ 3,341.27	25.00	9.40	1.40	0.53	$ 5,847.22	$ 9,188.50
42	271 820 02100 0000	Goulbourn	9	7	25.00	12.80	0.69	0.35	$ 3,155.21			0.00	0.00	$ -	$ 3,155.21
43	271 820 02000 0000	Goulbourn	9	7	25.00	11.73	0.55	0.26	$ 2,452.94			0.00	0.00	$ -	$ 2,452.94
45	271 820 01900 0000	Goulbourn	8	7	25.00	9.67	0.73	0.28	$ 3,051.50			0.00	0.00	$ -	$ 3,051.50
46	271 820 01800 0000	Goulbourn	8	7	25.00	9.67	0.88	0.34	$ 3,682.85			0.00	0.00	$ -	$ 3,682.85
47	271 820 01700 0000	Goulbourn	7/8	7	25.00	11.73	0.75	0.35	$ 3,344.91			0.00	0.00	$ -	$ 3,344.91
Total							**4.39**	**1.88**	**$ 19,028.67**			**2.64**	**0.90**	**$ 10,734.18**	**$ 29,762.85**

DETAILED COST ESTIMATE

SIMPSON BRANCH 3 (Sta. 0+000.00 - Sta. 1+746.16)

Robinson Consultants

Project No: B19060
Date: 11-Aug-23

Type	Item No.	Item	Unit	Cost/Unit	Quantity	Total
SIMPSON BRANCH 3 (Sta. 0+000.00 - Sta. 1+746.16)						**1746.16m**
		Construction				
Construction	**Site Preparation Activities**					
		Mobilization (maximum 2% of total construction cost)	LS	$ 2,200.00	100%	$ 2,200.00
		Erosion and Sediment Control Plan	LS	$ 5,000.00	50%	$ 2,500.00
		Erosion and Sediment Control Measures -- Minimum as Follows:				
		- (2) Rock Check Dam c/w Sediment Trap	each	$ 1,000.00	2.00	$ 2,000.00
		- (1) Straw BaleDam c/w Sediment Trap	each	$ 500.00	0.00	$ -
		Clearing/Grubbing (including individual tree removals)	ha (P)	$ 5,000.00	1.00	$ 5,000.00
		Fence removal and reinstatement	m	$ 50.00	120.00	$ 6,000.00
	Excavation Activities					
		Earth Ex. - Ditch (full construction)	m^3 (P)	$ 10.00	1670.00	$ 16,700.00
		Earth Ex. - Spreading	m3 (P)	$ 2.50	1670.00	$ 4,175.00
		Earth Ex. - Off-site Removal	m3 (P)	$ 20.00	0.00	$ -
		Culvert Crossing(s) -- 1200mm dia. CSP	m	$ 425.00	25.00	$ 10,625.00
		Culvert Crossing(s) -- 1000mm dia. CSP	m	$ 400.00	50.00	$ 20,000.00
		Rock Excavation (hydraulic ram)	m^3	$ 150.00	0.00	$ -
	Reinstatement Activities					
		Tile Outlet Restoration/Protection	each	$ 600.00	12.00	$ 7,200.00
		Hand Seeding	m^2	$ 0.60	19208.00	$ 11,524.80
		Rock Protection - Erosion Control	m^2	$ 35.00	350.75	$ 12,276.25
		Rock Protection - Culvert End Treatments	each	$ 1,000.00	14.00	$ 14,000.00
		Sub-Total - Construction Costs				**$ 114,201.05**
		Contingency Allowance - Construction				**$ 12,000.00**
		Total - Construction Costs				**$ 126,201.05**
		Engineering/Administration				
		Engineer's Report (apportioned by Section)	LS	$ 95,000.00	20%	$ 19,000.00
		Contract Administration/Inspection	LS	$ 30,000.00	40%	$ 12,000.00
		Sub-Total - Routine Engineering				**$ 31,000.00**
Total - Engineering/Administration						**$ 31,000.00**
		Other				
		Allowances	LS	(See Schedule)		$ 23,244.96
		Net HST	LS	(1.76% Of Costs Above)		$ 2,766.74
Total - Other Costs						**$ 26,011.70**
Sub-Total - Net Costs						**$ 183,212.75**
		Special Benefits				
City of Ottawa Branch 3		*Section 26 of the Ontario Drainage Act, R.S.O. 1900 states the following -- "In addition to all other sums lawfully assessed against the property of a public utility or road authority under this Act, and despite the fact that the public utility or road authority is not otherwise assessable under this Act, the public utility or road authority shall be assessed for and shall pay all the increase of cost of such drainage works caused by the existence of the works of the public utility or road authority."* *Specialized consideration and/or items specified by City of Ottawa Requirements are identified below and form a Special Benefit Assessment to the City of Ottawa. Engineering/Administration, Other fees, and a portion of the initial constuction costs associated with the required City of Ottawa works are also identified and form part of the City of Ottawa Special Benefit.*				
		Engineering/Administration and Other		$ 57,011.70	75%	$ 42,758.78
		Special Benefit -- Initial Construction		$ 126,201.05	75%	$ 94,650.79
		Sub-Total - City of Ottawa (Special Benefit)				**$ 137,409.56**
Total Net Costs - Branch 3 (For Distribution to Properties)						**$ 45,803.19**

DETAILED COST ESTIMATE

Robinson Consultants

BILTMORE BRANCH (Sta. 5+000.00 - Sta. 6+945.60)

