



# Grant Municipal Drain 2024

January 12, 2024

Prepared for:



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Kitchener, Ontario  
January 12, 2024

To the Mayor and Members of Council:

**Re: Branch 'B' of the Grant Municipal Drain 2024**  
**Municipality of Morris-Turnberry**  
**Our Reference No. MT-002**

Headway Engineering is pleased to provide its report for **Branch 'B' of the Grant Municipal Drain 2024** in the Municipality of Morris-Turnberry (Morris Ward).

The preparation of this report was authorized by a resolution of the Council of the Municipality of Morris-Turnberry on February 7, 2023, per Section 4 of the Drainage Act. A second petition was filed with the Municipality of Huron East. That petition was accepted by the Council of the Municipality of Huron East on June 20, 2023, and forwarded to the Municipality of Morris-Turnberry to be included as part of the ongoing Grant Municipal Drain project.

The primary objective of this report is to establish a new Municipal Drain designed to today's standards of drainage for an area which is currently not serviced by a municipal drain.

The report recommends the construction of a new Branch of the Grant Municipal Drain and improvements to the upper reach of the Main Open portion of the Grant Drain.

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

Municipal Lands	\$82,002
Privately Owned Non-Agricultural	\$1,243
Privately Owned Agricultural – Grantable	\$343,755
<b>Total Estimated Assessments</b>	<b>\$427,000</b>

Yours truly,

Stephen Brickman, P.Eng.  
Project Engineer and Manager



Adam Hall  
Project Coordinator  
**HEADWAY ENGINEERING**  
SB/





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## SPECIFICATIONS FOR THE CONSTRUCTION OF MUNICIPAL DRAINAGE WORKS

## **1.0 INTRODUCTION AND LOCATION**

The Council of the Municipality of Morris-Turnberry has appointed Headway Engineering to investigate a petition for a new municipal drainage works. The project services parts of Lots 29 and 30 in Concession 4, in the Municipality of Morris-Turnberry, Morris Ward, and parts of the following lots in the Municipality of Huron East, Grey Ward:

- Lots 1 to 3 in Concession 6
- Lots 1 to 4 in Concession 7
- Lots 1 to 3 in Concession 8

The drainage area for the proposed drain comprises of approximately 260.57 hectares, and land uses within the watershed include agricultural, bush lands, roads, and some residential.

The attached Plans, Profiles and Details; Drawing Numbers 1 to 3, show and describe in detail the location and extent of the work to be completed and the lands which are affected.

## **2.0 PROJECT AUTHORIZATION**

Authority to prepare this report was obtained by a resolution of the Council of the Municipality of Morris-Turnberry at its February 7, 2023, meeting to appoint Headway Engineering to prepare an Engineer's Report under Section 4 of the Drainage Act. A second petition was received by the Municipality of Huron East. This second petition was accepted by the Council of the Municipality of Huron East at its Council Meeting held on June 20, 2023, and forwarded to the Municipality of Morris-Turnberry to be included as part of the ongoing Grant Municipal Drain project.

The areas requiring drainage are parts of Lot 30, Concession 4 in the Municipality of Morris-Turnberry (Morris Ward), and parts of Lot 3, Concession 6 in the Municipality of Huron East (Grey Ward). The critical area requiring drainage controlling the upper limit of work is Part of Lot 3, Concession 6, in the Municipality of Huron East. The petitions are valid in accordance with Section 4(1)(a) of the Drainage Act.

## **3.0 DRAINAGE HISTORY**

### **3.1 Grant Drain (1912)**

The Grant Municipal Drain was originally constructed under the authority of a report prepared in 1912. The report provided for the installation of the Main Drain and Branch 'A' and improvements to the open portion of the Grant Drain.

### **3.2 Grant Drain (1955)**

A second report, written by James A. Howes O.L.S, dated January 28, 1955, authorized the construction of the Main Closed and deepening of the Main Open. The Main Closed consists of approximately 1,222 metres of tile with sizes ranging from 350mm to 375mm in diameter paralleling the existing Main Closed.



### 3.3 Grant Municipal Drain (2015)

Dietrich Engineering Limited prepared a report dated March 2, 2015. This report provided for the installation of two closed tile systems and improvements to the open ditch. The Main Closed consists of approximately 1,544 metres of 450mm to 750mm diameter tile. The report also called for the installation of approximately 248 metres of 450mm to 525mm tile which is known as Branch 'A'. The existing 1912 and 1955 Grant Municipal Drains were abandoned under this report, presumably only for the segments parallel to the work provided for in 2015.

## 4.0 PUBLIC MEETINGS AND ENGAGEMENTS

### 4.1 On-Site Meeting

In accordance with Section 9(1) of the Drainage Act, an on-site meeting was held on March 28, 2023. Persons in attendance were:

Stephen Brickman, P.Eng.	Headway Engineering
Adam Hall	Headway Engineering
Kirk Livingston	Municipality of Morris-Turnberry, Drainage Superintendent
Mike Alcock	Morris-Turnberry, Director of Public Works
Amanda Brown	Huron County

Landowners included:

Jeff Cardiff	Elizabeth Cardiff	Scott Cardiff
Blake Cardiff	Bill Van Nes	

A preliminary plan showing the watershed was distributed in advance. The information provided was based on previous engineering reports, and data made available to the public by the Province of Ontario.

During the meeting, it was clear that there was interest in extending the proposed municipal drain upstream, however, the original petition did not authorize works upstream of Brussels Line. The meeting included discussion on the steps required to authorize upstream works by filing an additional petition with the Municipality of Huron East.

### 4.2 Public Information Meeting

A Public Information Meeting was held on October 5, 2023. Persons in attendance were:

Stephen Brickman, P.Eng.	Headway Engineering
Adam Hall	Headway Engineering
Kirk Livingston	Municipality of Morris-Turnberry, Drainage Superintendent
Mike Alcock	Morris-Turnberry, Director of Public Works

Landowners included:

Jeff Cardiff	Ross McCall	Bill Van Nes
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The information provided included details on the proposed construction of a new municipal tile drainage system on an alignment similar to the existing private tile drain.

This meeting provided a review of the design of the proposed drainage system, the estimated costs of the project, and the proposed assessments, among other information.

All meeting materials were posted online following the meeting, and all parties invited to attend the meeting were provided with access instructions to the meeting materials.



## 5.0 FINDINGS

Based on the information collected during field investigations, surveys, public engagements, and review of documentation, the following summarizes Headway Engineering's findings:

### 5.1 Watershed Condition (Hydrology):

- The watershed was established through the analysis of tile drainage maps, previous engineers' reports for surrounding systems, field investigations, surveys, and data analysis of the Southwestern Ontario Orthophotographic Project (SWOOP). The drainage area comprises of approximately 260.57 hectares.
- Land uses within the watershed are as follows:
  - Agricultural: 241.7 hectares (93%)
  - Bush: 8.79 hectares (3%)
  - Roads: 6.93 hectares (3%)
  - Residential: 3.15 hectares (1%)
- Much of the watershed is systematically tiled. It is anticipated that improved farm tiling could take place following the construction of the Municipal Drain.
- The Ontario Ministry of Agriculture, Food and Rural Affairs' Agricultural Information Atlas describes the soil types within the watershed and along the route of the drain as loam.

### 5.2 Existing Drainage System:

- The existing drainage system consists of a 200mm diameter pipe and is not of sufficient capacity to drain the surrounding, and upstream lands within the watershed at today's standard of drainage.
- The precise age of the existing system is not known.
- The existing drainage system is private.

### 5.3 Outlet:

- The outlet for the private system is the Grant Drain (Main Open).
- The Grant Drain (Main Open) is not of sufficient depth to adequately drain the upstream lands at today's standards of drainage.

### 5.4 Other noted findings:

- Surface waters on the St. Brigids Dairy Ltd. property (Roll No. 6-001) and the Elizabeth Cardiff property (Roll No. 6-003) causes frequent crop damage and decreased workability.
- Blowouts are occurring along the alignment of the existing private drain downstream of Brussels Line.
- Additional systematic tiling within the watershed is likely.
- Lands and roads within the watershed of Branch 'B' do not currently have a secure legal outlet within the context of the Drainage Act.



- Landowners have noted that shale type soil material may be shallow in and around the working area.

#### 5.5 Environmental Requirements:

- The Maitland Valley Conservation Authority (MVCA) has indicated that a permit to alter a watercourse is required.

### 6.0 DESIGN CONSIDERATIONS

The proposed drainage system is sized using the Drainage Coefficient method contained in the OMAFRA Publication 29 - 'Drainage Guide for Ontario'. The Drainage Coefficient describes a depth of water to be conveyed by the drainage works per a 24-hour period and is expressed in millimeters per 24 hours. The drainage coefficient design standard used for the works proposed in this report is 38mm per 24-hour period.

The drain is to be installed along the existing alignment of the private tile drain.

Pipe materials were selected based on location and intended land uses adjacent to the drainage system.

Surface water inlets have been placed purposefully to receive surface flow and allow for subsurface tile connections. Likewise, the elevation of the pipe system is designed to provide for subsurface tile connections at, and between surface water inlets.

### 7.0 ENVIRONMENTAL CONSIDERATIONS AND PERMITTING

#### 7.1 Department of Fisheries and Oceans (DFO)

The work proposed under this report primarily consists of the new construction of a closed drainage system. However, there are in-water works proposed in the open portion of the Grant Drain, and likewise Headway Engineering submitted a Request for Review by DFO on November 22, 2023.

#### 7.2 Ministry of Natural Resources and Forestry (MNRF)

Headway Engineering completed a review of the Natural Heritage Information Centre mapping for Species At Risk in Ontario. Provincial Species at Risk requiring special consideration were not identified in the working area.

#### 7.3 Maitland Valley Conservation Authority (MVCA)

The MVCA has been included on the circulation list for this report and has been invited to all public engagements. Headway Engineering has forwarded design discussions and drawings to the MVCA on November 22, 2023.

The MVCA has indicated that a permit to alter a watercourse is required.

### 8.0 RECOMMENDATIONS

Headway Engineering recommends the following:



1. A new municipal drainage system be installed from the outlet into the Main Open on the Lacy Ellen Land Inc. property (Roll No. 4-072) and extending upstream to the east side of the St. Brigids Dairy Ltd. property (Roll No. 6-001).
2. The proposed drainage system includes the installation of approximately 1,329 metres of 450mm to 750mm diameter pipes ranging in material from HPDE and concrete tile to smooth wall steel casing. This system is designed to convey flows at a design standard of 38mm per 24-hour period.
3. The proposed tile drain alignment shall be approximately parallel to the existing private drainage system.
4. The existing private drainage system shall be destroyed.
5. This new drainage system shall be known as the **Branch 'B' of the Grant Municipal Drain 2024**.
6. Approximately 933 metres on the open portion of the Grant Municipal Drain shall be cleaned out.
7. Headway Engineering also recommends that the watersheds of the surrounding municipal drains be updated when those drainage systems are revisited in the future.

## **9.0 SUMMARY OF PROPOSED WORKS**

The proposed work consists of:

1. The installation of approximately 1,299 metres of 450mm to 750mm diameter concrete field tile and HDPE pipe.
2. The installation of 30 metres of 600mm diameter smooth wall steel casing under County Road 12.
3. The installation of five concrete catch basins and one junction box.
4. The construction of one energy dissipating plunge pool.
5. A cleanout of approximately 933 metres of open ditch.

## **10.0 WORKING AREA AND ACCESS**

Access to the working area shall be designated by the Landowners.

The working area shall be an average width of 25 metres for construction purposes for the closed portion and an average width of 12 metres for the open portion. The working area for maintenance purposes shall be an average width of 10 metres along the alignment of the proposed closed drains, and an average width of 10 metres along the working side of the open portion.

## **11.0 SCHEDULES**

Four schedules are attached and form part of this report.

### **11.1 Schedule A – Schedule of Allowances**

In accordance with Sections 29 and 30 of the Drainage Act, allowances are provided to Landowners for Right-of-Way and Damages to Lands and Crops. Schedule A contains a table of the applicable allowances to Landowners.





#### 11.2 Schedule B – Schedule of Estimated Construction Costs

An itemized cost estimate of the proposed construction work is included in detail in Schedule B.

#### 11.3 Schedule C – Schedule of Assessment for Construction

Schedule C provides details of the distribution of the total estimated costs of the construction of the municipal drain.

#### 11.4 Schedule D – Schedule of Assessment for Maintenance

Schedule D provides details of the distribution of future maintenance costs for the municipal drain. Maintenance assessments are expressed as a percentage of the total maintenance. Lands located upstream of the maintenance shall be determined by the Drainage Superintendent and assessed according to this schedule.

### 12.0 ALLOWANCES

In accordance with Sections 29 and 30 of the Drainage Act, Allowances payable to Landowners are described below.

#### 12.1 Allowances for Right-of-Way (Section 29)

The Right-of-Way allowance compensates the lands for the right to enter onto the land at various times for the purpose of inspecting the drainage system and conducting maintenance activities. The land value used for the Right-of-Way calculation is adjusted to account for the continued use of the land after construction.

The values used for calculating allowances for Right-of-Way are as follows:

Land Use and Location Description	Land Value	Adjustment Factor for Drainage Act Right-of-Way	Adjusted Land Value for Drainage Act Right-of-Way Allowance
Agricultural Land Use Working Width over Closed Drain	\$60,000/Ha	25%	\$15,000/Ha

#### 12.2 Allowances for Damages to Lands and Crops (Section 30)

Allowances for Damages to Lands and Crops under Section 30 of the Drainage Act, were primarily calculated to compensate landowners for crop losses, and land damages due to the construction and operation of the drain, including access to the working area.

It is anticipated that the working area will experience a complete crop loss in the year of construction, and a reduction in crop productivity for the following two years.

Area values used for calculating allowances for Damages are \$6,000/Ha.

Allowances payable to Landowners are shown in Schedule A.

**Total Allowances, under Sections 29 and 30 of the Drainage Act are \$46,210.**



Allowances will be deducted from the total assessments in accordance with Section 62(3) of the Drainage Act.

### **13.0 ESTIMATED CONSTRUCTION COSTS**

Headway Engineering has made an estimate of the cost of the proposed construction work. A detailed description of the construction costs can be found in Schedule B of this report.

