

The Corporation of the Municipality of Brockton



By-Law 2018-082

Being a By-Law to Provide For A Drainage Works In The Municipality Of Brockton In The County Of Bruce (Russell Municipal Drain 2018)

Whereas the requisite number of owners have petitioned the Council of the Corporation of the Municipality of Brockton in the County of Bruce in accordance with the provisions of the Drainage Act requesting that the following lands and roads be drained by a drainage works: Russell Municipal Drain beginning at the property line of Lot 56, Concession 3 and Sideroad 25 South, proceeding north and east crossing Concession 2 South Durham Road to Lot 56, Concession 2 and proceeding northeast, outletting to a new channel prior to a confluence with an existing natural watercourse on Lot 57, Concession 2, Municipality of Brockton (Geographic Township of Brant), County of Bruce.

And Whereas the Council of The Corporation of The Municipality of Brockton has procured a report under Section 4 of the Drainage Act, R.S.O. 1990, as amended, Chapter D.17, by R.J. Burnside & Associates Limited, dated September 2018 and the report is attached hereto as Schedule "A" and forms part of this by-law;

And Whereas the estimated total cost of constructing the drainage works is one hundred thirty five thousand dollars (\$135,000.00), less allowances and grants;

And Whereas fifty seven thousand one hundred forty dollars (\$57,140.00) is the amount to be contributed by the municipality for the construction of the drainage works;

And Whereas the Council of the Municipality of Brockton is of the opinion that the drainage of the area is desirable;

Now Therefore the Council of The Corporation of the Municipality of Brockton under the Drainage Act, enacts as follows:

1. The report prepared by R.J. Burnside & Associates Limited, dated September 2018 and attached hereto as Schedule "A" is hereby adopted and the drainage works as therein indicated and set forth is hereby authorized and shall be completed in accordance therewith.
2. This By-Law comes into force on the passing thereof and may be cited as the Russell Municipal Drain 2018 By-law.

Read, a First and Second Time and Provisionally Adopted this 5th day of November, 2018.

Original Signed By
Mayor – David Inglis

Original Signed By
Clerk – Fiona Hamilton

Read a Third Time and Finally Passed this 11th Day of February, 2020.

Mayor – Chris Peabody

Clerk – Fiona Hamilton



BURNSIDE

Engineers Report
Russell Municipal Drain 2018

Municipality of Brockton



NET ASSESSMENTS for CONSTRUCTION MAIN DRAIN

PROJECT: Russell MD
DATE : September 11, 2018

MUNICIPALITY: Brockton
PROJECT #: 300038962

Conc.	Lot or Part	Owner	Roll No.	Affected Area (Ha.)	Benefit Assess't (Sect.22)	Outlet Assess't (Sect.23)	Special Assess't (Sect.26)	Totals	Less 1/3 Grant	Less Allowances	Net Assessment
Agricultural Lands											
2	56 & 57	G. Girodat	(3-042)	0.72	\$ 10,550	\$ 310	\$ -	\$ 10,860	\$ 3,620	\$ 2,680	\$ 4,560
2	S Pt. 56	* E. Pedrosa	(3-040)	0.20	\$ 900	\$ 210	\$ -	\$ 1,110	\$ -	\$ -	\$ 1,110
3	56	J. Russell	(3-013)	3.31	\$ 30,950	\$ 3,680	\$ -	\$ 34,630	\$ 11,543	\$ 2,670	\$ 20,417
3	NE Pt. 55	* D. & V. Duncan	(3-010-01)	1.46	\$ -	\$ 2,490	\$ -	\$ 2,490	\$ -	\$ -	\$ 2,490
3	55	W. & J. Poechman	(3-010)	9.07	\$ -	\$ 10,050	\$ -	\$ 10,050	\$ 3,350	\$ -	\$ 6,700
3	54	* H. Demarce	(3-009)	10.96	\$ -	\$ 8,980	\$ -	\$ 8,980	\$ -	\$ -	\$ 8,980
3	53	Hillcrest Layer Farms Ltd.	(3-007)	4.67	\$ -	\$ 9,740	\$ -	\$ 9,740	\$ 3,247	\$ -	\$ 6,493
TOTAL ON LANDS				30.39	\$ 42,400	\$ 35,460	\$ -	\$ 77,860	\$ 21,760	\$ 5,350	\$ 50,750
Roads											
Sideroad 25 South		Municipality of Brockton		0.76	\$ 8,860	\$ 3,500	\$ -	\$ 12,360	\$ -	\$ -	\$ 12,360
Concession 2 SDR		Municipality of Brockton		0.98	\$ 26,490	\$ 4,700	\$ 13,590	\$ 44,780	\$ -	\$ -	\$ 44,780
TOTAL ON ROADS				1.74	\$ 35,350	\$ 8,200	\$ 13,590	\$ 57,140	\$ -	\$ -	\$ 57,140
ALL LANDS AND ROADS				32.13	\$ 77,750	\$ 43,660	\$ 13,590	\$ 135,000	\$ 21,760	\$ 5,350	\$ 107,890

Notes: 1) * Denotes lands that are not eligible for ADIP grant, based on property tax class at the time of assessment preparation, however; it is the responsibility of the landowner to confirm whether their property is eligible for grant.
2) The NET Assessment includes the total estimated property assessment, less both applicable ADIP grant and allowances.



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**Engineer's Report
Russell Municipal Drain 2018**

Municipality of Brockton

**R.J. Burnside & Associates Limited
449 Josephine St., P.O. Box 10
Wingham ON N0G 2W0 CANADA**

**September 2018
300038962.0000**

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Record of Revisions

Revision	Date	Description
0	September 10, 2018	Initial Submission to the Municipality of Brockton

R.J. Burnside & Associates Limited

Report Prepared By:



Ed DeLay, M.Eng., P.Eng.
Environmental Engineer

Executive Summary

Authorization

The preparation of this Engineer's Report was authorized through a resolution of the Council at their March 29, 2016 meeting and a letter dated April 4, 2016, from the Clerk for the Municipality of Brockton in accordance with Section 4 of the Drainage Act.

Objective & Recommendations

The primary objective of this Report is to determine a drainage solution to alleviate flow from the upper watershed which concentrates at the Sideroad 25 South culvert crossing, and additional ponding that currently takes place following storm events and snowmelt within the lower watershed area.

This Report recommends the construction of a new closed Main Drain beginning at the property line of Lot 56, Concession 3 and Sideroad 25 South, proceeding north and east crossing Concession 2 South Durham Road to Lot 56, Concession 2 and proceeding northeast, outletting to a new channel prior to a confluence with an existing natural watercourse on Lot 57, Concession 2, Municipality of Brockton (Geographic Township of Brant), County of Bruce.

This drain is primarily intended to provide a subsurface drainage outlet for the J. Russell property (Roll No. 3-013), as well as incorporating catchbasins and directional berms to collect and control surface water.

Summary of Assessments

A summary of the assessments for this project are as follows:

Privately Owned – Agricultural	\$ 65,280
Privately Owned – Non-Agricultural (non-grantable)	\$ 12,580
Municipal Roads (non-grantable)	\$ 43,550
Special Assessments (Section 26)	<u>\$ 13,590</u>
Total Estimated Assessments	\$135,000

Acknowledgements

Burnside would like to acknowledge the involvement and cooperation of Michelle Gallant from the Saugeen Valley Conservation Authority, former Drainage Superintendent Harold McKnight, and current Drainage Superintendent Steven Cobean, members of Council, and the Staff of the Municipality of Brockton.

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Appendix C Special Assessments – Section 26
Appendix D Schedules of Assessment
Appendix E Standard Drain Specifications
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Appendix G Soils Investigation
Appendix H Agency Correspondence
Appendix I Drawings

NOMENCLATURE

ac - acre (0.4047 ha)
BSWI - buried surface water inlet
CB - catchbasin
CDT - concrete drain tile
CSP - corrugated steel pipe
c/w - complete with
dia. - diameter
DICB – ditch inlet catchbasin
D/S - downstream
ea - each
FL - fence Line
FPPDT - filtered perforated plastic drainage tubing
H - horizontal
ha - hectare (2.471 ac)
HDPE – high density polyethylene
JB - junction box
km - kilometre
LS - lump sum
m - metre
mm - millimetre
m² - square metre
m³ - cubic metre
OB - observation box
O/H - overhead
O/S - offset
PDT - plastic drainage tubing
PL - property line
PPDT - perforated plastic drainage tubing
RCSP - riveted corrugated steel pipe
ROW – right-of-way
S & I - supply and install
SPDT - solid plastic drainage tubing
Sta. - station (chainage)
SWI - surface water inlet
SWWSP - smoothwall welded steel pipe
t - tonne (2,205 pounds)
U/G - underground
U/S - upstream
V – vertical

1.0 Petition for Drainage Works by Owners

This Report is being prepared in response to an appointment by the Municipality of Brockton, dated April 4, 2016, to investigate drainage issues on the property of the petitioning landowner, in accordance with Section 4 of the Drainage Act.

The Petition, dated February 23, 2016, was submitted by John Russell (Roll No. 3-013); owner of Lots 56 and 57, Concession 3, Municipality of Brockton (Geographic Township of Brant), County of Bruce.

2.0 Background Information

2.1 History

The watershed of the Russell Municipal Drain is not currently serviced by an existing municipal drain. Additionally, there are no existing municipal drainage systems adjacent to the proposed Russell Municipal Drain watershed. Various private drainage schemes are currently being employed within the watershed, however, they are unable to alleviate the surface ponding currently taking place. Surface flow from this watershed currently outlets to the north and east into an existing natural watercourse.

It was stated by landowners that prior to 2006, a functioning well was located on the east side of Sideroad 25 South. The overflow of the existing well was directed to an offset catchbasin which outletted into two 100 mm dia. runs of agricultural tubing. Water would then flow via surface flow or by the aforementioned agricultural tubing system underneath Concession 2, South Durham Road to a low run on Lot 56, Concession 2.

Upgrades were made to the well in 2006, but it appears that the well was decommissioned shortly thereafter. It was stated by John Russell that the well continued to leak onto his property after the decommissioning.

2.2 Existing Conditions

Groundwater fed flow from the upper watershed currently collects at the Sideroad 25 South culvert crossing and flows east towards Lot 56, Concession 3. Furthermore, surface ponding currently takes place following storm events and snowmelt in the low lying areas within the Russell Municipal Drain watershed. This is most evident in the wetland area in the northern portion of Lot 56, Concession 3 and the surrounding agricultural area.

It was also stated by landowners that a private drainage system outlets upstream of Sideroad 25 South near the Sideroad 25 South culvert crossing.

Surface water is currently conveyed from the northeastern portion of Lot 55, Concession 3 to the wetland area in the northern portion of Lot 56, Concession 3 by an existing CSP culvert crossing Sideroad 25 South. Water then flows overland towards the northeastern corner of Lot 56, Concession 3 to a CSP culvert crossing beneath Concession Road 2 South Durham Road. This culvert outlets to a low run in the southeast corner of Lot 56, Concession 2 and continues to an existing watercourse on Lot 57, Concession 2.

2.3 Watershed Area & Land Use

A watershed boundary for the proposed Russell Municipal Drain was determined as part of this Report. Topographic contour mapping and survey data were examined, and a watershed boundary was delineated through a combination of computer aided drafting (CAD) software and field verification. This watershed boundary has been adopted as part of this Report.

The total watershed area contributing to the Russell Municipal Drain is approximately 32.13 ha. Land use within the watershed is divided as follows:

- 8.85 ha used for agricultural purposes
- 4.17 ha as grassland
- 15.71 ha as woodlot
- 1.66 ha as residential property
- 1.74 ha as roadway.

2.4 Soils

The Bruce County soils map indicates that the predominant soil type within the watershed is Waterloo sandy loam. Waterloo sandy loam is characterized by irregular steeply sloping topography, few stones, and good natural drainage.

The soils within the Russell Municipal Drain watershed have an agricultural capability rating of Class 4 with severe limitations that restrict the range of crops or require special conservation practices, or both. These soils are low to fair in productivity for a fair range of crops but may have high productivity for a specially adapted crop.

3.0 Preliminary Investigations

3.1 On-Site Meeting

An on-site meeting regarding the proposed Municipal Drain was held on May 26, 2016 near the intersection of Concession Road 2 South Durham Road and Sideroad 25 South. The following were present at the meeting:

- Gene Girodat Landowner (Roll No. 3-042)
- John Russell Landowner (Roll No. 3-013)

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- Dave Duncan Landowner (Roll No. 3-010-01)
- Vicki Duncan Landowner (Roll No. 3-010-01)
- Wayne Poechman Landowner (Roll No. 3-010)
- Sheila Robertson Representative (Roll No. 3-009)
- Harold McKnight Drainage Superintendent, Municipality of Brockton
- Michelle Gallant Regulations Officer, SVCA
- Ed DeLay R.J. Burnside & Associates Limited
- George Guse R.J. Burnside & Associates Limited

The existing drainage conditions were discussed, and John Russell expressed his interest in a subsurface outlet to the downstream existing natural watercourse. It was determined from discussions at the meeting that a new drainage system would be required, and that the boundary of the contributing watershed should be investigated.

A discussion regarding the small woodlot area on the J. Russell property (Roll No. 3-013) also took place. John Russell expressed interest in tiling around the woodlot area to improve the drainage on his land. The Saugeen Valley Conservation Authority (SVCA) stated that they would have to complete a site visit to confirm if the woodlot area is a wetland. The SVCA also stated that the area would not be allowed to be altered if it is confirmed to be a wetland. Furthermore, the proposed work would be required to be reviewed by SVCA and a permit would be required to complete the work.

Landowners agreed that the drain should go straight to a Final Report, and that a Preliminary Report was not required.

As a result of the on-site meeting, it was determined that the primary purpose of this Report is to provide a new subsurface drainage outlet for the J. Russell property (Roll No. 3-013) and also including surface water capacity, especially for surface flow currently crossing Sideroad 25 South, from the west.

4.0 Validity of Petition

This Report has been prepared in accordance with Section 4 of the Drainage Act. The area requiring drainage was determined by the Engineer at the On-Site meeting as part of Lots 56 & 57, Concession 3. The Petition submitted is valid on the basis that all of the owners in the area requiring drainage have signed it, in accordance with Section 4 (1) (a) of the Act.

5.0 Environmental & Fisheries Considerations

When a new Engineer's Report is prepared that could affect an existing open Municipal Drain, natural watercourse, wetland, or have other environmental effects, a review of the work is required, and subsequent approvals and/or requirements must be obtained from the applicable agency. These may include the local Conservation Authority (CA),

Ministry of Natural Resources and Forestry (MNRF), and the Department of Fisheries and Oceans (DFO).

5.1 Saugeen Valley Conservation Authority

The Saugeen Valley Conservation Authority (SVCA) has been involved throughout the progression of this project. The SVCA established that the treed area in the northern part of Lot 56, Concession 3 is a wetland and indicated their concerns pertaining to this area. The SVCA has provided input regarding the location and depth of the drain as well as material specifications for the pipe in reference to the adjacent wetland.

A summary of the wetland investigation completed by Burnside can be found in Appendix H.

5.2 Ministry of Natural Resources and Forestry

A request for review of this project was submitted to the MNRF on April 11, 2017. Kathy Dodge, a biologist with the MNRF indicated that their primary concern in this area was for Bobolink, Eastern Meadowlark, and Snapping Turtles. She indicated that the MNRF is most concerned in work areas that interfere with hay fields and pasture land, and less concerned with areas that interfere with row crops. She mentioned that it would be ideal for work to be done outside of breeding season window from May 1st to July 31st.

Following a discussion and investigation by Hannah Maciver, a Terrestrial Ecologist with Burnside, the following mitigation measures are recommended to avoid potential impacts to Species at Risk (SAR).

- Apply timing windows to avoid direct impacts to birds during the core breeding window (April 1st and August 31st).
- Conduct a nest survey just prior to removing vegetation (i.e., 1-3 days in advance), in the event that a late nesting bird is still present. Should an active nest be found, all works will stop until the young have fledged from the nest.
- All works should be completed prior to the next breeding season (i.e., prior to April 1st).
- Ensure that the area of works is excluded from the surrounding area to prevent species such as turtles from entering the active work area (i.e., exclusion fencing). Should any wildlife be found, all works will stop until the animal has been safely removed from the work area. If a SAR is found, consultation with MNRF may be required.

The proposed works will occur within active agricultural fields. Two different fields will be affected as part of the proposed works. Both fields will remain suitable for an agricultural operation after the installation is completed. If the recommended avoidance windows listed above are applied, the proposed works will not impact breeding birds and potential breeding bird habitat that is temporarily removed will regenerate prior to the next

breeding season. Therefore, no temporary or permanent impacts to Species at Risk are anticipated.

5.3 Fisheries and Oceans Canada

The proposed Russell Municipal Drain 2018 outlets into an existing natural watercourse on Lot 57, Concession 2. The proposed work will take place within the bank of the existing watercourse and will not affect the in-water portion of the watercourse; however, a request for review was completed and submitted in order to keep DFO apprised on the proposed work.

A letter of advice received from Fisheries and Oceans Canada has been included in Appendix H of this report. No Federal Species at Risk have been identified within this drainage area that would require special consideration under the Species at Risk Act (SARA).

6.0 Design Criteria & Engineering Considerations

6.1 Drainage System Design & Sizing

The applicable sections of the *Design and Construction Guidelines for Work under the Drainage Act*, as prepared by the Government of Ontario, and the applicable sections of the *Drainage Guide for Ontario*, as published by the Ontario Ministry of Agriculture and Food, are used for the design and construction of Municipal Drains.

Under these guidelines it is recommended to use a drainage co-efficient of 38.1 mm (1.5 inches) in 24 hours, and following discussion with landowners, this co-efficient was selected as the design standard adopted for this project.

The design of the closed portion of the drain also took into consideration the vertical freeboard to the channel bottom at the outlet into the open portion of the existing watercourse.

6.2 Water Quality Considerations

The loss of sediment and nutrients from cropped land is a major concern to water quality in Ontario. Therefore, this design has incorporated several features to minimize these impacts including:

- Directional berms and rip-rap surround the catchbasins to slow and pond surface water, allowing suspended soil particles and nutrients to fall out of suspension and remain on the soil surface.
- All catchbasins include a 300 mm deep sump to slow and encourage deposition of suspended soils at these locations.

- A permanent sediment basin shall be constructed at the outlet of the Russell Municipal Drain prior to its confluence with the existing watercourse. Downstream of the stilling basin, a temporary sediment control structure constructed using filter socks and rock check dams shall be constructed to further enhance sediment deposition prior to exiting the construction zone. Both shall be constructed prior to the tile installation on the Russell Municipal Drain 2018.
- A buried surface water inlet, including a 600 mm deep sump, designed to encourage surface water infiltration through a layer of geo-textile wrapped 19 mm dia. clear stone and a layer of geo-textile wrapped pea gravel.

6.3 Decommissioned Well Investigation

An investigation was undertaken during the design stage to determine possible effects on the proposed drainage system from the decommissioned private well on the east shoulder of the Sideroad 25 South right-of-way. After reviewing a 2006 report on well upgrades by Joy Rutherford, a Senior Hydrogeologist with R.J. Burnside & Associates Limited, it was found that at that time advice was given to the Duncan and Pedrosa properties that the existing well would not be a long-term potable water solution, even following the upgrading. The upgrades were performed to increase the water quality from the well for the two properties and to decrease the effect of the overflow from the well onto the J. Russell property (Roll No. 3-013) downstream.

Following the recommendations of the 2006 report, it appears that the well was decommissioned a short time later. Municipal staff and landowners describe the lower sections of the well having been filled with concrete and buried. This was likely completed following the construction of a new dug well and drilled well on the Duncan and Pedrosa properties respectively.

6.4 Soils Investigation

A soils investigation was completed both along and adjacent to the proposed drain alignment on November 29, 2016. Various test pits were dug on both the J. Russell property (Roll No. 3-013) and the Gene Girodat property (Roll No. 3-042). The results of the investigation are summarized below, and shown on the accompanying plan in Appendix G.

J. Russell Property (Roll No. 3-013):

Test Pits Nos. 1 & 2

Immediately downstream of the Sideroad 25 South culvert crossing on Lot 56, Concession 3 two test pits (TP1, TP2) were dug to a maximum depth of 1.7 m. A mix of organic soil and topsoil was found from grade to approximately 0.6 m in depth, followed

by silty sandy soils to the extent of each test pit. Groundwater was not present in the pit at the time of excavation.

Test Pits Nos. 3, 4, & 5

Three test pits (TP3, TP4, & TP5) were dug to the south of the existing wetland area in the northern portion of Lot 56, Concession 3 to a maximum depth of 0.5 m. A mix of organic soil and topsoil was found from grade to approximately 0.15 m in depth followed by silty sandy soils to the extent of the test pits. Groundwater was not present in the pit at the time of excavation.

Test Pit No. 6

One test pit (TP6) was dug near the north property line of Lot 56, Concession 3 immediately to the west of the existing culvert crossing under Concession 2 South Durham Road. This test pit was dug to a total depth of 2.1 m. A mix of organic soil and topsoil was found from grade to approximately 0.15 m in depth, followed by silty sandy soils from 0.15 m to 1.7 m in depth. A grey clay was found from 1.7 m to the extents of the test pit. Groundwater was not present in the pit at the time of excavation.