Project No: B19060
Date: 11-Aug-23

Type	Item No.	Item	Unit	Cost/Unit	Quantity	Total
BILTMORE BRANCH (Sta. 5+000.00 - Sta. 6+945.60)						**1945.60m**
		Construction				
Construction		**Site Preparation Activities**				
		Mobilization (maximum 2% of total construction cost)	LS	$ 1,100.00	100%	$ 1,100.00
		Erosion and Sediment Control Plan	LS	$ 5,000.00	50%	$ 2,500.00
		Erosion and Sediment Control Measures -- Minimum as Follows:				
		- (1) Rock Check Dam c/w Sediment Trap	each	$ 1,000.00	2.00	$ 2,000.00
		- (1) Straw BaleDam	each	$ 500.00	5.00	$ 2,500.00
		Clearing/Grubbing (including individual tree removals)	ha (P)	$ 5,000.00	1.10	$ 5,500.00
		Fence removal and reinstatement	m	$ 50.00	100.00	$ 5,000.00
		Excavation Activities				
		Earth Ex. - Ditch (full construction)	m^3 (P)	$ 10.00	605.00	$ 6,050.00
		Earth Ex. - Spreading	m3 (P)	$ 2.50	330.00	$ 825.00
		Earth Ex. - Off-site Removal	m3 (P)	$ 20.00	275.00	$ 5,500.00
		Roadway Crossing -- Biltmore Crescent	LS	NO EST.	100%	NO EST.
		Roadway Crossing -- Munster Side Road (Future)	LS	NO EST.	100%	NO EST.
		Private Crossing(s) -- 600mm dia. CSP	m	$ 300.00	20.00	$ 6,000.00
		Rock Excavation (hydraulic ram)	m^3	$ 150.00	0.00	$ -
		Reinstatement Activities				
		Tile Outlet Restoration/Protection	each	$ 600.00	2.00	$ 1,200.00
		Hand Seeding	m^2	$ 0.60	21401.00	$ 12,840.60
		Rock Protection - Erosion Control	m^2	$ 35.00	132.25	$ 4,628.75
		Rock Protection - Culvert End Treatments	each	$ 1,000.00	6.00	$ 6,000.00
		Sub-Total - Construction Costs				**$ 61,644.35**
		Contingency Allowance - Construction				**$ 5,000.00**
		Total - Construction Costs				**$ 66,644.35**
		Engineering/Administration				
		Engineer's Report (apportioned by Section)	LS	$ 95,000.00	80%	$ 76,000.00
		Contract Administration/Inspection	LS	$ 30,000.00	60%	$ 18,000.00
		Sub-Total - Engineering				**$ 94,000.00**
Total - Engineering/Administration						**$ 94,000.00**
		Other				
		Allowances	LS	(See Schedule)		$ 12,556.12
		Net HST	LS	(1.76% Of Costs Above)		$ 2,827.34
Total - Other Costs						**$ 15,383.46**
Sub-Total - Net Costs						**$ 176,027.81**
		Special Benefits				
Road Authority (City of Ottawa) Biltmore Branch		*Under Section 69 of the Drainage Act, the "Road Authority" has the option to construct the required drainage works within the Road Right-Of-Way. It is assumed for the purpose of this estimate that the Road Authority will exercise this option. As such, the items required to complete the Road Authority works have been excluded from this estimate (NOT ESTIMATED). However, the Engineering/Administration and Other fees, associated with the required Road Authority works, where considered for the works, as noted below, are considered payable as a Special Benefit by the Road Authority. It is estimated that 50% of the costs noted below are due to the required Road Authority Works.*				
		Roadway Crossing -- Biltmore Crescent		NO EST.	100%	NO EST.
		Roadway Crossing -- Munster Side Road (Future)		NO EST.	100%	NO EST.
		Sub-Total - City of Ottawa				**$ -**
City of Ottawa Biltmore Branch		*Section 26 of the Ontario Drainage Act, R.S.O. 1900 states the following -- "In addition to all other sums lawfully assessed against the property of a public utility or road authority under this Act, and despite the fact that the public utility or road authority is not otherwise assessable under this Act, the public utility or road authority shall be assessed for and shall pay all the increase of cost of such drainage works caused by the existence of the works of the public utility or road authority."* *Specialized consideration and/or items specified by City of Ottawa Requirements are identified below and form a Special Benefit Assessment to the City of Ottawa. Engineering/Administration, Other fees, and a portion of the initial constuction costs associated with the required City of Ottawa works are also identified and form part of the City of Ottawa Special Benefit.*				
		Engineering/Administration and Other		$ 109,383.46	75%	$ 82,037.59
		Special Benefit -- Initial Construction		$ 66,644.35	75%	$ 49,983.26
		Sub-Total - City of Ottawa (Special Benefit)				**$ 132,020.86**
City of Ottawa (SWM Facilities)		*Section 26 of the Ontario Drainage Act, R.S.O. 1900 states the following -- "In addition to all other sums lawfully assessed against the property of a public utility or road authority under this Act, and despite the fact that the public utility or road authority is not otherwise assessable under this Act, the public utility or road authority shall be assessed for and shall pay all the increase of cost of such drainage works caused by the existence of the works of the public utility or road authority."* *Specialized consideration and/or items specified by a Stormwater management pond (Utility) are identified below and form a Special Benefit Assessment to the Utility. Engineering/Administration and Other fees, associated with the required Utility works are also identified and form part of the Utility Special Benefit.*				
		Engineering/Administration and Other		$ 109,383.46	10%	$ 10,938.35
		SWM Facilities (Pond and Easements) -- Associated Construction		$ 10,694.00	100%	$ 10,694.00
		Sub-Total - City of Ottawa (SWM Facilities)				**$ 21,632.35**
Total - Special Benefits						**$ 153,653.20**
Total Net Costs - Biltmore Branch (For Distribution to Properties)						**$ 22,374.61**

Appendix E

Assessment Methodology

ASSESSMENT METHODOLOGY

AS1.0 General

The exact method of determining the appropriate assessment and the distribution between outlet and benefit is left to the Drainage Engineer using best judgment to provide a system of assessments that is fair to all concerned. There are several basic principles that apply to the assessment for future maintenance of the Biltmore Branch of the Simpson Municipal Drain. The principles are:

1. You cannot assess a property for any part of the cost of work that is completed upstream from it, unless there is a special circumstance.