Part A – Main Open	\$ 45,100
Part B – Branch 'B'	\$ 209,700
Part C – Provisional Items	\$ 29,750
<b>Total Estimated Construction Costs</b>	<b>\$ 284,550</b>

### **14.0 SUMMARY OF ESTIMATED PROJECT COSTS**

The total estimated project costs are as follows:

Allowances under Sections 29 and 30 of the Drainage Act (Refer to Schedule A)	\$ 46,210
Total Estimated Construction Costs (Refer to Schedule B)	\$ 284,550
Utility Locates & Test Holes	\$ 1,500
Public engagements, survey, design and drafting, preparation of preliminary cost estimates and assessments, preparation of final drainage report, consideration of report	\$ 47,500
Environmental Agency Consultations and Approvals, including permit fees	\$ 1,000
Tendering and inspection of construction, as-recorded drawing preparation	\$ 21,200
Contingencies, Interest and net H.S.T.	\$ 25,040
<b>TOTAL ESTIMATED PROJECT COSTS</b>	
<b>BRANCH 'B' OF THE GRANT MUNICIPAL DRAIN 2024</b>	<b>\$ 427,000</b>

**The estimated cost of the work in the Municipality of Morris-Turnberry is \$239,470, and the estimated cost of the work in the Municipality of Huron East is \$187,530.**

The above costs are estimates only. The final costs of construction, engineering and administration cannot be determined until the project is completed.

The above cost estimate does not include costs associated with defending the drainage report should appeals be filed with the Court of Revision, Drainage Tribunal and/or Drainage Referee. Should additional costs be incurred, unless otherwise directed, the additional costs would be distributed in a pro-rata fashion over the assessments contained in Schedule C and as may be varied under the Drainage Act.



## 15.0 ASSESSMENT

Headway Engineering assesses the cost of this work against the Lands and Roads as shown in Schedule C - Assessment for Construction.

Assessments were determined using the principles included in the 'Drainage Assessment Revisited' paper prepared by E.P. Dries and H.H. Todgham. These principles of assessment are recognized to be fair and equitable for determining cost distributions among those affected.

### 15.1 Benefit (Section 22)

Benefit assessment is applied to those properties receiving a benefit as defined in Section 1 of the Drainage Act which is extracted below:

*Benefit means the advantages to any lands, roads, buildings or other structures from the construction, improvement, repair, or maintenance of a drainage works such as will result in a higher market value or increased crop production or improved appearance or better control of surface or sub-surface water, or any other advantages relating to the betterment of lands, roads, buildings or other structures.*

Typically, properties which have direct, or near direct access to the proposed drain receive Benefit as defined above.

### 15.2 Outlet Liability (Section 23)

Outlet Liability is distributed to all properties within the watershed area on an adjusted area basis. The areas are adjusted to accurately reflect equivalent run-off rates relative to other lands and roads within the watershed. Due to development, roads have been assessed higher Outlet Liability rates relative to agricultural lands.

### 15.3 Special Assessment (Section 26)

Special Assessments apply to public utilities and roads which directly cause increased costs to the construction of a drainage works due to the existence and operation of the public utility or road.

Construction costs, which are required solely because of the existence of County Road 12 (Brussels Line) are fully assessed to the road authority having jurisdiction over the road. The Special Assessment is calculated based on the actual costs of the road crossing, plus an allowance for administration as described below.

Road Name	Construction Costs	Plus Administration Costs	Less Equivalent Drain Costs (Fixed)	Plus Interest, and Net HST	Special Assessment
County Road 12	\$52,900	\$13,700	\$2,820	\$2,540	\$66,320

Whether or not Huron County elects to do the work on their property, County Road 12, they shall be assessed the actual increased costs of the work due to the construction and operation of the road as a Special Assessment.



## **16.0 GRANT ELIGIBILITY**

The Province provides grants towards assessments to eligible properties for drainage improvements which meet specified criteria. The provision of these grants for activities under the Drainage Act is called the Agriculture Drainage Infrastructure Program (ADIP).

A grant may be available for assessments to privately owned parcels of land which are used for agricultural purposes and eligible for the Farm Property Class Tax rate. Section 88 of the Drainage Act directs the Municipality to make application for this grant upon certification of completion. The Municipality will then deduct the grant from the assessments.

## **17.0 MAINTENANCE**

After completion, the portions of Branch 'B' residing within the Municipality of Huron East shall be maintained by the Municipality of Huron East and the portions of Branch 'B' residing in the Municipality of Morris-Turnberry shall be maintained by the Municipality of Morris-Turnberry.

Maintenance of Branch 'B' will be at the expense of all the lands and roads assessed in accordance with the attached Schedule D – Assessment for Maintenance, and in the same relative proportions until such time as the assessment is changed under the Drainage Act, except for the portions of the drainage works on municipal right-of-ways. These portions shall be maintained at the expense of the road authority having jurisdiction over the road.

The upper reach of the Grant Drain (Main Open) shall be maintained to the specifications included in this report, but at the expense of the Lands and Roads in accordance with the current by-laws until such time as the assessment is changed under the Drainage Act.



## **Schedule A**

### **Allowances**

# Schedule of Allowances

## Branch 'B' of the Grant Municipal Drain 2024

Main Open	Property Details				Drainage Act Allowances		
	Part			Roll	Right of Way (Sec. 29)	Damages (Sec. 30)	Total Allowances
	Lot	Concession	Landowner	Number			
	29	4	Wayne Wheeler	4-070-00	\$ -	\$ 100.00	\$ 100.00
	29	4	Leisa McCall Land Inc.	4-071-00	\$ -	\$ 5,700.00	\$ 5,700.00
	30	4	Lacey Ellen Land Inc.	4-072-00	\$ -	\$ 930.00	\$ 930.00
	<b>Total Allowances</b>						
	<b>Main Open</b>				\$ -	\$ 6,730.00	\$ 6,730.00

Branch 'B'	Property Details				Drainage Act Allowances		
	Part			Roll	Right of Way (Sec. 29)	Damages (Sec. 30)	Total Allowances
	Lot	Concession	Landowner	Number			
	30	4	Lacey Ellen Land Inc.	4-072-00	\$ 5,970.00	\$ 5,970.00	\$ 11,940.00
	1	6	St. Brigids Dairy Ltd.	6-001-00	\$ 11,180.00	\$ 11,180.00	\$ 22,360.00
	3	6	Elizabeth Cardiff	6-003-00	\$ -	\$ 500.00	\$ 500.00
	1	7	Calvin Semple	7-001-00	\$ 2,340.00	\$ 2,340.00	\$ 4,680.00
	<b>Total Allowances</b>						
	<b>Branch 'B'</b>				\$ 19,490.00	\$ 19,990.00	\$ 39,480.00

	Drainage Act Allowances		
	Right of Way (Sec. 29)	Damages (Sec. 30)	Total Allowances
<b>Total Allowances</b>	\$ 19,490.00	\$ 26,720.00	\$ 46,210.00



## **Schedule B**

### **Estimated Construction Costs**

## Schedule of Estimated Construction Costs

We have made an estimate of the cost of the proposed work which is outlined in detail as follows:

### Part A - Main Open

	Description	Estimated Quantity	\$/Unit	Total
1)	Clearing, brushing and mulching	I.s.		\$ 6,500.00
2)	Construct quarry stone rip-rap lined plunge pool	I.s.		\$ 8,548.00
3)	Open ditch excavation	934 m	\$ 20.00	\$ 18,680.00
4)	Levelling of excavated material	934 m	\$ 8.00	\$ 7,472.00
5)	Hand seeding of disturbed side slopes	2600 m2	\$ 1.50	\$ 3,900.00

### Total Estimated Construction Costs

<b>Part A - Main Open</b>				<b>\$ 45,100.00</b>
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### Part B - Branch 'B'

	Description	Estimated Quantity	\$/Unit	Total
1)	Supply 750mm diameter HDPE Pipe (CSA B182.8) outlet pipe complete with rodent grate	6 m	\$ 140.00	\$ 840.00
	Installation of 750mm diameter outlet pipe	I.s.		\$ 2,042.00
2)	Supply 750mm diameter concrete field tile	395 m	\$ 100.00	\$ 39,500.00
	Installation (Sta. 0+006 to Sta. 0+401)			
	Note: Top soil stripping width: 8m	395 m	\$ 50.00	\$ 19,750.00
3)	Supply 525mm diameter concrete field tile	469 m	\$ 50.00	\$ 23,450.00
	Installation (Sta. 0+431 to Sta. 0+900)	469 m	\$ 42.00	\$ 19,698.00



	Description	Estimated Quantity	\$/Unit	Total
4)	Supply 450mm diameter concrete field tile	429 m	\$ 40.00	\$ 17,160.00
	Installation (Sta. 0+900 to Sta. 1+329)	429 m	\$ 40.00	\$ 17,160.00
5)	Supply and install 900mm X 1200mm concrete catch basin at Sta. 1+329	1 ea.	\$ 4,000.00	\$ 4,000.00
6)	Supply and install 900mm X 1200mm inline concrete catch basin at Sta. 0+586	1 ea.	\$ 4,000.00	\$ 4,000.00
7)	Supply and install 600mm x 600mm concrete catch basin offset 71m north of Sta. 0+431 including connection into Branch 'B' with 300mm diameter HDPE pipe (CSA B182.8) with split coupler joining systems	I.s.		\$ 9,200.00
<b>Sub-Total - Work on Lands</b>				<b>\$ 156,800.00</b>
8)	Work to be done on the County of Huron Road Allowance, Brussels Line (Sta. 0+401 to Sta. 0+431)			
a)	Supply 600mm O.D. smooth wall steel casing, 9.56mm wall thickness	30 m	\$ 600.00	\$ 18,000.00
	Installation of 600mm O.D. smooth wall steel casing by the Boring Method (Sta. 0+401 to Sta. 0+431)	30 m	\$ 800.00	\$ 24,000.00
b)	Supply and install 600mm X 600mm concrete catch basin offset 6m North of Sta. 0+401, including connection to the Main Drain with 200mm diameter HDPE pipe (CSA B182.8)	I.s.		\$ 3,000.00
c)	Supply and install 900mm X 1200mm concrete junction box at Sta. 0+401.	1 ea.		\$ 2,500.00
d)	Supply and install 900mm X 1200mm inline concrete catch basin at Sta. 0+431	1 ea.	\$ 4,000.00	\$ 4,000.00

Description	Estimated Quantity	\$/Unit	Total
e) Supply & install 525mm diameter HDPE 30 deg bend at Sta 0+432	1 ea.	\$ 600.00	\$ 600.00
f) Supply & install 750mm diameter HDPE 30 deg bend at Sta 0+400	1 ea.	\$ 800.00	\$ 800.00
Sub-Total - Work on Brussels Line			\$ 52,900.00
<b>Total Estimated Construction Costs</b>			
<b>Part B - Branch 'B'</b>			\$ 209,700.00

### Part C - Provisional Items

A Provisional Item is an item that may or may not be required as a part of the Contract. The decision as to whether a Provisional Item will form part of the Contract will be at the discretion of the engineer at time of construction. Payment for Provisional Items will only be made for work authorized in writing by the Engineer. Payment for work performed under a Provisional Item shall be based on the Unit Price bid in the Scope of Work below.

- 1) Additional costs associated with installation of tile drain on 19mm diameter crushed clear stone bedding. This includes the supply and placement of all stone, and additional labour and equipment required for installation in accordance with the Typical Pipe Installation on wrapped Stone Bedding Detail.

Description	Estimated Quantity	\$/Unit	Total
450mm diameter pipe	50 m	\$ 65.00	\$ 3,250.00
525mm diameter pipe	50 m	\$ 70.00	\$ 3,500.00
750mm diameter pipe	50 m	\$ 70.00	\$ 3,500.00

- 2) Additional costs associated with installation of tile drain on 19mm diameter crushed clear stone bedding. This includes the supply and placement of all stone, and additional labour and equipment required for installation in accordance with the Typical Pipe Installation on Stone Bedding Detail (un-wrapped bedding).

Description	Estimated Quantity	\$/Unit	Total
450mm diameter pipe	125 m	\$ 30.00	\$ 3,750.00
525mm diameter pipe	150 m	\$ 45.00	\$ 6,750.00
750mm diameter pipe	60 m	\$ 45.00	\$ 2,700.00

3) Wheel machine lift outs due to stony conditions 6 ea. \$ 400.00 \$ 2,400.00

4) Tile connections:

Description	Estimated Quantity*	\$/Unit	Total
100mm diameter	25 m	\$ 90.00	\$ 2,250.00
150mm diameter	10 m	\$ 100.00	\$ 1,000.00
200mm diameter	5 m	\$ 130.00	\$ 650.00

\*The Contractor shall be paid for the actual quantity of tile connections at the above fixed unit prices.