G. Girodat Property (Roll No. 3-042):

Test Pit No. 7

A test pit (TP7) was dug approximately 20 m north of the downstream end of the CSP culvert crossing the Concession 2 South Durham Road. This test pit was dug to a total depth of 1.0 m. A mix of organic soil and topsoil was found from grade to approximately 0.2 m in depth, followed by very unstable sandy soil to the extent of the test pit. Groundwater was not present in the pit at the time of excavation.

Test Pits Nos. 8 & 9

A test pit (TP8) was dug in the center of the low run approximately 85 m downstream of the CSP culvert crossing Concession 2 South Durham Road. The test pit was dug to approximately 2.0 m in depth. A very wet silty and clayey soil was found throughout the test pit. Approximately 5 m north of TP8, an additional test pit was dug. This test pit (TP9) was dug to approximately 2.3 m in depth. Dark organic soil was found from grade to approximately 0.4 m in depth, followed by sandy silty soil from approximately 0.4 m to 2.1 m in depth. A grey clay was found from 2.1 m to the extent of the test pit. Groundwater was not present in the pit at the time of excavation but was noted to be seeping into the pit from the excavated banks.

6.5 Utilities Investigation

A utilities investigation was undertaken during the design stage to determine possible elevation conflicts prior to the time of construction. A telephone cable was located within the Concession Road 2 South Durham Road right-of-way, to the north of the road surface. No other utility conflicts were found during our investigation; however, all public and private utilities shall be re-located by the Contractor prior to construction of the proposed Russell Municipal Drain.

6.6 Material Selection

Material selections are typically made based on the lowest cost product that is also able to satisfy various engineering requirements. Typically, Plastic Drainage Tile (PDT) and non-reinforced concrete pipe are the most cost-effective materials that can be used. In this case, PDT was chosen as the most economical option compared to non-reinforced concrete pipe, and HDPE solid plastic pipe.

Road crossings require stronger pipe stiffness. As a result, high density polyethylene pipe (HDPE) is typically used underneath gravel ROWs as the pipe can be installed by the open cut method. On paved roads however, Smoothwall Welded Steel Pipe (SWWSP) is typically used as it can be installed via the Jack and Bore method. This is done to avoid disturbing the pavement on the road, and also to avoid closure of the road.

On the Concession 2 South Durham Road right-of-way, SWWSP has been specified for the road crossing.

Catchbasins are typically specified with galvanized birdcage grates to increase inlet surface area. When debris build-up occurs during storm events this increased surface area allows surface water to enter the inlets as intended.

6.7 Installation Techniques

6.7.1 Topsoil Stripping

Prior to tile installation, the topsoil shall be stripped for the entire width of the drainage plow and stockpiled, to be spread on top of the drain alignment as the final step of restoration. This practice limits the loss of topsoil through mixing with subsoil and encourages a faster transition period for the area above the trench to previous crop productivity.

6.7.2 Drainage Plow

A drainage plow is typically specified for the installation of PDT where soil conditions allow as it is the most cost-effective method of installation. Additionally, this installation

method will limit the effect of poor subsurface soil conditions on pipe gradient and soil support, both during and following construction.

6.7.3 Alternate Installation Techniques

In areas of poor subsoil conditions, where PDT installation is not feasible with a drainage plow, dual-wall HDPE (320 kPa) pipe shall be installed using an excavator on clear crushed stone wrapped in geo-textile to create a firm base for the tile. The tile will then be backfilled with select native material or backfilled with crushed stone to the top of the pipe (as specified by the Engineer based on site conditions). These techniques vary depending on soil conditions and are specified for each project accordingly.

6.7.4 Road Crossings

Road crossings for closed municipal drains are typically installed by the jack and bore method for paved roads to leave the road surface intact, or by the open cut method on gravel roads.

The jack and bore method typically involves the excavation of a boring pit on one side of the road, where a boring machine turns an auger inside a steel casing which is pushed across the road on a specified grade. The steel casing is then left to serve as the municipal drain crossing. The Concession 2 South Durham Road crossing shall be completed using this method.

7.0 Proposed Design

7.1 Information Meeting

An information meeting for the improvement was held on August 26, 2016 at the Municipality of Brockton office to discuss the proposed design of the drain, cost estimates, and assessments. The following were present at the meeting:

- | | |
|--------------------|---|
| • Gene Girodat | Landowner (Roll No. 3-042) |
| • John Russell | Landowner (Roll No. 3-013) |
| • Dave Duncan | Landowner (Roll No. 3-010-01) |
| • Vicki Duncan | Landowner (Roll No. 3-010-01) |
| • Wayne Poechman | Landowner (Roll No. 3-010) |
| • Harold Demarce | Landowner (Roll No. 3-009) |
| • Sheila Robertson | Representative (Roll No. 3-009) |
| • Harold McKnight | Drainage Superintendent, Municipality of Brockton |
| • Terry Tuck | Chief Building Official, Municipality of Brockton |
| • Michelle Gallant | Regulations Officer, SVCA |
| • Ed DeLay | R.J. Burnside & Associates Limited |
| • Trevor Kuepfer | R.J. Burnside & Associates Limited |

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The design presented included a sealed dual-wall HDPE pipe system, as required by the SVCA to negate long-term lowering of the water level in the established wetland on the J. Russell property (Roll No. 3-013). In addition, the watershed boundary, estimated costs, design and a general discussion on the allowances and assessments were reviewed with all of those in attendance.

Michelle Gallant commented in the meeting that the wetland area on the J. Russell property (Roll No. 3-013) property meets all 4 criteria specified in the Conservation Authority Act R.S.O. 1990, chapter C.27 section 28 subsection 25, and therefore the area cannot be altered.

Following this meeting, the Drainage Superintendent was available to the landowners not in attendance for information on the progress of the project.

7.2 Information Meeting No. 2

A second information meeting for the improvement was held on September 27, 2016 at the Municipality of Brockton office to discuss revisions to the proposed design of the drain, cost estimates, and assessments. The following were present at the meeting:

- Gene Girodat Landowner (Roll No. 3-042)
- John Russell Landowner (Roll No. 3-013)
- Vicki Duncan Landowner (Roll No. 3-010-01)
- Wayne Poechman Landowner (Roll No. 3-010)
- Sheila Robertson Representative (Roll No. 3-009)
- Bob Ottens Hillcrest Layer Farms Ltd. (Roll No. 3-007)
- David Inglis Mayor, Municipality of Brockton
- Dan Gieruszak Deputy Mayor, Municipality of Brockton
- Chris Oberle Councilor, Municipality of Brockton
- Steve Adams Councilor, Municipality of Brockton
- Dean Leifso Councilor, Municipality of Brockton
- Bill Bell Councilor, Municipality of Brockton
- Debra Roth Clerk, Municipality of Brockton
- Julie Farrell Deputy Clerk, Municipality of Brockton
- Trish Serratore Chief Financial Officer, Municipality of Brockton
- Amberly Keelan Municipality of Brockton
- John Strader Works Superintendent, Municipality of Brockton
- Harold McKnight Drainage Superintendent, Municipality of Brockton
- Michelle Gallant Regulations Officer, SVCA
- Ed DeLay R.J. Burnside & Associates Limited
- Jeremy Taylor R.J. Burnside & Associates Limited

Engineer's Report – Russell Municipal Drain 2018
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As part of the design presented at this meeting, a channel was proposed on the Gene Girodat property (Roll No. 3-042) as the outlet for the closed section of drain as the most cost-effective method of construction. Harold McKnight expressed a concern with the construction of a channel in this location because of unstable soils and the likely need for frequent future maintenance and commented on the ease of maintenance of a piped system compared to a channel. Wayne Poechman inquired about the feasibility of taking the drain straight east on the J. Russell property (Roll No. 3-013) to the existing natural watercourse and requested that this be investigated. Michelle Gallant reiterated the legal requirements for the wetland area and was to communicate with John Russell the drainage limitations that he has on his property following the meeting.

In addition, the watershed boundary, estimated costs, design and a general discussion on the allowances and assessments were reviewed with all of those in attendance.

Following this meeting, the Drainage Superintendent was available to the landowners not in attendance for information on the progress of the project.

7.3 Information Meeting No. 3

A third information meeting for the improvement was held on May 11, 2017 at the Municipality of Brockton office to discuss revisions to the proposed design of the drain, cost estimates, and assessments. The following were present at the meeting:

- Gene Girodat Landowner (Roll No. 3-042)
- John Russell Landowner (Roll No. 3-013)
- Vicki Duncan Landowner (Roll No. 3-010-01)
- Wayne Poechman Landowner (Roll No. 3-010)
- Harold Demarce Landowner (Roll No. 3-009)
- Sheila Robertson Representative (Roll No. 3-009)
- Julie Farrell Deputy Clerk, Municipality of Brockton
- Harold McKnight Drainage Superintendent, Municipality of Brockton
- Terry Tuck Chief Building Official, Municipality of Brockton
- Raymond Holliday Deputy Chief Building Official, Municipality of Brockton
- Michelle Gallant Regulations Officer, SVCA
- Ed DeLay R.J. Burnside & Associates Limited
- Trevor Kuepfer R.J. Burnside & Associates Limited

The design presented included a perforated PDT piped system on both the J. Russell (Roll No. 3-013) and G. Girodat (Roll No. 3-042) properties as requested by the landowners. Both, Gene Girodat and John Russell indicated their preference for perforated pipe being installed on their property. Wayne Poechman indicated his concern with having perforated pipe next to the wetland, and Michelle Gallant indicated that the SVCA would accept perforated pipe if the alignment location complies with the setback requirements with respect to the wetland on Lot 56, Concession 3.

In addition, the watershed boundary, estimated costs, design and a general discussion on the allowances and assessments were reviewed with all of those in attendance. Following this meeting, the Drainage Superintendent was available to the landowners not in attendance for information on the progress of the project.

7.4 Wetland Delineation

Following the third information meeting for the improvement held on May 11, 2017, a letter from Michelle Gallant of the SVCA was received outlining the delineation of the wetland on Lot 56, Concession 3.

At the request of the Engineer, the wetland boundary was also investigated and delineated by Burnside. A technical memo outlining the limits of the wetland was prepared by Nicholle Smith, a terrestrial ecologist with Burnside, and has been included in Appendix H.

This revised wetland limit was accepted by the SVCA and forms the setback boundary for the alignment of any perforated tile in the vicinity. Under the SVCA setback from the wetland, the location of the proposed perforated tile through the J. Russell property (Roll No. 3-013) would be in an unusable location to the landowner, and therefore solid PDT has been specified in the alignment within J. Russell property.

7.5 Proposed Work & Appurtenances

In accordance with the Drainage Act, the details of the proposed work are contained in the Appendices of this Report and provide complete details of the entire project. This section of the Report is intended to provide only a brief description of the work along the course of the new drain.

7.5.1 Main Drain

The Main Drain includes the installation of approximately 293 m of PDT to be installed with a drainage plow and dual-wall HDPE (320 kPa) pipe to be installed with an excavator, one (1) road crossing composed of approximately 20 m of SWWSP pipe installed by the jack and boring method. The design also provides for the installation of three (3) concrete ditch inlet catchbasins with directional berms, one (1) concrete observation box, and one (1) buried surface water inlet.

Appurtenances associated with the work on private lands include the connection or reconnection of existing field tile encountered during the work. Appurtenances associated with the work on affected road right-of-way include the stripping and replacing of topsoil and the seeding of all disturbed areas.

7.6 Description of Proposed Work on Each Property

A description of the proposed work being performed on each property is outlined below:

7.6.1 Main Drain

G. Girodat (Roll No. 3-042)

- The construction of a channel for approximately 20 m from Sta. -0+030 to Sta. -0+010.
- The construction of a stilling basin, spillway and outlet protection for 10 m from Sta. -0+010 to Sta. 0+000.
- Approximately 6 m of 450 mm dia. dual-wall HDPE bell & spigot (320 kPa) pipe (C/W outlet rodent grate & rip-rap erosion protection from Sta. 0+000 to Sta. 0+006.
- Approximately 79 m of 375 mm dia. solid PDT (210 kPa) from Sta. 0+006 to Sta. 0+085.
- One (1) new 600 mm x 600 mm concrete observation box at Sta. 0+085
- One (1) new 600 mm x 600 mm concrete ditch inlet catchbasin offset approximately 6 m east of Sta. 0+085 C/W directional berm and connected with approximately 6 m of 250 mm dia. dual-wall HDPE (320 kPa) pipe.

Concession 2 South Durham Road (Municipality of Brockton)

- Approximately 20 m of 400 mm dia. SWWSP pipe (O.D.) from Sta. 0+085 to Sta. 0+105 installed via the Jack and Bore method.
- One (1) new 600mm x 600mm concrete ditch inlet catchbasin at Sta. 0+105 C/W directional berm.

J. Russell (Roll No. 3-013)

- Approximately 202 m of 375 mm dia. solid PDT from Sta. 0+105 to Sta. 0+307.

Sideroad 25 South (Municipality of Brockton)

- One (1) new 600 mm x 600 mm concrete ditch inlet catchbasin at Sta. 0+307 C/W directional berm and buried surface water inlet.

7.7 Working Spaces and Access Routes

The working space and access routes being provided to the Contractor to undertake this work are described in the Special Provisions. This working space shall also be available for future maintenance of the drain. Access to the working space is to be confirmed by the Contractor with the Landowners and the Engineer prior to commencement of construction. Allowances for the working space and access routes have been provided

to the affected properties. Access to the various parts of the drain shall be as shown on the accompanying drawings in Appendix I

7.8 Change Orders

If unforeseen circumstances are encountered following the adoption of this Report, the Engineer may issue Change Orders, as required to have the works properly constructed.

7.9 Tile Connections & Reconnections

The reconnection of existing tiles encountered during the installation of the drain will be included as part of the construction costs. Where feasible, all tiles shall be reconnected over top of the drain. However, direct connections may be allowed due to the elevation of the existing tile, as approved by the Engineer. These direct connections will only be allowed at the time of construction of the Russell Municipal Drain 2018 and shall be completed as specified for future connections in this Report.

7.10 Future Connections

After construction, private tile drains shall not be connected directly to the Municipal Drain tile unless approved by the Municipality. All future connections must be made at a plugged inlet provided in a precast concrete structure or an approved core drilled hole into the tile, with approved fittings and materials and/or in a manner acceptable to the Municipality.

Direct connections by the owners or their Contractors not approved by the Municipality or its Drainage Superintendent may be removed and at the expense of the owner of the land upon which the connection was made.

7.11 Engineer's Report

The proposed works and costs contained herein are intended to reflect the requirements of the stakeholders and are based on information gathered during the on-site survey, as well as at the landowner meetings and follow up discussions. Details of the proposed work are described in this Report and its appendices.

8.0 Description of Appendices

8.1 Appendix A – Allowances

8.1.1 General

In accordance with Section 8(1)(d) of the Act, this Appendix provides a summary of the allowances provided under Sections 29 and 30 of the Act. A breakdown of these Allowances is available upon request to affected landowners. Allowances will be

deducted from total assessments in accordance with Section 62(3) of the Act. The land and crop values used for these calculations were determined based on recent land sales and a general understanding of the values within this geographic area and are described in the following sections. The results of the allowance calculations under each Section of the Act can be seen within this Appendix. Details regarding working space can be found in the Special Provisions.

8.1.2 Section 29 – Right-of-Way

The Act states:

The engineer in the report shall estimate and allow in money to the owner of any land that it is necessary to use,

- (a) for the construction or improvement of a drainage works;*
- (b) for the disposal of material removed from drainage works;*
- (c) as a site for a pumping station to be used in connection with a drainage works; or*
- (d) as a means of access to any such pumping station, if, in the opinion of the engineer, such right of way is sufficient for the purposes of the drainage works,*

the value of any such land or the damages, if any, thereto, and shall include such sums in the estimates of the cost of the construction, improvement, repair or maintenance of the drainage works R.S.O. 1990, s. 29.

A base value of \$24,711 per hectare (**\$10,000 per acre**) for workable, agricultural land has been used to calculate the right-of-way allowances provided in this Report. These allowances are generally provided to the properties where a right-of-way is required for a new open or closed drain.

The land value applied for the closed portion of the drain is reduced to one third of the base value for a 10 m width. The reduction to one third is on the basis that the land along and over the closed portions of the drain can still be used as cleared agricultural land.

The land value applied for the open portion of the drain is the full base value for the actual width of channel. A reduction to one third of the base value has been used to establish a 10 m access right-of-way directly adjacent to the channel. The reduction to one third is on the basis that the land next to the open portion of the drain can still be used as cleared agricultural land.

A right-of-way allowance is also provided for access routes, where land value is reduced to one third, for a 6 m width, since it can still be used as agricultural land.

No permanent buildings, structures or plantings will be allowed within the right-of-way, to allow for future maintenance of this drain.

8.1.3 Section 30 – Damages

Section 30 of the Act states *“The engineer shall determine the amount to be paid to persons entitled thereto for damage, if any, to ornamental trees, lawns, fences, lands and crops occasioned by the disposal of material removed from a drainage works and shall include such sums in the estimates of the cost of the construction, improvement, repair or maintenance of the drainage works R.S.O. 1990, c. D.17, s. 30”.*

In this Report, a base value of \$1,977 per hectare (**\$800 per acre**) for workable, agricultural land has been applied to the calculation of the allowances as it may be necessary to damage lands during the construction of this drain. Complete loss of the crop was assumed for the year of construction for the specified width of the working space or area.

A 20 m width was provided for the closed drain to allow for the installation of the tile drain, topsoil stripping, tile placement and travel along the drain.

No damage has been given for the channelized portion of the drain in grasslands, as this area will be restored following construction.

8.2 Appendix B – Project Cost Estimate

In accordance with Section 8(1)(b) of the Act, this Appendix provides a breakdown of the total estimated cost of the proposed work, including all labour, materials, construction, engineering, administration and allowances.

8.3 Appendix C – Special Assessments

8.3.1 Section 26 – Special Assessment

Section 26 of the Act states that *“In addition to all other sums lawfully assessed against the property of a public utility or road authority under this Act, and the 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 of the public utility or road authority R.S.O. 1990, c.D17, s.26”.*

A Section 26 assessment was applied to the road crossing on Concession 2 South Durham Road. The increased cost for installing the road crossing has been assessed to the road authority, as well as an administrative charge for the on-site inspection. The remaining administrative costs have been assessed as a Specific Benefit to the road.

8.4 Appendices D1 – Schedules of Assessment for Construction

8.4.1 General

In accordance with Section 8(1)(c) of the Act, these Appendices show the distribution of the total estimated cost over the lands and roads involved and are in accordance with Sections 21, 22, 23, 24 and 26 of the Act (a description and breakdown of the Section 26 – Special Assessments is shown in Appendix C). Affected private lands that are agricultural within the meaning of the Act may be eligible for any grants which may be available through the Ontario Ministry of Agriculture, and Food and Rural Affairs (OMAFRA). The Engineering and Administration costs have been assessed out over the entire drain.

The assessments have been calculated using the Modified Todgham Method to distribute the project costs throughout the watershed in a fair and equitable manner. Detailed calculations of these assessments are available to affected landowners upon request. More information on assessment and the Drainage Act can be found on the website for the Ontario Ministry of Agriculture and Food and Rural Affairs (OMAFRA).

8.4.2 Sections 22 and 23 – Benefit and Outlet Assessment

Section 21 of the Act states:

The engineer in the report shall assess for benefit, outlet liability and injuring liability, and shall insert in an assessment schedule, in separate columns, the sums assessed for each opposite each parcel of land and road liable therefor. R.S.O. 1990, c. D.17, s. 21.

Section 22 of the Act states:

Lands, roads, buildings, utilities or other structures that are increased in value or are more easily maintained as a result of the construction, improvement, maintenance or repair of a drainage works may be assessed for benefit. R.S.O. 1990, c. D.17, s. 22.

Section 23 of the Act states:

(1) Lands and roads that use a drainage works as an outlet, or for which, when the drainage works is constructed or improved, an improved outlet is provided either directly or indirectly through the medium of any other drainage works or of a swale, ravine, creek or watercourse, may be assessed for outlet liability.

(2) 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.

(3) The assessment for outlet liability and injuring liability provided for in subsections (1) and (2) shall be based upon the volume and rate of flow of the water artificially caused to flow upon the injured land or road or into the drainage works from the lands and roads liable for such assessments.

(4) The owners of the lands and roads made liable to assessment only under subsection (1) or (2) shall neither count for nor against the petition required by section 4 unless within the area therein described R.S.O. 1990, c. D.17, s. 23.

Throughout the course of the drain, specific costs were assigned to various landowners. Part of the costs of items such as catchbasins, junction boxes, berms, etc. was assessed to the lands directly upstream and downstream of the item and/or to the entire upstream watershed.

8.4.3 Section 24 – Special Benefit

Section 24 of the Act states that “*The engineer may assess for special benefit any lands for which special benefits have been provided by the drainage works. R.S.O. 1990, c. D.17, s. 24*”.

There were no Section 24 assessments levied in this Report.

8.5 Appendices D2 – Schedules of Assessment for Maintenance

In accordance with Section 74 of the Drainage Act, an assessment schedule for future maintenance of the Russell Municipal Drain 2018 has been included as the basis on how to divide such costs. Affected lands located upstream of the maintenance shall be determined by the Drainage Superintendent and assessed according to this schedule.