2. You cannot make a benefit assessment against a property for work completed some distance downstream, although you do assess the property for outlet liability for this work.

3. You can only assess benefit for lands that are reasonably close to the drain. These usually are properties abutting the drain or which otherwise have direct access to the drain.

4. You cannot assess those lands that are too low to make use of the works, such as a gravel pit or quarry, unless they are clearly connected by an outlet to the drain.

5. You must assess public utilities and road authorities for the increase in the actual cost of the proposed drainage work caused by the existence of the works of the public utility or road authority. An example is a culvert on a public roadway.

6. In assessing lands covered with bush and trees, if the situation is such that once the drain is in place, the property owner will be able to clear the bush and cultivate the land, then the property should be assessed in the same way as land already under cultivation, unless there is an agreement or legal restrictions which prevent clearing and cultivation.

The principles of assessment for municipal drains have evolved over time. At present, the recommended approach is to divide the drain into a series of sections in arriving at the ultimate benefit and outlet assessment schedules. This permits the cost estimates to be developed for each section and should result in a fair distribution of costs throughout the drainage basin. The division of the drain into sections is most beneficial for assessing the cost of future maintenance.

A technique that is employed to simplify the assessment process involves converting all the lands within the watershed into a factored or equivalent area. In the case of benefit assessment, this includes the area of the land within the basin and a factor that is related to land use. For outlet assessment, we use the area of the land within the drainage basin, the land use and a factor that represents the location of the land relative

to the drain. For the location factor (or the distance from the drain), the principle is to apply a higher factor for lands that are closer to the drain, or to an outlet that connects directly into the drain, and a lower factor to lands that are more remote from the drain. The factored area method allows the Drainage Engineer to recognize that the volume and rate of flow of water differs with different land uses, soil types, surface conditions and distance from the drain. This method brings the entire area within a watershed to a common denominator and simplifies the application of outlet assessments.

Based on the principle that properties are only assessed for works that are undertaken downstream of the property in question, we have further introduced a factor within each section which divides the section into three equal parts (subsections) and applies a subsection factor to the outlet assessment. Therefore, the properties with an outlet within the downstream one-third of a section of drain are in essence only using one-third of the total section of drain, whereas the lands that are in the upstream one-third or beyond, are using the whole section of the drain. Hence, we have applied a subsection factor to the lands within the section of the drain where maintenance will be carried out. All of the lands upstream of the section where maintenance is being undertaken are also assessed a portion of the costs of the drainage works. The assessment on the lands upstream of the section where maintenance is being completed are charged a section factor equal to the most upstream portion of the lands within the section where the work is being completed.

AS2.0 Calculation of Assessments

AS2.1 Benefit Assessment

Benefit by definition under the Drainage Act, R.S.O. 1990, c D.17, is the "advantages to any lands, roads, building or other structures from the construction, improvement, repair or maintenance of a drainage works will result in a higher market value or increased crop production or improved appearance or better control of surface or subsurface water, or any other advantages relating to the betterment of lands, roads, buildings, or other structures".

Lands that are located immediately adjacent to the drain are charged a benefit assessment. A Benefit Assessment for maintenance is only charged against properties in the section where work is being completed. The benefit factored area is determined by multiplying the individual assessed area of each property that is immediately adjacent to the drain, by the land use factor. Using the benefit factored area for all of the properties and the cost of maintenance assigned to benefit assessment, a cost per unit benefit factored area (factored hectare) is determined. This amount is then multiplied by the total benefit factored area of each property to calculate the benefit assessment that is applied to that property.

AS2.2 Outlet Assessment

Outlet by definition under the Drainage Act, R.S.O. 1990, c. D17, is the "outlet liability" and means the part of the cost of the construction, improvement or maintenance of a drainage works that is required to provide such outlet or improved outlet. Lands and roads that may be assessable for outlet liability are those lands that use a drainage works as an outlet or for which after construction or improvement of the drainage works an improved outlet is provided. The outlet or improved outlet may be provided either directly or indirectly through any drainage works, overland flow, swale, ravine, creek, or watercourse. Assessment for outlet is based on location, area, and rate of flow.

Each parcel of land that lies within the drainage basin and is upstream of the location where maintenance is being undertaken pays for a portion of the cost of the maintenance through an outlet assessment.

The outlet assessment factored area for each property is determined by multiplying the area of each property in the drainage basin by the land use factor, the distance factor and the section or subsection factor. Using the outlet assessment factored area for all of the properties being assessed and the cost of future maintenance assigned to outlet assessment, a cost per unit outlet factored area (factored hectare) is determined. This is then multiplied by the total outlet assessment factored area of each property to calculate the outlet assessment that is applied to that property.