### Total Estimated Construction Costs

**Part C - Provisional Items** \$ 29,750.00

## Summary of Estimated Construction Costs

Part A - Main Open \$ 45,100.00  
Part B - Branch 'B' \$ 209,700.00  
Part C - Provisional Items \$ 29,750.00

**Total Estimated Construction Costs** \$ 284,550.00

Total Estimated Materials \$ 98,950.00  
Total Estimated Labour and Equipment \$ 185,600.00

### Total Estimated Construction Costs

**Branch 'B' of the Grant Municipal Drain 2024** \$ 284,550.00



## **Schedule C**

### **Assessment for Construction**

Schedule of Assessment for Construction  
Branch 'B' of the Grant Municipal Drain 2024

Main Open	Property Details					Drainage Act Instruments of Assessment				For Information		
	Part Lot	Concession	Landowner	Roll Number	Approx. Ha. Affected	Benefit (Sec. 22)	Outlet Liability (Sec. 23)	Special Assessment (Sec. 26)	Total Assessment	Less Gov't Grant	Less Allowances	Net Estimated Expense
	Municipality of Morris-Turnberry (Morris Ward)											
	29	4	Wayne Wheeler	4-070-00		\$ -	\$ -		\$ -	\$ -	\$ 100.00	-\$ (100.00)
	29	4	Leisa McCall Land Inc.	4-071-00	15.38	\$ 11,262.00	\$ 2,583.00		\$ 13,845.00	\$ 4,615.00	\$ 5,700.00	\$ 3,530.00
	30	4	McCall Farms Ltd.	4-034-00	0.79	\$ -	\$ 416.00		\$ 416.00	\$ 139.00	\$ -	\$ 277.00
	30	4	Lacey Ellen Land Inc.	4-072-00	16.22	\$ 1,728.00	\$ 3,322.00		\$ 5,050.00	\$ 1,683.00	\$ 930.00	\$ 2,437.00
	Total Assessments on Lands					\$ 12,990.00	\$ 6,321.00	\$ -	\$ 19,311.00	\$ 6,437.00	\$ 6,730.00	\$ 6,244.00
	County Road 12		Huron County		4.53	\$ -	\$ 2,319.00		\$ 2,319.00			\$ 2,319.00
	Total Assessments on Roads					\$ -	\$ 2,319.00	\$ -	\$ 2,319.00	\$ -	\$ -	\$ 2,319.00
	Total Assessments											
	Municipality of Morris-Turnberry (Morris Ward)					\$ 12,990.00	\$ 8,640.00	\$ -	\$ 21,630.00	\$ 6,437.00	\$ 6,730.00	\$ 8,563.00
	Municipality of Huron East (Grey Ward)											
	1	6	Paul & Kathy Nichol	6-001-01	0.62	\$ -	\$ 254.00		\$ 254.00	*	\$ -	\$ 254.00
	1	6	St. Brigids Dairy Ltd.	6-001-00	40.06	\$ -	\$ 8,204.00		\$ 8,204.00	\$ 2,735.00	\$ -	\$ 5,469.00
	2	6	St. Brigids Dairy Ltd.	6-002-00	17.05	\$ -	\$ 3,754.00		\$ 3,754.00	\$ 1,251.00	\$ -	\$ 2,503.00
	3	6	Elizabeth Cardiff	6-003-00	19.58	\$ -	\$ 3,921.00		\$ 3,921.00	\$ 1,307.00	\$ -	\$ 2,614.00
	1	7	Calvin Semple	7-001-00	40.44	\$ -	\$ 8,282.00		\$ 8,282.00	\$ 2,761.00	\$ -	\$ 5,521.00
	2	7	Terpstra Farms Ltd.	7-002-00	40.97	\$ -	\$ 7,876.00		\$ 7,876.00	\$ 2,625.00	\$ -	\$ 5,251.00
	3	7	Cardiff Land & Cattle Ltd.	7-003-00	34.22	\$ -	\$ 5,991.00		\$ 5,991.00	\$ 1,997.00	\$ -	\$ 3,994.00
4	7	Joseph Semple	7-004-00	6.17	\$ -	\$ 1,264.00		\$ 1,264.00	\$ 421.00	\$ -	\$ 843.00	
1	8	Terpstra Farms Ltd.	8-001-00	4.6	\$ -	\$ 891.00		\$ 891.00	\$ 297.00	\$ -	\$ 594.00	
1	8	Samantha Edgar	8-001-10	1.07	\$ -	\$ 131.00		\$ 131.00	*	\$ -	\$ 131.00	
2	8	Terpstra Farms Ltd.	8-002-00	13.32	\$ -	\$ 2,728.00		\$ 2,728.00	\$ 909.00	\$ -	\$ 1,819.00	
3	8	Cardiff Land & Cattle Ltd.	8-003-00	3.15	\$ -	\$ 645.00		\$ 645.00	\$ 215.00	\$ -	\$ 430.00	
Total Assessments on Lands					\$ -	\$ 43,941.00	\$ -	\$ 43,941.00	\$ 14,518.00	\$ -	\$ 29,423.00	
Brandon Road		Huron East		2.4	\$ -	\$ 1,229.00		\$ 1,229.00			\$ 1,229.00	
Total Assessments on Roads					\$ -	\$ 1,229.00	\$ -	\$ 1,229.00	\$ -	\$ -	\$ 1,229.00	
Total Assessments												
Municipality of Huron East (Grey Ward)					\$ -	\$ 45,170.00	\$ -	\$ 45,170.00	\$ 14,518.00	\$ -	\$ 30,652.00	
Total Assessments												
Main Open					\$ 12,990.00	\$ 53,810.00	\$ -	\$ 66,800.00	\$ 20,955.00	\$ 6,730.00	\$ 39,215.00	

Branch 'B'	Property Details					Drainage Act Instruments of Assessment				For Information		
	Part Lot	Concession	Landowner	Roll Number	Approx. Ha. Affected	Benefit (Sec. 22)	Outlet Liability (Sec. 23)	Special Assessment (Sec. 26)	Total Assessment	Less Gov't Grant	Less Allowances	Net Estimated Expense
	Municipality of Morris-Turnberry (Morris Ward)											
	30	4	McCall Farms Ltd.	4-034-00	0.79	\$ -	\$ 682.00		\$ 682.00	\$ 227.00	\$ -	\$ 455.00
	30	4	Lacey Ellen Land Inc.	4-072-00	5.34	\$ 39,334.00	\$ 1,549.00		\$ 40,883.00	\$ 13,628.00	\$ 11,940.00	\$ 15,315.00
	Total Assessments on Lands					\$ 39,334.00	\$ 2,231.00	\$ -	\$ 41,565.00	\$ 13,855.00	\$ 11,940.00	\$ 15,770.00
	County Road 12		Huron County		2.42	\$ 6,612.00	\$ 5,522.00	\$ 66,320.00	\$ 78,454.00			\$ 78,454.00
	Total Assessments on Roads					\$ 6,612.00	\$ 5,522.00	\$ 66,320.00	\$ 78,454.00	\$ -	\$ -	\$ 78,454.00
	Total Assessments											
	Municipality of Morris-Turnberry (Morris Ward)					\$ 45,946.00	\$ 7,753.00	\$ 66,320.00	\$ 120,019.00	\$ 13,855.00	\$ 11,940.00	\$ 94,224.00
	Municipality of Huron East (Grey Ward)											
	1	6	Paul & Kathy Nichol	6-001-01	0.62	\$ -	\$ 858.00		\$ 858.00	*	\$ -	\$ 858.00
	1	6	St. Brigids Dairy Ltd.	6-001-00	40.06	\$ 87,756.00	\$ 39,225.00		\$ 126,981.00	\$ 42,327.00	\$ 22,360.00	\$ 62,294.00
	2	6	St. Brigids Dairy Ltd.	6-002-00	17.05	\$ -	\$ 12,683.00		\$ 12,683.00	\$ 4,228.00	\$ -	\$ 8,455.00
	3	6	Elizabeth Cardiff	6-003-00	19.58	\$ 18,855.00	\$ 41,012.00		\$ 59,867.00	\$ 19,956.00	\$ 500.00	\$ 39,411.00
	1	7	Calvin Semple	7-001-00	15.4	\$ 24,853.00	\$ 10,630.00		\$ 35,483.00	\$ 11,828.00	\$ 4,680.00	\$ 18,975.00
	2	7	Terpstra Farms Ltd.	7-002-00	4.89	\$ -	\$ 4,088.00		\$ 4,088.00	\$ 1,363.00	\$ -	\$ 2,725.00
3	7	Cardiff Land & Cattle Ltd.	7-003-00	1.03	\$ -	\$ 221.00		\$ 221.00	\$ 74.00	\$ -	\$ 147.00	
Total Assessments on Lands					\$ 131,464.00	\$ 108,717.00	\$ -	\$ 240,181.00	\$ 79,776.00	\$ 27,540.00	\$ 132,865.00	
Total Assessments												
Municipality of Huron East (Grey Ward)					\$ 131,464.00	\$ 108,717.00	\$ -	\$ 240,181.00	\$ 79,776.00	\$ 27,540.00	\$ 132,865.00	
Total Assessments												
Branch 'B'					\$ 177,410.00	\$ 116,470.00	\$ 66,320.00	\$ 360,200.00	\$ 93,631.00	\$ 39,480.00	\$ 227,089.00	

	Drainage Act Instruments of Assessment Summary				For Information		
	Benefit (Sec. 22)	Outlet Liability (Sec. 23)	Special Assessment (Sec. 26)	Total Assessment	Less Gov't Grant	Less Allowances	Net Estimated Expense
Total Assessments Branch 'B' of the Grant Municipal Drain 2024	\$ 190,400.00	\$ 170,280.00	\$ 66,320.00	\$ 427,000.00	\$ 114,586.00	\$ 46,210.00	\$ 266,304.00

- Notes:
- 1 Benefit and Outlet Liability are assessed based on the estimated costs of a typical municipal drain design standard.
  - 2 '\*' Denotes Lands not eligible for ADIP Grants.
  - 3 The Special Assessment (Sec. 26) shall be a non-proratable assessment. All other assessments are proratable.
  - 4 The Net Estimated Expense is the Total Assessment less gov't grants and allowances (if applicable).

Schedule of Assessment for Construction  
Branch 'B' of the Grant Municipal Drain 2024

Branch 'B' of the Grant Municipal Drain 2024	Property Details					Summary of Assessment			For Information		
					Approx. Ha. Affected			Total Assessment			Net Estimated Expense
	Part Lot	Concession	Landowner	Roll Number		Main Open	Branch 'B'		Less Gov't Grant	Less Allowances	
	Municipality of Morris-Turnberry (Morris Ward)										
	29	4	Wayne Wheeler	4-070-00		\$ -	\$ -	\$ -	\$ -	\$ 100.00	-\$ (100.00)
	29	4	Leisa McCall Land Inc.	4-071-00	15.38	\$ 13,845.00	\$ -	\$ 13,845.00	\$ 4,615.00	\$ 5,700.00	\$ 3,530.00
	30	4	McCall Farms Ltd.	4-034-00	0.79	\$ 416.00	\$ 682.00	\$ 1,098.00	\$ 366.00	\$ -	\$ 732.00
	30	4	Lacey Ellen Land Inc.	4-072-00	16.22	\$ 5,050.00	\$ 40,883.00	\$ 45,933.00	\$ 15,311.00	\$ 12,870.00	\$ 17,752.00
	Total Assessments on Lands					\$ 19,311.00	\$ 41,565.00	\$ 60,876.00	\$ 20,292.00	\$ 18,670.00	\$ 21,914.00
	County Road 12		Huron County		4.53	\$ 2,319.00	\$ 78,454.00	\$ 80,773.00			\$ 80,773.00
	Total Assessments on Roads					\$ 2,319.00	\$ 78,454.00	\$ 80,773.00	\$ -	\$ -	\$ 80,773.00
	Total Assessments										
	Municipality of Morris-Turnberry (Morris Ward)					\$ 21,630.00	\$ 120,019.00	\$ 141,649.00	\$ 20,292.00	\$ 18,670.00	\$ 102,687.00
	Municipality of Huron East (Grey Ward)										
	1	6	Paul & Kathy Nichol	6-001-01	0.62	\$ 254.00	\$ 858.00	\$ 1,112.00	*	\$ -	\$ 1,112.00
	1	6	St. Brigids Dairy Ltd.	6-001-00	40.06	\$ 8,204.00	\$ 126,981.00	\$ 135,185.00	\$ 45,062.00	\$ 22,360.00	\$ 67,763.00
	2	6	St. Brigids Dairy Ltd.	6-002-00	17.05	\$ 3,754.00	\$ 12,683.00	\$ 16,437.00	\$ 5,479.00	\$ -	\$ 10,958.00
	3	6	Elizabeth Cardiff	6-003-00	19.58	\$ 3,921.00	\$ 59,867.00	\$ 63,788.00	\$ 21,263.00	\$ 500.00	\$ 42,025.00
	1	7	Calvin Semple	7-001-00	40.44	\$ 8,282.00	\$ 35,483.00	\$ 43,765.00	\$ 14,588.00	\$ 4,680.00	\$ 24,497.00
	2	7	Terpstra Farms Ltd.	7-002-00	40.97	\$ 7,876.00	\$ 4,088.00	\$ 11,964.00	\$ 3,988.00	\$ -	\$ 7,976.00
	3	7	Cardiff Land & Cattle Ltd.	7-003-00	34.22	\$ 5,991.00	\$ 221.00	\$ 6,212.00	\$ 2,071.00	\$ -	\$ 4,141.00
	4	7	Joseph Semple	7-004-00	6.17	\$ 1,264.00	\$ -	\$ 1,264.00	\$ 421.00	\$ -	\$ 843.00
	1	8	Terpstra Farms Ltd.	8-001-00	4.60	\$ 891.00	\$ -	\$ 891.00	\$ 297.00	\$ -	\$ 594.00
	1	8	Samantha Edgar	8-001-10	1.07	\$ 131.00	\$ -	\$ 131.00	*	\$ -	\$ 131.00
	2	8	Terpstra Farms Ltd.	8-002-00	13.32	\$ 2,728.00	\$ -	\$ 2,728.00	\$ 909.00	\$ -	\$ 1,819.00
	3	8	Cardiff Land & Cattle Ltd.	8-003-00	3.15	\$ 645.00	\$ -	\$ 645.00	\$ 215.00	\$ -	\$ 430.00
	Total Assessments on Lands					\$ 43,941.00	\$ 240,181.00	\$ 284,122.00	\$ 94,293.00	\$ 27,540.00	\$ 162,289.00
	Brandon Road		Huron East		2.40	\$ 1,229.00	\$ -	\$ 1,229.00			\$ 1,229.00
	Total Assessments on Roads					\$ 1,229.00	\$ -	\$ 1,229.00	\$ -	\$ -	\$ 1,229.00
	Total Assessments										
	Municipality of Huron East (Grey Ward)					\$ 45,170.00	\$ 240,181.00	\$ 285,351.00	\$ 94,293.00	\$ 27,540.00	\$ 163,518.00
	Total Assessments										
Branch 'B' of the Grant Municipal Drain 2024					\$ 66,800.00	\$ 360,200.00	\$ 427,000.00	\$ 114,585.00	\$ 46,210.00	\$ 266,205.00	

Notes: 1 '\*' Denotes Lands not eligible for ADIP Grants.  
2 The Net Estimated Expense is the Total Assessment less gov't grants and allowances (if applicable).



## **Schedule D**

### **Assessment for Future Maintenance**



## Schedule of Assessment for Future Maintenance Branch 'B' of the Grant Municipal Drain 2024

Branch 'B'	Property Details					
	Part Lot	Concession	Landowner	Roll Number	Approx. Ha. Affected	Total Maintenance Assessment
	Municipality of Morris-Turnberry (Morris Ward)					
	30	4	McCall Farms Ltd.	4-034-00	0.79	1.81%
	30	4	Lacey Ellen Land Inc.	4-072-00	5.34	4.77%
	Total Assessments on Lands					6.59%
	County Road 12		Huron County		2.42	5.41%
	Total Assessments on Roads					5.41%
	Total Assessments					
	Municipality of Morris-Turnberry (Morris Ward)					11.99%
Municipality of Huron East (Grey Ward)						
1	6	Paul & Kathy Nichol	6-001-01	0.62	*	1.11%
1	6	St. Brigids Dairy Ltd.	6-001-00	40.06		35.80%
2	6	St. Brigids Dairy Ltd.	6-002-00	17.05		16.38%
3	6	Elizabeth Cardiff	6-003-00	19.58		17.11%
1	7	Calvin Semple	7-001-00	15.4		13.76%
2	7	Terpstra Farms Ltd.	7-002-00	4.89		3.76%
3	7	Cardiff Land & Cattle Ltd.	7-003-00	1.03		0.09%
Total Assessments on Lands						88.01%
Total Assessments						
Municipality of Huron East (Grey Ward)						88.01%
Total Assessments						
Branch 'B'						100.00%

- Notes:
1. '\*' Denotes Lands not eligible for ADIP grants.
  2. All maintenance activities on road right-of-ways shall be completed at the expense of the road authority having jurisdiction over the road.
  3. Lands located upstream of the maintenance shall be determined by the Drainage Superintendent.



