The Corporation of the Municipality of Brockton

By-Law 2019-081

Being a By-Law to Provide for Drainage Works on the Van Nes Municipal Drain in the Municipality Of Brockton

Whereas the requisite number of owners have petitioned the Council of The Corporation of the Municipality of Brockton in the County of Bruce in accordance with the provisions of the *Drainage Act,* R.S.O., 1990, c. D.17 requesting that the following lands and roads be drained by a drainage works: Van Nes Municipal Drain parts of Lots 3 to 5, Concession 16, in the Municipality of Brockton, Former Township of Greenock, Bruce County.

And Whereas the Council of The Corporation of The Municipality of Brockton has procured a report under Section 4 of the Drainage Act, R.S.O. 1990, as amended, Chapter D.17, by Dietrich Engineering Limited, dated June 27, 2019 and the report is attached hereto as Schedule "A" and forms part of this by-law;

And Whereas the estimated total cost of constructing the drainage works is ninety-six thousand, six hundred dollars ($96,600.00);

And Whereas twenty thousand five hundred fifty one dollars ($20,551.00) is the amount to be contributed by the Municipality for the construction of the drainage works;

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

Now Therefore the Council of The Corporation of the Municipality of Brockton pursuant to the *Drainage Act,* R.S.O., 1990, c. D.17 enacts as follows:

1.0 That The Corporation of the Municipality of Brockton hereby adopts the report dated June 27, 2019 and the drainage works as therein indicated and set forth is hereby authorized and shall be completed in accordance therewith;

2.0 The Corporation of the Municipality of Brockton may borrow on the credit of the Corporation the amount necessary for construction of the drain works;

3.0 The Corporation will issue invoices for the amount borrowed less the total amount of:

a) Grants received under Section 85 of the Act;

b) Moneys paid under subsection 61(3) of the Act;

4.0 A special rate sufficient to redeem the total cost of the drainage works shall be levied upon the lands and roads, as noted on Schedule “A” attached hereto, to be collected.

5.0 All assessments will be payable as per the payment terms established by the Municipality.

6.0 This By-Law shall come into full force and effect upon final passage

7.0 This By-Law may be sited as the “Van Nes Municipal Drain By-Law”.

Read a First and Second Time and Provisionally Adopted this 9th day of July, 2019.

Original Signed By
Mayor –Chris Peabody

Original Signed By
Clerk – Fiona Hamilton

Read a Third Time and Finally Passed This 24th Day of September, 2019.

_____
Mayor –Chris Peabody

_____
Clerk – Fiona Hamilton

DIETRICH ENGINEERING LIMITED
CONSULTING ENGINEERS

10 Alpine Court, Kitchener, ON, N2E 2M7 | T: (519) 880-2708 | F: (519) 880-2709 | E: mail@dietricheng.com

DATE June 28, 2019

JOB NO. 1846

INV. NO. 1544

TO Municipality of Brockton
Mr. Terry Tuck
Chief Building Official
100 Scott Street
P.O. Box 68
Walkerton, Ontario N0G 2V0

FOR SERVICES RENDERED

Re: Engineering Services in Connection with the Van Nes Municipal Drain

These engineering services include:

Meetings, survey, design, preparation of preliminary cost estimates and reports, preparation of final drainage report, consideration of report and consulting with environmental agencies.

Sub-Total	$ 8,550.00
13% H.S.T.	$ 1,111.50
Total Amount of This Invoice	**$ 9,661.50**

H.S.T. REGISTRATION No. R867614208

Van Nes Municipal Drain 2019

Municipality of Brockton

(Former Township of Greenock)

DIETRICH ENGINEERING LIMITED

CONSULTING ENGINEERS

Reference No. 1846

June 27, 2019

TABLE OF CONTENTS

1.0 Introduction 1
2.0 Authorization 1
3.0 On-Site Meeting 1
4.0 Information Meeting 2
5.0 Findings 2
6.0 Recommendations 3
7.0 Environmental Considerations 3
8.0 Summary of Proposed Works 3
9.0 Working Area and Access 4
10.0 Watershed and Soils Characteristics 4
11.0 Allowances 4
12.0 Estimated Construction Costs 5
13.0 Summary of Estimated Project Costs 5
14.0 Assessment 6
15.0 Maintenance 6
16.0 Schedule A – Allowances 7
17.0 Schedule B – Estimated Construction Costs 8
18.0 Schedule C – Assessment for Construction 11
19.0 Schedule D – Assessment for Maintenance 14

Specification for Construction of Municipal Drainage Works

DIVISION A – General Conditions
DIVISION B – Specification for Open Drains
DIVISION C – Specification for Tile Drains
DIVISION H – Special Provisions

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Kitchener, Ontario

June 27, 2019

Van Nes Municipal Drain 2019
Municipality of Brockton
(Former Township of Greenock)

To the Mayor and Council
of the Municipality of Brockton

Members of Council:

1.0 Introduction

We are pleased to present our report on the "Van Nes Municipal Drain 2019", serving parts of the following Lots and Concessions in the Municipality of Brockton, former Township of Greenock, County of Bruce:

Lots 3 to 5, Concession 16
Lot of 4, Concession 17

The attached Plan, Profile and Details, Drawing Numbers 1 & 2, Reference No. 1846, Specifications and the Instructions to Tenderers form part of this report. They show and describe in detail the location and extent of the work to be done and the lands which are affected.