AS2.3 Assessment for Special Benefit

Special Benefit as defined under the Drainage Act, RSO 1990, c D.17 is "any additional work or feature included in the construction, repair or improvement of a drainage works that has no effect on the functioning of the drainage works." An assessment for Special Benefit and/or a Special Assessment is charged against any owner, public utility, agency, authority, or municipality for which special consideration was required to accommodate special design consideration or a special feature.

AS2.4 Injuring Liability Assessment

Injuring Liability as defined under the Drainage Act, RSO 1990, c D.17 is "If, from any land or road, water is artificially caused by any means to flow upon and injure any other land or road, the land or road from which the water is caused to flow may be assessed for injuring liability with respect to a drainage works to relieve the injury so caused to such other land or road."

AS2.5 Block Assessment

Engineer may assess a block, etc.

25. (1) of the Drainage Act: The council of the local municipality may direct the engineer to assess as a block, a built-up area designated by the council, and the sum assessed therefore may be levied against all the ratable properties in the designated

area proportionately on the basis of the assessed value of the land and buildings. R.S.O. 1990, c. D.17, s. 25 (1).

Assessment to be charged against public roads.

(2) Where the engineer makes a block assessment under subsection (1), the engineer shall designate the proportion of the assessment to be charged against the public roads in the designated area. R.S.O. 1990, c. D.17, s. 25 (2).

As noted within the Engineer's Report, there are no Block Assessments for this Municipal Drain.

AS3.0 Factors Affecting Assessments

AS3.1 Maintenance Sections

The consideration of maintenance sections allows for factors to be adjusted where work for construction and future maintenance is completed. This factor accounts for how much of the drain each property uses and allows for other factors such as the Distance Factor to be applied (reducing assessments the further away from the drain the property is). The area that is tributary to each section has been determined based on the subcatchment areas that convey flow to each section.

AS3.2 Sub-Section Factor

For each maintenance section as defined in the Report, the section is further divided into three subsections or parts. The upstream subsection is assigned a factor of 1.00, the middle subsection of the drain is assigned a factor of 0.67 and the downstream subsection is assigned a factor of 0.33. Each individual property is assigned a subsection factor corresponding to the location where the drainage from the property enters the drain. All properties upstream of a section are assigned a subsection factor of 1.0.

The use of the subsection or section factor is based on the principle that all land is assessed for maintenance that is undertaken downstream of the location where the runoff from the land enters the drain.

AS3.3 Land Use Factor

A land use factor is included in the assessment calculation to account for the volume of runoff from lands used for different purposes. A numeric value of 1.0 is assigned to all agricultural, rural use, large lot residential (greater than 2.0ha) and vacant lands, or any land where an alternative factor is not otherwise specified. A numerical value of 0.7 is assigned to unprotected forest lands (not subject to a registered management agreement). A value of 2.0 is assigned to small lots of 2.0 Ha (5.0 acres) or less. A

value of 4.0 is assigned to land classified as higher density residential, institutional, and commercial or is a road right-of-way. A value of 2.0 is assigned for a Hydro right-of-way. A value of 0.5 is assigned to all lands designated as Provincially Significant Wetland (PSW) and subsequently protected by legislation. A value of 0.5 may be applied to forested land where the Drainage Engineer has been provided with documentation confirming that the forested land is subject to a registered Forest Management Agreement and subsequently protected from modification by the agreement.

The area of each parcel of land within the drainage basin is multiplied by the land use factor to arrive at a factored area, which is used to determine the final benefit and outlet assessment. For example, one hectare of road right-of-way is assessed at four times the rate applied to one hectare of agricultural land.

AS3.4 Distance Factor

A distance factor was developed to account for the proximity of land to the drain and the relative amount of water that will enter the drain. A band is drawn on each side of the drain at a distance of approximately 200 meters, a second band is drawn at a distance of approximately 600 metres from the drain, and a third at 1000 meters from the drain. A property that is included entirely within the first band is given a distance factor of 1.0. A property that falls entirely within the second band is given a distance factor of 0.75. A property that falls entirely within the third band is given a distance factor of 0.5 and the land that is located beyond 1000 metres from the drain (outside the third band), is given a distance factor of 0.3. In many cases, a property will not be entirely included within one of the bands. For example, one-half of a property might fall within the first band and the other half might fall in the second band. In this case, a distance factor of 0.875 is assigned to that property.

AS3.5 Grants

Grants are applied at the time of assessment, typically one (1) year or greater following the construction or maintenance of the drain based on eligibility at that time. As such, current grant eligibility should not be considered to indicate that a property will be grant eligible at the time of assessment. Additionally, it is noted that program eligibility and/or availability is subject to change at the discretion of the Ontario Ministry of Agriculture Food and Rural Affairs (OMAFRA) within the Agricultural Drainage Infrastructure Program (ADIP). Current eligibility requirements as prescribed by OMAFRA are available on the OMAFRA website (http://omafra.gov.on.ca/).

To accurately provide the cost of the drain and provide property owners with the full cost for their consideration exclusive of any deductions that may be made under the Drainage Act, "grants" are not summarized in conjunction with the assessments and must be deducted separately.

Where program availability and property eligibility are confirmed at the time of assessment, the grant (currently set at 33%) will be applied to the total net assessment.

AS3.6 Allowances

Properties eligible for allowances are marked with a "**" notation in the "Allowance Eligibility" column of the Schedules of Assessment. In order to accurately provide the cost of the drain and provide property owners with the full cost of their assessment, exclusive of any deductions that may be made under the Drainage Act, allowances are not summarized in conjunction with the assessments and must be viewed separately.