## **Specifications for the Construction of Municipal Drainage Works**

DIVISION A – General Conditions  
DIVISION B – Specifications for Open Ditches  
DIVISION C – Specifications for Tile Drains  
DIVISION E – Specifications for Drainage  
Crossings by the Boring Method  
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**DIVISION A**

**General Conditions**





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**DIVISION A**  
**General Conditions**

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## **DIVISION A – GENERAL CONDITIONS**

### **A.1. Scope**

The work to be done under this contract consists of supplying all labour, equipment and materials to construct the drainage work as outlined in the Scope of Work, Drawings, General Conditions and other Specifications.

### **A.2. Tenders**

Tenders are to be submitted on a lump sum basis for the complete works or a portion thereof, as instructed by the Municipality. The Scope of Work must be completed and submitted with the Form of Tender and Agreement. A certified cheque is required as Tender Security, payable to the Treasurer of the Municipality.

All certified cheques, except that of the bidder to whom the work is awarded will be returned within ten (10) days after the tender closing. The certified cheque of the bidder to whom the work is awarded will be retained as Contract Security and returned when the Municipality receives a Completion Certificate for the work.

A certified cheque is not required if the Contractor provides an alternate form of Contract Security such as a Performance Bond for 100% of the amount of the Tender or other satisfactory security, if required/permitted by the Municipality. A Performance Bond may also be required to insure maintenance of the work for a period of one (1) year after the date of the Completion Certificate.

### **A.3. Examinations of Site, Drawings, and Specifications**

The Tenderer must examine the premises and site to compare them with the Drawings and Specifications in order to satisfy himself of the existing conditions and extent of the work to be done before submission of his Tender. No allowance shall subsequently be made on behalf of the Contractor by reason of any error on his part. Any estimates of quantities shown or indicated on the Drawings, or elsewhere are provided for the convenience of the Tenderer. Any use made of these quantities by the Tenderer in calculating his Tender shall be done at his own risk. The Tenderer for his own protection should check these quantities for accuracy.

The standard specifications (Divisions B through G) shall be considered complementary and where a project is controlled under one of the Divisions, the remaining Divisions will apply for miscellaneous works.

In case of any inconsistency or conflict between the Drawings and Specifications, the following order of precedence shall apply:

- Direction of the Engineer
- Special Provisions (Division H)
- Scope of Work
- Contract Drawings
- Standard Specifications (Divisions B through G)
- General Conditions (Division A)



#### **A.4. Payment**

Progress payments equal to 87±% of the value of work completed and materials incorporated in the work will be made to the Contractor monthly. An additional ten per cent (10±%) will be paid 45 days after the final acceptance by the Engineer, and three per cent (3±%) of the Contract price may be reserved by the Municipality as a maintenance holdback for a one (1) year period from the date of the Completion Certificate. A greater percentage of the Contract price may be reserved by the Municipality for the same one (1) year period if in the opinion of the Engineer, particular conditions of the Contract requires such greater holdback.

After the completion of the work, any part of this reserve may be used to correct defects developed within that time from faulty workmanship and materials, provided that notice shall first be given to the Contractor and that he may promptly make good such defects.

#### **A.5. Contractor's Liability Insurance**

Prior to commencement of any work, the Contractor shall file with the Municipality evidence of compliance with all Municipality insurance requirements (Liability Insurance, WSIB, etc.) for no less than the minimum amounts as stated in the Purchasing Procedures of the Municipality. All insurance coverage shall remain in force for the entire contract period including the warranty period which expires one year after the date of the Completion Certificate.

The following are to be named as co-insured:

- Successful Contractor
- Sub-Contractor
- Municipality
- Headway Engineering

#### **A.6. Losses Due to Acts of Nature, Etc.**

All damage, loss, expense and delay incurred or experienced by the Contractor in the performance of the work, by reason of unanticipated difficulties, bad weather, strikes, acts of nature, or other mischances shall be borne by the Contractor and shall not be the subject of a claim for additional compensation.

#### **A.7. Commencement and Completion of Work**

The work must commence as specified in the Form of Tender and Agreement. If conditions are unsuitable due to poor weather, the Contractor may be required, at the discretion of the Engineer to postpone or halt work until conditions become acceptable and shall not be subject of a claim for additional compensation.

The Contractor shall give the Engineer a minimum of 48 hours notice before commencement of work. The Contractor shall then arrange a meeting to be held on the site with Contractor, Engineer, and affected Landowners to review in detail the construction scheduling and other details of the work.

If the Contractor leaves the job site for a period of time after initiation of work, he shall give the Engineer and the Municipality a minimum of 24 hours notice prior to returning to the project. If any work is commenced without notice to the Engineer, the Contractor shall be fully responsible for all such work undertaken prior to such notification.





The work must proceed in such a manner as to ensure its completion at the earliest possible date and within the time limit set out in the Form of Tender and Agreement.

### **A.8. Working Area and Access**

Where any part of the drain is on a road allowance, the road allowance shall be the working area. For all other areas, the working area available to the Contractor to construct the drain is specified in the Special Provisions (Division H).

Should the specified widths become inadequate due to unusual conditions, the Contractor shall notify the Engineer immediately. Where the Contractor exceeds the specified working widths without authorization, he shall be held responsible for the costs of all additional damages.

If access off an adjacent road allowance is not possible, each Landowner on whose property the drainage works is to be constructed, shall designate access to and from the working area. The Contractor shall not enter any other lands without permission of the Landowner and he shall compensate the Landowner for damage caused by such entry.

### **A.9. Sub-Contractors**

The Contractor shall not sublet the whole or part of this Contract without the approval of the Engineer.

### **A.10. Permits, Notices, Laws and Rules**

The Contractor shall obtain and pay for all necessary permits or licenses required for the execution of the work (but this shall not include MTO encroachment permits, County Road permits permanent easement or rights of servitude). The Contractor shall give all necessary notices and pay for all fees required by law and comply with all laws, ordinances, rules and regulations relating to the work and to the preservation of the public's health and safety.

### **A.11. Railways, Highways, and Utilities**

A minimum of 72 hours' notice to the Railway or Highways, exclusive of Saturdays, Sundays, and Statutory Holidays, is required by the Contractor prior to any work activities on or affecting the applicable property. In the case of affected Utilities, a minimum of 48 hours' notice to the utility owner is required.

### **A.12. Errors and Unusual Conditions**

The Contractor shall notify the Engineer immediately of any error or unusual conditions which may be found. Any attempt by the Contractor to correct the error on his own shall be done at his own risk. Any additional cost incurred by the Contractor to remedy the wrong decision on his part shall be borne by the Contractor. The Engineer shall make the alterations necessary to correct errors or to adjust for unusual conditions during which time it will be the Contractor's responsibility to keep his men and equipment gainfully employed elsewhere on the project.

The Contract amount shall be adjusted in accordance with a fair evaluation of the work added or deleted.

### **A.13. Alterations and Additions**

The Engineer shall have the power to make alterations in the work shown or described in the Drawings and Specifications and the Contractor shall proceed to make such changes without causing delay. In



every such case, the price agreed to be paid for the work under the Contract shall be increased or decreased as the case may require according to a fair and reasonable evaluation of the work added or deleted. The valuation shall be determined as a result of negotiations between the Contractor and the Engineer, but in all cases the Engineer shall maintain the final responsibility for the decision. Such alterations and variations shall in no way render the Contract void. No claims for a variation or alteration in the increased or decreased price shall be valid unless done in pursuance of an order from the Engineer and notice of such claims made in writing before commencement of such work. In no such case shall the Contractor commence work which he considers to be extra before receiving the Engineer's approval.

#### **A.14. Supervision**

The Contractor shall give the work his constant supervision and shall keep a competent foreman in charge at the site.

#### **A.15. Field Meetings**

At the discretion of the Engineer, a field meeting with the Contractor or his representative, the Engineer and with those others that the Engineer deems to be affected, shall be held at the location and time specified by the Engineer.

#### **A.16. Periodic and Final Inspections**

Periodic inspections by the Engineer will be made during the performance of the work. If ordered by the Engineer, the Contractor shall expose the drain as needed to facilitate inspection by the Engineer.

Final inspection by the Engineer will be made within twenty (20) days after he has received notice from the Contractor that the work is complete.

#### **A.17. Acceptance By the Municipality**

Before any work shall be accepted by the Municipality, the Contractor shall correct all deficiencies identified by the Engineer and the Contractor shall leave the site neat and presentable.

#### **A.18. Warranty**

The Contractor shall repair and make good any damages or faults in the drain that may appear within one (1) year after its completion (as dated on the Completion Certificate) as the result of the imperfect or defective work done or materials furnished if certified by the Engineer as being due to one or both of these causes; but nothing herein contained shall be construed as in any way restricting or limiting the liability of the Contractor under the laws of the Country, Province or Locality in which the work is being done. Neither the Completion Certificate nor any payment there under, nor any provision in the Contract Documents shall relieve the Contractor from his responsibility.

#### **A.19. Termination of Contract By The Municipality**

If the Contractor should be adjudged bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should refuse or fail to supply enough properly skilled workmen or proper materials after having received seven (7) days notice in writing from the Engineer to supply additional workmen or materials to commence or complete the works, or if he should fail to make prompt payment to Sub-Contractors, or for material, or labour, or persistently disregards laws, ordinances, or the instruction of the Engineer,



or otherwise be guilty of a substantial violation of the provisions of the Contract, then the Municipality, upon the certificate of the Engineer that sufficient cause exists to justify such action, may without prejudice to any other right or remedy, by giving the Contractor written notice, terminate the employment of the Contractor and take possession of the premises, and of all materials, tools and appliances thereon, and may finish the work by whatever method the Engineer may deem expedient but without delay or expense. In such a case, the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Contract price will exceed the expense of finishing the work including compensation to the Engineer for his additional services and including the other damages of every name and nature, such excess shall be paid by the Contractor. If such expense will exceed such unpaid balance, the Contractor shall pay the difference to the Municipality. The expense incurred by the Municipality, as herein provided, shall be certified by the Engineer.

If the Contract is terminated by the Municipality due to the Contractor's failure to properly commence the works, the Contractor shall forfeit the certified cheque bid deposit and furthermore shall pay to the Municipality an amount to cover the increased costs, if any, associated with a new Tender for the Contract being terminated.

If any unpaid balance and the certified cheque do not match the monies owed by the Contractor upon termination of the Contract, the Municipality may also charge such expense against any money which may thereafter be due to the Contractor from the Municipality.

## **A.20. Tests**

The cost for the testing of materials supplied to the job by the Contractor shall be borne by the Contractor. The Engineer reserves the right to subject any lengths of any tile or pipe to a competent testing laboratory to ensure the adequacy of the tile or pipe. If any tile supplied by the Contractor is determined to be inadequate to meet the applicable A.S.T.M. standards, the Contractor shall bear full responsibility to remove and/or replace all such inadequate tile in the Contract with tile capable of meeting the A.S.T.M. Standards.

## **A.21. Pollution**

The Contractor shall keep their equipment in good repair. The Contractor shall refuel or repair equipment away from open water.

If polluted material from construction materials or equipment is caused to flow into the drain, the Contractor shall immediately notify the Ministry of the Environment, and proceed with the Ministry's protocols in place to address the situation.

## **A.22. Species and Risk**

If a Contractor encounters a known Species at Risk as designated by the MNR or DFO, the Contractor shall notify the Engineer immediately and follow the Ministry's guidelines to deal with the species.

## **A.23. Road Crossings**

This specification applies to all road crossings (Municipality, County, Regional, or Highway) where no specific detail is provided on the drawings or in the standard specifications. This specification in no way limits the Road Authority's regulations governing the construction of drains on their Road Allowance.

### **A.23.1. Road Occupancy Permit**



Where applicable, the Contractor must submit an application for a road occupancy permit to the Road Authority and allow a minimum of five (5) working days for its review and issuance.

### **A.23.2. Road Closure Request and Construction Notification**

The Contractor shall submit written notification of construction and request for road closure (if applicable) to the Road Authority and the Engineer for review and approval a minimum of five (5) working days prior to proceeding with any work on the road allowance. The Contractor shall be responsible for notifying all applicable emergency services, schools, etc. of the road closure or construction taking place.

### **A.23.3. Traffic Control**

The Contractor shall supply flagmen, and warning signs and ensure that detour routes are adequately signed in accordance with no less than the minimum standards as set out in the Ontario Traffic Manual's Book 7.

### **A.23.4. Weather**

No construction shall take place during inclement weather or periods of poor visibility.

### **A.23.5. Equipment**

No construction material and/or equipment is to be left within three (3) metres of the travelled portion of the road overnight or during periods of inclement weather.

If not stated on the drawings, the road crossing shall be constructed by open cut method. Backfill from the top of the cover material over the subsurface pipe or culvert to the under side of the road base shall be Granular "B". The backfill shall be placed in lifts not exceeding 300mm in thickness and each lift shall be thoroughly compacted to 98% Standard Proctor. Granular "B" road base for County Roads and Highways shall be placed to a 450mm thickness and Granular "A" shall be placed to a thickness of 200mm. Granular road base materials shall be thoroughly compacted to 100% Standard Proctor.

Where the road surface is paved, the Contractor shall be responsible for placing HL-8 Hot Mix Asphalt patch at a thickness of 50mm or of the same thickness as the existing pavement structure. The asphalt patch shall be flush with the existing roadway on each side and without overlap.

Excavated material from the trench beyond 1.25 metres from the travelled portion or beyond the outside edge of the gravel shoulder may be used as backfill in the trench in the case of covered drains. The material shall be compacted in lifts not exceeding 300mm.

## **A.24. Laneways**

All pipes crossing laneways shall be backfilled with material that is clean, free of foreign material or frozen particles and readily tamped or compacted in place unless otherwise specified. Laneway culverts on open ditch projects shall be backfilled with material that is not easily erodible. All backfill material shall be thoroughly compacted as directed by the Engineer.