2.0 Authorization

Authority to prepare this report was obtained by a resolution of the Municipality of Brockton Council at its March 12, 2018 meeting to appoint Dietrich Engineering Limited to prepare an Engineer's Report.

In accordance with your instructions pursuant to a petition received by Council under Section 4 of the Drainage Act, R.S.O. 1990, signed by Kevin Van Nes, on behalf of Longman Hill Farms Limited, Lots 3 & 4, Concession 16 (Roll No. 3-154); and Bryan (David) & Martha Barrett, Lot 5, Concession 16 (Roll No. 3-156); we have made an examination and survey of the affected area and submit herewith our Report which includes Plan, Profile and Specifications for this work.

The area requiring drainage is the agricultural lands in Parts of Lots 3 to 5, Concession 16.

The petition, having been signed by the majority of landowners within the area requiring drainage is valid and in compliance with Section 4(1)(a) of the Drainage Act, R.S.O. 1990.

3.0 On-Site Meeting

In accordance with Section 9(1) of the Drainage Act, R.S.O. 1990, an on-site meeting was held on Friday December 7, 2018. The place of meeting was at the Brockton Municipal office at 100 Scott Street, Walkerton.

Persons in attendance were:

Greg Nancekivell, C.E.T.	Dietrich Engineering Limited
Michel Terzian	Dietrich Engineering Limited
Fiona Hamilton	Clerk, Municipality of Brockton
Terry Tuck	Chief Building Official, Municipality of Brockton
Stephen Cobean, P. Eng., FEC	Drainage Superintendent, Municipality of Brockton
Paul Elston, P. Eng.	Regulations Officer, Saugeen Valley Conservation Authority

Landowners:

Phyllis Metcalf	Eric Metcalf
Kevin Van Nes	(975427 Ontario Limited) Tom Fritz

**Other people may have been in attendance but their names were not recorded on the sign in sheet.*

4.0 Information Meeting

An information meeting was held on Tuesday June 18, 2019 at the Brockton Municipal Office. Persons in attendance were:

Greg Nancekivell, C.E.T.	Dietrich Engineering Limited
Fiona Hamilton	Clerk, Municipality of Brockton
Terry Tuck	Chief Building Official, Municipality of Brockton
Stephen Cobean, P. Eng., FEC	Drainage Super Intendent, Municipality of Brockton
John Strader	Roads Supervisor, Municipality of Brockton
Paul Elston, P. Eng.	Regulations Officer, Saugeen Valley Conservation Authority

Landowners:
Kevin Van Nes

**Other people may have been in attendance but their names were not recorded on the sign in sheet.*

The information provided proposed constructing a new municipal drainage pipe system from the lot line between Lots 4 and 5 Concession 16 and extending downstream to its outlet into a natural watercourse on the Patrick and Nicole Donnelly property (Roll No. 3-176) in Lot 4 Concession 17. The incorporation of the natural watercourse was included in the proposal as well.

This meeting also provided a review of the design of the proposed drainage system, the estimated costs of the project and proposed preliminary assessments.

5.0 Findings

We have made an examination of the drainage area and have found the following:

1. The area within the watershed of the Van Nes Municipal Drain 2019 is currently being served by an existing natural watercourse on the Patrick and Nicole Donnelly property, Lot 4, Concession 17 (Roll No. 3-176). This natural watercourse outlets into the Teeswater River.
2. The existing natural watercourse is of sufficient capacity and depth to drain the surrounding and upstream lands within the watershed at today's standards of drainage.
3. The existing road culvert is not of sufficient depth to accommodate the subsurface drainage required by upstream lands.

4. Longman Hill Farms Limited has plans to systematically tile drain Lots 3 & 4 and intends to construct this tile drainage system as soon as the construction of the Van Nes Municipal Drain 2019 has been completed.

6.0 Recommendations

It is our recommendation that:

1. A new tile drainage system be constructed from its outlet into the existing natural watercourse in Lot 4, Concession 17 approximately 361 metres upstream to the lot line between Lots 4 and 5, Concession 16.
2. The new tile drainage system includes the installation of approximately 361 metres of 350mm to 750mm diameter concrete field tile and HDPE pipe.
3. The existing natural watercourse be incorporated from Sta. 0+232, downstream to the Teeswater River for the purpose of future maintenance.
4. The drainage coefficient design standard used for this drain is 38mm (1.5") of rainfall per 24 hours.
5. This new drainage system shall be known as the "Van Nes Municipal Drain 2019".

7.0 Environmental Considerations

The work proposed under this report includes the construction of an energy dissipating plunge pool to be constructed in the open watercourse at the outlet of the closed tile drainage system.