8.6 Appendices E – Standard Specifications

The Standard Drain Specifications have been provided in Appendix E and govern the work described herein.

8.7 Appendices F – Special Provisions

Special Provisions are specific directions for this project in particular and detail requirements not encompassed by Appendix E - Standard Drain Specifications. Special Provisions shall take precedence over the Standard Drain Specifications where a conflict between the two documents may exist.

8.8 Appendices G – Soil Investigation Figure

One (1) figure has been included with this Report to depict the locations of soil test pits that were dug during a soils investigation on November 29, 2016,

8.9 Appendices H – Agency Correspondence

A summary of the project documents and requirements from SVCA, MNRF and DFO are included in this appendix.

8.10 Appendices I – Drawings

Four (4) drawings are included with this Report, consisting of a plan, profiles, and details pertinent to the construction of the Russell Municipal Drain 2018.

9.0 Maintenance

9.1 General

While the Municipality of Brockton will be responsible for the maintenance of the drain after construction is complete, the sections of the Act dealing with obstruction of, damage and injury to a Municipal Drain, namely Sections 80 and 82 respectively are brought to the attention of the landowners. As can be seen from these Sections, both the landowners and the Municipality have responsibilities to ensure that a Municipal Drain is properly maintained and kept in good working condition.

The inlet structures should be inspected on a regular basis, prior to heavy rainfall events and prior to the spring melt to ensure that ice and snow or other material have not obstructed the inlets. Landowners should assist with this maintenance activity by making regular inspections of the drain and inlet structures, clearing debris from the inlet structures in a timely manner and reporting any problems to the Municipality, so that the Drainage Superintendent can take proper action.

9.2 Maintenance Costs

The Russell Municipal Drain 2018 shall be maintained by the Municipality of Brockton at the expense of the upstream lands and roads as determined by the Drainage Superintendent and in accordance with Section 74 of the Drainage Act and distributed among the upstream landowners using the Appendix D2 - Maintenance Assessment Schedule and in the same relative portions until such time as they are varied in accordance with the Drainage Act.

The Municipality of Brockton shall be entirely responsible for the maintenance of the Municipal Drain located within the Concession 2 South Durham Road and Sideroad 25 South right-of-ways, including the catchbasins and the road crossings.



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Appendix A

Allowances – Sections 29 & 30

APPENDIX A - ALLOWANCES

PROJECT: Russell MD
DATE : September 10, 2018

MUNICIPALITY: Brockton
PROJECT #: 300038962

Conc.	Lot	Owner	Roll No.	Right of Way (Sect.29)	Damages (Sect.30)	Totals
		<u>Main Drain</u>				
2	56 & 57	G. Girodat	(3-042)	\$ 2,140	\$ 540	\$ 2,680
3	56	J. Russell	(3-013)	\$ 1,830	\$ 840	\$ 2,670
Total - Main Drain				\$ 3,970	\$ 1,380	\$ 5,350
TOTAL ALLOWANCES				\$ 3,970	\$ 1,380	\$ 5,350



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Appendix B

Project Cost Estimate

Appendix B – Project Cost Estimate**Russell Municipal Drain 2018**

The estimate of the cost of all labour, equipment and material required to construct this project is as follows:

Note **SP** refers to **Special Provisions** (in Appendix F) to reference for additional details of work.

Item	Description	Approx. Quantity	Cost Estimate
A. MAIN DRAIN			
A1	Contractor Mobilization	LS	\$ 1,750
<u>Work on Private Property (Open Work)</u>			
A2	a) Construction of approximately 20 m of channel. (Sta. -0+030 to Sta. 0+010) (SP A2)	LS	\$ 500
	b) Construction of one bio-filter sediment control structure at the downstream end of the channel construction (see accompanying details). (SP A2) (Sta. -0+030)	LS	\$ 1,730
	c) Construction of one sediment basin at the downstream end of the channel construction (see accompanying details) (SP A2) (Sta. -0+030 to Sta. -0+025)	LS	\$ 230
	d) Construction of one (1) stilling basin c/w approximately 10 m ² river stone and 40 m ² of rip-rap c/w non-woven geotextile. (Sta. -0+010 to Sta. 0+000) (SP A2)	LS	\$ 3,530
Total Estimated Cost of Construction			
Private Property (OPEN WORK)			\$ 5,990
<u>Work on Private Property (Closed Work)</u>			
A3	Supply and install 6 m of 450 mm dia. solid bell and spigot dual-wall HDPE pipe (320 kPa) pipe c/w rodent grate. (SP A3) (Sta. 0+000 to Sta. 0+006)	6 m	\$ 1,670
A4	Supply and install 79 m of 375 mm dia. solid PDT installed by drainage plow. (Sta. 0+006 to Sta. 0+085)	79 m	\$ 4,200

A5	Supply and install 202 m of 375 mm dia. solid PDT installed by drainage plow. (Sta. 0+105 to Sta. 0+307)	202 m	\$ 10,730
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Total Estimated Cost of Construction

Private Property (CLOSED WORK) \$ 16,600

Work on Concession 2 South Durham Road Right-Of-Way**(Sta. 0+085 to Sta. 0+105)**

A6	Supply and install one (1) 600 mm X 600 mm offset concrete DICB c/w directional berm and 6 m - 250 mm dia. perforated dual-wall HDPE (320 kPa) pipe lead, complete with non-woven geotextile filter sock, connection to the OB, and 19 mm crushed stone envelope (per the accompanying details). (SP A6) (o/s 6 m east of Sta. 0+085)	LS	\$ 4,030
A7	Supply and install one (1) 600 mm X 600 mm inline concrete OB. (Sta. 0+085)	LS	\$ 2,420
A8	Supply and install 400 mm O.D. smoothwall welded steel pipe (6.35 mm thickness) by the boring (Jack and Bore) method. (SP A8) (Sta. 0+085 to Sta. 0+105)	20 m	\$ 12,650
A9	Supply and install one (1) 600 mm X 600 mm inline concrete DICB c/w directional berm. (Sta. 0+105)	LS	<u>\$ 3,000</u>

Total Estimated Cost of Construction

Concession 2 South Durham Road Right-Of-Way \$ 22,100

Work on Sideroad 25 South Right-Of-Way (Sta. 0+307)

A10	a) Supply and install one (1) 600 mm X 600 mm inline concrete DICB c/w directional berm. (Sta. 0+307)	LS	\$ 2,990
	b) Supply and install one (1) BSWI (per the attached details). (SP A10)		<u>\$3,450</u>

Total Estimated Cost of Construction

Sideroad 25 South Right-Of-Way \$ 6,440

Total Estimated Cost of Construction Main Drain \$ 52,880

B. CONTINGENCIES

B1	Existing tile reconnections and tile connections to the drain as per the attached details (as approved by the Engineer). (SP B1)		
	a) 100 mm diameter pipe - Reconnection	2 ea.	\$ 230
	b) 150 mm diameter pipe - Reconnection	2 ea.	\$ 290
	c) 100 mm diameter pipe - Connection	2 ea.	\$ 350
	d) 150 mm diameter pipe - Connection	2 ea.	\$ 400
B2	Install a 450 mm thickness of 150 mm to 300 mm (OPSS R50) diameter quarry stone rip-rap with geotextile underlay. (SP B2)	25 m ²	\$ 1,580
B3	19 mm (3/4") crushed clear stone delivered on-site. (SP B3)	45 t	\$ 1,040
B4	OPSS Granular 'B' material delivered on-site. (SP B4)	45 t	\$ 1,040
B5	Supply and install 375 mm dia. solid HDPE (320 kPa) dual-wall pipe on 19 mm dia. crushed clear stone bedding per the attached detail. (SP B5)	25 m	<u>\$ 3,160</u>
Total Estimated Cost for the Construction - Contingencies			\$ 8,090
<u>Total Estimated Cost of Construction – Russell Municipal Drain 2018</u>			<u>\$ 60,970</u>

C. SUMMARY OF COSTS

Total Estimated Cost of Construction	\$ 60,970
Allowances to Owners (Sections 29 & 30)	\$ 5,350
Preparation of Report	\$ 42,000
Site Meetings, Investigations, and Field Survey	
Information Meetings, Additional Investigations	
Watershed Plan, Design and Profile	
Report Preparation including Allowances,	
Construction and Maintenance Assessment Schedules	
Meetings and Procedure	\$ 2,500
Preparation of Report Copies for Distribution	
Preparation and Attendance at the	
Consideration of the Report	
Tendering and Construction Inspection	\$ 10,500
Preparation and Distribution of Tender	
Inspections During Construction	
Payment Certificates and Related Appurtenances	
Administration and Financing	\$13,680
SVCA Review Fee	
Net HST (Construction and Engineering)	
and Interest Charges	
<u>Total Estimated Cost – Russell Municipal Drain 2018</u>	<u>\$ 135,000</u>

NOTE: The above summary contains cost estimates only. It is emphasized that these estimates do NOT include costs to defend the Drainage Report and procedures if appeals are filed with the Court of Revision, Ontario Drainage Tribunal and/or the Ontario Drainage Referee. Unless otherwise directed, additional costs to defend the report are typically distributed in a pro-rata fashion over the assessments contained in the Construction Assessment Schedule, excluding any Special Assessments.

Also, in addition to the work included in the above estimate, should repairs, replacements, underpinning or other alterations be required for existing bridges, culverts, overflow culverts or any other structure necessary to conduct overflow water, or water in open channels under or across a road allowance, as affected by this drainage work, the work and cost thereof, including any necessary expenses incidental thereto, and if not determined otherwise, shall be the responsibility of and shall be assessed against the authority having control of such road or road allowance.



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Appendix C

Special Assessments – Section 26

Appendix C - Special Assessments (Section 26)

Russell Municipal Drain 2018

Pursuant to Section 26 of the Drainage Act the following Special Assessments are made:

1. **Main Drain – Concession 2 South Durham Road (Municipality of Brockton)** **(Sta. 0+085 to Sta. 0+105)**

The Special Assessment for this portion of the work is the increased cost to the Municipal Drain due to the presence and operation of the road and is calculated as follows:

Construction Costs	-	Equivalent Drain	+	Engineering/ Administration	=	Special Assessment
Consisting of Items:		Consisting of:		Consisting of:		
<i>Item A8 – 20 m 400 mm dia. SWWSP installed by the boring method</i>		20 m of 375 mm dia. PDT installed by drainage plow		Construction layout & inspection		
\$ 12,650	-	\$ 1,060	+	\$ 2,000	=	<u>\$13,590</u>

Whether or not the Municipality of Brockton elects to do the work on their property (Concession 2 South Durham Road), they shall be assessed the actual cost of the work incurred (estimated as \$12,650), minus the actual cost of an equivalent drain (estimated as \$1,060), plus engineering/administration (estimated as \$2,000) as a Special Assessment.



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Appendix D

Schedules of Assessment

Schedule of Assessment – For Construction	D1
Schedule of Assessment – For Maintenance	D2

FACTSHEET



ORDER NO. 92-035

FEBRUARY 1992

AGDEX 557



Ontario

Ministry of Agriculture,
Food and Rural Affairs

AGRICULTURAL
ENGINEERING

UNDERSTANDING DRAINAGE ASSESSMENTS

Agriculture and Rural Division
(Reprinted March 1997)

The *Drainage Act* provides a legal procedure by which an "area requiring drainage" may have an outlet drain constructed to dispose of excess water.

The drainage work is initiated by interested individuals within an "area requiring drainage" who will benefit from the construction of the drain. A petition form, obtained from the municipal clerk, is signed by interested landowners. In order to be valid or sufficient, the petition must be signed by the majority of the owners in the "area requiring drainage" or by owners that represent at least 60% of the lands in this area. The "area requiring drainage" is usually described by lot and concession, or other legal land description. By taking this action, it is presumed that the owners signing the petition have made a decision that the drain will be of benefit to them and that the probable cost will be lower than the anticipated benefits. The initial benefit-cost decision is made at this point by the landowners, not the engineer or Council.

The petition is presented to and considered by Council. If the petition represents a proper "area requiring drainage", that is a real drainage basin, and appears to be valid, the Council may decide to proceed. Council then notifies each of the petitioners of this decision as well as any other municipality affected and the local Conservation Authority and the Ministry of Natural Resources.

Council then appoints an engineer. The engineer is an employee of Council, hired to design this specific drain. Under *The Drainage Act*, Section 9(2), the engineer is required to hold an on-site meeting to determine (1) the area requiring drainage, (2) if the petition is valid, (3) the drainage needs of the area. The engineer is then required "to make an examination of the area requiring drainage as described in the petition and to prepare a report which shall include:

- (a) plans, profiles and specifications of the drainage works;
- (b) a description of the area requiring drainage;
- (c) an estimate of the total cost thereof;
- (d) an assessment of the amount or proportion of the cost of the works to be assessed against every parcel of land and road for benefit, outlet liability and injuring liability;

- (e) allowances, if any, to be paid to the owners of land affected by the drainage works and
- (f) such other matters as are provided for under this Act."

The engineer's report is presented to Council, who then notifies all persons assessed and calls a special meeting where the report is considered. General objections to the report may be raised at this time. At this meeting signatures may be added or removed from the petition and this determines if the project will continue. Unresolved problems, depending on the subject, may be appealed to the Court of Revision, the Ontario Drainage Tribunal or the Drainage Referee. Details on appeal procedures may be found in *The Drainage Act** or in Ontario Ministry of Agriculture, Food and Rural Affairs Factsheet, Drainage Legislation.

The engineer's report includes two important items:

1. The estimated cost of the work — No matter how individual assessments are arrived at, this total estimated cost must always be equal to the total amount assessed, otherwise the work cannot proceed.
2. The assessment liability — This may be spread over several pages if an owner owns several parcels of land and if there are branch drains. It may be summarized.

Let us examine the obligations regarding this assessment.

RESPONSIBILITIES UNDER COMMON LAW

A natural watercourse is defined generally as a stream of water which flows along a defined channel, with bed and banks, for a sufficient time to give it substantial existence. This may include streams that dry up periodically.

**The Drainage Act may be found in the Revised Statutes of Ontario 1980, Chapter 126, available in most public libraries. Individual copies may be purchased from the Ontario Government Bookstore, 1-800-668-9938.*

A riparian landowner (owner of lands that abut upon a natural watercourse) has the right to drain his or her lands into the natural stream, but may not bring water in from another watershed. He or she can collect water in ditches and drains and discharge it into the watercourse even though it results in an increase in volume and rate of flow.

Where a natural watercourse becomes a part of a drain, it is no longer a natural watercourse. When this occurs, the riparian rights, as described earlier, are lost.

Surface water not flowing in a natural watercourse (i.e. not having discernible bed and banks) has no right of drainage. An owner of lower land may, at his or her own choice, either allow the water from higher land to flow over it or by dams or banks, keep such water off his or her property. No owner has the right to collect such surface water by ditches or drains and discharge it on lands of another. He or she has a responsibility to take this water to a sufficient outlet, i.e., a natural watercourse or a drain constructed under *The Drainage Act*.

Since there is no right to drain surface water, the owner of each parcel of land in the watershed is generally assessed for "outlet liability". In other words, his or her Common Law liability is removed by paying for the increased size or cost of the drain due to the volume of water which is discharged from his or her property, even though the drain may not provide a direct outlet for this water. The authority for this liability is set out in Section 23(1).

Since, through Common Law, a landowner is also liable for any damage he or she may cause from water which he or she collects in drains and discharges on other land without a sufficient outlet, he or she may be assessed for relief from such "injuring liability" if the new drain serves as an outlet for his or her drains and prevents this injury from occurring. The authority for this liability is set out in Section 23(2).

Injuring liability is frequently difficult to distinguish from outlet liability, consequently many engineers' reports do not contain such an item.

The assessment for outlet liability and injuring liability is based on the volume and rate of flow of the water artificially caused to flow from an owner's property. Generally, the assessment is based upon a unit value per hectare. Owners at higher elevations on a watershed may have a higher unit charge than those owners near the outlet since the water from their land makes use of a greater length of drain. A difference may be made in the unit outlet charge due to varying types of soil or land use, or the distance to the drain.

RESPONSIBILITY UNDER THE DRAINAGE ACT

In addition to the Common Law responsibility, an owner may also be assessed for benefit.

Benefit will vary between different lands, according to their differences of elevation, quantity of water to be drained from each, distance of undrained land from the course of the proposed ditch, and the presence or absence of existing drains, and other like factors.

To consider whether a parcel of land will receive any benefit from the construction, it is proper to consider whether any enhanced financial value will accrue to it as a result of the drain construction. This may occur through the increased productive power of the land or by rendering it more salable and at a better price, or by preventing water from entering on to it.

If the proposed drainage works can be of no possible benefit to the owner, or is of no commercial or agricultural value, the Act does not authorize a contribution for benefit.

Sometimes, an owner has an undeveloped area that he or she intends to leave in this condition. The owner may feel that he or she should not be assessed since the drain will be of no benefit. However, the property could change hands and the new owner might want to drain and develop it. It is with this in mind that the engineer must make an assessment, regardless of the present owner's intentions.

It is the duty of the engineer to determine whether or not a parcel of land will benefit from the project. When appealing a benefit assessment, the landowner must prove that the land does not benefit from the drain.

An owner has no responsibility for work done upstream from his or her property unless the work provides a benefit by "cutting off" a harmful flow of water across the property.

In some instances, a "special benefit assessment" may be levied against the property. This value usually represents the difference in cost between that which was originally designed and the increased level of design requested by a landowner. Examples include a closed or tile drain where open ditches would ordinarily suffice, or the construction of ponds beside the drain, or other special requests by a landowner specifically for this benefit. The authority for this liability is set out in Section 24.

ENGINEER'S REPORT

The Engineer's report should contain a plan and profile of the drain, as well as details on the drain design and the assessment schedule.

The plan shows the location of drains and the limits of the watershed. The profile shows ground elevations along the drain and the present and proposed drain bottom. The specifications give details on how the drain is to be constructed.

The Schedule of Assessment contains several columns. The first group contains the names of owners with a description of each parcel of land assessed.

The hectarage shown in the schedule for which an owner is assessed is only approximate. No survey is made to accurately establish the watershed boundary or farm areas. Any minor error in hectarage assessed is not a valid basis for appeal nor does it greatly affect the assessment. The other columns in the Schedule set forth the assessment liability for each drain and/or branch drain. These values are only estimates. The final value will not be known until the construction work is finished. The assessment will then be prorated to recover the actual cost.

Allowances to lands injured by the work are set out in a separate schedule by the engineer as authorized in Sections 29 to 33 of *The Drainage Act*.

Damage to crops during construction and disposal of waste material will vary depending on the time of year that the work is constructed. Crop damage due to spreading the spoil on the banks is based on a decreasing yearly loss of crop over several years. All or part of the cost of access bridges from a public road to the property may be assessed to the property owner.

Farm bridges are constructed as a part of the work. In certain circumstances a severance allowance may be paid instead of building the bridge. The allowance will depend upon the value of the land severed, or the cost of the bridge that would be required. The cost, or part of the cost of farm bridges or the severance allowance may be assessed across the property.

Where private drains are incorporated into the new drain, a nominal allowance may be paid based on any saving that may result from using the private drain. These allowances may not be included in the Summary of Assessments but are usually shown in a separate Schedule of Allowances.

RELEVANT OMAFRA FACTSHEETS

Drainage Legislation.

This Factsheet was authored by **Sid Vander Veen, P.Eng.**, Resources Management Branch.

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APPENDIX D - ASSESSMENTS for CONSTRUCTION MAIN DRAIN

PROJECT: Russell MD
DATE : September 10, 2018

MUNICIPALITY: Brockton
PROJECT #: 300038962

Conc.	Lot or Part	Owner	Roll No.	Affected Area (Ha.)	Benefit Assess't (Sect.22)	Outlet Assess't (Sect.23)	Special Assess't (Sect.26)	Totals
Agricultural Lands								
2	56 & 57	G. Girodat	(3-042)	0.72	\$ 10,550	\$ 310	\$ -	\$ 10,860
2	S Pt. 56	* E. Pedrosa	(3-040)	0.20	\$ 900	\$ 210	\$ -	\$ 1,110
3	56	J. Russell	(3-013)	3.31	\$ 30,950	\$ 3,680	\$ -	\$ 34,630
3	NE Pt. 55	* D. & V. Duncan	(3-010-01)	1.46	\$ -	\$ 2,490	\$ -	\$ 2,490
3	55	W. & J. Poechman	(3-010)	9.07	\$ -	\$ 10,050	\$ -	\$ 10,050
3	54	* H. Demarce	(3-009)	10.96	\$ -	\$ 8,980	\$ -	\$ 8,980
3	53	Hillcrest Layer Farms Ltd.	(3-007)	4.67	\$ -	\$ 9,740	\$ -	\$ 9,740
TOTAL ON LANDS				30.39	\$ 42,400	\$ 35,460	\$ -	\$ 77,860
Roads								
Sideroad 25 South		Municipality of Brockton		0.76	\$ 8,860	\$ 3,500	\$ -	\$ 12,360
Concession 2 SDR		Municipality of Brockton		0.98	\$ 26,490	\$ 4,700	\$ 13,590	\$ 44,780
TOTAL ON ROADS				1.74	\$ 35,350	\$ 8,200	\$ 13,590	\$ 57,140
ALL LANDS AND ROADS				32.13	\$ 77,750	\$ 43,660	\$ 13,590	\$ 135,000

Notes: 1) * Denotes lands that are not eligible for ADIP grant, based on property tax class at the time of assessment preparation, however; it is the responsibility of the landowner to confirm whether their property is eligible for grant.