Culverts shall be bedded with a minimum of 300mm of granular material. Granular material shall be placed simultaneously on each side of the culvert in lifts not exceeding 150mm in thickness and compacted to 95% Standard Proctor Density. Culverts shall be installed a minimum of 10% of the



culvert diameter below design grade with a minimum of 450mm of cover over the pipe unless otherwise noted on the Drawings.

The backfill over culverts and subsurface pipes at all existing laneways that have granular surfaces on open ditch and closed drainage projects shall be surfaced with a minimum of 300mm of Granular “B” material and 150mm of Granular “A” material. All backfill shall be thoroughly compacted as directed by the Engineer. All granular material shall be placed to the full width of the travelled portion.

Any settling of backfilled material shall be repaired by or at the expense of the Contractor during the warranty period of the project and as soon as required.

### **A.25. Fences**

No earth is to be placed against fences and all fences removed by the Contractor shall be replaced by him in as good a condition as found. Where practical the Contractor shall take down existing fences in good condition at the nearest anchor post and roll it back rather than cutting the fence and attempting to patch it. The replacement of the fences shall be done to the satisfaction of the Engineer. Any fences found in such poor condition where the fence is not salvageable, shall be noted and verified with the Engineer prior to commencement of work.

Fences damaged beyond repair by the Contractor’s negligence shall be replaced with new materials, similar to those materials of the existing fence, at the Contractor’s expense. The replacement of the fences shall be done to the satisfaction of the Landowner and the Engineer.

Any fences paralleling an open ditch that are not line fences that hinder the proper working of the excavating machinery, shall be removed and rebuilt by the Landowner at his own expense.

The Contractor shall not leave fences open when he is not at work in the immediate vicinity.

### **A.26. Livestock**

The Contractor shall provide each landowner with 48 hours notice prior to removing any fences along fields which could possibly contain livestock. Thereafter, the Landowner shall be responsible to keep all livestock clear of the construction areas until further notified. The Contractor shall be held responsible for loss or injury to livestock or damage caused by livestock where the Contractor failed to notify the Landowner, or through negligence or carelessness on the part of the Contractor.

### **A.27. Standing Crops**

The Contractor shall be responsible for damages to standing crops which are ready to be harvested or salvaged along the course of the drain and access routes if the Contractor has failed to notify the Landowners 48 hours prior to commencement of the work on that portion of the drain.

### **A.28. Surplus Gravel**

If as a result of any work, gravel or crushed stone is required and not all the gravel or crushed stone is used, the Contractor shall haul away such surplus material.

### **A.29. Iron Bars**

The Contractor is responsible for the cost of an Ontario Land Surveyor to replace any iron bars that are altered or destroyed during the course of the construction.

### **A.30. Rip-Rap**



Rip-rap shall be quarry stone rip-rap material and shall be the sizes specified in the Special Provisions. Broken concrete shall not be used as rip-rap unless otherwise specified.

### **A.31. Clearing, Grubbing and Brushing**

This specification applies to all brushing where no specific detail is provided on the drawings or in the Special Provisions.

The Contractor shall clear, brush and stump trees from within the working area that interfere with the installation of the drainage system.

All trees, limbs and brush less than 150mm in diameter shall be mulched. Trees greater than 150mm in diameter shall be cut and neatly stacked in piles designated by the Landowners.

### **A.32. Restoration of Lawns**

This specification applies to all lawn restoration where no specific detail is provided on the drawings or in the Special Provisions and no allowance for damages has been provided under Section 30 of the Drainage Act RSO 1990 to the affected property.

The Contractor shall supply “high quality grass seed” and the seed shall be broadcast by means of an approved mechanical spreader. All areas on which seed is to be placed shall be loose at the time of broadcast to a depth of 25mm. Seed and fertilizer shall be spread in accordance with the supplier’s recommendations unless otherwise directed by the Engineer. Thereafter it will be the responsibility of the Landowner to maintain the area in a manner so as to promote growth

**END OF DIVISION**



**DIVISION B**

**Specifications for Open Drains**







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## **DIVISION B – SPECIFICATIONS FOR OPEN DRAINS**

### **B.1. Alignment**

The drain shall be constructed in a straight line and shall follow the course of the present drain or water run unless noted on the drawings. Where there are unnecessary bends or irregularities on the existing course of the drain, the Contractor shall contact the Engineer before commencing work to verify the manner in which such irregularities or bends may be removed from the drain. All curves shall be made with a minimum radius of fifteen (15) metres from the centre line of the drain.

### **B.2. Profile**

The Profile Drawing shows the depth of cuts from the top of the bank to the final invert of the ditch in metres and decimals of a metre, and also the approximate depth of excavated material from the bottom of the existing ditch to the final invert of the ditch. These cuts are established for the convenience of the Contractor; however, bench marks (established along the course of the drain) will govern the final elevation of the drain. The location and elevation of the bench marks are given on the Profile Drawing. Accurate grade control must be maintained by the Contractor during ditch excavation.

### **B.3. Excavation**

The bottom width and the side slopes of the ditch shall be those shown on the drawings. If the channel cross-section is not specified it shall be a one metre bottom width with 1.5(h):1(v) side slopes. At locations along the drain where the cross section dimensions change, there shall be a transitional length of not less than 10:1 (five metre length to 0.5 metre width differential). Where the width of the bottom of the existing ditch is sufficient to construct the design width, then construction shall proceed without disturbing the existing banks.

Where existing side slopes become unstable, the Contractor shall immediately notify the Engineer. Alternative methods of construction and/or methods of protection will then be determined prior to continuing work.

Where an existing drain is being relocated or where a new drain is being constructed, the Contractor shall strip the topsoil for the full width of the drain, including the location of the spoil pile. Upon completion of levelling, the topsoil shall be spread to an even depth across the full width of the spoil.

An approved hydraulic excavator shall be used to carry out the excavation of the open ditch unless otherwise directed by the Engineer.

### **B.4. Excavated Material**

Excavated material shall be placed on the low side of the drain or opposite trees and fences. The Contractor shall contact all Landowners before proceeding with the work to verify the location to place and level the excavated material.

No excavated material shall be placed in tributary drains, depressions, or low areas which direct water behind the spoil bank. The excavated material shall be placed and levelled to a maximum depth of 200 mm, unless instructed otherwise and commence a minimum of one (1) metre from the top of the bank. The edge of the spoil bank away from the ditch shall be feathered down to the existing ground; the edge of the spoil bank nearest the ditch shall have a maximum slope of 2(h):1(v). The material shall be levelled such that it may be cultivated with ordinary farm equipment without causing undue



hardship to the farm machinery and farm personnel. No excavated material shall cover any logs, brush, etc. of any kind.

Any stones or boulders which exceed 300mm in diameter shall be removed and disposed of in a location specified by the Landowner.

Where it is necessary to straighten any unnecessary bends or irregularities in the alignment of the ditch or to relocate any portion or all of an existing ditch, the excavated material from the new cut shall be used for backfilling the original ditch. Regardless of the distance between the new ditch and the old ditch, no extra compensation will be allowed for this work and must be included in the Contractor's lump sum price for the open work.

### **B.5. Excavation at Existing Bridge and Culvert Sites**

The Contractor shall excavate the drain to the full specified depth under all bridges and to the full width of the structure. Temporary bridges may be carefully removed and left on the bank of the drain but shall be replaced by the Contractor when the excavation is complete. Permanent bridges must, if at all possible, be left intact. All necessary care and precautions shall be taken to protect the structure. The Contractor shall notify the Landowner if excavation will expose the footings or otherwise compromise the structural integrity of the structure.

The Contractor shall clean through all pipe culverts to the grade and width specified on the profile.

### **B.6. Pipe Culverts**

All pipe culverts shall be installed in accordance with the standard detail drawings. If couplers are required, five corrugation couplers shall be used for up to and including 1200mm diameter pipes and 10 corrugation couplers for greater than 1200mm diameter pipes.

When an existing crossing is being replaced, the Contractor may backfill the new culvert with the existing native material that is free of large rocks and stones. The Contractor is responsible for any damage to a culvert pipe that is a result of rocks or stones in the backfill.

### **B.7. Rip-Rap Protection For Culverts**

Quarry stone rip-rap shall be used as end treatment for new culverts and placed on geotextile filter material (Mirafi 160N or approved equal). The rip-rap shall be adequately keyed in along the bottom of the slope, and shall extend to the top of the pipe or as directed on the drawings. The maximum slope for rip-rap shall be 1(h):1(v) or as directed by the Engineer.

The Contractor shall be responsible for any defects or damages that may develop in the rip-rap or the earth behind the rip-rap that the Engineer deems to have been fully or partially caused by faulty workmanship or materials.

### **B.8. Clearing, Grubbing and Mulching**

Prior to excavation, all trees, scrub, fallen timber and debris shall be removed from the side slopes of the ditch and for such a distance on the working side so as to eliminate any interference with the construction of the drain or the spreading of the spoil. The side slopes shall be neatly cut and cleared flush with the slope whether or not they are affected directly by the excavation. With the exception of large stumps causing damage to the drain, the side slopes shall not be grubbed. All other cleared areas shall be grubbed and the stumps put into piles for disposal by the Landowner.



All trees or limbs 150mm or larger, that is necessary to remove, shall be cut, trimmed and neatly stacked in the working width for the use or disposal by the Landowner. Brush and limbs less than 150mm in diameter shall be mulched. Clearing, grubbing and mulching shall be carried out as a separate operation from the excavation of the ditch, and shall not be completed simultaneously at the same location.

### **B.9. Tributary Tile Outlets**

All tile outlets in existing ditches shall be marked by the Landowner prior to excavation. The Contractor shall guard against damaging the outlets of tributary drains. Any tile drain outlets that were marked or noted on the drawings and are subsequently damaged by the Contractor shall be repaired by the Contractor at his expense. The Landowner shall be responsible for repairs to damaged tile outlets that were not marked.

### **B.10. Seeding**

The side slopes where disturbed shall be seeded using an approved grass seed mixture. The grass seed shall be applied the same day as the excavation of the open ditch.

Grass seed shall be fresh, clean and new crop seed, meeting the requirements of the MTO and composed of the following varieties mixed in the proportion by weight as follows:

- 55% Creeping Red Fescue
- 40% Perennial Rye Grass
- 5% White Clover

Grass seed shall be applied at the rate of 100 kg/ha.

### **B.11. Hydro Seeding**

The areas specified in the contract document shall be hydro seeded and mulched upon completion of construction in accordance with O.P.S.S. 572.

### **B.12. Hand Seeding**

Placement of the seed shall be of means of an approved mechanical spreader.

### **B.13. Completion**

At the time of completion and final inspection, all work in the Contract shall have the full dimensions and cross-sections specified without any allowance for caving of banks or sediment in the ditch bottom.

**END OF DIVISION**





**DIVISION C**

**Specifications for Tile Drains**







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## **DIVISION C – SPECIFICATIONS FOR TILE DRAINS**

### **C.1. Pipe Materials**

#### **Concrete Tile**

Concrete drain tile shall conform to the requirements of the most recent A.S.T.M. specification for Heavy-Duty Extra Quality drain tile. All tile with diameters less than 600mm shall have a pipe strength of 1500D. All tile with diameters 600mm or larger shall have a pipe strength of 2000D.

All tile furnished shall be subject to the approval of the Engineer. All rejected tile are to be immediately removed from the site.

#### **High Density Polyethylene (HDPE) Pipe**

All HDPE pipe shall be dual-wall corrugated drainage pipe with a smooth inner wall. HDPE pipe shall have a minimum stiffness of 320 kPa at 5% deflection.

Unless otherwise noted, all sealed HDPE pipe shall have a water tight gasketed bell and spigot joining system meeting the minimum requirements of CSA B182.8. Perforated HDPE pipe shall have a soil tight joining system, and shall be enveloped in non-woven geotextile filter sock.

### **C.2. Alignment**

The Contractor shall contact the Engineer to establish the course of the drain. Where an existing drain is to be removed and replaced by the new drain, or where the new drain is to be installed parallel to an existing drain, the Contractor shall locate the existing drain (including repairing damaged tile caused by locating) at intervals along the course of the drain. The costs of locating shall be included in the tender price.

The drain shall run in as straight a line as possible throughout its length, except that at intersections of other watercourses or at sharp corners, it shall run on a curve of at least 15 metres radius. The new tile drain shall be constructed at an offset from and parallel with any ditch or defined watercourse in order that fresh backfill in the trench will not be eroded by the flow of surface water.

The Contractor shall exercise care not to disturb any existing tile drain or drains which parallel the course of the new drain, particularly where the new and existing tile act together to provide the necessary capacity. Where any such existing drain is disturbed or damaged, the Contractor shall perform the necessary repair at his expense.

### **C.3. Profile**

Benchmarks have been established along the course of the drain which are to govern the elevations of the drain. The location and elevations of the benchmarks are shown on the drawings. Tile is to be installed to the elevation and grade shown on the profiles. Accurate grade control must be maintained by the Contractor at all times.

When installing a drain towards a fixed point such as a bore pipe, the Contractor shall uncover the pipe and confirm the elevation a sufficient distance away from the pipe in order to allow for any necessary minor grade adjustments to be made.



## **C.4. Excavation**

### **Wheel machine**

Unless otherwise specified, all trenching shall be carried out with a wheel machine approved by the Engineer. The wheel machine shall shape the bottom of the trench to conform to the outside diameter of the pipe. The minimum trench width shall be equal to the outside diameter of the pipe plus 100mm on each side of the pipe, unless otherwise specified. The maximum trench width shall be equal to the outside diameter of the pipe plus 300mm on each side of the pipe, unless otherwise specified.

### **Scalping**

Where the depths of cuts in isolated areas along the course of the drain as shown on the profile exceed the capability of the Contractor's wheel machine, he shall lower the surface grade in order that the wheel machine may trench to the correct depth. Topsoil is to be stripped over a sufficient width that no subsoil will be deposited on top of the topsoil. Subsoil will then be removed to the required depth and piled separately. Upon completion, the topsoil will then be replaced to an even depth over the disturbed area. The cost for this work shall be included in his tender price.

### **Excavator**

Where the use of an excavator is used in-lieu of a wheel machine, the topsoil shall be stripped and replaced in accordance with Item C.4.2. All tile shall be installed on 19mm clear crushed stone bedding placed to a minimum depth of 150mm which has been shaped to conform to the bottom of the pipe. The Contractor shall include the costs of this work in his tender price.

## **C.5. Installation**

### **Concrete Tile**

The tile is to be laid with close joints and in regular grade and alignment in accordance with the drawings. The tiles are to be bevelled, if necessary to ensure close joints. The inside of the tile is to be kept clear when laid. The sides of the tile are to be supported by partial filling of the trench (blinding) prior to inspection by the Engineer. No tile shall be backfilled until inspected by the Engineer unless otherwise permitted by the Engineer. The tile shall be backfilled such that a sufficient mound of backfill is placed over the trench to ensure that no depression remains after settling occurs in the backfill.