The Contractor shall construct and maintain approved sediment control measures during construction.

The works proposed under this report do not cause death of fish, permanent alteration, or destruction of fish habitat. Likewise, the involvement of the Department of Fisheries and Oceans is not required.

The SVCA has been provided with details of the proposed work, and has indicated in correspondence provided on June 27, 2019 that,*"The construction as proposed will not require a formal permission from the SVCA."*

8.0 Summary of Proposed Works

The proposed work consists of:

1. The installation of 38 metres of 750mm diameter HDPE storm sewer HDPE pipe;
2. The installation of approximately 230 metres of 525mm diameter concrete field tile;
3. The installation of approximately 93 metres of 350mm diameter concrete field tile;
4. Installation of one 525mm diameter HDPE 45 degree elbow;
5. The installation of two concrete ditch inlet catch basins, and one junction box;
6. The construction of one energy dissipating plunge pool;
7. The incorporation of approximately 232 metres of existing open watercourse;

9.0 Working Area and Access

Each landowner on whose property the drainage work is to be constructed shall provide access to and from the working area. Construction access is specified in the attached drawing set.

9.1 Open Work

The working area shall be a width of ten (10) metres for construction and future maintenance purposes on the east side of the drain where the excavated material resulting from the construction of the plunge pool and future drain maintenance is to be placed and levelled.

9.2 Closed Work

The working area shall be an average width of twenty-five (25) metres for construction purposes, and an average width of ten (10) metres for maintenance purposes along the alignment of the proposed tile drain.

10.0 Watershed and Soils Characteristics

The watershed was established by field investigation, surveys, and data analysis of the Southwestern Ontario Orthophotographic Project ("SWOOP").

The Drainage Area comprises of approximately 77.9 hectares (189 acres). Land use within the watershed is primarily agricultural, with some bush areas.

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 proposed drain as Perth Clay Loam.

11.0 Allowances

In accordance with Sections 29 and 30 of the Drainage Act, R.S.O. 1990, we have calculated Allowances payable to Landowners using the following methodology.

11.1 Allowances for Right-of-Way (Section 29)

The land values used for calculating allowances for Right-of-Way are $35,000/ha ($14,165/ac) for agricultural lands and $17,500/ha ($7,082/ac) for woodlots.

11.1.1 Open Drain

The allowances for Right-of-Way under Section 29 of the Drainage Act, R.S.O. 1990 for open drains were calculated based on 25% of the estimated land value, $4,375/ha ($1,771/ac) for an average working width of 10 metres (33 feet) for future maintenance purposes.

11.1.2 Closed Drain

The allowances for Right-of-Way under Section 29 of the Drainage Act, R.S.O. 1990 for closed drains were calculated based on 25% of the land value, $8,750/ha ($3,541/ac) for a ten metre Right-of-Way.

11.2 Allowances for Damages to Lands and Crops (Section 30)

Allowances for Damages to Lands and Crops under Section 30 of the Drainage Act, R.S.O. 1990 were primarily calculated to compensate landowners for crop losses, bush losses and land damages due to the construction of the drain, including access to the working corridor.

Damages have been calculated based on $4,000/ha ($1,619/ac) for agricultural lands and $2,000/ha ($809/ac) for woodlots.

We determined the allowances payable to Landowners entitled thereto as shown in Schedule A.

Total Allowances, under Sections 29 and 30 of the Drainage Act, R.S.O. 1990;

Van Nes Municipal Drain 2019: **$8,600**

12.0 Estimated Construction Costs

We have made an estimate of the cost of the proposed work based on labour, equipment and materials. A detailed description of the costs involved can be found in Schedule B of this report.

The total estimated construction costs for this project are as follows:

A) Total Estimated Construction Costs – Main Drain (Open Work)	$ 4,500
B) Total Estimated Construction Costs – Main Drain (Closed Work)	$ 49,700
C) Provisional Items	$ 2,000
Total Estimated Construction Costs	**$ 56,200**

13.0 Summary of Estimated Project Costs

The total estimated project costs are as follows:

Allowances under Sections 29 and 30 of the Drainage Act, R.S.O. 1990 (Refer to Schedule A)	$ 8,600
Total Estimated Construction Costs (Refer to Schedule B)	$ 56,200
Meetings, survey, design, preparation of preliminary cost estimates, preparation of final drainage report, consideration of report	$ 18,600
Consultation with Environmental Agencies	$ 1,200
Saugeen Valley Conservation Authority Fees	$ 800
Preparation of contract documents, contract administration, supervision and inspection of construction	$ 7,800
Contingencies, Interest and net H.S.T.	$ 3,400
TOTAL ESTIMATED PROJECT COSTS – Van Nes Municipal Drain 2019	**$ 96,600**

The estimated cost of the work in the Municipality of Brockton is $96,600.

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

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 the Drainage Referee.

14.0 Assessment

We assess the cost of this work against the lands and roads liable for assessment for benefit and outlet as shown in the annexed Schedule C - Assessment for Construction. We have determined that there is no injuring liability assessment involved.