APPENDIX D - ASSESSMENTS for MAINTENANCE MAIN DRAIN

PROJECT: Russell MD
DATE : September 10, 2018

MUNICIPALITY: Brockton
PROJECT #: 300038962

Conc.	Lot or Part	Owner	Roll No.	Affected Area (Ha.)	Equivalent Area (Ha.)	Totals
Agricultural Lands						
2	56 & 57	G. Girodat	(3-042)	0.72	0.72	2.2%
2	S Pt. 56	* E. Pedrosa	(3-040)	0.20	0.25	0.7%
3	56	J. Russell	(3-013)	3.31	3.12	9.3%
3	NE Pt. 55	* D. & V. Duncan	(3-010-01)	1.46	1.83	5.5%
3	55	W. & J. Poechman	(3-010)	9.07	7.36	22.0%
3	54	* H. Demarce	(3-009)	10.96	6.58	19.7%
3	53	Hillcrest Layer Farms Ltd.	(3-007)	4.67	7.13	21.2%
TOTAL ON LANDS				30.39	26.98	80.6%
Roads						
Sideroad 25 South		Municipality of Brockton		0.76	2.56	7.7%
Concession 2 SDR		Municipality of Brockton		0.98	3.92	11.7%
TOTAL ON ROADS				1.74	6.48	19.4%
ALL LANDS AND ROADS				32.13	33.46	100%

Notes: 1) * Denotes lands that are not eligible for ADIP grant, based on property tax class at the time of assessment preparation, however; it is the responsibility of the landowner to confirm whether their property is eligible for grant.



BURNSIDE

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Appendix E

Standard Drain Specifications

General Drain Specifications	E.2.1
Specifications for Open Drains	E.2.2
Specifications for Closed Drains	E.2.3
Specifications for Road Crossing (Boring Method)	E.2.4

E.2.1 GENERAL DRAIN SPECIFICATIONS

E.2.1.1 SCOPE OF SPECIFICATIONS

This specification covers the general conditions governing the construction of a Municipal Drain under the most recent revision of The Drainage Act and amendments. All work shall be done in accordance with current and applicable Ontario Provincial Standard Specifications and Drawings (OPSS and OPSD).

E.2.1.2 BENCHMARKS

Benchmarks shall be set at intervals along the course of the work at locations shown on the accompanying plan and/or profile. The Contractor or landowner shall be held liable for the cost of re-establishing benchmarks destroyed. Attention is drawn to Section 13 of The Drainage Act.

E.2.1.3 STAKES/FLAGS/MARKERS

Stakes, flags or markers are typically set at intervals throughout the course of the work, at all fences and property lines. The Contractor or landowner shall be held liable for the cost of replacing any stakes removed or destroyed.

E.2.1.4 PROFILE

The drain is to be excavated or installed to regular gradient lines as shown on the profile(s). These gradients show the bottom of the finished drain (open or closed) and are governed entirely by the benchmarks. In the case of closed drains, the gradient is that of the invert of the tile. The profile(s) shows the approximate depth from the surface of the ground to the invert of the tile or ditch bottom at the point where the stations are set and from the average bottom of the open drain as taken at the time of survey. Open drains shall be brought to an even gradient in the bottom to prevent standing water. For closed drains, a variation of 25 mm (unless specified otherwise) from the gradient may be deemed sufficient reason for the work to be rejected and required to be rebuilt.

E.2.1.5 CLEARING

Clearing means the cutting of all standing trees, brush, bushes and other vegetation to a maximum height of 300 mm above original ground level as well as the removal of felled materials and windfalls. Trees measuring 150 mm or more in diameter shall be felled, delimbed, cut into lengths no longer than 4 m and stacked to the designated side of the working space. The work shall not damage or disturb the area outside the areas specified in the Contract Documents.

The work shall consist of clearing all areas of earth excavation, earth surfaces to be covered by embankments up to and including 1.2 m in height, and any other areas specified in the Contract Documents.

No trees, brush or bushes are to be left inside the slopes of the drain, whether they are located within the limits of the excavation or not. Brush cleared in accordance with the above shall be piled in a location and in a manner satisfactory to the Engineer for burning by the Owner. Unless otherwise specified or directed, these piles shall be a minimum of 100 m apart and shall contain only cleared material. All work shall be done in accordance with OPSS 201.

E.2.1.6 CLOSE CUT CLEARING

Close Cut Clearing means the cutting of all standing trees, stumps, brush, bushes and other vegetation at original ground level and the removal of felled materials and windfalls. Grubbing means the removal of all stumps, roots, embedded logs, debris and secondary growth. Trees measuring 150 mm or more in diameter shall be felled, delimbed, cut into lengths no longer than 4 m and stacked to the designated side of the working space. The work shall not damage or disturb the area outside the areas specified in the Contract Documents.

The work shall consist of close cut clearing all earth surfaces to be covered by embankments greater than 1.2 m in height, and any other areas specified in the Contract Documents.

No trees, stumps, brush or bushes are to be left inside the slopes of the drain whether they are located within the limits of the excavation or not. Brush cleared in accordance with the above shall be piled in a location and in a manner satisfactory to the Engineer for burning by the Owner. Unless otherwise specified or directed, these piles shall be a minimum of 100 m apart and shall contain only cleared material. All work shall be done in accordance with OPSS 201.

E.2.1.7 BRUSHING

Brushing means the grinding or chipping to ground level of vegetation in the working space under 150 mm in diameter by means of a hydraulic brushing attachment used with an excavator or approved equivalent. This includes grinding or chipping all standing trees, stumps, brush, bushes and other vegetation to original ground level.

Trees measuring 150 mm or more in diameter shall be felled, delimbed, cut into lengths no longer than 4 m and stacked to the designated side of the working space. The work shall not damage or disturb the area outside the areas specified in the Contract Documents. All work shall be done in accordance with OPSS 201.

E.2.1.8 GRUBBING

Grubbing means the removal of all stumps, roots, embedded logs, debris and secondary growth.

The work shall consist of grubbing all areas of earth excavation, earth surfaces to be covered by embankments up to and including 1.2 m in height and any other areas specified in the Contract Documents.

Grubbing is not required in swamps. Mechanical stump cutters are permitted, provided the entire root structure is removed. Depressions remaining after grubbing shall be backfilled with suitable earth material and compacted to avoid settlement. When clearing has been previously completed by others, all secondary growth, brush and debris shall be removed.

Piled boulders and surface boulders that are not specified in the Contract Documents for removal and lie within areas to be grubbed shall be removed. The work shall not damage or disturb the area outside the areas specified in the Contract Documents. All work shall be done in accordance with OPSS 201.

E.2.1.9 REMOVAL OF SURFACE BOULDERS & REMOVAL OF PILED BOULDERS

Piled Boulders means any cobbles, boulders or rock fragments that have been placed in fence rows or piles.

Rock means rock as defined in OPSS 206.

Surface Boulder means any boulder or rock fragment that measures 200 mm or greater in any one dimension, extends a minimum of 200 mm above original ground and can be removed without excavation.

The work shall consist of the removal of surface boulders and removal of piled boulders within the areas specified in the Contract Documents. Depressions remaining after removal shall be backfilled with suitable earth material and compacted to avoid settlement. The work shall not damage or disturb the area outside the areas specified in the Contract Documents. All work shall be done in accordance with OPSS 201.

E.2.1.10 FENCES

The Contractor will be permitted to remove fences to the extent necessary to allow the construction of the drain and to dispose of any excess material according to specifications. Any such fences shall be carefully handled so as to cause no unnecessary damage. Such fences shall be replaced by the Contractor in as good a condition as found. The Contractor shall supply all material necessary to properly reconstruct any fences. The Contractor shall not leave any fence open when he is not at work in the immediate area and shall replace the fence in a timely manner, all to the satisfaction of the Engineer.

E.2.1.11 STANDING CROPS AND LIVESTOCK

Should a property owner wish to harvest any crop along an access route or within the construction working space as set out in the Engineer's Report, then it shall be the responsibility of the property owner to do so prior to construction. Provisions for the loss of, or damage to, crops along the access route or in the construction area ("Working Space") have been made in the Report and such loss or damage shall not be the liability of the Contractor.

The Contractor shall contain construction operations to the working space and width specified. As long as the construction operations are contained within the specified working space, the Contractor shall not be responsible for damages to crops along the course of the drain.

It shall be the responsibility of the property owners to keep their livestock clear of the construction area upon receiving 24 hours advance notice by the Contractor. After receiving proper notice, the Owner of the property upon which a drain is being constructed shall be liable for any loss or damage to livestock, the drain, drain materials or the Contractor's equipment caused by their livestock.

E.2.1.12 NOTIFICATION OF AGENCIES

The Contractor shall notify the appropriate agency before performing any work affecting the land or property of the MTO, railway, telephone, pipeline or public utility or regulatory agency. The Contractor shall further agree to perform the work affecting such lands or property in accordance with the specifications and approval/permit of the applicable agency.

E.2.1.13 FINAL INSPECTIONS

After substantial completion of the work, but prior to demobilization and final removal of all equipment and materials from the site, the Contractor MUST arrange an on-site FINAL Inspection of the work with the engineer to ensure all aspects of the work have been satisfactorily completed and/or that arrangements have been made to expedite the completion of any outstanding "minor" items or deficiencies. All the work included in the contract, at the time of the Final Inspection, must have the full dimensions and cross-sections called for in the plans and specifications. Notification to the Engineer of this Final Inspection shall be provided at least 5 days prior and it shall be completed as soon as possible or as soon thereafter as weather conditions permit.

E.2.2 SPECIFICATIONS FOR OPEN DRAINS

E.2.2.1 GEOMETRY

The drain shall have the full bottom width, at the gradient, specified or shown on the accompanying plan(s), profile(s) and detail sheet(s).

E.2.2.2 ALIGNMENT

The drain shall run in straight lines throughout each course except at intersections, where it shall run on a minimum curve of 15 m radius unless otherwise specified. If the work consists of the improvement of an existing open drain, then the centre line of the existing drain may be the centre line of the finished work unless otherwise specified.

E.2.2.3 EXCAVATED MATERIAL

A clear buffer of at least 3 m shall be left between the top edge of the open drain and the excavated material. Excavated material shall be placed on the side specified or, if not specified, on the lower side of the drain or on the side opposite trees or fences. No excavated material is to be left in any low runs intended to conduct water into the open drain. It shall be deposited, spread and leveled to a maximum depth of 150 mm, unless specified otherwise and left in a manner such that the lands on which it is spread may be cultivated with adjacent lands by use of ordinary farm machinery. Material excavated in land that is timbered, may be spread to the depth specified or to a maximum depth of 300 mm. In cultivated areas, the Contractor shall remove stones and boulders on the surface greater than 100 mm diameter from the excavated material and dispose of in an approved location. Treatment of excavated material shall be to the satisfaction of the Engineer. After the excavated material has been spread and leveled, it shall be seeded as specified.

E.2.2.4 SURFACE WATER INLETS

Surface water inlets to the drain shall be provided through the leveled spoil on each property at obvious natural low runs or at other locations as specified by the Engineer on site at the time of construction. No excavated material shall be left in, or any damage done to a ditch, furrow, pipe, tile or depression that is intended to conduct water into an open drain. The ditch bank at all such inlets shall be riprapped as directed by the Engineer and reimbursed under the appropriate contract item.

E.2.2.5 OUTLETS

During the construction of an open drain, the Contractor shall guard against damaging the outlet of any tributary drain or pipes encountered. The Contractor will be reimbursed for damage to unmarked outlet pipes under the appropriate contract item.

E.2.2.6 ACCESS CULVERTS

All culverts shall be installed with the invert a minimum of 10% of its diameter or as specified below the gradient and the firm bottom of the drain.

All pipes installed under these specifications shall be carefully bedded so as to ensure uniform bearing throughout its entire length.

Except where requiring concrete cradle or encasement, all pipes shall be bedded on granular fill as specified or as shown on the contract drawings. Bedding shall be hand placed, tamped and consolidated throughout. Granular fill and bedding shall be gravel or crushed stone having no particles over 20 mm in size, except where otherwise specified.

Concrete cradle and concrete encasement shall be placed as shown on the drawings, and the concrete shall be minimum 25 MPa.

From the top of the bedding material to a point 150 mm below the existing grade of the laneway, backfill material shall be clean pit run gravel meeting O.P.S.S. Granular "B" or approved equivalent. The material shall be placed in lifts not to exceed 300 mm in depth and all granular materials shall be compacted to 100 % SPMDD and all subsoil or previously excavated material to 95 % SPMDD.

The final 150 mm of the excavation shall be filled with clean crushed gravel conforming to O.P.S.S. Granular "A" specifications. The material shall be placed in lifts not exceeding 150 mm in depth and shall be thoroughly compacted to 100 % SPMDD.

E.2.2.7 EXCAVATION AT BRIDGE SITES

The excavation at bridge sites shall be to the full depth of the drain and as nearly as possible the full width of the drain as specified for the bridge location. The excavation at a bridge site shall be made in a manner to protect the structural integrity of any permanent bridge. A temporary bridge may be carefully removed to allow excavation. The removal of a bridge is to be done in such a manner so as to cause no damage to the bridge components. Temporary bridges removed to allow excavation shall be replaced in as good a condition as found, so far as material allows. Replacing of such bridges shall be to the satisfaction of the Engineer. The Contractor shall immediately notify the Engineer if it becomes apparent that excavating to a specified gradient will endanger or underpin any culvert or bridge. The Contractor shall cease excavation at the bridge or culvert site until the Engineer instructs the Contractor to proceed.

E.2.2.8 SEEDING

Unless indicated otherwise in the Special Provisions, the Contractor shall seed all disturbed areas which includes newly excavated ditch banks and leveled spoil (where

specified) with the OPSS (MTO) Standard Roadside Seed Mix, consisting of 55% Creeping Red Fescue, 27% Kentucky Bluegrass, 15% Perennial Ryegrass and 3% White Clover, at an application rate of 100 kg/10,000 m², plus a nurse crop of Fall Rye Grain or Winter Wheat Grain at an application rate of 60 kg/10,000 m², at the end of each working day.

E.2.2.9 TEMPORARY SEDIMENT CONTROLS

Unless indicated otherwise in the Special Provisions, the Contractor shall install an approved sediment control measure at the downstream end of the open drain excavation and at any other locations specified. The Contractor shall remove any accumulated sediment at regular intervals or as directed by the Engineer. The Contractor shall then remove these temporary measures, and any accumulated sediment therein, after the new open drain has stabilized and only after authorized by the Engineer or the Drainage Superintendent.

E.2.2.10 PERMANENT SEDIMENT/STILLING BASINS

The Contractor shall construct and maintain sediment control or stilling basins as specified in the Special Provisions.

E.2.2.11 RIP RAP & NON-WOVEN GEOTEXTILE

Rip Rap – The Contractor shall supply and install a 500 mm thickness of 150 mm to 300 mm (R50) diameter quarry stone rip rap with filter cloth underlayment for culvert and pipe outlets. This will include areas of the existing bank where erosion or bank slumping has occurred, as directed on-site by the Engineer. For the area surrounding catchbasins, unless noted otherwise, the contractor shall supply and install a 300 mm thickness of 100 to 150 mm (R10) diameter quarry stone rip rap with filter cloth underlayment.

Non-Woven Geotextile - All geotextile used for tile wrapping under these specifications shall be non-woven Terrafix 200R (or equivalent). All geotextile used under these specifications for heavy duty applications such as under rip-rap surrounding catchbasins, and at tile outlets in channels shall be non-woven Terrafix 270R (or equivalent).

E.2.3 SPECIFICATIONS FOR CLOSED DRAINS

E.2.3.1 MATERIALS

Tile, tubing and pipe materials supplied by the Contractor shall be approved by the Engineer prior to being incorporated in the work. The Contractor shall be responsible for the unloading and placement of all materials required for the Municipal Drain construction. Such unloading and placement shall be undertaken in a manner acceptable to the Engineer using only the specified and approved access routes and working space.

Concrete Drain Tile (CDT) - All CDT installed under these specifications shall have a circular cross section with a minimum 2000D, meeting the latest revision of CSA A257.1-14 and ASTM C412. The manufacturer shall provide the Engineer with a copy of all available test results for the materials being shipped to the project site. The Engineer shall have the right to order any additional tests he deems necessary to be performed on the tile taken from inventory prior to shipment from the manufacturer's plant. The cost of such additional tests shall be borne by the Contractor.

Plastic Drainage Tubing (PDT) - All PDT installed under these specifications shall be manufactured in accordance with the latest revision of the Drainage Guide for Ontario, as published by the Ministry of Agriculture and Food.

Corrugated Steel Pipe (CSP) - All CSP installed under these specifications shall be galvanized spiral wound corrugated steel pipe. All corrugated steel pipe installed under these specifications shall conform to CSA G401.

- CSP tile outlet pipes shall be up to 1,200 mm in diameter and 2.0 mm in thickness and shall have 68 mm x 13 mm corrugations unless specified otherwise.
- CSP culverts shall up to 1,000 mm in diameter and 2.8 mm in thickness and shall have 68 mm x 13 mm corrugations unless specified otherwise. CSP culverts equal to and larger than 1,200 mm in diameter shall be 3.5 mm in thickness and shall have 125 mm x 25 mm corrugations unless specified otherwise.

High Density Polyethylene(HDPE) Pipe - All corrugated or dual wall smooth walled HDPE pipe (Armtec BOSS 2000 or equivalent) installed under these specifications as culverts or as part of a new closed drain shall be manufactured in accordance with the latest revision of Ontario Provincial Standard Specification 1840 and shall have a pipe stiffness of 320 kPa.

- All perforated dual-wall smoothwalled HDPE pipe joining systems shall be soil-tight split coupler unless specified otherwise, conforming to CSA B182.8. As

specified, perforated pipe shall include a knitted sock or non-woven geotextile covering (Terrafix 200R or equivalent).

- All solid dual-wall smoothwalled HDPE pipe shall be soil-tight split coupler, unless specified otherwise, conforming to CSA B182.8.
- All watertight solid dual-wall HDPE pipe joining systems shall be water-tight bell and spigot, complete with gasketed connections unless specified otherwise, conforming to CSA B182.6.

Steel Reinforced Polyethylene (SRPE) Pipe - All smooth walled SRPE pipe (Armtec DuroMaxx or equivalent) installed under these specifications as culverts or as part of a new closed drain shall be manufactured in accordance with the latest revision of Ontario Provincial Standard Specification 1840. All SRPE pipe shall conform to AASHTO M294.

- All solid SRPE pipe shall be soil-tight split coupler, unless specified otherwise, conforming to CSA B182.14.
- All watertight solid SRPE pipe joining systems shall be water-tight bell and spigot, complete with gasketed connections unless specified otherwise, conforming to CSA B182.15.

Polypropylene (PP) Pipe - All triple-wall smooth walled PP pipe (ADS HP Sanitite or equivalent) installed under these specifications as culverts or as part of a new closed drain shall be manufactured in accordance with the latest revision of Ontario Provincial Standard Specification 1843 and shall have a pipe stiffness of 320 kPa.

- All watertight solid triple-wall PP pipe joining systems shall be water-tight bell and spigot, complete with gasketed connections unless specified otherwise, conforming to CSA B182.13.

Non-Woven Geotextile - All geotextile under these specifications shall conform to OPSS 1860. All geotextile used for tile wrapping under these specifications shall be non-woven Terrafix 200R (or equivalent). All geotextile used under these specifications for heavy duty applications such as under rip-rap surrounding catchbasins, and at tile outlets in channels shall be non-woven Terrafix 270R (or equivalent).

E.2.3.2 DRAIN GRADIENT AND VERIFICATION

The proposed gradient shall be established using laser grade control equipment, cross-head boning rods together with horizontal sight-bars at stations above and below the point where the tile is being laid or other method acceptable to the Engineer.

If the Engineer has not checked the tile, inspection points shall be left at intervals of not greater than 50 m for sections with gradients less than 0.5 % and at intervals of not greater than 30 m for sections with gradients above 0.5 %. Inspection points shall also

be left at all structures and all changes in gradient. Other inspections points may be required from time to time as requested by the Engineer.

E.2.3.3 TILE LAYING INCLUDING TOPSOIL STRIPPING

In the case of the installation of CDT, and unless specified otherwise in the Special Provisions, the Contractor shall strip the topsoil a full width of the trenching machine plus 0.3 m on each side prior to installing the new tile with the trencher as part of the work under the appropriate item and no extra payment will be made for this stripping. After installation, confirming gradient, blinding, and back filling of the trench, the topsoil shall be replaced throughout the entire length of the Drain. The Contractor shall take into consideration the settlement of the backfill material over the trench prior to replacing the topsoil.

All CDT shall be installed with a wheel-type trencher and each tile shall be laid firmly and carefully in a smooth bottomed trench so that successive tiles align both vertically and horizontally as tightly as possible; the maximum allowable space between successive tiles shall be 6 mm.