Where a tile connects to a catch basin or similar structure, the Contractor shall include in his tender price for the supply and placement of compacted Granular 'A' bedding or 19mm clear crushed stone under areas backfilled from the underside of the pipe to undisturbed soil. Where a tile drain passes through a bore pit, the Contractor shall include in his tender price for the supply and placement of compacted Granular 'A' bedding or 19mm clear crushed stone from the underside of the pipe down to undisturbed soil with the limits of the bore pit.

The Contractor shall supply and wrap all concrete tile joints with Mirafi 160N geotextile filter material as part of this contract. The width of the filter material should be:

- 300mm wide for tile sizes 150mm diameter to 350mm diameter.
- 400mm wide for tile sizes 400mm diameter to 750mm diameter.
- 500mm wide for tile sizes larger than 750mm diameter.

The filter material shall completely cover the tile joint and shall have a minimum overlap of 300mm. The type of filter material shall be.



### **HDPE Pipe**

HDPE pipe shall be installed using compacted Granular 'A' bedding or 19mm clear crushed stone bedding from 150mm below the pipe to 300mm above the pipe. All granular material shall be compacted using a suitable mechanical vibratory compactor. Granular bedding and backfill shall be placed in lifts not exceeding 300mm and compacted to at least 95% Standard Proctor Maximum Dry Density (SPMDD).

Where a pipe connects to a catch basin or similar structure, the Contractor shall include in his tender price for the supply and placement of compacted Granular 'A' bedding or 19mm clear crushed stone under areas backfilled from the underside of the pipe to undisturbed soil. Where a pipe passes through a bore pit, the Contractor shall include in his tender price for the supply and placement of compacted Granular 'A' bedding or 19mm clear crushed stone from the underside of the pipe down to undisturbed soil with the limits of the bore pit.

As determined by the Engineer, unsuitable backfill material must be hauled off-site by the Contractor and Granular "B" shall be used as replacement backfill material.

### **C.6. Trench Crossings**

The Contractor shall not cross the backfilled trench with any construction equipment or vehicles, except by one designated crossing location on each property. 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 ensure that no equipment or vehicles travel along the length of the trench. The Contractor shall be responsible for any damage to the new tile caused by the construction of the drain.

### **C.7. Outlet Protection**

A tile drain outlet into a ditch shall be either HDPE pipe or corrugated steel pipe and shall include a hinged grate for rodent protection. The maximum spacing between bars on the rodent grate shall be 40mm. All corrugated steel outlet pipes shall be bevelled at the end to generally conform to the slope of the ditch bank.

Quarry stone rock rip-rap protection and geotextile filter material (Mirafi 160N), shall be installed around the outlet pipe and extended downstream a minimum distance of three metres, unless otherwise specified. The protection shall extend to the top of the backfilled trench and below the pipe to 300 mm under the streambed. The protection shall also extend 600mm into undisturbed soil on either side of the backfilled trench. In some locations, rip-rap may be required on the bank opposite the outlet.

Where the outlet occurs at the upper end of an open ditch, the rip-rap protection will extend all around the end of the ditch and to a point 800mm downstream on either side. Where heavy overflow is likely to occur, sufficient additional rip-rap and filter material shall be placed as directed by the Engineer to prevent the water cutting around the protection.

### **C.8. Catch Basins and Junction Boxes**

Unless otherwise noted, catch basins shall be in accordance with OPSD 705.010 and 705.030. The catch basin grate shall be a "Birdcage" type substantial steel grate, removable for cleaning and shall be inset into a recess provided around the top of the structure. The grate shall be fastened to the catch basin with bolts into the concrete. Spacing of bars on grates for use on 600mmX600mm



structures shall be 65mm centre to centre. Spacing of bars on grates for use on structures larger than 600mmX600mm shall be 90mm.

All catch basins shall be backfilled with compacted Granular 'A' or 19mm clear crushed stone placed to a minimum width of 300mm on all sides. If settling occurs after construction, the Contractor shall supply and place sufficient granular material to maintain the backfill level flush with adjacent ground. The riser sections of the catch basin shall be wrapped with filter cloth.

Quarry stone rip-rap protection shall be placed around all catch basins and shall extend a minimum distance of one (1) metre away from the outer edge of each side of the catch basin, and shall be placed so that the finished surface of the rip-rap is flush with the existing ground.

If there are no existing drains to be connected to the catch basin at the top end of the drain, a plugged tile shall be placed in the upstream wall with the same elevations as the outlet tile.

Junction boxes shall have a minimum cover over the lid of 450mm.

The Contractor shall include in his tender price for the construction of a berm behind all ditch inlet structures. The berm shall be constructed of compacted clay keyed 300mm into undisturbed soil. The top of the spill way of the earth berm shall be the same elevation as the high wall of the ditch inlet catch basin. The earth berm shall be covered with 100mm depth of topsoil and seeded with an approved green seed mixture. The Contractor shall also include for regrading, shaping and seeding of road ditches for a maximum of 15 metres each way from all catch basins.

The Contractor shall clean all catch basin sumps after completion of the drain installation. Catch basin markers shall be placed beside each catch basin.

### **C.9. Tributary Drains**

Any tributary tile encountered in the course of the drain is to be carefully taken up by the Contractor and placed clear of the excavated earth. If the tributary drains encountered are clean or reasonably clean, they shall be connected into the new drain in accordance with the typical tile drain connection detail. Tributary tile drain connections into the new drain shall be made using high density polyethylene agricultural drain tubing installed on and backfilled with 19mm clear crushed stone. All tile drain connections into the new drain shall be either a cored hole with an insert coupler or a manufactured tee.

Where the existing drains are full of sediment, the decision to connect the tributary drain to the new drain shall be left to the Engineer. The Contractor shall be paid for each tributary drain connection as outlined in the Form of Tender and Agreement.

The Contractor shall be responsible for all tributary tile connections for a period of one year from the date of the Completion Certificate. After construction, any missed tile connections required to be made into the new drain shall be paid at the same rate as defined in the Form of Tender and Agreement. The Contractor will have the option to make any subsequent tile connections or have the Municipality make the required connections and have the cost of which deducted from the holdback.

Where an open ditch is being replaced by a new tile drain, existing tile outlets entering the ditch from the side opposite the new drain shall be extended to the new drain.

Where the Contractor is required to connect an existing tile which is not encountered in the course of the drain, the cost of such work shall constitute an extra to the contract.



### **C.10. Clearing, Grubbing and Mulching**

The Contractor shall clear, brush and stump trees from within the working area.

All trees or limbs 150mm or larger, that is necessary to remove, shall be cut, trimmed and neatly stacked in the working width for the use or disposal by the Landowner. Brush and limbs less than 150mm in diameter shall be mulched.

Clearing, grubbing and mulching shall be carried out as a separate operation from installing the drain, and shall not be completed simultaneously at the same location.

### **C.11. Roads and Laneway Sub-Surface Crossings**

All roads and laneway crossings may be made with an open cut. The Contractor may use original ground as backfill to within 600mm of finished grade only if adequate compaction and if the use of the original ground backfill has been approved beforehand by the Engineer.

### **C.12. Filling In Existing Ditches**

The Contractor shall backfill the ditch sufficiently for traversing by farm equipment. If sufficient material is available on-site to fill in the existing ditch, the topsoil shall be stripped and the subsoil shall be bulldozed into the ditch and the topsoil shall then be spread over the backfilled waterway. The Contractor shall ensure sufficient compaction of the backfill and if required, repair excess settlement up to the end of the warranty period.

### **C.13. Construction of Grassed Waterways**

Where the Contractor is required to construct a grassed waterway, the existing waterway shall be filled in, regraded, shaped and a seed bed prepared prior to applying the grass seed. The grass seed shall be fresh, clean and new crop seed, meeting the requirements of the MTO.

- 55% Creeping Red Fescue
- 15% Perennial Rye Grass
- 27% Kentucky Bluegrass
- 3% White Clover

Grass seed shall be applied at the rate of 100 kg/ha.

### **C.14. Unstable Soil**

The Contractor shall immediately contact the Engineer if unstable soil is encountered. The Engineer shall, after consultation with the Contractor, determine the action necessary and a price for additions or deletions shall be agreed upon prior to further drain installation.

### **C.15. Rocks**

The Contractor shall immediately contact the Engineer if boulders of sufficient size and number are encountered such that the Contractor cannot continue trenching with a wheel machine. The Engineer shall determine the action necessary and a price for additions or deletions shall be agreed upon prior to further drain installation.



If only scattered large stone or boulders are removed on any project, the Contractor shall either excavate a hole to bury same adjacent to the drain, or he shall haul the stones or boulders to a location designated by the Landowner.

#### **C.16. Broken or Damaged Tile**

The Contractor shall remove and dispose of all broken (existing or new), damaged or excess tile off site.

#### **C.17. Recommended Practice For Construction of Sub-Surface Drainage Systems**

Drainage Guide for Ontario, Ministry of Agriculture, Food and Rural Affairs, Publication 29 and its amendments, dealing with the construction of Subsurface Drainage Systems, shall be the guide to all methods and materials to be used in the construction of tile drains except where superseded by other Specifications of the Contract.

**END OF DIVISION**





**DIVISION E**

**Specifications for Boring Method**





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<b>E.4. INSTALLATION .....</b>	<b>1</b>
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## **DIVISION E – SPECIFICATION FOR DRAINAGE**

### **CROSSING BY BORING METHOD**

#### **E.1. GENERAL REQUIREMENTS**

When a drainage crossing of a Roadway, Railway, etc. is to be carried out by the Boring Method, the following Specifications for this work shall apply. The Authority having jurisdiction over the lands involved with the crossing will supply no labour, equipment or materials for the construction of the crossing unless otherwise specified.

The Contractor shall be fully responsible for availing himself of, and satisfying any further Specifications that may apply to borings affecting the Authority having jurisdiction over the lands involved with the crossing.

#### **E.2. NOTIFICATION**

The Contractor shall give the Authority responsible for the lands being crossed at least five (5) days notice before he commences any work on the crossing.

#### **E.3. PIPE**

The pipe or casing used in the crossing shall be smooth wall welded steel pipe with a minimum wall thickness as specified on the Plan and Profile. All pipe shall be new and manufactured from weldable steel having a minimum yield strength of 241 MPa. Pipe ends shall be bevel edged in the intrude to an angle of thirty (30) degrees for butt weld splicing. The name or trademark of the manufacturer and the heat number shall be clearly marked in the inside of the section of the pipe.

The pipe shall be of sufficient length so that during placement, no part of any excavation shall be closer than three (3) metres to the edge of a pavement and the slope of the excavation from the edge of shoulder, or other point as specified to the invert of the pipe shall be no less than one (1) metre vertical to one (1) metre horizontal (1:1) [See item E.5 “Auger Pit”].

#### **E.4. INSTALLATION**

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 unless the method to be adopted is approved in advance by both the Engineer and the Authority responsible for the lands being crossed.

#### **E.5. AUGER PIT**

The pit excavated to accommodate the boring machine shall be so constructed so that the top edge of the pit shall not be closer than three (3) metres to the edge of the pavement. The slope of the pit from the top edge at the shoulder to the bottom of the pit shall not be steeper than one (1) metre vertical to one (1) metre horizontal (1:1). Shoring, sheeting, etc. shall be in accordance with the applicable and most recent Provincial Statutes.

The pit shall be left open for an absolute minimum of time, and if at all possible work shall be so scheduled so that excavation, placement of pipe and backfilling take place in one (1) working day. If



this is not possible, every effort should be made to schedule the work so that the pit is not left open for more than one (1) day before and one (1) day after the boring operation.

## **E.6. CONSTRUCTION**

During excavation, every effort should be made to place the top 300 mm of spoil (topsoil) in a separate pile for replacement on top on completion of the backfill operation. If this is not possible or practical, the Contractor shall import and place a minimum of 150 mm of good quality topsoil over the excavated and backfilled area. The finished work shall be left in a clean and orderly condition flush or slightly higher than the adjacent ground so that after settlement, it will conform to the surrounding ground. Excess earth (if any) shall be disposed of as directed by the Engineer and no additional payment will be allotted for such work.

The Contractor shall at his expense supply, erect and maintain suitable and adequate barricades, flashing lights, warning signs and/or flagmen to the satisfaction of the Engineer to adequately warn and protect the motoring public.

Any areas disturbed within the Right-of-Way of a County Road or King's Highway during construction, shall be covered with a minimum of 75 mm of topsoil, fertilized and seeded with an approved grass seed mixture.

## **E.7. ACCEPTANCE**

All work undertaken by the Contractor shall be to the satisfaction of the Engineer.

**END OF DIVISION**



## **SPECIAL PROVISIONS**

**Branch 'B' of the Grant Municipal  
Drain 2024**







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Special Provisions means special directions containing requirements particular to the work not adequately provided for by the standard or supplemental specifications. Special provisions shall take precedence and govern over any standard or supplemental specification.

## **1.0 GENERAL**

The Contractor shall notify the Landowner, the Drainage Superintendent, and the Engineer 48 hours prior to construction.

The Contractor shall arrange a pre-construction meeting and shall invite the Engineer, Drainage Superintendent, and the Landowners on whose property work will take place.

The Contractor shall verify the location of the new drainage system with the Engineer and Landowner prior to construction.

The Contractor shall check and verify all dimensions and elevations and report any discrepancies to the Engineer prior to proceeding with the work.

The Contractor must maintain access to all driveways along the route of the drain as well as always maintain access for all emergency vehicles during the construction.

The Contractor shall be responsible for settlement within the warranty period.

## **2.0 UTILITIES**

All utilities shall be located and uncovered in the affected areas by the Contractor prior to construction.

The locations and elevations of all utilities shown on the drawings are approximate locations. Actual locations and elevations of all utilities must be verified by the Contractor prior to construction.

The Contractor shall arrange to have a representative of the utility owner on site during construction if it is a requirement by the utility owner.

## **3.0 WORKING AREA AND ACCESS**

Access to the working area shall be designated by the Landowner.

### **3.1 Closed Portion**

The average working width for construction purposes shall be 25 metres along the alignment of the proposed drain.

### **3.2 Open Portion**

The average working width for construction purposes shall be 12 metres along the working side of the ditch.



#### **4.0 CLEARING BRUSHING AND MULCHING**

The Contractor shall clear, brush and mulch trees from within the working area that interfere with the construction of the drainage system. The Contractor shall not clear all trees within the working area unless the full working width in a specific section is required for the installation of the drain and unless the Engineer has authorized the full clearing of the trees.