14.1 Special Assessments (Section 26)

Whether or not the Municipality of Brockton elects to do the work on their property, Sta. 0+244 to Sta. 0+264, (Concession Road 16), they shall be assessed the actual increased costs to the drainage works due to the construction and operation of the roads as a Special Assessment in addition to any benefit and outlet assessments. The Special Assessment shall be made up of the actual construction costs plus an allowance for administration costs.

15.0 Maintenance

After completion, this drain shall be maintained by the Municipality of Brockton at the expense of all the lands and roads assessed in 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 portion of the drain constructed within the Concession 16 Road right-of-way. This portion of the drain shall be maintained by the Municipality at the expense of the road authority having jurisdiction over said road.

Respectfully submitted,

DIETRICH ENGINEERING LIMITED



Stephen Brickman, P.Eng.
Project Engineer

Greg Nancekivell, C.E.T.
Project Manager

SB:gn

Schedule A - Allowances

Lot or Part	Con.	Landowner	Roll No.	Right-of-Way (Section 29)	Damages to Lands and Crops (Section 30)	Total Allowances
Main Drain (Open)						
Greenock Ward						
4	17	P. & N. Donnelly	3-176	$930	$400	$1,330
Total Allowance, Main Drain (Open)				**$930**	**$400**	**$1,330**
Main Drain (Closed)						
Greenock Ward						
3 & 4	16	Longman Hill Farms Ltd.	3-154	$2,880	$3,290	$6,170
5	16	B. & M. Barrett	3-156		$500	$500
4	17	P. & N. Donnelly	3-176	$200	$400	$600
Total Allowance, Main Drain (Closed)				**$3,080**	**$4,190**	**$7,270**
Total Allowances						
Van Nes Municipal Drain 2019				**$4,010**	**$4,590**	**$8,600**

Schedule B - Estimated Construction Costs

The estimated construction costs for the outlined proposed work below is as follows:

	Description	Estimated Quantity		$/Unit	Total
A) Main Drain (Open)					
1	Clearing, brushing and mulching	l.s.			$500.00
2	Excavation for plunge pool (approx. 60m^3)	l.s.			$300.00
3	Levelling of excavated material	l.s.			$200.00
4	Construct quarry stone rip-rap lined plunge pool at Sta. 0+232 including geotextile filter material (Mirafi 180N or approved equivalent) (approx. 30m^2)	l.s.			$3,500.00
Total Estimated Construction Costs Main Drain (Open)					**$4,500.00**
B) Main Drain (Closed)					
1	Stripping, stockpiling and leveling of topsoil, 10 metre width (Sta. 0+264 to Sta. 0+593)	329	m	$10.00	$3,290.00
2	Supply 750mm diameter HDPE pipe (320kPa)	12	m	$175.00	$2,100.00
	Installation by means of excavator on 19mm crushed clear stone bedding (Sta. 0+232 to Sta. 0+244)	12	m	$60.00	$720.00
3	Supply 525mm diameter HDPE pipe (320kPa) (perforated with filter sock)	6	m	$90.00	$540.00
	Installation by means of excavator on 19mm crushed clear stone bedding (Sta. 0+264 to Sta. 0+270)	6	m	$60.00	$360.00
4	Supply 525mm diameter concrete field tile	230	m	$40.00	$9,200.00
	Installation by means of wheel trencher or by hydraulic excavator on 19mm crushed clear stone bedding (Sta. 0+270 to Sta. 0+500)	230	m	$40.00	$9,200.00
5	Supply 350mm diameter concrete field tile	93	m	$25.00	$2,325.00
	Installation by means of wheel trencher or by hydraulic excavator on 19mm crushed clear stone bedding (Sta. 0+500 to Sta. 0+593)	93	m	$35.00	$3,255.00

	Description	Estimated Quantity	$/Unit		Total
6	Supply and install 525mm diameter HDPE pipe 45 degree elbow at Sta. 0+264	1 ea.	$210.00		$210.00
7	Supply and install 600mm X 600mm concrete ditch inlet catch basin at Sta. 0+593 (inline type) including earth berm & rip-rap spillway	1 ea.	$3,000.00		$3,000.00
8	Supply and install 900mm X 1200mm concrete junction box at Sta. 0+500	1 ea.	$3,000.00		$3,000.00
Sub-Total				**$**	**37,200.00**
9	Work to be done on the Municipality of Brockton Road Allowance, Concession Road 16 (Sta. 0+244 to Sta. 0+264)				
a)	Supply 750mm diameter CSA B182.8 Storm Sewer HDPE pipe (320kPa)	20 m	$175.00		$3,500.00
	Installation of 750mm diameter HDPE pipe with rodent grate including granular base and backfill (open cut method) (Sta. 0+244 to Sta. 0+264)	l.s.			$6,000.00
b)	Supply and install 900mm X 1200mm concrete ditch inlet catch basin at Sta. 0+264	1 ea.	$3,000.00		$3,000.00
Sub-Total				**$**	**12,500.00**
Total Estimated Construction Costs Main Drain (Closed)				**$**	**49,700.00**

C) Provisional Items

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 (text or email) 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, labour and equipment required for installation in accordance with the details on Drawing 2 of 2.