ALL joints of the CDT MUST be completely wrapped with geotextile (Terrafix 200R or equivalent) as part of the work under the appropriate item and no extra payment will be made for this wrapping. The wrap on each joint shall be a minimum of:

- 300 mm wide for tile sizes smaller than 450 mm diameter
- 600 mm wide for tile sizes 450 mm diameter and above

The Contractor is reminded that the widths of the tile trenches are to be kept to a minimum. It is recommended that the minimum trench width be 300 mm greater than the outside diameter of the tile or 150 mm on each side of the tile being installed. It is recommended that the maximum trench width be 600 mm greater than the outside diameter of the tile or 300 mm on each side of the tile being installed.

All PDT shall be installed with a self-propelled drainage plow.

All obstructions, dirt or foreign material shall be removed from the inside of the tile prior to laying.

Tile drains shall be constructed at an offset from, and parallel to, any existing ditch, defined watercourse or low run. The Contractor shall exercise care not to disturb any existing private or municipal tile drains which follow the same course as the new drain.

E.2.3.4 RECONNECTION OF EXISTING PRIVATE TILE

Any subsurface drain encountered by the Contractor when constructing a Municipal Drain under these specifications shall be reconnected to itself and not connected to the

new Municipal Drain, unless approved otherwise by the Engineer. The accepted practice for reconnecting existing tile drains will be to compact sub-base material from the new trench bottom to the underside of the existing tile. Rigid pipe, HDPE (320 kPa) or approved equivalent, with a diameter equal or larger than the existing tile with a minimum length of 0.6 m beyond the trench width to the existing tile. This connection shall be made only where the existing tile is operable and in good condition. When completing backfilling of the Municipal Drain trench at such a location, the Contractor shall take sufficient care to ensure that the new connecting pipe is not damaged.

The Contractor shall provide a unit price per connection and the unit price shall include the supply of all material, labour and equipment necessary to make the connection. Further, the Contractor shall keep a written record of all sub-surface drains encountered. All connections completed shall be reviewed with the Engineer on a daily basis and a summary of all subdrains shall be provided to the landowner.

E.2.3.5 CONNECTION OF EXISTING PRIVATE TILES TO MUNICIPAL DRAIN

A subsurface drain encountered during construction can be connected to the Municipal Drain if requested by the landowner and approved by the Engineer prior to commencement of the connection. The drain shall be connected to the Municipal Drain either by core drilling through the CDT or a prefabricated fitting for HDPE. The core shall be drilled on-site and backfilled as per the specified detail included within the drawings. Any tile drains connected to the Municipal Drain shall have the downstream end of the tile plugged to prevent entry of foreign material into the tile.

E.2.3.6 TRENCH BACKFILLING

As the laying of the tile progresses, partial filling or blinding shall be made at the sides of the trench sufficient to hold the tiles securely in place. The Contractor shall place the remainder of the excavated material carefully when backfilling the trench. Any excess backfill material shall be mounded over the trench such that future settlement and compaction around the new tile can occur without creating a depression over the width of the trench. The Contractor shall not operate construction equipment over any backfilled trench, except as specified in Trench Crossings. Care shall be exercised in backfilling the trench to see that no stone or boulder capable of damaging the tile is used in the backfill material adjacent to the tile. In no case shall stones having a diameter greater than 150 mm be used in backfill material within 300 mm of the tile. The Contractor shall backfill any open tile trenches at the end of each working day except for inspection points as specified. The Contractor shall be entirely responsible for any damage to the new tile throughout the warranty period.

E.2.3.7 TRENCH CROSSINGS

The Contractor shall not cross any backfilled trench with any construction equipment or vehicles, except at only **ONE** designated crossing location on each property which shall be marked in an acceptable manner. The Contractor shall ensure that the bedding and backfill material at this designated crossing location is properly placed and compacted so as to adequately support the equipment and vehicles that may cross the trench. The Contractor may undertake any other approved work to ensure the integrity of the tile at the crossing location. The Contractor shall insure that no equipment or vehicles are allowed to travel along the length of any trench. The Contractor shall be entirely responsible for any damage to the new tile throughout the warranty period.

E.2.3.8 OUTLET PROTECTION

The outlet end of a tile drain shall normally consist of a 6 m length of CSP or HDPE fitted with a rodent proof grating which is hinged at the top to allow the exit of foreign material from the tile. An outlet marker shall be supplied and installed.

Unless otherwise specified, the end of the CSP or HDPE shall be protected with the type of riprap on geotextile as specified by the Engineer from a point 500 mm above the ditch bottom on the opposite side of the ditch, across the ditch bottom, and for the full height of the ditch sideslope where the pipe is located. The minimum width of this riprap shall be equal to the outside diameter of the outlet pipe plus 2 m.

E.2.3.9 PRECAST CONCRETE STRUCTURES

Junction Box (JB) means an acceptable precast concrete structure installed and buried below the surface of the ground to facilitate two or more tiles meet and connect.

Catchbasin (CB) or **Ditch Inlet Catchbasin (DICB)** means an acceptable precast concrete structure installed at or slightly below the surface of the ground where two or more tiles meet and connect and that is intended to accommodate surface water.

Observation Box (OB) means an acceptable precast concrete structure installed above the surface of the ground where two or more tiles meet and connect and that is intended to only inspect the tile connected thereto.

Unless specified otherwise, JB's, CB's, DICB's and OB's shall be supplied by a precast manufacturer meeting the Engineer's approval. An "approximate elevation of top" of each structure has been indicated on the "Structures Table"; however, each structure shall be placed onsite such that the exact horizontal and vertical location in the field is as directed by the Engineer. All structures shall have a knock out, set at a minimum of 100 mm above the elevation of the outlet or as specified, placed in **all** sides not used by the municipal drain. Knock outs must be of a size capable of connecting a HDPE pipe with

a minimum inside diameter of 250 mm. All structures shall have a minimum 300 mm deep sump, unless specified otherwise.

Non-shrink grouting material, unless specified otherwise, shall be placed around all pipes connected to the structure. In addition, the exterior of all grouted connections shall be completely wrapped with geotextile (similar to a wrapped joint). Geotextile shall also be placed in the joints between all sections of the box and around the full perimeter of the box at these joints. For the area surrounding catchbasins, unless noted otherwise, the contractor shall supply and install a 300 mm thickness of 100 to 150 mm (R10) diameter quarry stone rip rap with filter cloth underlayment.

Hot dipped galvanized, heavy duty, three-sided protruding type bird cage grates, shall be supplied for all CBs, DICBs or OBs, unless specified otherwise. All DICBs shall have a slope of 2H:1V, unless specified otherwise. Grates shall be fastened to the structure using non-corrosive fasteners as recommended by the Ontario Farm Safety Association. JB's shall have no sump and shall have a minimum 150 mm thick solid reinforced concrete tops.

Post and sign type markers shall be supplied and installed at each at or above ground structure.

E.2.3.10 STRIPPING FOR DEEP TILE INSTALLATION

Where the tile installation depth exceeds the digging or plowing depth of the Contractor's equipment, the Contractor shall undertake any stripping that may be necessary in a manner such that when restored, the topsoil returns uncontaminated to the top of the stripped area. This would normally mean that the topsoil would be stripped and piled separately from the subsoil. The Contractor shall have regard for the working space provided for such stripping operations. Unless approved otherwise by the Engineer prior to work being undertaken, stripping shall be done using a hydraulic excavator. The cost of any stripping shall be included in the price provided for the tile installation.

E.2.3.11 STONE REMOVAL

The Contractor shall remove and dispose of any stones larger than 100 mm that remain on the surface of the working space after completion of construction.

E.2.4 SPECIFICATIONS FOR ROAD CROSSING (BORING OR DIRECTIONALLY DRILLED METHOD)

E.2.4.1 GENERAL

When a drainage works crossing of a Road is to be carried out by the jacking and boring method, the following specifications shall apply as well as OPSS 416. The Contractor shall supply all labour, equipment and material unless specified otherwise in the Special Provisions.

E.2.4.2 PIPE MATERIAL

The pipe or casing used in the crossing shall be smoothwall welded steel pipe (SWWSP) with a minimum wall thickness as specified in the Special Provisions as per OPSS 1802. The pipe shall be of a sufficient length so that during placement no part of any excavation shall be closer to the edge of the gravel shoulder than 2 m and the slope of the excavation from the top to the bottom shall be 1 m vertical to 1 m horizontal (1:1).

E.2.4.3 EXTENSIONS

All extensions of the SWWSP installed via the jacking and boring shall be completed with SWWSP of identical diameter and wall thickness (either from structure to structure or to the limits of the right-of-way). Extensions of any other pipe material will not be acceptable. Pipe shall be placed on undisturbed native material with a minimum of 150 mm drainage stone bedding. Excavated material will not be permitted for use as bedding material.

E.2.4.4 INSTALLATION METHOD

The pipe or casing shall be placed by means of continuous flight augering inside the casing and simultaneous jacking to advance the casing immediately behind the tip of the auger. Complete augering of a tunnel slightly larger than the pipe and placing the entire length by pulling or jacking after completion of the tunnel WILL NOT BE ACCEPTABLE. Once a crossing is completed, the area around the outer annulus and any other openings from the jack and bore shall be grouted at the time of construction.

The Auger pit excavated to accommodate the boring machine shall be constructed such that the edge of the pit shall not be closer than 2 m to the edge of the gravel shoulder. The slope of the pit from the top edge at the shoulder to the bottom of the pit shall not be steeper than 1 m vertical to 1 m horizontal (1:1). Shoring, sheeting, etc. shall be in accordance with all governing regulations and Acts. The pit shall be left open for an absolute minimum length of time and if at all possible work should be so scheduled so that the excavation, placement of pipe and backfilling takes place in one working day.

During excavation, the existing topsoil shall be stripped and placed in a separate pile for replacement on top upon completion of the backfilling operation; a minimum of 150 mm of topsoil is required and if necessary, the Contractor shall and place imported topsoil. In either case, the topsoil area over the excavation shall be seeded with the specified grass seed mixture to the requirements of the Road Authority. The finished work shall be left in a clean and orderly condition slightly higher than the adjacent ground so that after settlement it will conform to the surrounding ground. Excess material shall NOT be spread on the road allowance or within the right-of-way without the express written consent of the Road Authority but shall be hauled away and disposed of at the expense of the Contractor.

E.2.4.5 PERMITS & TRAFFIC

The Contractor shall be responsible for providing the Road Authority at least 7 days notice in writing before commencing any work on any right-of-way. If the crossing is on a right-of-way that requires a Municipal or Provincial Permit, the Contractor shall ensure that the Permit is obtained before any work commences.

The Contractor shall be responsible for providing, erecting, maintaining and removing all signage and traffic control in accordance with the Ontario Traffic Manual (OTM) and the OTM Book 7 Temporary Conditions - Field Edition, as noted in Document D of the Tender/Contract.



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Appendix F

Special Provisions

Appendix F – Special Provisions

Russell Municipal Drain 2018

These ***Special Provisions*** are specific directions for this project in particular and detail requirements not encompassed by ***Appendix E - Standard Drain Specifications***.

Special Provisions shall take precedence over the ***Standard Drain Specifications*** where a conflict between them may exist.

Standard Drain Specifications

All work for this project shall also be governed by ***Appendix E - Standard Drain Specifications***. The Contractor is fully responsible for a reasonable and prudent review of these Standards to have a complete and clear understanding of the scope and character of the work.

Description & Location

The proposed drain is located in the Municipality of Brockton on Lots 56 and 57, Concessions 2 and 3 (Geographic Township of Brant), County of Bruce.

The proposed Russell Municipal Drain includes approximately 307 m of closed drain and 30 m of open drain construction. The location of the work is shown on the enclosed plan.

General

The following general conditions and requirements apply to this project:

- Install, maintain and remove any temporary sediment control measures as specified and/or directed by the Engineer, Drainage Superintendent, or the Conservation Authority.
- Spreading and leveling of excavated material as required, and seeding of all disturbed areas within the right-of-way of the Russell Municipal Drain, Concession 2 South Durham Road, and Sideroad 25 South.
- Installation of the new pipe by drainage plow unless specified otherwise by the Engineer.
- Supply and place a minimum of 1.0 m width of rip-rap and geotextile on all sides of all catchbasins.
- Restore and rehabilitate the entire site and each access route to its pre-construction condition(s).

Subsoil Conditions

Subsoil investigations have been undertaken on this project. Details can be reviewed in Section 6.4 of the Report. The Contractor shall tender the installation of the new pipe on

the basis of using a drainage plow; however, as specified in the contingency items, the Contractor shall provide **additional** unit prices for the installation of HDPE dual-wall (320 kPa) pipe under poor conditions with an excavator as detailed. The Contractor shall specify the **additional** installation cost for both conditions specified under the associated contingency item.

All costs associated with the removal of the drainage plow, due to stony and/or poor soil conditions, and installation by excavator shall be included in the additional contingency price. No extra payment will be made for the removal of the drainage plow, crew downtime, or other costs for this transition.

Alternate Installation Techniques

Closed sections of the drain specified to be installed by drainage plow may alternatively be installed using an excavator and installing 375 mm dia. dual-wall HDPE (320 kPa) pipe on a minimum depth of 150 mm of 19 mm dia. clear crushed stone (or approved equal). The stone shall be used to achieve pipe gradient and select native material shall be used for backfill of the pipe trench. No extra payment shall be made per item if the Contractor specifies this method at the time of bidding.

Private Systematic Drainage Systems

The location of existing private drainage systems shall be discussed at the Pre-Construction meeting and existing systems affected by the Russell Municipal Drain shall be located by the Contractor and reviewed with the Engineer and affected landowners prior to construction.

Pre-Construction Meeting

The Contractor MUST arrange an on-site Pre-Construction Meeting with the Engineer, Drainage Superintendent and affected landowners before any equipment or materials are moved onto the site and before any work is commenced on this project.

Furthermore, the Contractor shall also provide notification of the commencement of in-water work (if required) to the Saugeen Valley Conservation Authority (SVCA) or any other applicable agency(s) at least ten (10) working days prior to the initiation of the work.

Agency Project Requirements

Attention is drawn to the SVCA permit and both the MNRF and DFO documents. All work is to be in accordance with the terms of these documents.

Working Space

The area being provided to the Contractor to undertake the work is described herein and the maximum widths are specified on the table entitled 'Working Space'.

<u>WORKING SPACE</u>		
Station	Max. Width (m)	Comments
<u>Main Drain</u>		
-0+030 to 0+000	10 m working space	Access to the Main Drain (Open) will be from Concession 2 South Durham Road to AR#1 on the G. Girodat (Roll No. 3-042) property, as shown in the drawing details. The stilling basin and channel construction shall be along the north/west bank. Spoil levelling shall be to a maximum depth of 300 mm. Excess excavation material shall be removed from the site by the Contractor.
0+000 to 0+085	20 m working space	Access to the Main Drain (Closed) will be from Concession 2 South Durham Road to AR#1 on the G. Girodat (Roll No. 3-042) property, as shown in the drawing details.
0+105 to 0+307	20 m working space	Access to the Main Drain (Closed) will be from Sideroad 25 South to AR#2 on the J.Russell (Roll No. 3-013) property, as shown on the plan.
<u>NOTES:</u>		
<p>(1) The Contractor shall contain their construction operations to as narrow a width as possible, so as to prevent damage to lands, crops, bush, etcetera, and shall not exceed the widths indicated.</p> <p>(2) The Contractor shall be entirely responsible for any damage to lands, crops, etcetera, beyond the widths and locations of both the access routes and the working spaces specified, caused by the Contractor, their Subcontractors or their employees while undertaking the work.</p> <p>(3) The Engineer's approval MUST BE OBTAINED BEFORE exceeding the maximum widths indicated.</p> <p>(4) Access to the working space shall be public roads or as specified. All routes must be approved by the Engineer and Drainage Superintendent prior to construction.</p>		

Access Routes

The access routes for construction shall be from specified locations on Concession 2 South Durham Road, and Sideroad 25 South to the Drain, as specified in the Table 'Working Space' and on the enclosed Plan. The Contractor shall confirm these access routes with the Engineer, Drainage Superintendent and affected landowners prior to commencing any work.

Final Inspection

After substantial completion of the work and prior to demobilization and removal of equipment and materials from the site, the Contractor **MUST** arrange an on-site FINAL inspection of the work with the Engineer. This is to ensure all aspects of the work have been satisfactorily completed and/or that arrangements have been made to expedite the completion of any outstanding minor items or deficiencies. Notification to the Engineer of this Final Inspection shall be provided at least 2 days prior.

Description of Work - General Construction

The following general construction conditions and requirements apply to this project:

- Post-construction restoration of the working area shall be to the satisfaction of the Engineer.
- All disturbed areas including the Concession 2 South Durham Road and Sideroad 25 South right-of-ways, and all berms, shall be seeded with an approved seed mixture or as directed by and to the satisfaction of the Engineer.

Directional Berms

Directional Berms shall be installed with all catchbasins except where noted. Typical berm height shall be 500 mm, top width of 300 mm, sideslopes of 1.5:1 and length of 10 m, to the satisfaction of the Engineer. Berms shall be constructed of material containing suitable clay content to allow for direction of overland flow to catchbasins and are intended for minor ponding only.

Plastic Drainage Tubing (PDT) (Section E.2.3.1)

All PDT installed under these specifications shall be manufactured in accordance with the latest revision of the Drainage Guide for Ontario, as published by the Ministry of Agriculture, Food, and Rural Affairs.

All PDT shall be single wall drainage tubing (Ideal Pipe - HDPE drainage tubing or approved equal) and have a minimum pipe stiffness of 210 kPa and shall be solid pipe.

Description of Work

The specific items listed here are in addition to those described in the *Estimate of the Cost of Work* (Appendix B) and the *Standard Drain Specifications* (Appendix E). The numbering of each item references the corresponding item in the *Estimate of the Cost of Work*.

SECTION A– Main Drain

A2. Channel Section

Channel Construction (Sta. -0+030 to Sta. -0+010). A 10 m right-of-way has been provided on the north/west bank of open section of the Russel Municipal Drain for the spreading and leveling of spoil from the drain, however the spoil shall not be spread within 2 m from the top of the ditchbank and shall not be spread to a depth greater than 300 mm. Topsoil shall be stripped prior to the spoil being placed and spread back over the leveled spoil. The disturbed area shall then be seeded with an approved grass seed mixture (or approved equivalent).

Excavated subsoil or material deemed unsuitable by the Engineer shall be disposed of off-site by the Contractor. The bank slopes at the outlet pipe shall 2H:1V and be lined with rip-rap. A rodent grate shall be installed on the outlet pipe.

Sediment Control Structure (Sta. -0+030). A temporary two bay sediment control structure shall be constructed at the end of the proposed channel work,

immediately upstream of the confluence of the Russell Municipal Drain and the existing natural watercourse. This shall be completed prior to any other sitework and construction shall be to the satisfaction of the Engineer and the Drainage Superintendent.

The sediment control structure shall be constructed using three (3) lengths of 300 mm dia. treated woodchip sediment control socks (FILTREXX SILTSOXX or approved equal) and anchored into each side bank and the channel bottom to control channel baseflows. The socks shall be spaced approximately 2 m apart from one another, to allow for sediment cleanout with an excavator. Riverstone (300 mm thickness of 150 to 300 mm dia. rounded river stone) shall be used to create check dams at each sock and to additionally anchor the socks (see *accompanying drawing detail*).

The sediment control structure shall be left in place for a period of one (1) year following the construction of the Russell Municipal Drain and after that time shall be removed and the riverstone formed into a shallow riffle structure by the Contractor.

Sediment Basin (Sta. -0+030 to Sta. -0+025). A permanent sediment basin (approximately 5 m in length and 600 mm deep) shall be constructed immediately upstream of the sediment control structure; or where directed by the Engineer. This shall be completed prior to any other sitework and construction shall be to the satisfaction of the Engineer and the Drainage Superintendent.

When necessary, during and at the completion of the project and/or when instructed by the Engineer, the Contractor shall remove and spread any accumulated sediment within the working right-of-way.

The dug sediment basin shall be left in place permanently following the construction of the Russell Municipal Drain 2018 and thereafter shall be maintained by the Drainage Superintendent.

Stilling Basin (Sta. -0+010 to Sta. 0+000). A permanent stilling basin (Sta. 0+000 to Sta. 0+006) and spillway (Sta. 0+006 to Sta. 0+010) shall be installed immediately downstream of the outlet pipe at Sta. 0+000 to the satisfaction of the Engineer. The basin shall be lined with approximately 10 m² of river stone (450 mm thickness of 150 mm to 300 mm dia. round river stone) in the base and spillway from the outlet at Sta. 0+000 to Sta. -0+010. Additionally, approximately 40 m² of rip-rap (450 mm thickness of 150 mm to 300 mm (OPSS R50) diameter quarry stone with geotextile underlay) shall be installed on the banks from Sta. -0+000 to Sta. -0+010 as erosion protection. The banks of the stilling basin and spillway shall be sloped at 2H:1V to match existing grade.

A3. Outlet Pipe**(Sta. 0+000 to Sta. 0+006)**

One 6 m length of 450 mm dia. solid dual-wall HDPE bell and spigoted pipe (320 kPa) shall be connected to the proposed 375 mm dia. PDT. The outlet of of the pipe shall be installed with a rodent grade.

A6. Offset Ditch Inlet Catchbasin**(Sta. 0+085)**

A ditch inlet catchbasin shall be installed directly downstream of the outlet of the existing culvert crossing Concession 2 South Durham Road. The catchbasin shall be installed with a directional berm and rip-rap spillway as per the accompanying details.