All trees, limbs, and brush less than 150mm in diameter shall be mulched/chipped. Clearing and brushing shall be done prior to the construction of the drain. Trees and branches greater than 150mm in diameter shall be cut into lengths no greater than four metres and placed in nearby stacks designated by the Landowner. Trees removed from road right-of-ways shall be mulched or disposed of offsite by the Contractor.

#### **5.0 OPEN DITCH EXCAVATION**

An approved hydraulic excavator shall be used to carry out the excavation of the open ditch. The open ditch shall have a 900mm bottom width and shall be parabolic in shape. The side slopes shall be a 1.5H:1V or flatter.

#### **6.0 EXCAVATED MATERIAL**

The excavated material from the ditch cleanout shall be spread on the working side of the ditch to a maximum depth of 200mm.

#### **7.0 PIPE AND INSTALLATION**

##### **7.1 Concrete Field Tile**

An approved wheel trencher shall be used to install the concrete field tile whenever possible.

All concrete tile shall be Heavy-Duty Extra Quality Concrete Drain Tile 2000D.

Where the drain is to be installed by means of an approved wheel trencher, the Contractor shall strip the topsoil for the specified width centred on the proposed drain. Where there is no specified width for stripping topsoil, the Contractor shall strip the topsoil for a minimum of four metres, centred on the trench.

Where the drain is to be installed by means of an approved hydraulic excavator (due to poor soil conditions), the Contractor shall strip the topsoil for a width equal to the top width of the trench, or the specified width, whichever is greater. The Contractor shall stockpile the topsoil and later spread it over the backfilled trench. The Contractor shall ensure that the topsoiled trench is left in a condition such that the landowner can perform final restoration using nothing more than farm equipment. The Contractor will not attempt to place frozen topsoil over the backfilled trench.

Concrete field tile installed by means of a wheel machine shall be backfilled using suitable native material. The backfill shall not be compacted but a sufficient mound shall be left over the trench by the Contractor to allow for settlement flush with adjacent lands.

Concrete field tile installed by means of an approved hydraulic excavator shall be installed using 19mm crushed stone bedding from a minimum of 150mm below the pipe to the springline of the pipe. Suitable native material shall be used as backfill from the springline to the underside of the topsoil.



The Contractor shall supply and wrap all concrete joints with geotextile filter material. The width of the filter material shall be:

- 400mm wide with 400mm overlap for tile sizes 400mm diameter and larger.

The filter material shall completely cover the tile joint.

The Contractor shall be responsible for all trench settlement within the warranty period.

## **7.2 High Density Polyethylene Pipe (HDPE)**

All HDPE pipe shall be CSA B182.8.

All HDPE pipe shall be installed using 19mm crushed stone bedding (or approved equivalent) from a minimum of 150mm below the pipe to 150mm above the pipe. Suitable native material shall be used as backfill from 150mm above the pipe to the underside of the topsoil.

The Contractor shall be responsible for all trench settlement within the warranty period.

## **7.3 Poor Soil Conditions**

The Contractor shall submit a unit price for installation of the pipe per the detail on wrapped crushed stone bedding as a provisional item. The provisional amount for installation on wrapped crushed stone bedding shall include the supply and installation of all additional labour, equipment and materials required for the installation of the pipe by this method.

If poor soil conditions are encountered, the Contractor shall install the pipe in accordance with the detail for wrapped crushed stone bedding and shall be entitled to the provisional tender amount, in addition to the tendered standard installation price. The Contractor shall be paid for the actual lengths installed in this condition.

## **8.0 TOPSOIL STRIPPING AND FINE GRADING**

The Contractor shall strip the topsoil along the alignment of the tile drain in accordance with the following table:

Station Range	Stripping Width
0+000 to 0+401	8 metres
0+431 to 1+329	4 metres

The Contractor shall stockpile the topsoil and later spread it over the backfilled trench. The Contractor shall ensure that the topsoiled trench is left in a condition that the Landowner can perform final restoration using nothing more than farm equipment.

## **9.0 SEEDING**

The Contractor shall supply and spread an approved seed mixture (OPS 804 – Standard Roadside Mix) over the disturbed areas near the outlet, and at the road right-of-way.

All seed shall be applied using the manufacturer's application recommendations.



## **10.0 OUTLET STRUCTURE (PLUNGE POOL)**

The Contractor shall construct a plunge pool at the outlet of the pipe system. The plunge pool shall be lined with quarry stone rip-rap protection 300mm to 450mm in diameter, and placed 450mm deep. The rip-rap shall be placed on an approved geotextile filter material.

The plunge pool shall be constructed in accordance with the Plunge Pool Detail included in the drawing set.

## **11.0 EXISTING DRAINS/TILE CONNECTIONS**

The Contractor shall locate the existing drains prior to the installation of the new drainage systems. The Contractor shall destroy the private drainage system along which the proposed municipal drainage system will be constructed.

The Contractor shall make all tributary tile drain connections.

The Contractor shall be responsible for all tile connections for a period of one year after the issuance of the completion certificate. Tile connections required to be made within this warranty period shall be made at the expense of the Contractor. After construction, the Contractor will be given the option to make any subsequent tile connections or have the Municipality make said connections and have the costs of which deducted from the holdback.

The Contractor shall supply all necessary materials to complete the connections of the existing drains to the new drain. The type of materials used to make the tributary drain connections shall be verified with the engineer.

All existing drains cut off during the installation of the new drainage system that will be connected to the new drainage system shall be flagged or marked by the Contractor prior to the connection being made.

## **12.0 CATCH BASINS AND JUNCTION BOXES**

All catch basins shall be precast concrete catch basins and shall have a 300mm sump.

All catch basin grates shall be fastened to the new catch basin and shall be hot dipped galvanized bird cage grates. Catch basin marker signs shall be erected at all catch basins.

All existing catch basins that are to be removed shall be disposed of off-site by the Contractor.

The catch basin grate elevations shall be set to the satisfaction of the Engineer. Lifts shall be placed by the Contractor on all catch basins if necessary to achieve the desired elevation when field setting the structures.

All catch basins shall be installed using 19mm crushed stone bedding from 150mm below the structure to 150mm above the top of the highest pipe entering or exiting the structure. Structures within the road allowances shall have 300mm minimum of Granular 'B' backfill around all sides up to the underside of the topsoil layer. Structures on private property shall be backfilled using approved native material up to the underside of the topsoil layer. All backfill material shall be placed and thoroughly compacted evenly around each structure in lifts not exceeding 300mm to minimize settlement around the structures. The Contractor shall be responsible for all settlement around catch basins. Should the area around the catch basin settle after construction, the Contractor shall be



responsible for providing additional rip-rap required so that the top of the rip-rap is flush with the surrounding ground.

The Contractor shall place quarry stone rip-rap material around all sides of the catch basins and shall be placed on geotextile filter material in accordance with the attached set of drawing plans.

All holes for catch basin pipe connections to be cored by the manufacturer. All pipes entering or exiting a catch basin or shall be installed such that the face of the pipe is flush with the inside wall of the structure.

The Contractor shall be responsible to repair or reapply mortar for all mortared connections into any catch basin for a period of one year after the completion certificate has been issued.

### **13.0 ROAD WORKS/CROSSING**

The Contractor shall be responsible to arrange all traffic control signals, signs and devices that are required for safe and proper traffic management during the installation of the drainage system. The Contractor shall contact the Municipality of Bluewater and Huron County for specific local procedures, guidelines, and timelines. Traffic control shall meet the standards of Book 7 of the Ontario Traffic Manual.

The Contractor shall notify the Engineer and local road authority having jurisdiction over the road a minimum of 48 hours prior to the scheduled road crossing.

The Contractor shall grade the road ditches to the new catch basins. Any disturbed area within the Municipal Right-of-Way during construction shall be topsoiled and seeded with an approved grass seed mixture.

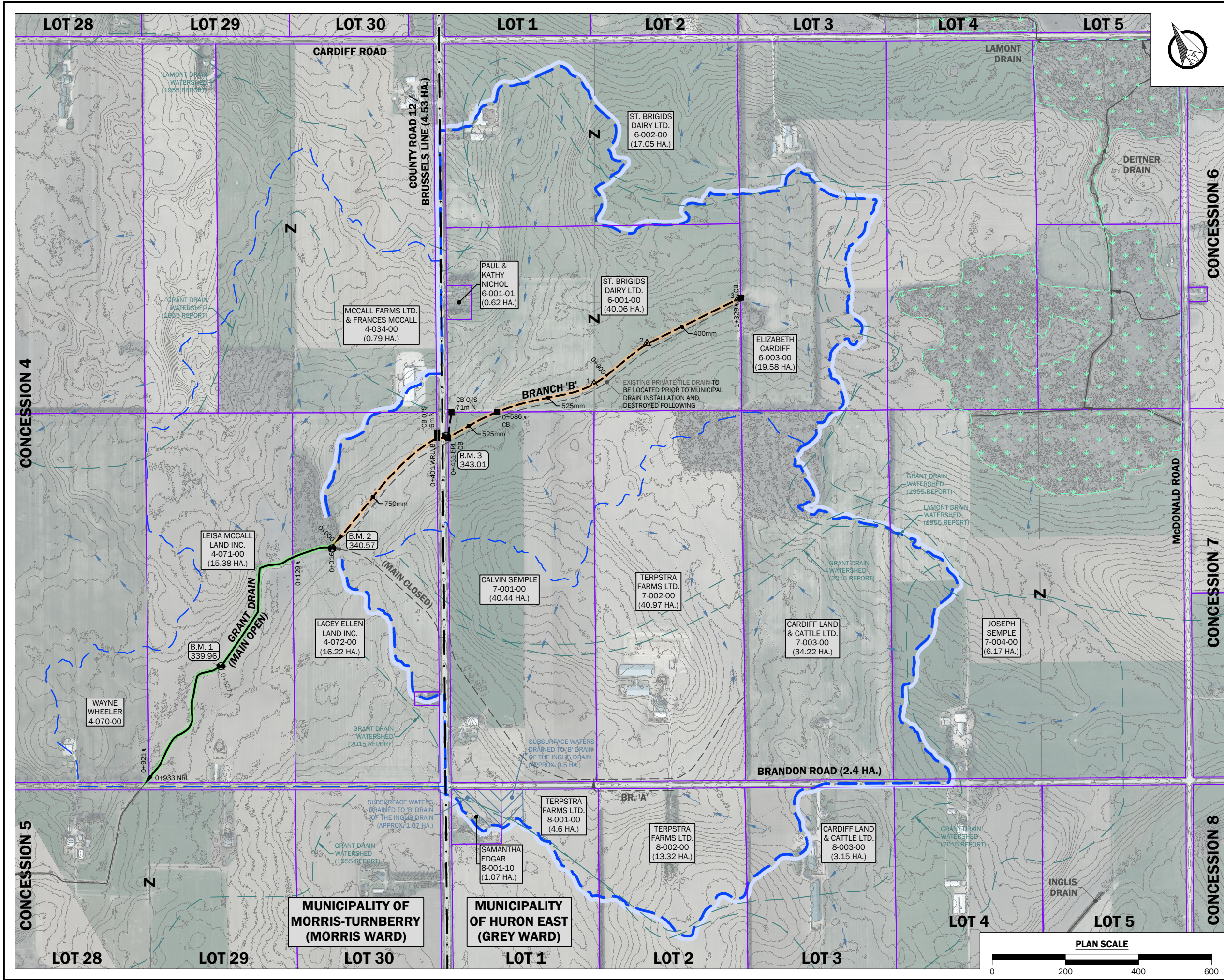
### **14.0 RIP-RAP**


All stone rip-rap material shall be quarry stone 150mm to 300mm diameter and placed to a depth of 450mm, unless otherwise noted. All rip-rap material shall be placed on geo-textile filter material.

### **15.0 EROSION AND SEDIMENT CONTROL**

The Contractor shall provide adequate erosion and sediment control for the duration of the construction including monitoring and maintenance of the control measures put in place. The Contractor shall inspect the erosion and sediment control measures regularly, and specifically before predicted rainfall events, and after rainfall events.







MUNICIPALITY OF  
MORRIS-TURNBERRY

MORRIS WARD

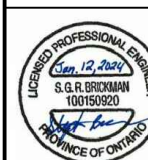
BRANCH 'B' OF THE GRANT  
MUNICIPAL DRAIN 2024

Watershed Plan


NOTES:  
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2. THE CONTOURS WERE CREATED USING IMAGERY DERIVED DIGITAL DATA (2015) FROM LAND INFORMATION ONTARIO.