Description	Estimated Quantity	$/Unit	Total
a) 350mm diameter concrete tile			
300mm depth of stone bedding and backfill up to the haunches (bedding wrapped in geo-textile filter material)	25 m	$25.00	$625.00
b) 525mm diameter concrete tile			
300mm depth of stone bedding and backfill up to the haunches (bedding wrapped in geo-textile filter material)	25 m	$35.00	$875.00
2 Wheel machine lift outs due to stony conditions	2 ea.	$ 250.00	$ 500.00
Total Provisional Items			**$ 2,000.00**
TOTAL ESTIMATED CONSTRUCTION COSTS VAN NES MUNICIPAL DRAIN 2019			**$ 56,200.00**

Summary of Construction Costs

A)	Total Estimated Construction Costs - Main Drain (Open)	$4,500.00
B)	Total Estimated Construction Costs - Main Drain (Closed)	$49,700.00
C)	Provisional Items	$2,000.00
TOTAL ESTIMATED CONSTRUCTION COSTS VAN NES MUNICIPAL DRAIN 2019		**$56,200.00**

Schedule C - Assessment For Construction

TOTAL ASSESSMENT										
Lot or Part	Con.	Landowner	Roll No.	Approx. Hectares Affected	Benefit (Section 22)	Outlet Liability (Section 23)	Total Assessment	Less 1/3 Gov't Grant	Less Allowances	Net Assessment
Main Drain (Open)										
Greenock Ward										
3 & 4	16	Longman Hill Farms Ltd.	3-154	41.1		$4,954	$4,954	$1,651		$3,303
5	16	B. & M. Barrett	3-156	34.2		$3,081	$3,081	$1,027		$2,054
4	17	P. & N. Donnelly	3-176		$2,000		$2,000	$667	$1,330	$3
Total Assessment on Lands					$2,000	$8,035	$10,035	$3,345	$1,330	$5,360
Concession Rd. 16		Municipality of Brockton		0.9	$2,000	$259	$2,259			$2,259
Sideroad 5		Municipality of Brockton		0.4		$106	$106			$106
Total Assessment on Roads					$2,000	$365	$2,365			$2,365
Total Assessment on Lands and Roads Van Nes Municipal Drain 2019 Main Drain (Open)					**$4,000**	**$8,400**	**$12,400**	**$3,345**	**$1,330**	**$7,725**

NOTES: 1. All the above lands are eligible for ADIP grants.
2. The NET ASSESSMENT is the total estimated assessment less a one-third (1/3) Provincial grant, and allowances, if applicable
3. The NET ASSESSMENT is provided for information purposes only

Schedule C - Assessment For Construction

TOTAL ASSESSMENT											
Lot or Part	Con.	Landowner	Roll No.	Approx. Hectares Affected	Benefit (Section 22)	Outlet Liability (Section 23)	Special Assessment (Section 26)	Total Assessment	Less 1/3 Gov't Grant	Less Allowances	Net Assessment
Main Drain (Closed)											
Greenock Ward											
3 & 4	16	Longman Hill Farms Ltd.	3-154	41.1	$34,500	$11,317		$45,817	$15,272	$6,170	$24,375
5	16	B. & M. Barrett	3-156	34.2	$3,000	$17,197		$20,197	$6,732	$500	$12,965
4	17	P. & N. Donnelly	3-176							$600	-$600
Total Assessment on Lands					$37,500	$28,514		$66,014	$22,004	$7,270	$36,740
Concession Rd. 16		Municipality of Brockton		0.4	$1,000	$96	$16,300	$17,396			$17,396
Sideroad 5		Municipality of Brockton		0.4		$790		$790			$790
Total Assessment on Roads					$1,000	$886	$16,300	$18,186			$18,186
Total Assessment on Lands and Roads Van Nes Municipal Drain 2019 Main Drain (Closed)					**$38,500**	**$29,400**	**$16,300**	**$84,200**	**$22,004**	**$7,270**	**$54,926**

NOTES: 1. All the above lands are eligible for ADIP grants.
2. The NET ASSESSMENT is the total estimated assessment less a one-third (1/3) Provincial grant, and allowances, if applicable
3. The NET ASSESSMENT is provided for information purposes only