The parcels of land which have been granted allowances are outlined in the Schedule of Allowances provided in **Appendix D**. The allowances have been established in accordance with Sections 29, 30 and 31 of the Drainage Act, RSO 1990, c D.17. The allowance for the land (Section 29) is for the land lost due to ditch widening and relocation. The allowance is calculated using the following:

- The width of any land lost to the proposed construction (new – excludes the existing channel), multiplied by;
- The length of the proposed modification on the property, multiplied by;
- The unit rate (value) of lands based on the average Municipal Property Assessment Corporation (MPAC) assessed value for farmlands (land only) in the area.

The allowance for crops lost due to the use of the working space (Sections 29 & 30) is provided for agricultural lands (only) as that area is anticipated to be out of production during construction, with reduced productivity for a period of two years thereafter. The area associated with the allowance is calculated using the following:

- The anticipated width (for spreading of material) plus the width of the prescribed buffer area, multiplied by;
- the length of the disturbed area on the property, multiplied by;
- The value of the crops.

The value of crops used in the allowance is calculated using an average of corn and soya beans, based on the latest published AgriCorp market prices for the area and the average area yield as published by the Ontario Ministry of Agriculture Food and Rural Affairs to determine an average value per hectare of crops.

The allowance for existing drains (Section 31) is to compensate property owners for the costs associated with improvements to drainage works which were not constructed by requisition or petition under the Act but which will be incorporated in whole or in part in the drainage works. Section 31 of the Drainage Act, RSO 1990, c D.17 stipulates that the Engineer shall estimate and allow in money to the owner of such drain the value of such drainage works and shall include the sum in the estimated initial cost of construction, improvement or repair of the drainage works.

These allowances are fixed amounts and are in accordance with Section 62 (3) and 62(4) of the Drainage Act, R.S.O. 1990, c D.17. The allowance shown for each property may be deducted from the final assessment levied before the assessment is collected from the affected owner.

Payment to the owner would only be made when the allowance is greater than the assessment against the property. The allowances can only be changed if modified prior to adoption of the report by bylaw. Where the allowance is greater than any assessment the municipality shall collect the amount and pay the amount to the respective property owners.

The allowance for land lost due to the Municipal Drain construction or widening has been calculated using average MPAC local area estimated land values.

The allowance for crop loss assumes full loss for the first year, 60% reduction for the second year and 40% reduction for the third year in areas where excavated material has been spread or for equipment access for construction on lands presently under cultivation.

Appendix F

SAR/MECP/MNRF

Robinson Consultants

SPECIES AT RISK (SAR)
SIMPSON MUNICIPAL DRAIN PROJECT No. 19060
BILTMORE BRANCH AND BRANCH 3
FIGURE F-1

Birds	SAR Level	Anticipated?	Description
Bobolink	Threatened	Yes	The Government of Ontario SAR website defines the habitat for Bobolink as follows: “Historically, Bobolinks lived in North American tallgrass prairie and other open meadows. With the clearing of native prairies, Bobolinks moved to living in hayfields. Bobolinks often build their small nests on the ground in dense grasses. Both parents usually tend to their young, sometimes with a third Bobolink helping" Habitat may be disturbed by this project. However, where overall habitat is disturbed, the disturbance (working area) is limited in extent. Only a small portion of the existing habitat is anticipated to be disturbed. No long term impacts or permanent removal of habitat is anticipated. “Avoidance” is prescribed as the primary mitigation measure – standard timing windows limit work during the nesting season. A daily sweep of the work are will be completed, looking for active nests. Where none are found, work may be permitted. However, shoulder active nests be found, additional measures will be implemented.
Eastern Meadowlark	Threatened	Yes	The Government of Ontario SAR website defines the habitat for Eastern Meadowlarks as follows: “Eastern Meadowlarks breed primarily in moderately tall grasslands, such as pastures and hayfields, but are also found in alfalfa fields, weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields, or other open areas. Small trees, shrubs or fence posts are used as elevated song perches.” Habitat may be disturbed by this project. However, where overall habitat is disturbed, the disturbance (working area) is limited in extent. Only a small portion of the existing habitat is anticipated to be disturbed. No long term impacts or permanent removal of habitat is anticipated. “Avoidance” is prescribed as the primary mitigation measure – standard timing windows limit work during the nesting season. A daily sweep of the work are will be completed, looking for active nests. Where none are found, work may be permitted. However, shoulder active nests be found, additional measures will be implemented.

Wood Thrush	Threatened	No	The Government of Ontario SAR website defines the habitat for Wood Thrush as follows: “The wood thrush lives in mature deciduous and mixed (conifer-deciduous) forests. They seek moist stands of trees with well-developed undergrowth and tall trees for singing perches. These birds prefer large forests, but will also use smaller stands of trees. They build their nests in living saplings, trees or shrubs, usually in sugar maple or American beech. The wood thrush flies south to Mexico and Central America for the winter” It is not anticipated that Wood Thrush habitat will be distrubed by this project. “Avoidance” is prescribed as the primary mitigation measure – standard timing windows limit work during the nesting season. Should active nests be found additional measures will be implemented. It is recommended that clearing of tress be completed in the winter months in advance of construction to avoid having active nests near the construction area. Where this is not possible a sweep of the area for active nests will be completed daily during construction.
Insects	**SAR Level**	**Anticipated?**	**Description**
Gypsy Cuckoo Bumble Bee	Endangered	No	The Government of Ontario SAR website defines the habitat for Gypsy Cuckoo Bumble Bee as follows: "In Canada, the Gypsy Cuckoo Bumble Bee has been recorded in every province and territory except Nunavut and occurs in diverse habitats such as open meadows, agricultural and urban areas, boreal forest and woodlands." Where this species or it's habitat is identified within the general vicinity of the project, additional screening by a professional Biologist is required. Screening as completed is attached following this document -- Within the recovery document entitled "Recovery strategy for the Gypsy Cuckoo Bumble Bee" available at https://www.ontario.ca/page/recovery-strategy-gypsy-cuckoo-bumble-bee#section-5 indicates the only known population to be in the Pinery Provincial Park. It is anticipated that this SAR occurrence was triggered on Historical Records only. In consultation with local area biologists, it was determined that this SAR habitat is unlikely to be impacted by this project (as it does not exist in this area, occurrence was based on historic records only).