BENCHMARK DESCRIPTIONS  
BENCHMARK No. 1 ELEV.=339.96  
TOP CENTRE UPSTREAM END OF 1200mmØ CSP CULVERT AT STA. 0+523 (MAIN)  
BENCHMARK No. 2 ELEV.=340.57  
TOP CENTRE OF 750mmØ HDPE OUTLET PIPE 4m EAST OF STA. 0+016 (MAIN)  
BENCHMARK No. 3 ELEV.=343.01  
TOP CENTRE UPSTREAM END OF 1200mmØ SURFACE CULVERT 6m NORTH OF STA. 0+426 (BRANCH 'B')

LEGEND  
LOT/CONCESSION LINE  
PROPERTY LINE  
TOWNSHIP BOUNDARY  
MAJOR WATERSHED BOUNDARY  
MINOR WATERSHED BOUNDARY  
WETLAND LIMIT  
TESTHOLE  
BENCHMARK LOCATION  
BENCHMARK No.  
BENCHMARK ELEVATION  
LANDOWNER NAME(S)  
ASSESSMENT ROLL No. (ABBREVIATED)  
AREA WITHIN WATERSHED  
EXISTING FEATURES:  
DRAIN NAME OPEN DRAIN WITH CROSSING AND FLOW DIRECTION  
DRAIN NAME CLOSED DRAIN WITH CATCH BASIN, MANHOLE AND FLOW DIRECTION  
OVERLAND FLOW PATH  
PROPOSED FEATURES:  
DRAIN NAME OPEN DRAIN WITH CROSSING AND FLOW DIRECTION  
DRAIN NAME CLOSED DRAIN WITH CATCH BASIN, MANHOLE AND FLOW DIRECTION



3	REPORT SUBMISSION	24-01-12
2	INFORMATION MEETING	23-10-05
1	ON-SITE MEETING	23-03-28
No.	REVISION	DATE (YY-MM-DD)



Headway  
Engineering

DRAWN BY: R.U.	DESIGNED BY: A.H.	CHECKED BY: S.B.
DATE: 2024-01-12	REFERENCE No. MT-002	DRAWING No. 1 OF 3

PLAN SCALE  
0 200 400 600





BRANCH 'B' OF THE GRANT  
MUNICIPAL DRAIN 2024

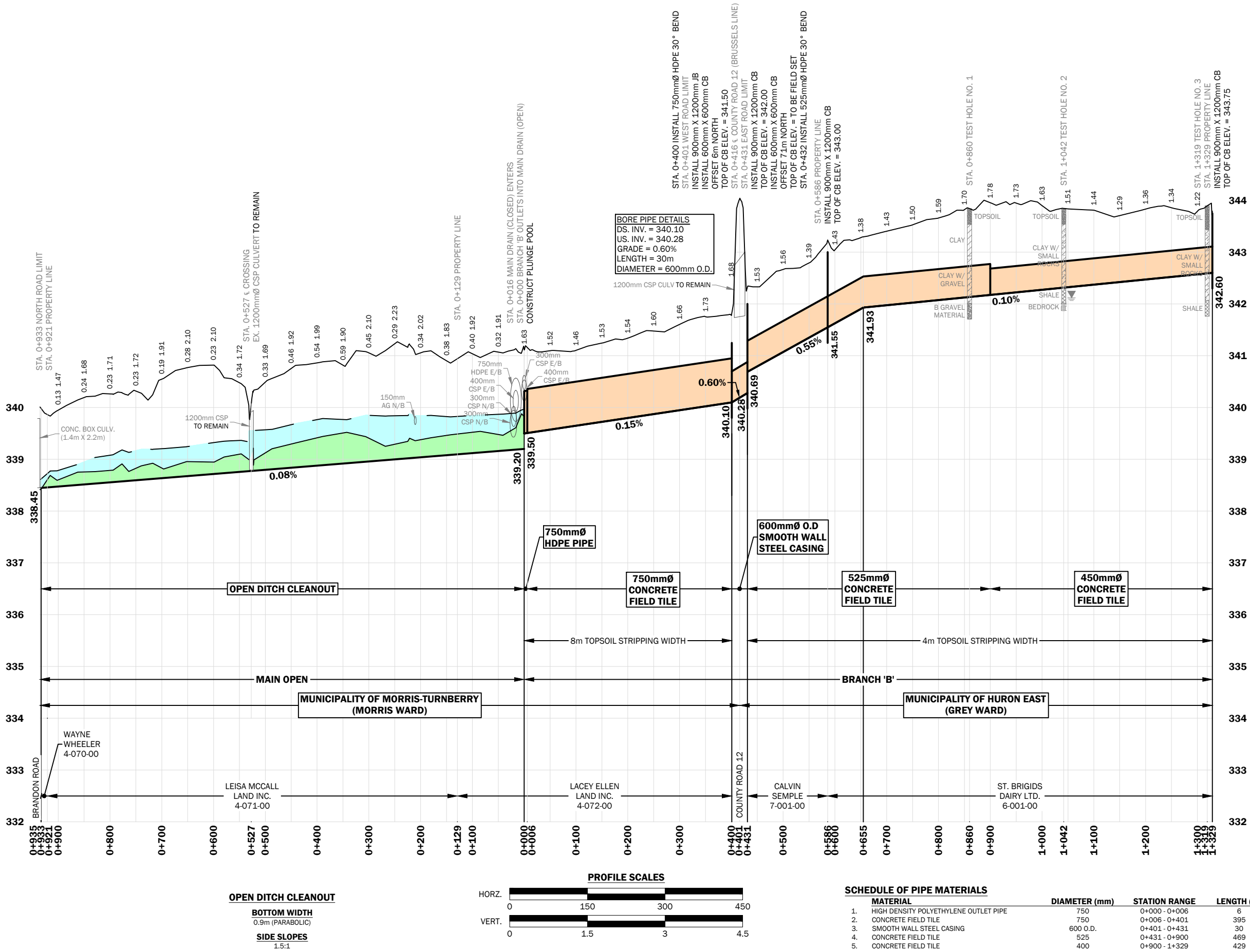
Profile

NOTES:

1. EXISTING PRIVATE TILE DRAIN TO BE LOCATED PRIOR TO MUNICIPAL DRAIN INSTALLATION AND DESTROYED FOLLOWING.

BENCHMARK DESCRIPTIONS

- BENCHMARK No. 1** ELEV.=339.96  
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DRAWN BY: R.U.	DESIGNED BY: A.H.	CHECKED BY: S.B.
DATE: 2024-01-12	REFERENCE No. MT-002	DRAWING No. 2 OF 3



BRANCH 'B' OF THE GRANT  
MUNICIPAL DRAIN 2024

Details

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LEGEND

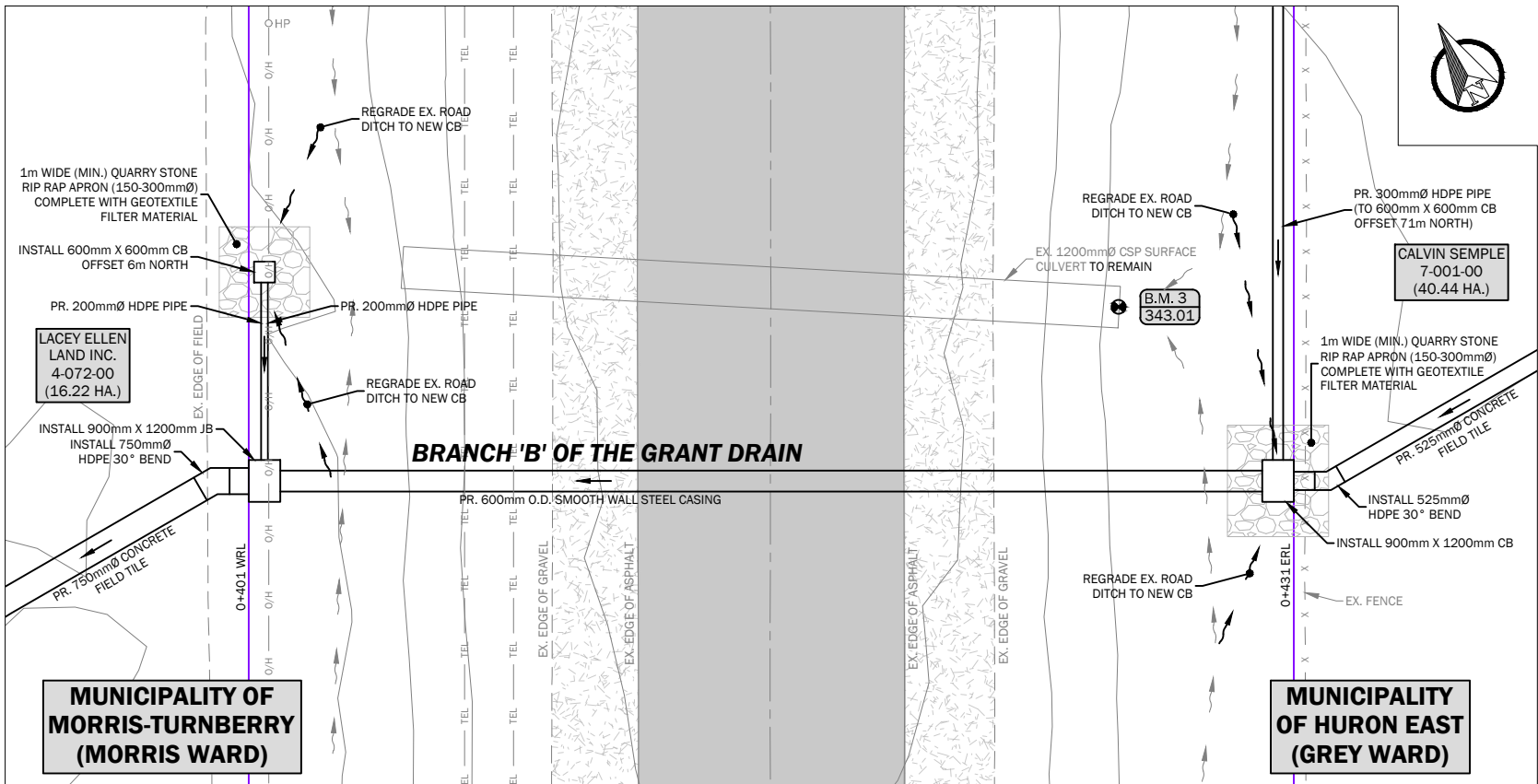
TEL	TEL	PROPERTY LINE
O/H	O/H	TELEPHONE CABLE
OHP		OVERHEAD HYDRO LINE
		HYDRO POLE
		BENCHMARK LOCATION
B.M. 1	123.45	BENCHMARK No.
		BENCHMARK ELEVATION
JOHN & JANE SMITH		LANDOWNER NAME(S)
12-345		ASSESSMENT ROLL No. (ABBREVIATED)
(12.3 Ha.)		AREA WITHIN WATERSHED



No.	REVISION	DATE (YY-MM-DD)
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2	INFORMATION MEETING	23-10-05
1	ON-SITE MEETING	23-03-28

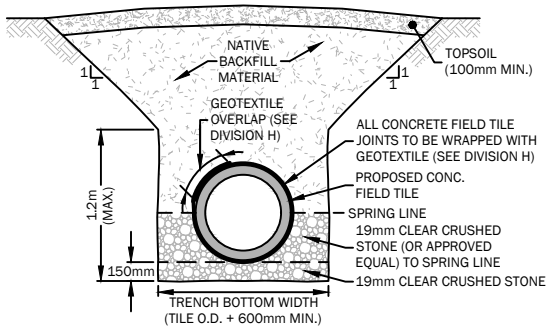
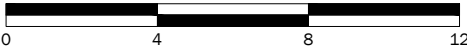


DRAWN BY: R.U.	DESIGNED BY: A.H.	CHECKED BY: S.B.
DATE: 2024-01-12	REFERENCE No. MT-002	DRAWING No. 3 OF 3

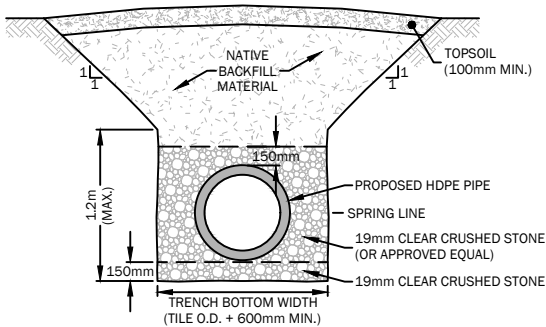


COUNTY ROAD 12 (BRUSSELS LINE) CROSSING DETAIL

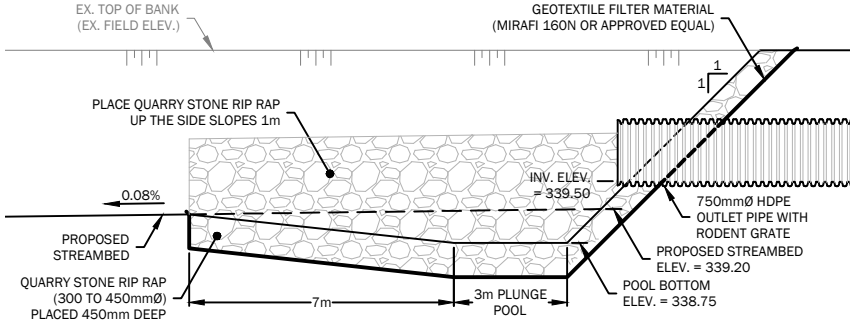
PLAN SCALE



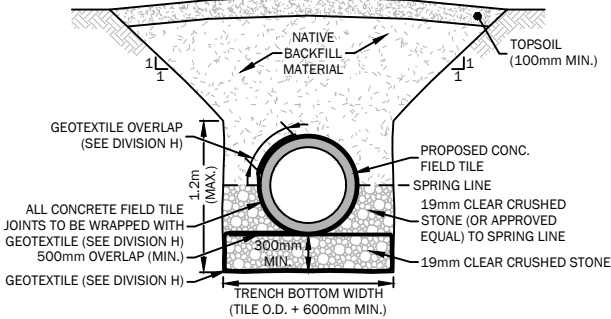
TYPICAL CONCRETE TILE INSTALLATION  
ON STONE BEDDING DETAIL  
N.T.S.



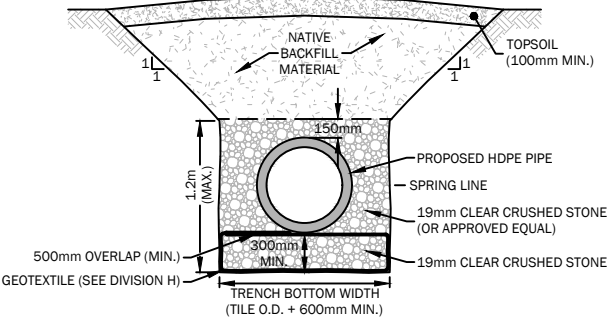
TYPICAL HDPE PIPE INSTALLATION  
ON STONE BEDDING DETAIL  
N.T.S.



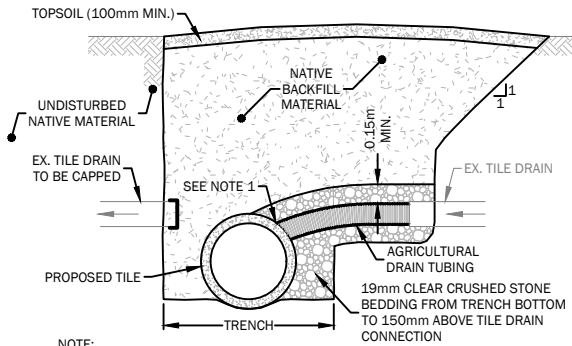
PLUNGE POOL DETAIL  
N.T.S.



TYPICAL CONC. TILE INSTALLATION ON WRAPPED  
STONE BEDDING DETAIL (PROVISIONAL ITEM)  
N.T.S.



TYPICAL HDPE PIPE INSTALLATION ON WRAPPED  
STONE BEDDING DETAIL (PROVISIONAL ITEM)  
N.T.S.



- NOTE:
- ALL TILE CONNECTIONS TO BE EITHER A CORED HOLE WITH AN INSERT COUPLER, OR A MANUFACTURED TEE.
  - CLEAR CRUSHED STONE BEDDING NOT REQUIRED IF DUAL WALL H.D.P.E. PIPE IS USED FOR THE CONNECTION.

TYPICAL TILE CONNECTION DETAIL  
N.T.S.