Schedule C - Total Assessment For Construction

TOTAL ASSESSMENT									
Lot or Part	Con.	Landowner	Roll No.	Main Drain (Open)	Main Drain (Closed)	Total Assessment	Less 1/3 Gov't Grant	Less Allowances	Net Assessment
Greenock Ward									
3 & 4	16	Longman Hill Farms Ltd.	3-154	$4,954	$45,817	$50,771	$16,924	$6,170	$27,677
5	16	B. & M. Barrett	3-156	$3,081	$20,197	$23,278	$7,759	$500	$15,019
4	17	P. & N. Donnelly	3-176	$2,000		$2,000	$667	$1,930	-$597
Total Assessment on Lands				$10,035	$66,014	$76,049	$25,350	$8,600	$42,099
Concession Rd. 16		Municipality of Brockton		$2,259	$17,396	$19,655			$19,655
Sideroad 5		Municipality of Brockton		$106	$790	$896			$896
Total Assessment on Roads				$2,365	$18,186	$20,551			$20,551
Total Assessment on Lands and Roads Van Nes Municipal Drain 2019				**$12,400**	**$84,200**	**$96,600**	**$25,350**	**$8,600**	**$62,650**

NOTES: 1. All the above lands are eligible for ADIP grants.
2. The NET ASSESSMENT is the total estimated assessment less a one-third (1/3) Provincial grant, and allowances, if applicable
3. The NET ASSESSMENT is provided for information purposes only

Schedule D - Assessment For Maintenance

Lot or Part	Con.	Landowner	Roll No.	Approx. Hectares Affected	Portion of Maintenance Cost
Main Drain (Open)					
Greenock Ward					
3 & 4	16	Longman Hill Farms Ltd.	3-154	41.1	64.7%
5	16	B. & M. Barrett	3-156	34.2	33.3%
4	17	P. & N. Donnelly	3-176	3.1	0.7%
Total Assessment on Lands					**98.7%**
Concession Rd. 16		Municipality of Brockton		0.9	0.9%
Sideroad 5		Municipality of Brockton		0.4	0.4%
Total Assessment on Roads					**1.3%**
Total Assessment on Lands and Roads Van Nes Municipal Drain 2019 - Main Drain (Open)					**100.0%**

NOTES: 1. All the above lands are eligible for ADIP grants.

Schedule D - Assessment For Maintenance

Lot or Part	Con.	Landowner	Roll No.	Approx. Hectares Affected	Portion of Maintenance Cost
Main Drain (Closed)					
Greenock Ward					
3 & 4	16	Longman Hill Farms Ltd.	3-154	41.1	62.3%
5	16	B. & M. Barrett	3-156	34.2	23.5%
Total Assessment on Lands					**85.8%**
Concession Rd. 16		Municipality of Brockton		0.4	7.8%
Sideroad 5		Municipality of Brockton		0.4	6.4%
Total Assessment on Roads					**14.2%**
Total Assessment on Lands and Roads					
Van Nes Municipal Drain 2019 - Main Drain (Closed)					**100.0%**

NOTES: 1. All the above lands are eligible for ADIP grants.

SPECIFICATIONS FOR THE CONSTRUCTION OF MUNICIPAL DRAINAGE WORKS

DIVISION A – General Conditions

DIVISION B – Specification for Open Drains

DIVISION C – Specification for Tile Drains

DIVISION H – Special Provisions

DIVISION A – GENERAL CONDITIONS

TABLE OF CONTENTS

A.1. Scope 1
A.2. Tenders 1
A.3. Examinations of Site, Drawings, and Specifications 1
A.4. Payment 2
A.5. Contractor's Liability Insurance 2
A.6. Losses Due to Acts of Nature, Etc. 2
A.7. Commencement and Completion of Work 2
A.8. Working Area and Access 3
A.9. Sub-Contractors 3
A.10. Permits, Notices, Laws and Rules 3
A.11. Railways, Highways, and Utilities 3
A.12. Errors and Unusual Conditions 3
A.13. Alterations and Additions 3
A.14. Supervision 4
A.15. Field Meetings 4
A.16. Periodic and Final Inspections 4
A.17. Acceptance By the Municipality 4
A.18. Warranty 4
A.19. Termination of Contract By The Municipality 4
A.20. Tests 5
A.21. Pollution 5
A.22. Species and Risk 5
A.23. Road Crossings 5
A.24. Laneways 6
A.25. Fences 7
A.26. Livestock 7
A.27. Standing Crops 7
A.28. Surplus Gravel 7
A.29. Iron Bars 7
A.30. Rip-Rap 7
A.31. Clearing, Grubbing and Brushing 7
A.32. Restoration of Lawns 8

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
- Dietrich Engineering Ltd.

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

DIVISION B – SPECIFICATIONS FOR OPEN DRAINS

TABLE OF CONTENTS

B.1. Alignment....1
B.2. Profile....1
B.3. Excavation....1
B.4. Excavated Material....1
B.5. Excavation at Existing Bridge and Culvert Sites....2
B.6. Pipe Culverts....2
B.7. Rip-Rap Protection For Culverts....2
B.8. Clearing, Grubbing and Mulching....2
B.9. Tributary Tile Outlets....3
B.10. Seeding....3
B.11. Hydro Seeding....3
B.12. Hand Seeding....3
B.13. Completion....3

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.