Dakota Dumont

From: Whittaker, Damien <Damien.Whittaker@ottawa.ca>
Sent: April 22, 2022 2:40 PM
To: Lisa Emond
Cc: Baird, Natasha; Moore, Erin Jennifer (Roger Stevens); Ryan, David W; Angela Jonkman; Andy Robinson; Barbara St. Aubin; Lorne Franklin
Subject: RE: 0B19060.00 - Biltmore Extension ECA

"CAUTION: External Sender"
Hello Lisa,

Though this isn't a planning application the application is in the Rural area so I thought I would respond.

If the sewage works predominantly drain agricultural lands (and not a planning application) then no ECA is required.

Regards,

Damien Whittaker, P.Eng
Senior Engineer - Infrastructure Applications ▪ Ingénieur principal - applications d'infrastructure
Development Review, Rural Services Unit ▪ Examen des projets d'eménagement, Unité des services ruraux
Planning, Real Estate and Economic Development Department ▪ Direction générale de la planification, des biens immobiliers et du développement économique
City of Ottawa | **ville d'Ottawa** ▪ damien.whittaker@ottawa.ca ▪ 01-14

*** please note that I will be on vacation starting June 30 and returning to work July 12, 2022 ***

From: Lisa Emond <lemond@rcii.com>
Sent: Wednesday, April 20, 2022 1:39:30 PM
To: Baird, Natasha <Natasha.Baird@ottawa.ca>
Cc: Moore, Erin Jennifer (Roger Stevens) <ErinJennifer.Moore@ottawa.ca>; Ryan, David W <David.Ryan@ottawa.ca>; Angela Jonkman <ajonkman@rcii.com>; Andy Robinson <ajrobinson@rcii.com>; bst-aubin@rcii.com <bst-aubin@rcii.com>; Lorne Franklin <lfranklin@rcii.com>
Subject: 0B19060.00 - Biltmore Extension ECA

We note that projects under the Ontario Drainage Act are typically exempt from ECA requirements, except where the project is primarily completed for development requirements. This amendment to the existing Simpson Municipal Drain provides a new branch to the drain. The primary purpose is to convey flow from upstream agricultural/rural lands. However, flows are conveyed through an existing ditch system in an existing subdivision before retuning to agricultural lands. For your reference we have attached a draft copy of Plan A1.1 showing the alignment of the proposed modification.

Subject to confirmation, it is our interpretation that the modification of the existing ditch system (partially within subdivision lands) is exempt from the ECA submission requirements in conformance with exemptions for projects under the Drainage Act. As such, we are proceeding on this basis unless otherwise directed.

Should you have any questions or concerns, please contact us.

Thank you,

Lisa Emond, P.Eng | Project Engineer

Robinson Consultants
350 Palladium Drive, Suite 210, Ottawa ON, K2V 1A8
T.(613) 592-6060 ext. 128 | rcii.com

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Appendix G

RVCA - Letter of Permission

RVCA Letter of Permission — revised

Ont. Reg. 174/06, S. 28 *Conservation Authorities Act* 1990, As Amended.

Rideau Valley Conservation Authority
3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504
F 613-692-0831 | www.rvca.ca

February 16, 2023
File: RV5-6522
Contact: hal.stimson@rvc

Mr. David Ryan
City of Ottawa
2155 Roger Stevens Dr.
North Gower, ON
K0A 2T0

Permit to alter a waterway under Section 28 of the *Conservation Authorities Act* for alterations to a municipal drain at Lots 8 through 11, Concession 7/8, Goulbourn township, now in the City of Ottawa.

Dear Mr. David Ryan,

The Rideau Valley Conservation Authority has reviewed your application on behalf of the City of Ottawa and understands the proposal to be for:

the extension upstream of the existing Simpson Branch 3 Municipal Drain which involves construction of approximately 1946m of new drain to be known as the Biltmore Branch in accordance with the engineers report as prepared by Robinson Consulting dated November 2022 (89pgs). The watercourse is a tributary of the Jock River and the work is the result of drainage improvements required in the Fallowfield Road, Munster Road and Biltmore Crescent area which will affect a catchment of approximately 103 ha. Modifications are also required to the Branch 3 drain to provide sufficient legal outlet and will involve maintenance and adjustment as required to the existing profile and addition/replacement of culverts as detailed in the Engineer's report.

This proposal was reviewed under Ontario Regulation 174/06, the "*Development, Interference with Wetlands, and Alteration to Watercourse and Shorelines"* regulation and the RVCA Development Policies (approved by the RVCA, Board of Directors), specifically Section 3.0 Alteration to Waterways. The proposal is not expected to impact the control of flooding, pollution, erosion or conservation of land providing conditions are followed.