The ditch inlet catchbasin shall be connected to the proposed observation box at Sta. 0+085 with approximately 6 m of 250 mm dia. dual-wall HDPE (320 kPa) pipe.

A8. Concession 2 South Durham Road Crossing**(Sta. 0+085 to Sta. 0+105)**

The Concession 2 South Durham Road crossing from Sta. 0+085 to Sta. 0+105 shall be completed using the Boring (Jack and Bore) method. The road crossing shall be completed within one (1) working day. An approved traffic management plan shall be prepared and submitted by the Contrator with repect to the road crossing activity.

Note: Any settlement/negative effects caused to the road shall be the sole responsibility of the Contractor, per the Standard Drain Specifications (Appendix E). Any voids surrounding the pipe shall be filled with grout by the Contractor within a reasonable timeframe of knowing of the voids. The owner of the Road right-of-way shall be contacted by the Contractor regarding any issues pertaining the pipe installation on their property, prior to leaving the site. Issues shall be remedied to the satisfaction of the Engineer.

The catchbasins at Sta. 0+085 and Sta. 0+105 shall be installed on the existing property line and grading shall be completed to ensure positive drainage of surface water to the catchbasins.

A10. Buried Surface Water Inlet**(Sta. 0+307)**

The catchbasin at Sta. 0+307 shall be installed with four (4) - 10m lengths of 200 mm dia. dual-wall perforated HDPE (320 kPa) c/w a geotextile wrapped 19 mm

dia. clear stone and pea gravel envelope including connection the north and south walls of the catchbasin per the accompanying detail.

SECTION B – Contingency Items

This section covers work that may be required for this project. These items shall apply only as and when approved by the Engineer.

B1. Reconnection and/or Connection of Existing Tiles

Typically, existing private tiles encountered during construction will be reconnected to themselves per the detail in the accompanying drawings. In circumstances where, in the opinion of the Engineer, reconnection is not possible, private tiles may be connected to the new drain as noted and with the downstream side of the existing tile capped.

Reconnections (Section E.2.3.4). For the unit price bid the Contractor shall reconnect existing private tile drains encountered during construction across the trench to themselves, above the new Municipal Drain tile. Included in this price shall be all labour equipment and material required to support the tile connection above the new drain, consisting of compacted backfill or clear stone bedding, and connection of the tile using solid dual-wall (320 kPa) HDPE pipe (or approved equal) across the trench as per the detail in the accompanying drawings.

Connections (Section E.2.3.5). The unit price bid for this item shall include all labour equipment and material required to connect existing private tile drains encountered during construction, to the new municipal drain. Installation shall include appropriately sized PDT or dual-wall (320 kPa) HDPE pipe, connected to the new pipe using a core drilled hole and manufactured HDPE coupler fitting, including backfill with 19 mm clear crushed stone under the connection to native soil and a minimum of 300 mm over top of the connection. Connections directly into the new drain without the use of a coupler will not be permitted.

Existing tile drains shall be connected primarily to catchbasins through the provided knockouts when possible. Any proposed direct connections to the new municipal drain in the vicinity of catchbasins shall be approved by the Engineer prior to being installed.

Missed Reconnection/Connections. Missed connections and/or reconnections during construction shall be completed by the Contractor during the warranty period and paid at the Contract price. If the Contractor fails to complete the connection and/or reconnection within a reasonable timeframe in the opinion of the Engineer and/or the Municipality, the work shall be completed by a Contractor of the Engineer's choosing and the cost of the work deducted from the Contract holdback.

B2. Rip-Rap

For the unit price bid per square metre, the Contractor shall supply and install a 450 mm thickness of 150 mm to 300 mm (OPSS R50) diameter quarry stone rip-rap with geotextile underlay. These unit prices shall be used for payment for any rip-rap installed in addition to those quantities already specified in other items and for credit for any quantities of rip-rap deleted from other items. Additionally, this will include areas of

existing channel bank where erosion or bank slumping has occurred, as directed on-site by the Engineer.

B3. 19 mm Clear Crushed Stone

For the unit price bid per tonne, the Contractor shall supply 19 mm (3/4 inch) diameter clear crushed stone. These unit prices shall be used for payment for any 19 mm clear crushed stone installed in addition to those quantities already specified in other items.

B4. OPSS Granular 'B' Material

For the unit price bid per tonne, the Contractor shall supply OPSS Granular 'B' material. These unit prices shall be used for payment for any Granular 'B' material installed in addition to those quantities already specified in other items.

B5. HDPE Dual-Wall (320 kPa) Pipe Installation

For the unit price bid per metre, if approved by the Engineer, the Contractor shall install 375 mm dia. solid HDPE dual-wall (320 kPa) pipe by excavator on a minimum depth of 150 mm of 19 mm (3/4 inch) diameter clear crushed stone bedding per the accompanying detail.



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Appendix G

Soils Investigation

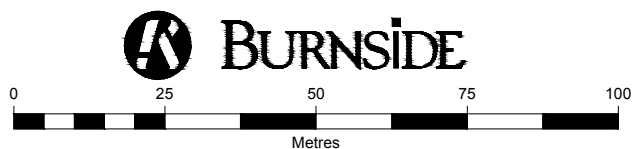


Figure Title

RUSSELL MUNICIPAL DRAIN

SOIL TEST PIT LOCATIONS

Client

MUNICIPALITY OF BROCKTON

Drawn

TK

Checked

EMD

Date

2017/05/11

Scale

1:1250

Project No.

300038962

Figure No.

FIG1

Appendix H

Agency Correspondence



Technical Memorandum

Date: December 1, 2017 **Project No.:** 300038962

Project Name: Russell Municipal Drain

Client Name: The Municipality of Brockton

Submitted To: Megan Lay, Fisheries Protection Biologist, Department of Fisheries and Oceans Canada

Submitted By: Matthew Moote, H. B.Sc., Aquatic Ecologist

Reviewed By: Chris Pfohl, C.E.T., EP, Can-CISEC, Sr. Aquatic Ecologist

1.0 Background

R.J. Burnside and Associates Limited (herein, Burnside) have been retained to complete the detailed design of the proposed works, the proposed Russell Municipal Drain. As part of the Fisheries Act compliance process Burnside aquatic ecology staff performed a rapid aquatic habitat assessment on November 20, 2017 to supplement the detailed design and drawings previously submitted by Burnside with respect to the drainage system.

Burnside staff visited the site and performed the aquatic habitat assessment in order to assess and characterize the existing aquatic conditions within the existing watercourse at the proposed location of the Russell Municipal Drain. In addition to the site visit and reviewing the proposed works, Burnside ecology staff conducted a review of historical records pertaining to the watercourses downstream of the proposed Russell Municipal Drain. This memorandum is being submitted to provide an understanding of the existing aquatic conditions at the location of the proposed Russell Municipal Drain to support the documents submitted for the proposed works.

2.0 Project Description

The existing watercourse is currently an overland flow route that flows from west to east from west of Sideroad 25 South then flowing from south to north beneath Concession 2 South Durham Road. This overland flow route discharges into an unnamed tributary of the Saugeen River, north of Concession 2 South Durham Road. The proposed works involve the enclosing of the overland flow route through approximately 300 m of 600 mm diameter pipe. The pipe will convey flow from 25 Sideroad South to the downstream unnamed tributary of the Saugeen River. The existing watercourse flows from west of Sideroad 25 South and this portion of the existing watercourse will not be enclosed. The Russell Municipal Drain is proposed to end at this road. The enclosure will discharge into 30 m of new channel, the first 10 m of which will be

a stilling basin which will allow for the dissipation of flows. A wetland exists south of Concession 2 South Durham Road and east of Sideroad 25 South and this wetland will not be altered. The proposed works include the enclosing of the overland flow route through the use of the 600 mm pipe south and east around this wetland and would not result in removing the water from the wetland.

Since the project has the potential to impact the existing aquatic environment, mitigation measures will be required to be implemented during construction. Prior to any construction being completed, all avoidance and mitigation measures must be in place and remain in place until the works are completed. For drain maintenance and repair activities, considerations for review agencies, erosion and sediment control measures, offsetting and mitigation measures please see the previously submitted project drawings and Request for Review form.

3.0 Site Conditions

3.1 Desktop Assessment

The following sources of background information were reviewed as part of our desktop assessment for the subject watercourse:

- Natural Heritage Information Centre (2016);
- Ministry of Agriculture, Food, and Rural Affairs Mapping (2015 and 2017);
- Aerial orthophotography (2015);
- Ministry of Natural Resources and Forestry (MNRF) Aquatic Resource Area mapping (2015);
- Fisheries and Oceans Canada (DFO) Aquatic Species at Risk mapping (2015);
- DFO Critical SAR Habitat mapping (2017); and
- Ontario Hydro Network Mapping (2015).

The desktop review indicated that the existing watercourse is a first order stream that discharges into an unnamed tributary of the Saugeen River and it is located within the Saugeen Valley Conservation Authority. The existing watercourse is an intermittent stream (OHN, 2015) that flows primarily from south to north, discharging into the unnamed tributary of the Saugeen River approximately 300 m downstream from Sideroad 25 South. The reviewed background information did not identify which, if any, fish species inhabit the existing watercourse, however historical records for the downstream unnamed tributary of the Saugeen River were reviewed and a summary of these fish species is displayed in Table 1. The data was obtained from the MNRF Aquatic Resource Area mapping.

The DFO drain classification could not be determined through the review of background information (OMAFRA, 2015 and 2017) as this is not an existing municipal drain. Sensitive species listed within the Guidance for Maintaining and Repairing Drains in Ontario (DFO, 2017) are not present within the unnamed tributary of the Saugeen River or within the overland flow area where the Russell Municipal Drain is proposed.

The thermal regime of the existing watercourse and unnamed tributary of the Saugeen River could not be determined through the reviewed background information. Based on the fish species that inhabit the downstream unnamed tributary of the Saugeen River, to which the existing watercourse contributes to flow and water quality, it is likely that the existing watercourse is cool/mixed in nature.

Table 1: Summary of fish species records for the unnamed Tributary of the Saugeen, downstream of the proposed Russell Municipal Drain based on desktop assessment.

Common Name	Scientific Name	Thermal Regime Preference	Source of Information
Fathead Minnow	<i>Pimephales promelas</i>	Warm	MNRF Aquatic Resources Area Mapping.
Eastern Blacknose Dace	<i>Rhinichthys atratulus</i>	Cool	
Bluntnose Minnow	<i>Pimephales notatus</i>	Warm	
Creek Chub	<i>Semotilus atromaculatus</i>	Cool	
Common Shiner	<i>Luxilus cornutus</i>	Cool	
White Sucker	<i>Catostomus commersonii</i>	Cool	

No records of Species at Risk (SAR) or critical habitat for those species were identified in the vicinity of the project area.

3.2 Aquatic Habitat Assessment

Burnside aquatic ecology staff conducted a fish habitat/passage assessment on November 20, 2017, in order to document existing conditions, determine how and if the proposed works may effect conditions within the existing watercourse and the downstream unnamed tributary, and supplement information collected through the desktop assessment. The accessible lengths of the existing watercourse and the unnamed tributary of the Saugeen River were assessed as per the MTO Fisheries Protocol - Environmental Guide for Fish and Fish Habitat (June, 2009). Previous weather conditions were wet, with a few snow and rain events in the week prior to the site visit, however the waters were not turbid at the time of the site visit. Photographs 1-5 below show the upstream and downstream sides of the existing watercourse during the November 20, 2017 site visit. Photos 6 and 7 display the unnamed tributary of the Saugeen River.

As mentioned the existing watercourse generally flows from south to north. The drain crosses beneath Concession 2 South Durham Road through a corrugated steel pipe (CSP) surface culvert that is approximately 600 mm in diameter. The proposed Russell Municipal Drain would end at the eastern right-of-way limit of Sideroad 25 South, however the existing watercourse also crosses Sideroad 25 South in a west to east direction and it flows through a CSP surface culvert that is approximately 400 mm in diameter. The land adjacent to the proposed Russell Municipal Drain is classified as active agricultural lands with some rural homes.

3.2.1 Conditions Upstream of Proposed Works

Burnside staff assessed an upstream reach of the existing watercourse during the site visit from the road right-of-way. The existing watercourse flows beneath Sideroad 25 South in a west to east direction through a CSP surface culvert, approximately 400 mm in diameter. The watercourse formed a flat and watercress was present within the outlet of the culvert, indicating potential groundwater discharge (Photo 1). In this area a formed channel was evident. The flat had a wetted width and depth of approximately 0.3 m and 0.02 m respectively. The watercourse then narrows considerably to a wetted width of the approximately 0.08 m, and flowed through an area vegetated with grasses and cedar trees (Photo 1).

Burnside staff assessed the existing watercourse from Concession 2 South Durham Road when observing the upstream portion. Downstream of Concession 2 South Durham Road, Burnside staff walked the watercourse to the outlet to the unnamed tributary. Upstream of Concession 2 South Durham Road the overland flow route was exhibiting base flow conditions and there was no defined channel. No banks or related morphology were observed. There was laminar flow at the inlet of the culvert approximately 3 m long, 0.6 m wide and 0.03 m deep (Photo 3). Minor areas of watercress were observed upstream of this culvert.

Downstream of the Concession 2 South Durham Road there was a pool that was densely vegetated with watercress and iron staining was present as well (Photo 2). A channel was formed downstream of this pooled area that ran for approximately 5 m (Photo 4). A defined channel could not be identified other than this channel. The overland flow area was densely vegetated with grasses, reeds and forbs (Photo 5). Further downstream in the area of the unnamed tributary there were mature riparian trees. It was apparent that the existing watercourse was receiving minimal water from the upstream reaches and was mostly receiving water through groundwater input.

3.2.2 Conditions Downstream of Proposed Works

Burnside staff assessed the unnamed tributary of the Saugeen River downstream where the existing watercourse will outlet. This unnamed tributary is a meandering stream and it flows from south to north beneath Concession 2 South Durham Road. At the time of the site visit the unnamed tributary was flowing at approximately 0.05 m/s and was comprised mostly of a run (Photo 6). Downstream of where the proposed outlet would be located a deep refuge pool was formed at a bend within the unnamed tributary (Photo 7). There was minimal overhanging vegetation present and the substrate was comprised as silt, gravel and sand. The banks were undercut, but stable through the observed reach of the tributary. Bankfull width and height were estimated at 2.8 m and 1.0 m respectively. Wetted width and depth were estimated at 0.8 m and 0.2 m respectively. The west bank was approximately 1.5 m deep and was much higher than the east bank.

3.2.3 Fish habitat

No fish were observed within the unnamed tributary or within the existing watercourse. The unnamed tributary is considered to contain fish habitat and definitely contributes to fish habitat

downstream within the Saugeen River through conveying flow, water quality and nutrients. The existing watercourse is not considered to be direct fish habitat due to the lack of a defined channel, the lack of water quantity and the dense vegetation growing within the area that a channel could exist. The enclosing of the existing watercourse to form the proposed Russell Municipal Drain would not remove fish habitat and would contribute surface and groundwater flows free of sediment to the unnamed tributary of the Saugeen River.



**Photo 1: Looking East, Existing Watercourse, Downstream of Sideroad 25 South
(November 2017).**



Photo 2: Looking East, Pooled Area Downstream of Concession 2 South Durham Road with Iron Staining and Watercress Present (November, 2017).



Photo 3: Looking South, the Inlet to the Culvert beneath Concession 2 South Durham Road.



Photo 4: Looking North, the Small Channel Downstream of the Pooled Area (November 2017).



Photo 5: Looking North, Downstream of the Small Channel North of Concession 2 South Durham Road (November, 2017).



Photo 6: Looking East, The Unnamed Tributary of the Saugeen River Where the Proposed Russel Municipal Drain is Proposed to Outlet (November, 2017).



Photo 7: Looking North, Downstream of the Proposed Russell Municipal Drain Outlet. A Deep Refuge Pool was Present at the Bend in the Tributary (November, 2017).

R.J. Burnside & Associates Limited

A handwritten signature in black ink, reading "Matthew Moote". The signature is fluid and cursive, with a long horizontal stroke extending from the end.

Matthew Moote
Aquatic Ecologist

MM:js

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Fisheries and Oceans
Canada

Pêches et Océans
Canada

Central & Arctic Region
Fisheries Protection Program
867 Lakeshore Road,
Burlington, ON
L7S 1A1

Région centrale et de l'Arctique
Programme de protection des pêches
867 chemin Lakeshore
Burlington, ON
L7S 1A1

February 1, 2018

Your file Votre référence

300038962

Our file Notre référence

17-HCAA-00965

Municipality of Brockton
Attention: Julie Farrel
100 Scott Street, Box 68
Walkerton, Ontario
N0G 2V0

Subject: Pipe Installation, Dredging, Russell Municipal Drain, Municipality of Brockton, Ontario – Implementation of Measures to Avoid and Mitigate Serious Harm to Fish and Prohibited Effects on Listed Aquatic Species at Risk

Dear Ms. Farrel:

The Fisheries Protection Program (the Program) of Fisheries and Oceans Canada (DFO) received your proposal on July 4, 2017. We understand that you propose to:

- Enclosing a natural watercourse for approximately 307 linear meters from east of Sideroad 25 South to north of Concession 2 South Durham Road.
- Realign approximately 30 m of the existing watercourse from the proposed drain enclosure to the confluence of an Unnamed Tributary of the Saugeen River.

Our review considered the following information:

- DFO Request for Review, dated June 26, 2017
- Russell Municipal Drain Drawings, prepared by R. J. Burnside & Associates Limited, dated May 11, 2017.
- Email correspondence with Trevor Kuepfer (R.J Burnside & Associates) and Megan Lay (DFO) on September 28, 2017.
- Email correspondence with Ed Delay (R.J Burnside & Associates) and Megan Lay (DFO) on October 24, 2017.
- Technical Memorandum, prepared by R. J. Burnside & Associates Limited, dated December 1, 2017.

Your proposal has been reviewed to determine whether it is likely to result in serious harm to fish which is prohibited under subsection 35(1) of the *Fisheries Act* unless

authorized. Your proposal has also been reviewed to determine whether it is likely to affect 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*, unless authorized.

To avoid and mitigate the potential for serious harm to fish, we recommend implementing the measures listed below:

- Work outside of the restricted activity period of March 15 to July 15.
- Install sediment control socks at the drainage outlet.
- Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation.

Provided that you incorporate these measures into your plans, the Program is of the view that your proposal will not result in serious harm to fish or prohibited effects on listed aquatic species at risk. As such, an authorization under the *Fisheries Act* or a permit under the *Species at Risk Act* is not required.

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 avoid causing serious harm to fish and avoid prohibited effects on listed aquatic species at risk, any part of their critical habitat or the residences of their individuals.

It is also your *Duty to Notify* DFO if you have caused, or are about to cause, serious harm to fish that are part of or support a commercial, recreational or Aboriginal fishery. Such notifications should be directed to <http://www.dfo-mpo.gc.ca/pnw-ppe/violation-infraction/index-eng.html>.

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

If you have any questions, please contact Megan Lay at 905-336-6445, or by email at (Megan.Lay@dfo-mpo.gc.ca). Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,



Rick Kiriluk

A/Senior Fisheries Protection Biologist, Marine and Coastal
Fisheries Protection Program

Copy:

Megan Lay, Fisheries and Oceans Canada

Ed DeLay, R. J. Burnside & Associates Limited

Michelle Gallant, Saugeen Valley Conservation Authority



Memorandum

Date: April 4, 2018 **Project No.:** 300038962.0000
Project Name: Russell Municipal Drain
Client Name: Municipality of Brockton
To: Michelle Gallant, Regulations Officer, SVCA
From: Nicholle Smith

1.0 Introduction

As part of the proposed Russell Municipal Drain project, Burnside staff completed further investigation to review comments provided by Michelle Gallant of Saugeen Valley Conservation Authority regarding SVCA regulated areas of the site. It was determined that the proposed works are subject to the SVCA's Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (Ontario Regulation 169/06). This Regulation is in accordance with Section 28 of the Conservation Authorities Act, R.S.O. 1990, Chap. C. 27, as amended, and requires that a person obtain the written permission of the SVCA prior to any "development" in a Regulated Area or alteration to a watercourse or wetland.

As a result, it was determined that the boundaries of the area designated as wetland on the site should be delineated and refined by an in-field investigation to accurately reflect the existing conditions and the limits of the SVCA regulation boundaries.

2.0 Policy Context

Under Ontario's Provincial Policy Statement (PPS), development is not permitted within significant wetlands in Ecoregions 5E, 6E, and 7E. Development may occur on adjacent lands provided that it can be demonstrated that there will be no negative impacts on the features or ecological functions for which the area is designated. Consideration must be given to the potential for indirect impacts on the unevaluated wetland through the alteration of surface water flows and groundwater levels.

3.0 Ontario Wetland Evaluation System and Site Conditions

Delineation of the boundaries of wetlands is guided in Ontario by the Ontario Wetland Evaluations System (OWES) (OMNRF 2014). This guidance document establishes the methods for determining the outside boundaries of a wetland feature using several principles to be determined based on the site-specific conditions on a subject site. The conditions present

during the site visit completed on October 20, 2017 on the proposed Russell Municipal Drain site included an isolated area of naturally vegetated communities connected to offsite features by the Russell Municipal Drain and its surrounding riparian area, as shown on the proposed Russell Municipal Drain drawings (Drawing 1 of 4).