DIVISION C – SPECIFICATIONS FOR TILE DRAINS

TABLE OF CONTENTS

C.1. Pipe Materials 1
C.2. Alignment 1
C.3. Profile 1
C.4. Excavation 2
C.5. Installation 2
C.6. Trench Crossings 3
C.7. Outlet Protection 3
C.8. Catch Basins and Junction Boxes 3
C.9. Tributary Drains 4
C.10. Clearing, Grubbing and Mulching 5
C.11. Roads and Laneway Sub-Surface Crossings 5
C.12. Filling In Existing Ditches 5
C.13. Construction of Grassed Waterways 5
C.14. Unstable Soil 5
C.15. Rocks 5
C.16. Broken or Damaged Tile 6
C.17. Recommended Practice For Construction of Sub-Surface Drainage Systems 6

DIVISION C – SPECIFICATIONS FOR TILE DRAINS

C.1. Pipe Materials

C.1.1 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.

C.1.2 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

C.4.1 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.

C.4.2 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.

C.4.3 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

C.5.1 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.

C.5.2 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.

DIVISION H – SPECIAL PROVISIONS

TABLE OF CONTENTS

H.1 General 1
H.2 Utilities 1
H.3 Working Area and Access 2
H.4 Open Ditch Excavation 2
H.5 Clearing, brushing and Disposal of Woody Debris 2
H.6 Topsoil Stripping and Fine Grading 2
H.7 Pipe, Installation, Bedding & Backfill 2
H.8 Catch Basins 3
H.9 Existing Drains/Tile Connections 4
H.10 Road Works 4
H.11 Rip-Rap 4

DIVISION H – SPECIAL PROVISIONS

Van Nes Municipal Drain 2019

Municipality of Brockton

Reference No. 1846

Special provisions mean 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 any standard or supplemental Specifications.

H.1 General

The Contractor shall notify the Landowners, the Municipality's Drainage Superintendent Stephen Cobean (519-506-5959) and the Engineer forty-eight (48) hours prior to construction and arrange a pre-construction meeting.

The Contractor shall notify the Municipality's Roads Supervisor, John Strader (519-881-2223 ext. 125) forty-eight (48) hours prior to any commencement of work on Concession Road 16 (Sta. 0+244 to Sta. 0+264).

The Contractor shall verify the location of the new drainage system with the Engineer and the Landowners 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 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 Brockton for specified local procedures, guidelines and timelines. Traffic control shall meet the standards of Book 7 of the Ontario Traffic Manual.

All objects or obstructions within the construction working area such as signs, mailboxes, property ornamentals, etc., that interfere with the installation of the drain shall be removed and re-erected in the same location or another location satisfactory to the Landowner. Any damages to such objects by the Contractor shall be repaired, replaced, installed and paid for by the Contractor at the discretion of the Engineer.

The Contractor shall be responsible for all settlement.

H.2 Utilities

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

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.

H.3 Working Area and Access

Each Landowner on whose property the drainage work is to be constructed shall provide access to and from the working area.

The working area for open work shall be a width of ten (10) metres on the east side of the drain.

The working area for closed work shall be an average width of twenty-five (25) metres along the alignment of the proposed tile drain.

H.4 Open Ditch Excavation

The Contractor shall construct an energy dissipating plunge pool in accordance with the "Typical Plunge Pool Detail" on drawing 2 of 2. The excavated material from the construction of the plunge pool shall be spread and levelled within the working area adjacent to the open drain.

The contractor shall hand seed the levelled material and any disturbed areas with an approved grass seed mixture.

H.5 Clearing, brushing and Disposal of Woody Debris

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 only clear trees within the working area if it is required for the construction 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 or disposed of offsite by the Contractor.

H.6 Topsoil Stripping and Fine Grading

The Contractor shall strip the topsoil for a width of ten (10) metres along the alignment of on the tile drain.

The Contractor shall stockpile the topsoil and later spread it over the backfilled trench. The Contractor shall ensure that the top soiled trench is left in a condition that both satisfies the Engineer and the landowner can perform final restoration using nothing more that farm equipment.

H.7 Pipe, Installation, Bedding & Backfill

H.7.1 Concrete Field Tile

An approved wheel trencher shall be used to install the concrete field tile. If the Contractor elects to install the concrete field tile by means of hydraulic excavator the Contractor must install the tile in accordance with "Typical Drain Installation on Stone Bedding Detail" on drawing 2 of 2 and include all material, labour and equipment necessary in the unit price for installation of concrete field tile in the form of tender.

All concrete field tile shall be backfilled using 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. The Contractor shall be responsible for all trench settlement.

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

The Contractor shall supply and wrap all concrete tile joints with 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 900mm diameter.

The filter material shall completely cover the tile joint and shall have a minimum overlap of 400mm. The type of filter material shall be Mirafi 160N.

H.7.2 High Density Polyethylene Pipe (H.D.P.E.)

An approved hydraulic excavator shall be used for the installation of all H.D.P.E. pipe.

All 525mm diameter HDPE pipe shall be CSA B182.8 320 KPa with split coupler joining systems.

All 750mm diameter HDPE pipe shall be CSA B182.6 320 KPa with bell and spigot gasketed joining systems.