PERMISSION AND CONDITIONS

By this letter the Rideau Valley Authority hereby grants you approval to undertake this project as outlined in your permit application but subject to the following conditions:

1. Approval is subject to the understanding of the project as described above and outlined in the application and submitted plans including:

- Report titled “Engineers report Amendments to the Simpson Municipal Drain Construction of the Biltmore Branch and Modifications to Branch 3”, prepared by Robinsons Consulting Inc., dated November 2022. Project No. 19060 (89 Pages).

2. **A De-watering Plan and Sediment and Erosion Control Plan must be submitted by the contractor to this office for review prior to construction activities commencing.**

3. Any excess excavated material, as a result of the work or on-going maintenance, must be disposed of off-site in accordance with the Engineers Report or in a suitable location outside any regulatory floodplain and fill regulated area. RVCA must be consulted to ensure fill is not placed elsewhere within a flood plain or wetland.

4. It is recommended that you retain the services of a professional engineer to conduct on-site inspections to ensure adequacy of the work, verify stability of the final grade and slopes and confirm all imported fill is of suitable type and has been adequately placed and compacted.

5. Work in-water shall not be conducted at times when flows are elevated due to local rain events, storms or seasonal floods. Existing stream flows must be maintained downstream of the de-watered work area without interruption, during all stages of the work. There must be no increase in water levels upstream of the de-watered work area. All pumped water shall be released with energy control systems in place to prevent scour.

6. Only clean non-contaminated fill material will be used.

7. Sediment barriers should be used on site in an appropriate method according to the Ontario Provincial Standard Specifications (OPSS) for silt barriers and/or the Engineer’s Report as a minimum. Soil type, slope of land, drainage area, weather, predicted sediment load and deposition should be considered when selecting the type of sediment/erosion control.

8. Demolition or construction debris is not to be deposited in the waters of any creek; inert concrete/asphalt debris will be considered a deleterious substance. An emergency spill kit should be kept on site in case of fluid leaks or spills from machinery.

9. Sediment and erosion control measures shall be in place before any excavation or construction works commence. All sediment/erosion control measures are to be monitored regularly by experienced personnel and maintained as necessary to ensure good working order. If the erosion and sedimentation control measures are deemed not to be performing adequately, the contractor shall undertake immediate additional measures as appropriate to the situation to the satisfaction of the Conservation Authority.

10. All materials and equipment used for the purpose of site preparation and project completion must be operated and stored in a manner that prevents any deleterious substance (e.g. petroleum products, silt, debris etc.) from entering the water.

11. The waters of the creek are NOT to be considered as machine staging areas. Activities such as equipment refuelling, and maintenance must be conducted away from the water to prevent entry of petroleum products, debris, or other deleterious substances into the water.

12. Operate machinery from outside the water, or on the water in a manner that minimizes disturbance to the banks or bed of the watercourse. Equipment shall not be cleaned in the watercourse or where wash-water can enter any watercourse. All equipment that is to be used near water will arrive on-site in a clean state; To mitigate the potential risk for invasive species colonization within the newly graded areas please follow the guidance in the Clean Equipment Protocol Document https://www.ontarioinvasiveplants.ca/wp-content/uploads/2016/07/Clean-Equipment-Protocol_June2016_D3_WEB-1.pdf

13. All disturbed soil areas must be appropriately stabilized to prevent erosion.

14. It is recommended that you ensure your contractor(s) are provided with a copy of this letter to ensure compliance with the conditions listed herein.

15. A Spill Management Plan shall be implemented in the event of an accidental spill.

16. **There will be no in-water works between March 15 and June 30, of any given year to protect local aquatic species populations during their spawning and nursery time periods.**

17. Any aquatic species (fish, turtles) trapped within an enclosed work area are to be safely relocated outside of the enclosed area to the main watercourse downstream of the work zone.

18. The RVCA is to receive 48 hours' notice of the proposed commencement of the works to ensure compliance with all conditions.

19. All other approvals as might be required from the Municipality, and/or other Provincial or Federal Agencies must be obtained prior to initiation of work. This includes but is not limited to the Drainage Act, the Endangered Species Act, the Ontario Water Resources Act, Environmental Protection Act, Public Lands Act, or the Fisheries Act.

20. A new application must be submitted should any work as specified in this letter be ongoing or planned for or after February 16, 2025.

By this letter the Rideau Valley Conservation Authority assumes no responsibility or liability for any flood, erosion, or slope failure damage which may occur either to your property or the structures on it or if any activity undertaken by you adversely affects the property or interests of adjacent landowners. This letter does not relieve you of the necessity or responsibility for obtaining any other federal, provincial or municipal permits. This permit is not transferable to subsequent property owners.

Should you have any questions regarding this letter, please contact Hal Stimson.

Terry K. Davidson P.Eng
Conservation Authority S. 28 Signing delegate
O. Reg. 174/06

c.c. L. Franklin, Robinson Consultants

- Pursuant to the provisions of S. 28(12) of the Conservation Authorities Act (R.S.O.1990, as amended.) any or all of the conditions set out above may be appealed to the Executive Committee of the Conservation Authority in the event that they are not satisfactory or cannot be complied with.
- Failure to comply with the conditions of approval or the scope of the project may result in the cancelling of the permission and/or initiation of legal action under S. 28(16) of the Act.
- Commencement of the work **and/or** a signed and dated copy of this letter indicates acknowledgement and acceptance of the conditions of the RVCA's approval letter concerning the application and the undertaking and scope of the project.