The existing agricultural land use, including row crops (corn), have resulted in a fairly well-defined boundary to this vegetation community (Drawing 3 of 4). Some encroachment into the edges of the seasonally wet areas are evident but re-establishment of plant species has occurred naturally. This is evidenced by the topography of the site, the soil characteristics and the vegetation noted within the areas designated as wetland.

The edges of this community were refined in the field based on the percentage of wetland plant species composition in the community. Diversity in the community included a central area of treed swamp dominated by willow, ash and poplar species. This area was surrounded by a shrub thicket swamp boarder dominated by dogwood and willow species. The outer fringe of the wetland area included a variety of wetland plant species dominated by horsetail species. In addition, soils within the wetland area included a high amount of organic materials and there was indication of groundwater input (seeps) as iron precipitate staining was documented in both the Sideroad 25 South CSP culvert and the wetland, especially in close proximity to the culvert. This staining may have been associated with the tile bed to the east of the site.

4.0 Proposed Russell Municipal Drain

Currently, the proposed municipal drain would begin at the eastern Sideroad 25 South right-of-way, proceeding to the southeast around the periphery of the treed portion of the wetland, offset approximately 6 metres south of the tree limit (Drawings 1 of 4, 3 of 4). The alignment would continue to the north and east, crossing Concession Road 2 SDR approximately 6 metres west of the existing CSP culvert and proceeding to outlet downstream into the natural watercourse to the northeast.

This section of the proposed municipal drain on the J. Russell property (Roll No. 3-013) would be composed of 375 mm dia. solid single-wall drainage tubing to be installed with a drainage plow, since it would be installed within the wetland boundary.

Alternatively, as determined with the SVCA, this section of the proposed municipal drain could be installed with perforated 375 mm dia. single-wall drainage tubing if located beyond a 6 metre setback from the delineated wetland boundary. This would force the alternative alignment to the south and east of the existing proposal for a solid pipe, although the pipe sections within the wetland boundary and 6 metre setback would still remain as solid pipe, namely in the areas of Sideroad 25 South and the Concession Road 2 SDR.

5.0 Results

The wetland mapping provided by SVCA was refined as depicted in the drawing set (Drawings 2 of 4, 3 of 4) to indicate where the location of the wetland boundaries and the locations of the existing culvert crossings with respect to the proposed drain location. The proposed works are subject to the SVCA's Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (Ontario Regulation 169/06). This Regulation is in accordance with Section 28 of the Conservation Authorities Act, R.S.O, 1990, Chap. C. 27, as amended, and requires that a person obtain the written permission of the SVCA prior to any "development" in a Regulated Area or alteration to a watercourse or wetland, as determined by SVCA.

The proposed works are not predicted to result in a long term measurable adverse effect to the existing wetland features or functions and will aim to maintain the water balance to this feature.

NJS:ls

cc: Stephen Cobeau, P.Eng., Drainage Superintendent, Municipality of Brockton

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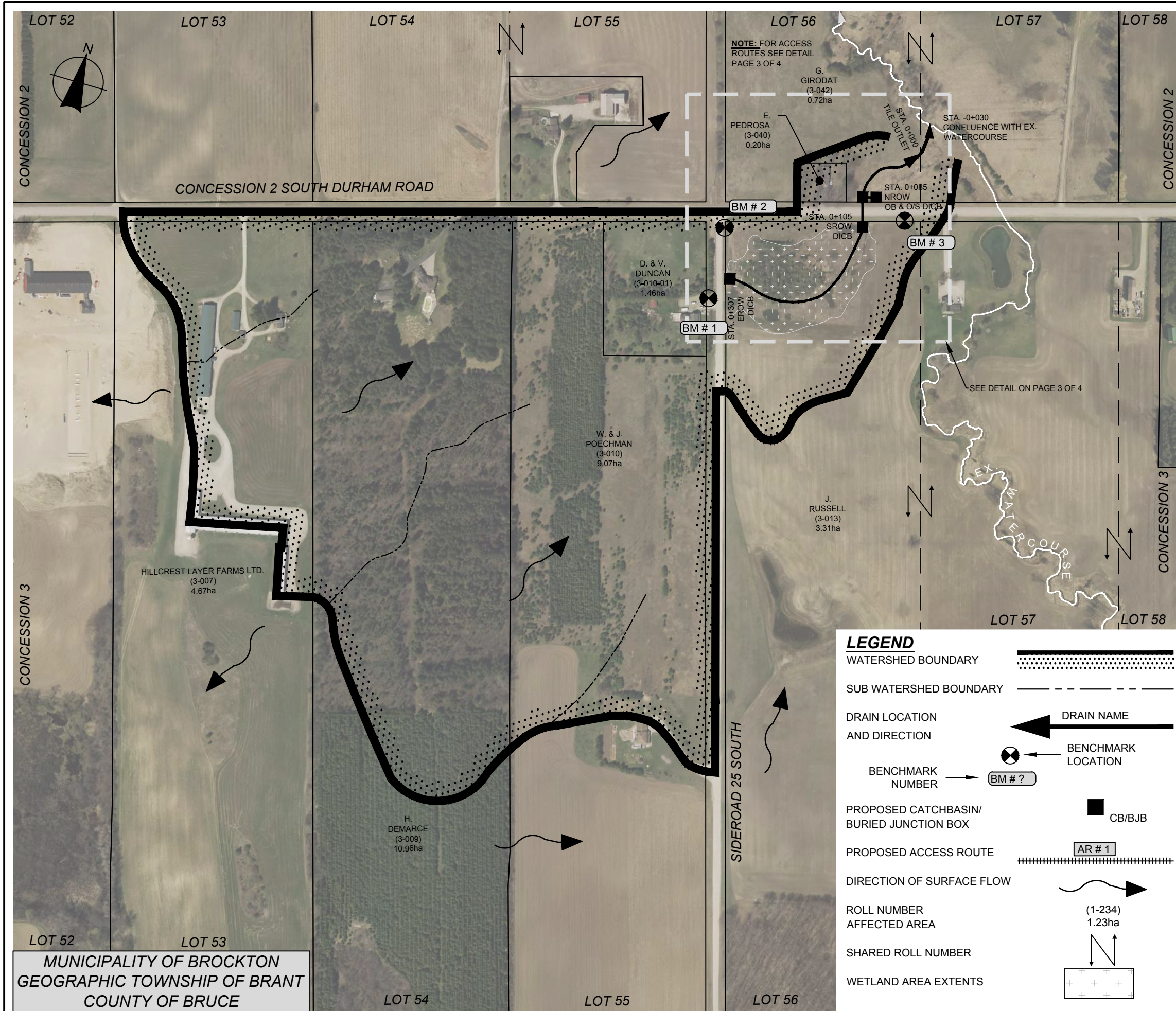
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[THE DIFFERENCE IS OUR PEOPLE]

Appendix I

Drawings

Watershed Plan	1 of 4
Profile	2 of 4
Details 1	3 of 4
Details 2	4 of 4



MUNICIPALITY OF BROCKTON
GEOGRAPHIC TOWNSHIP OF BRANT
COUNTY OF BRUCE

LEGEND

WATERSHED BOUNDARY

SUB WATERSHED BOUNDARY

DRAIN LOCATION AND DIRECTION

BENCHMARK LOCATION

BENCHMARK NUMBER

PROPOSED CATCHBASIN/ BURIED JUNCTION BOX

PROPOSED ACCESS ROUTE

DIRECTION OF SURFACE FLOW

ROLL NUMBER AFFECTED AREA

SHARED ROLL NUMBER

WETLAND AREA EXTENTS



KEY PLAN
SCALE: N.T.S.

Notes

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2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to this office prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. All property lines are approximate and for information purposes only.

FOR REPORT

LICENSED PROFESSIONAL ENGINEER
9/10/2018
E. M. DELAY
100180151
PROVINCE OF ONTARIO

No.	Issue / Revision	Date	Auth.
1	ISSUED FOR INFORMATION MEETING	2016/08/26	EMD
2	ISSUED FOR INFORMATION MEETING NO.2	2016/09/27	EMD
3	ISSUED FOR AGENCY APPROVAL	2017/02/24	EMD
4	ISSUED FOR INFORMATION MEETING NO.3	2017/05/11	EMD
5	ISSUED FOR ENGINEER'S REPORT	2018/09/10	EMD

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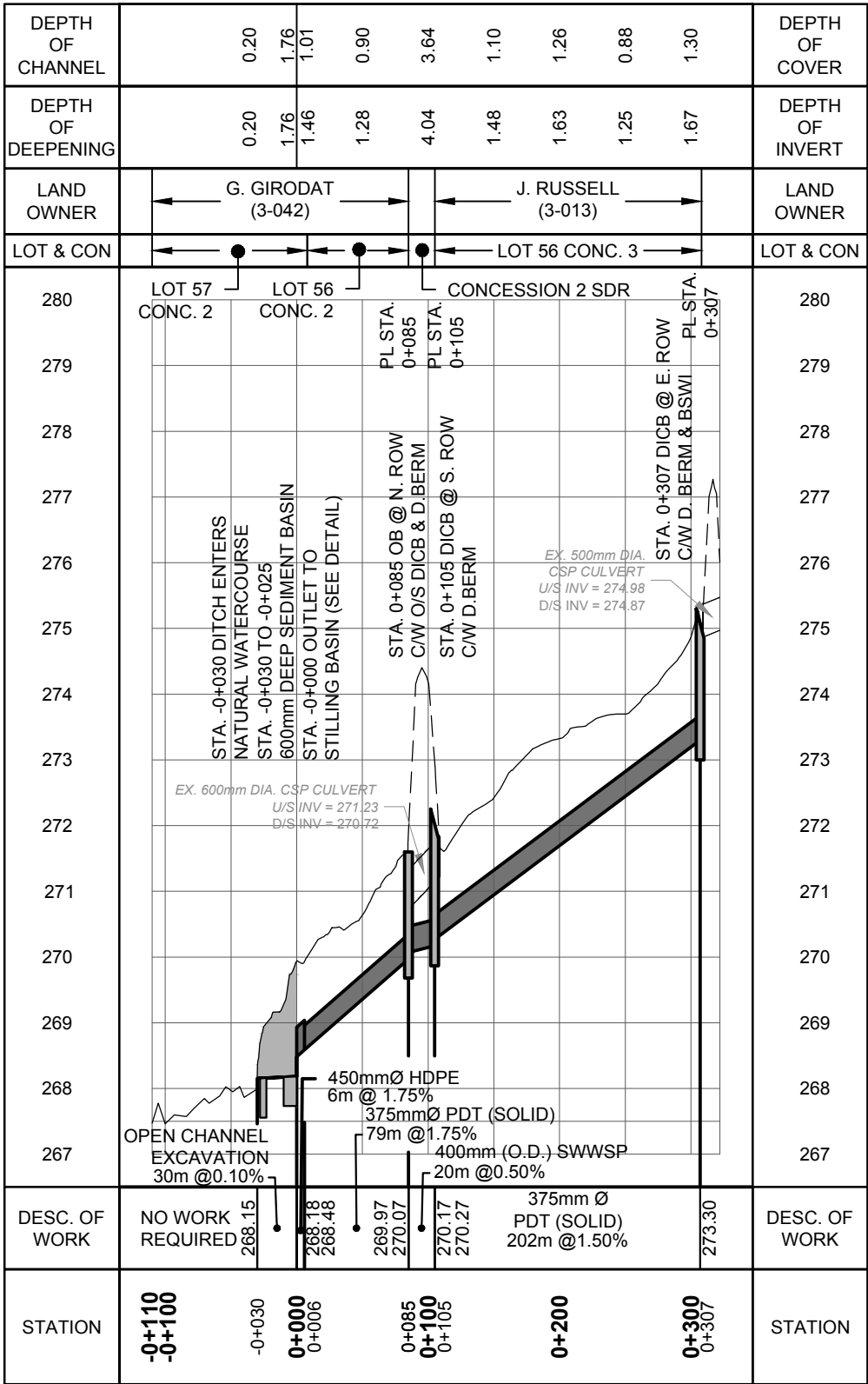
Client
MUNICIPALITY OF BROCKTON
100 SCOTT STREET
WALKERTON, ONTARIO
N0G 2V0

Drawing Title
RUSSELL MUNICIPAL DRAIN 2018

PLAN

0 40 80 160 240m

Drawn TK	Checked EMD	Date 2016/08/26	Drawing No. 1 OF 4
Scale 1:4000	Project No. 300038962		



PIPE TABLE						
PIPE MATERIAL	JOINING METHOD	DIAMETER (mm)	STATION		LENGTH (m)	NOTES
			FROM	TO		
PDT	SPLIT COUPLER	375	0+105	0+307	202	SINGLE WALL SOLID CORRUGATED HDPE (210 kPa) C/W NON-WOVEN GEOTEXTILE
SWWSP	WELDED	400	0+085	0+105	20	O.D. (6.35mm THICKNESS)
HDPE	SPLIT COUPLER	250	0+085	6m O/S E	6	DUAL-WALL SOLID HDPE (320 kPa)
PDT	SPLIT COUPLER	375	0+006	0+085	79	SINGLE WALL SOLID CORRUGATED HDPE (210 kPa) C/W NON-WOVEN GEOTEXTILE
HDPE	BELL & SPIGOT	450	0+000	0+006	6	DUAL-WALL HDPE (320 kPa)

PIPE NOTES:

- ALL PIPE AND PIPE WORKS SHALL CONFORM TO THE GENERAL SPECIFICATIONS.
- ALL CONCRETE DRAINAGE TILE (CDT) SHALL BE NON-REINFORCED 2000D RATED, OR APPROVED EQUAL.
- ALL HIGH DENSITY POLYETHYLENE (HDPE) PIPE SHALL BE DUAL-WALL, 320 kPa PIPE STIFFNESS, OR APPROVED EQUAL.
- ALL SMOOTH WALLED WELDED STEEL PIPE (SWWSP) USED IN JACK AND BORING INSTALLATIONS SHALL BE MEASURED ON OUTSIDE DIAMETER (O.D.) UNLESS OTHERWISE NOTED.
- ALL CORRUGATED STEEL PIPE (CSP) SHALL BE GALVANIZED AND CONFORM TO THE GENERAL SPECIFICATIONS.
- ALL PLASTIC DRAINAGE TILE (PDT) SHALL CONFORM TO THE GENERAL SPECIFICATIONS.
- ALL OUTLET PIPES SHALL BE CORRUGATED STEEL PIPE (CSP) OR HIGH DENSITY POLYETHYLENE (HDPE).
 - CSP OUTLET PIPES SHALL FIT AROUND THE LAST SECTION OF TILE WITH A MINIMUM OVERLAP LENGTH OF 450mm, COMPLETE WITH A GEO-TEXTILE WRAPPED CONNECTION.
 - HDPE OUTLET PIPES SHALL BE THE SAME DIAMETER AS THE LAST SECTION OF TILE, COMPLETE WITH A BELL CONNECTION TO FIT AROUND THE PIPE. THIS CONNECTION SHALL BE GEOTEXTILE WRAPPED.
 - ALL OUTLET PIPES SHALL HAVE A RODENT GRATE AND HAVE RIP-RAP PROTECTION.

STRUCTURE TABLE					
STATION	TYPE	SIZE (mm)	TOP/ LOW WALL ELEV.	GRATE	NOTES
0+307	DICB	600mm X 600mm	274.85	BIRDCAGE	C/W D. BERM & BSWI
0+105	DICB	600mm X 600mm	271.80	BIRDCAGE	C/W D. BERM
0+085	OB	600mm X 600mm	271.60	BIRDCAGE	C/W O/S DICB
O/S 0+085	DICB	600mm X 600mm	270.70	BIRDCAGE	C/W D.BERM, O/S 6m E

STRUCTURE NOTES:

- ANY VARIATION FROM THE ELEVATIONS AND DIMENSIONS OF THESE STRUCTURES MUST BE APPROVED BY THE ENGINEER.
- STRUCTURES NOT MANUFACTURED AS SPECIFIED MAY BE REJECTED FOR USE AND SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- ALL ABOVE GRADE STRUCTURES SHALL HAVE A MINIMUM SUMP OF 300mm UNLESS OTHERWISE NOTED; BURIED STRUCTURES ARE NOT REQUIRED TO BE BENCHED.
- ALL ABOVE GRADE STRUCTURES SHALL HAVE BIRDCAGE GRATES TO SUIT AND RIP-RAP C/W GEOTEXTILE UNDERLAY FOR ONE METRE AROUND THE STRUCTURE, UNLESS INDICATED OTHERWISE IN THE DETAILED SPECIFICATIONS.
- ALL ABOVE GRADE STRUCTURES ARE TO HAVE POSTS AND MARKERS.
- ALL GRATES AND COVERS SHALL BE FASTENED TO THE STRUCTURE IN AN APPROVED MANNER.
- ALL STRUCTURES MUST HAVE PLUGGED INLETS IN THE SIDES NOT UTILIZED BY THE MUNICIPAL DRAIN TO ACCOMMODATE A 250mm DIAMETER HDPE PIPE SET 0.10m ABOVE THE OUTLET INVERT, UNLESS OTHERWISE NOTED. ALL PLUGGED INLETS MUST HAVE THEIR LOCATION IDENTIFIED ON THE INSIDE OF THE STRUCTURE.
- ALL CONNECTIONS TO STRUCTURES MUST BE MADE USING RIGID PIPE WHICH MUST SPAN FROM THE STRUCTURE TO UNDISTURBED NATIVE SOIL.
- WHERE 900mm X 1200mm STRUCTURES ARE SPECIFIED, THE MUNICIPAL DRAIN INLETS AND OUTLETS SHALL BE INSTALLED IN THE 1200mm WALLS AND THE PLUGGED INLETS SHALL BE IN THE 900mm WALLS, UNLESS NOTED OTHERWISE.
- ALL STRUCTURES SHALL BE CAST WITH A MINIMUM OF A 150mm HIGH RISER SECTION TO ALLOW FOR ADJUSTMENT OF THE TOP ELEVATION TO SUIT FIELD CONDITIONS; ACCORDINGLY NO MONOLITHIC STRUCTURES WILL BE PERMITTED.
- A CATCHBASIN (CB, OR DICB) IS INTENDED TO TAKE ON SURFACE WATER, AN OBSERVATION BOX (OB) IS INTENDED FOR TILE CONNECTIONS AND TO SERVE AS AN OBSERVATION/INSPECTION POINT.
- ALL 600mm X 600mm DICB TO HAVE A 2:1 SLOPE AND ALL 900mm X 1200mm DICB TO HAVE A 3:1 SLOPE WITH CORRESPONDING BIRDCAGE GRATES.