Name: Dave Ryan (print)

Signed: _____ _____ Date: __February 24, 20-3

Appendix H

DFO – Class Authorization

Fisheries and Oceans Canada
Pêches et Océans Canada

Ontario and Prairie Region
Fish and Fish Habitat Protection Program
867 Lakeshore Rd.
Burlington, ON
L7S 1A1

Région de l'Ontario et des Prairies
Programme de protection du poisson et de son habitat
867 chemin Lakeshore
Burlington, ON
L7S 1A1

February 20, 2023

Our file *Notre référence*
22-HCAA-02820

Lorne Franklin
Robinson Consultants Inc.
350 Palladium Drive, Suite 210
Ottawa, ON
K2V 1A8

Subject: Drain Improvements, Simpson Br 3 Drain and Biltmore Branch Drain, Class F, Ottawa (22-HCAA-02820) – Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

Dear Lorne Franklin:

The Fish and Fish Habitat Protection Program (the Program) of Fisheries and Oceans Canada (DFO) received your proposal on November 16, 2022. We understand that you propose to:

- Improve the existing Simpson Branch 3 Municipal Drain from STA 0+000 to 1+746 by:
  - Widening the channel from 0.5m to 1m and adjusting/flattening the cross section to a 2H:1V slope where not already present;
  - Replacement of 4 existing culvert crossings with like-for-like or larger culverts, embedded within the drain below existing grade;
  - Installation of 4 new culvert crossings with minimum diameters of 1m, sized and embedded similar to the replacement culverts above;
- Establish a new municipal drain profile for the Biltmore Branch from STA 5+000 to 6+946 as described in the draft Engineer's Report by:
  - Modifying existing drainage ditches to new profiles and cross sections (1m bottom width and 2H:1V slopes) designed to accommodate flows for the 2 and 5 year storm events;
  - Replacement of 2 existing culverts with like-for-like or larger culverts and installation of a single new culvert crossing, embedded within the drain;
  - Removal of 2 existing culvert crossings;
- Install rock protection to stabilize the banks at bends and areas of active erosion, tile drain and storm sewer outlets, and at culvert inlets and outlets;
- Maintain existing pools and coarse rocky substrates within the drain;

- Install and maintain erosion and sediment control measures consisting of straw check dams and sediment traps with rock check dams; and,
- Seed and restore all disturbed areas with native species suitable for the site and establish riparian buffer strips ≥ 5m through agricultural areas.

Our review considered the following information:

- Request for Review form and associated documents submitted on November 16, 2022.

Your proposal has been reviewed to determine whether it is likely to result in:

- the death of fish by means other than fishing and the harmful alteration, disruption or destruction of fish habitat which are prohibited under subsections 34.4(1) and 35(1) of the *Fisheries Act*; and
- effects to listed aquatic species at risk, any part of their critical habitat or the residences of their individuals in a manner which is prohibited under sections 32, 33 and subsection 58(1) of the *Species at Risk Act.*

The aforementioned impacts are prohibited unless authorized under their respective legislation and regulations.

To avoid and mitigate the potential for prohibited effects to fish and fish habitat (as listed above), we recommend implementing the measures listed below:

- Plan in-water works, undertakings and activities to respect timing windows to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed and migrate;
  - No in-water work between March 15 to July 15;
- Conduct in-water undertakings and activities during periods of low or no flow;
- Limit the duration of in-water works, undertakings and activities so that it does not diminish the ability of fish to carry out one or more of their life processes (spawning, rearing, feeding, migrating);
- Capture, relocate and monitor for fish trapped within isolated, enclosed, or dewatered areas;
- Limit impacts on riparian vegetation to those approved for the work, undertaking or activity;
  - Maintain an undisturbed vegetated riparian zone on one bank (limit brushing to one bank only), leaving the west and south bank undisturbed if possible;
- Replace/restore any other disturbed habitat features and remediate any areas impacted by the work, undertaking or activity;
- Develop and implement an erosion and sediment control plan to minimize sedimentation of the waterbody during all phases of the work, undertaking or activity;

  - Install effective erosion and sediment control measures prior to beginning work, undertaking or activity in order to stabilize all erodible and exposed areas;
    - One permanent sediment trap should be installed for every 1000m of continuous cleanout or construction in the channel;
  - Regularly inspect and maintain the erosion and sediment control measures and structures during all phases of the project;
  - Dispose of, and stabilize all dredged or excavated material above the High Water Mark or top of bank of nearby waterbodies and ensure sediment re-entry to the watercourse is prevented;
  - Schedule work to avoid wet, windy and rainy periods (and heed weather advisories) that may result in high flow volumes and/ or increase erosion and sedimentation;
  - Operate machinery on land in stable dry areas; and,
- Develop and implement a response plan to avoid a spill of deleterious substances

Provided that you incorporate these measures into your plans, the Program is of the view that your proposal is not likely to result in the contravention of the above mentioned prohibitions and requirements.

Should your plans change or if you have omitted some information in your proposal, further review by the Program may be required. Consult our website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html) or consult with a qualified environmental consultant to determine if further review may be necessary. It remains your responsibility to remain in compliance with the *Fisheries Act* and the *Species at Risk Act*.

It is also your *Duty to Notify* DFO if you have caused, or are about to cause, the death of fish by means other than fishing and/or the harmful alteration, disruption or destruction of fish habitat. Such notifications should be directed to FisheriesProtection@dfo-mpo.gc.ca or 1-855-852-8320.

We recommend that you notify this office at least 10 days before starting your project and that a copy of this letter be kept on site while the work is in progress. It remains your responsibility to meet all other federal, territorial, provincial and municipal requirements that apply to your proposal.

If you have any questions with the content of this letter, please contact Kyle Mataya at Kyle.Mataya@dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

Kyle Mataya
Biologist, Triage and Planning
Fish and Fish Habitat Protection Program