BENCHMARKS:

- BENCHMARK # 1** ELEVATION = 276.59
NAIL IN HYDRO POLE 7.5m W OF SIDEROAD 25S, 20m S OF CULVERT CROSSING SIDEROAD 25 S AT STA. 0+307 OF PROPOSED MUNICIPAL DRAIN
- BENCHMARK # 2** ELEVATION = 275.93
NAIL IN HYDRO POLE 9m S OF CONCESSION 2 SOUTH DURHAM ROAD AND 10m E OF SIDEROAD 25S
- BENCHMARK # 3** ELEVATION = 273.13
NAIL IN HYDRO POLE 8m SOUTH OF CONCESSION 2 SOUTH DURHAM ROAD AND 45m E OF STA. 0+105

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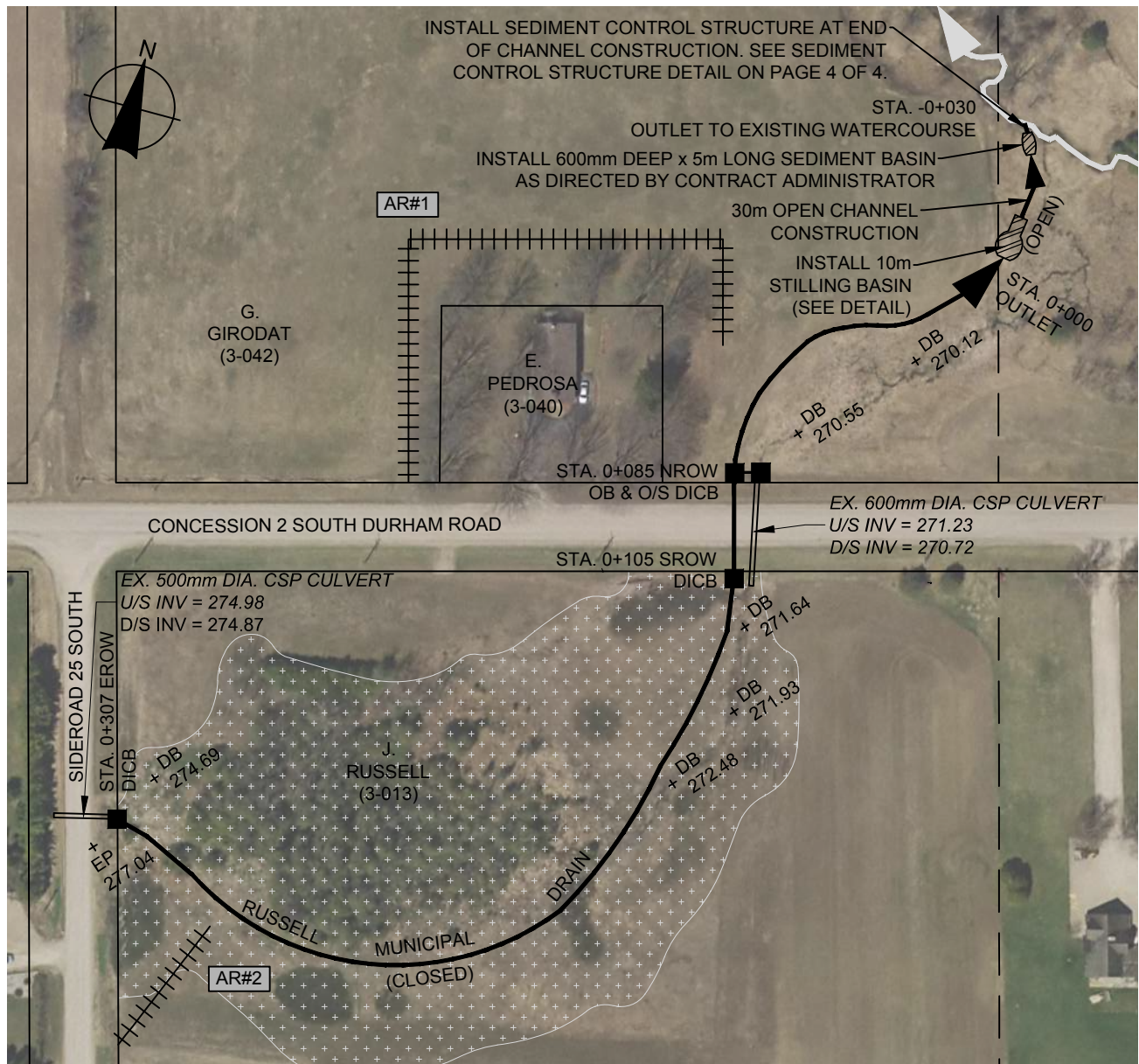
Client
MUNICIPALITY OF BROCKTON
100 SCOTT STREET
WALKERTON, ONTARIO
N0G 2V0



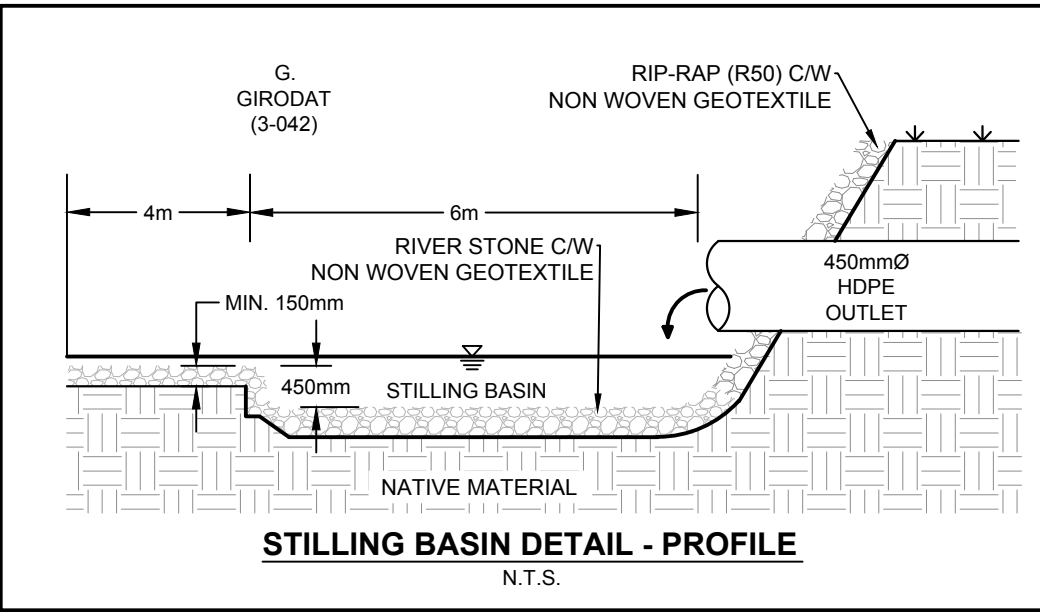
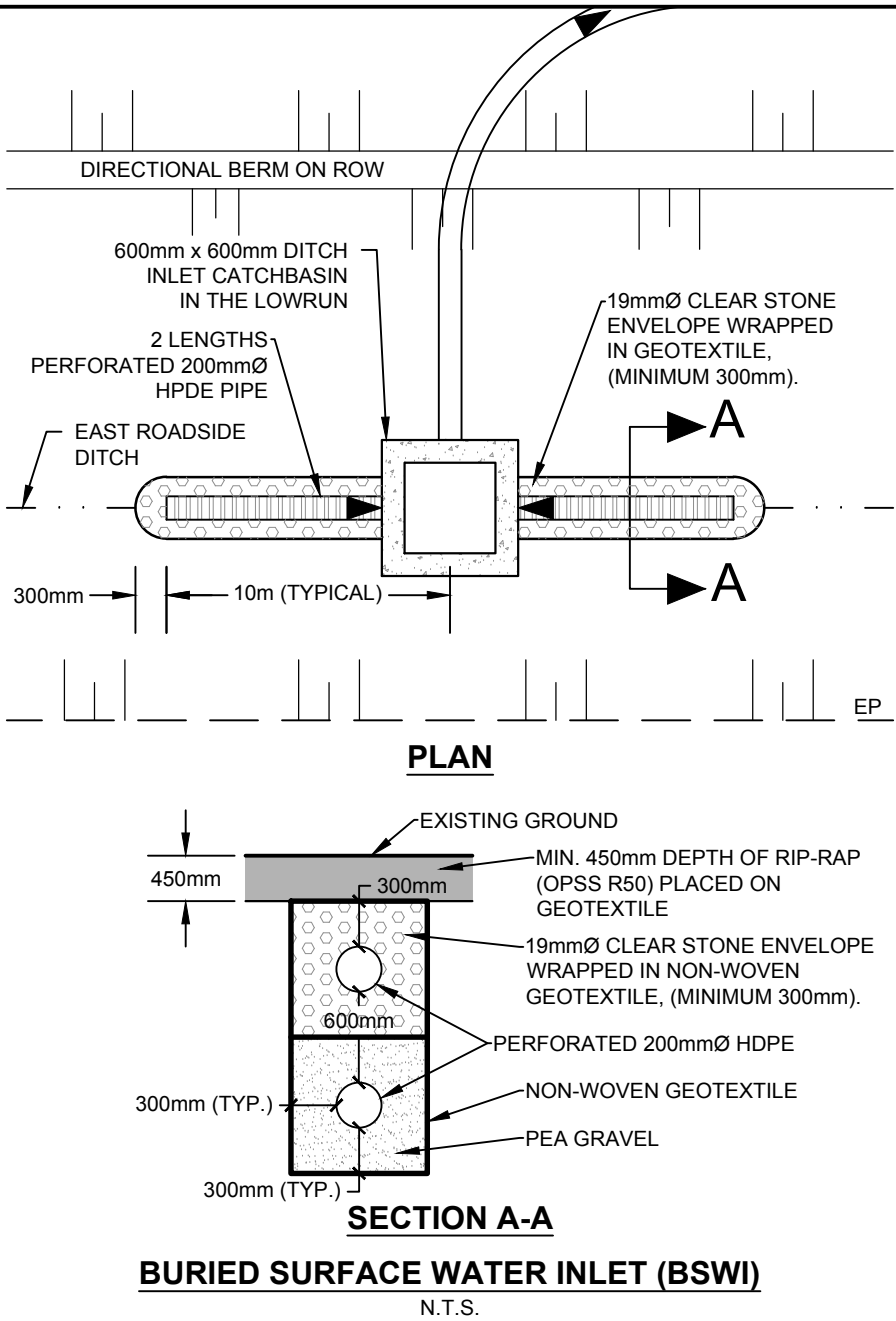
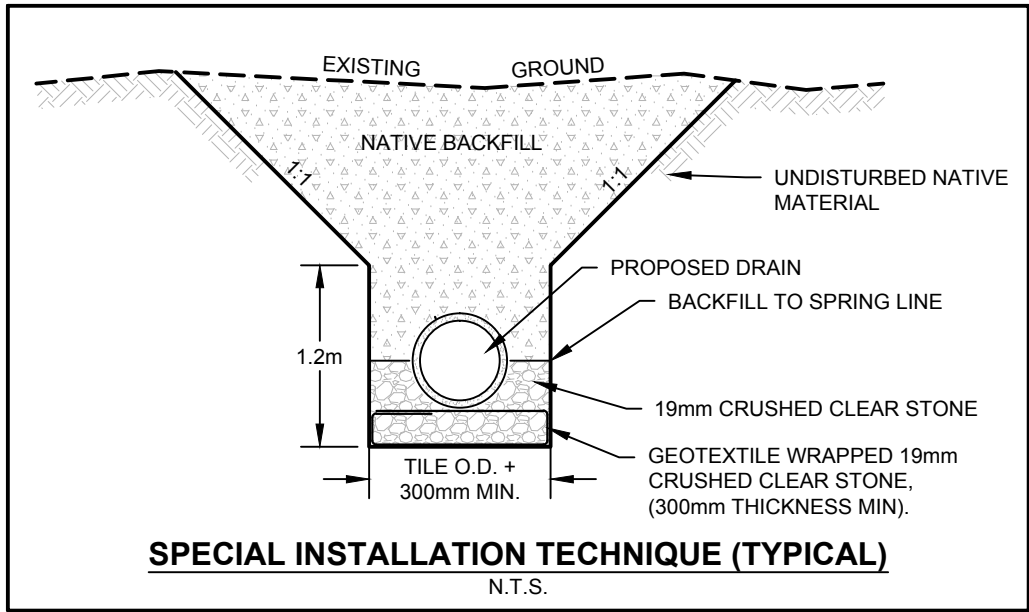
Drawing Title
RUSSELL MUNICIPAL DRAIN 2018

PROFILE

Drawn	Checked	Date	Drawing No.
TK	EMD	2016/08/26	2 OF 4
Scale		Project No.	
H 1:5000 - V 1:500		300038962	



DRAIN OUTLET DETAIL
SCALE - 1:1500



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5	ISSUED FOR ENGINEER'S REPORT	2018/09/10	EMD

BURNSIDE

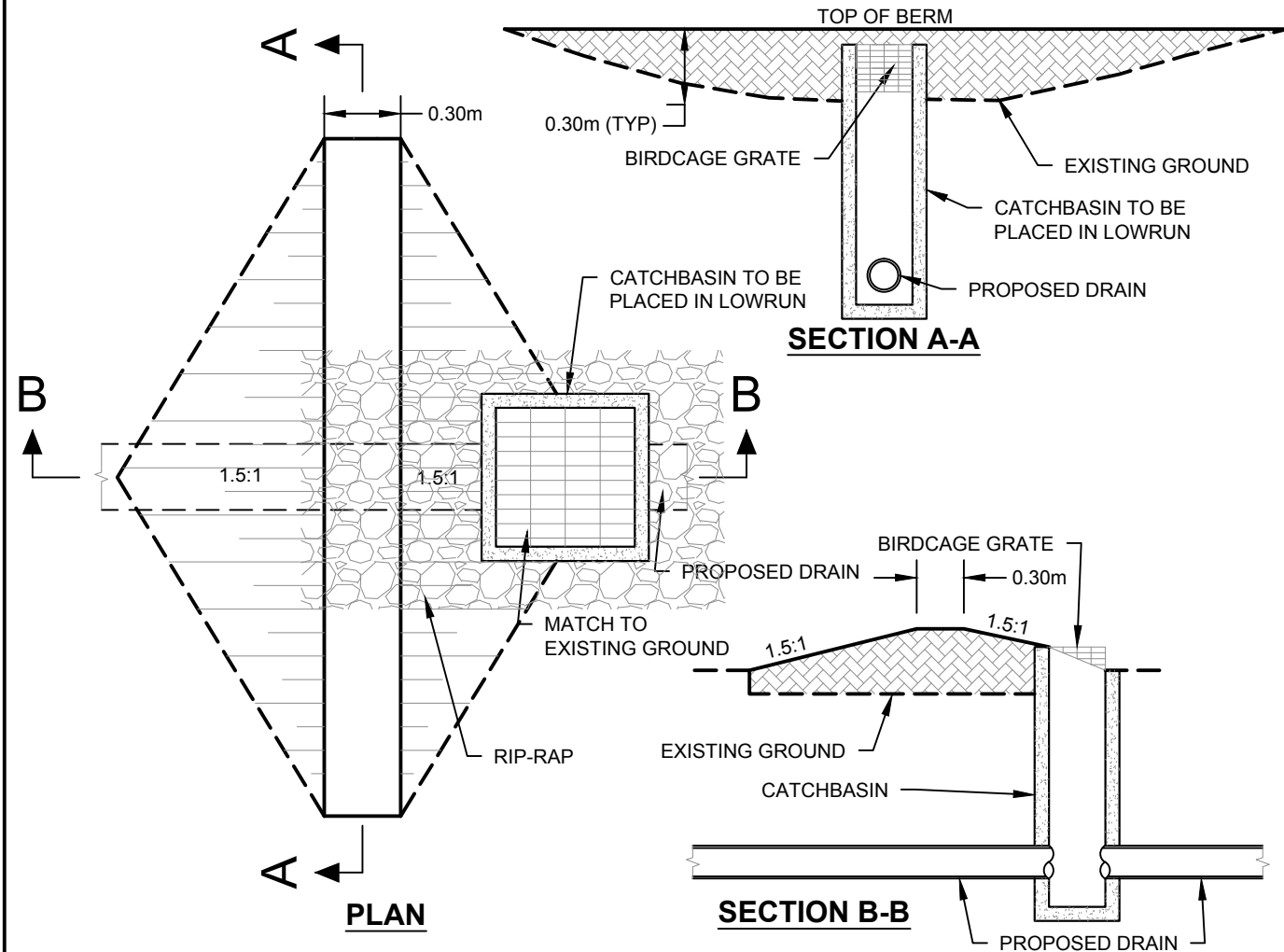
R.J. Burnside & Associates Limited
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web www.rjburnside.com

Client
MUNICIPALITY OF BROCKTON
100 SCOTT STREET
WALKERTON, ONTARIO
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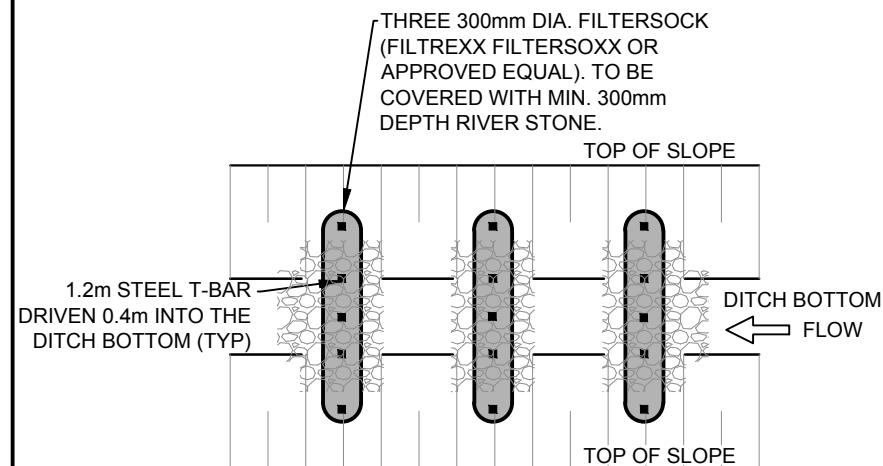
Drawing Title
RUSSELL MUNICIPAL DRAIN 2018

DETAILS

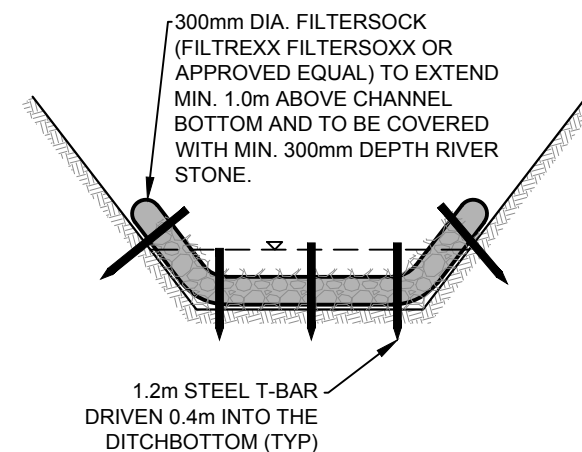
Drawn TK	Checked EMD	Date 2016/08/26	Drawing No. 3 OF 4
Scale AS NOTED	Project No. 300038962		



TYPICAL DIRECTIONAL BERM
N.T.S.



SEDIMENT CONTROL STRUCTURE - PLAN
N.T.S.



SEDIMENT CONTROL STRUCTURE - SECTION
N.T.S.

Notes

1. This drawing is the exclusive property of R. J. Burnside & Associates Limited. The reproduction of any part without prior written consent of this office is strictly prohibited.
2. The contractor shall verify all dimensions, levels, and datums on site and report any discrepancies or omissions to this office prior to construction.
3. This drawing is to be read and understood in conjunction with all other plans and documents applicable to this project.
4. All property lines are approximate and for information purposes only.

FOR REPORT



No.	Issue / Revision	Date	Auth.
1	ISSUED FOR INFORMATION MEETING	2016/08/26	EMD
2	ISSUED FOR INFORMATION MEETING NO.2	2016/09/27	EMD
3	ISSUED FOR AGENCY APPROVAL	2017/02/24	EMD
4	ISSUED FOR INFORMATION MEETING NO.3	2017/05/11	EMD
5	ISSUED FOR ENGINEER'S REPORT	2018/09/10	EMD



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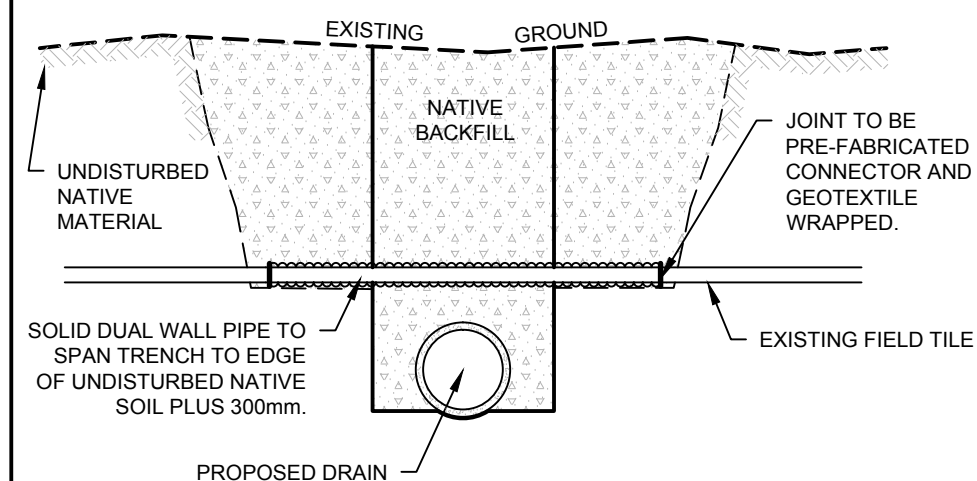
Client
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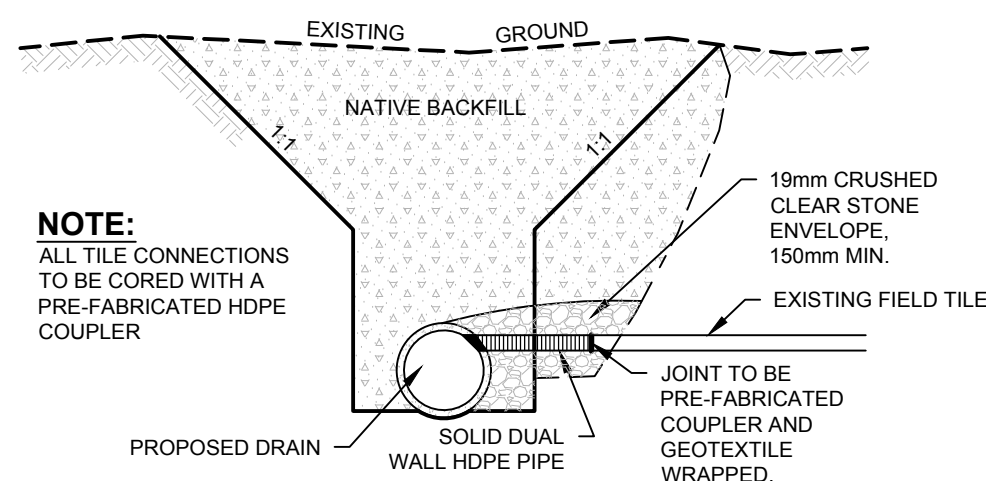
Drawing Title
RUSSELL MUNICIPAL DRAIN 2018

DETAILS (CON.)

Drawn	Checked	Date	Drawing No.
TK	EMD	2016/08/26	4 OF 4
Scale	Project No.		
AS NOTED	300038962		



TYPICAL TILE RE-CONNECTION
N.T.S.



TYPICAL TILE CONNECTION
N.T.S.