All H.D.P.E. pipe, shall be installed using 19mm (3/4") crushed stone bedding (or approved equivalent) from 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.

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.

H.7.3 Poor Soil Conditions

If poor soil conditions are encountered, the Contractor shall install the pipe in accordance with the "Typical Drain Installation on Wrapped Stone Bedding Detail" on drawing 2 of 2.

The Contractor shall be paid for the actual lengths of pipe installed in poor soil conditions.

H.8 Catch Basins

All catch basins shall be precast concrete catch basins (Coldstream Concrete Ltd. or approved equal).

All catch basins to have 300mm sumps.

The catch basin grate elevations shall be set to the satisfaction of the Engineer.

All catch basin grates shall be fastened to the new catch basins.

All catch basins shall be hot dipped galvanized bird cage grates.

Knockouts shall be provided in all catch basins.

All catch basin structures shall be installed on 150mm crushed stone bedding.

Structures within the road allowances shall have 300mm minimum M.T.O. 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 so as to minimize settlement around the structures.

The Contractor shall place quarry stone rip-rap material around all sides of catch basins for a minimum width of 1m and shall be placed on an approved geo-textile filter material.

All holes for catch basin pipe connections to be cored by the manufacturer.

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

The installation of the ditch inlet catch basin at Sta. 0+593 shall include the construction of an earth berm of approved compacted clay material. The berm shall be fine graded with topsoil to the specified elevation and hand seeded with an approved grass seed mixture. An overflow spillway shall be lined with quarry stone rip-rap and shall extend to one (1) metre width on each side of the structure in accordance with the, "DICB and Berm Installation Detail" included in the attached drawing set.

H.9 Existing Drains/Tile Connections

The Contractor shall make all tributary tile drain connections in accordance with the "Typical Tile Connection Detail" found on drawing 2 of 2.

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 same rate as defined on the Form of Tender and Agreement. 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.

H.10 Road Works

The Contractor shall notify the Municipality's Roads Supervisor, John Strader (519-881-2223 ext. 125) forty-eight (48) hours prior to any commencement of work on Concession Road 16 (Sta. 0+244 to Sta. 0+264).

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 Brockton for specified local procedures, guidelines and timelines. Traffic control shall meet the standards of Book 7 of the Ontario Traffic Manual.

MTO Granular 'B' shall be placed in lifts not exceeding 300mm and shall be compacted to 95% Standard Proctor using an approved mechanical vibrating compactor. The Contractor shall place Granular 'A' to a depth of 150mm and shall be compacted to 95% Standard Proctor.

The Contractor shall restore all disturbed areas within the road allowance, including topsoil, hand seed with an approved grass seed mixture and seed bed preparation.

H.11 Rip-Rap

All stone rip-rap material for the construction of the plunge pool shall be quarry stone 150mm to 300mm diameter and placed to a depth of 450mm. All rip-rap material shall be placed on geo-textile filter material (Mirafi 180N).

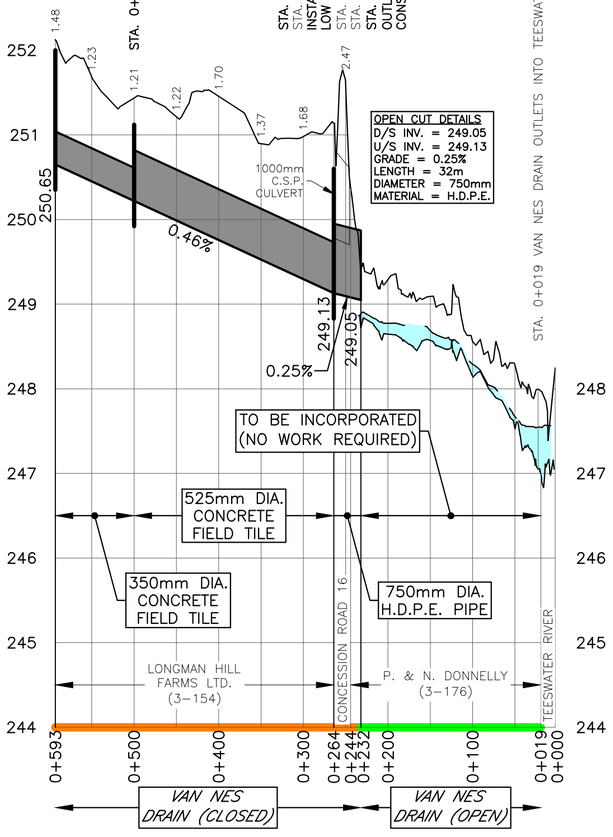
Rip-rap around the DICB at Sta. 0+593 shall be placed in accordance with the, "DICB and Berm Installation Detail" included in the attached drawing set.

STA. 0+593 PROPERTY LINE
INSTALL 600mm X 600mm D.I.C.B.
LOW WALL ELEV. = 252.00 RIP-RAP SPILLWAY
INCLUDING EARTH BERM &
SPILLWAY ELEV. = 252.45
TOP OF BERM ELEV. = 252.65

STA. 0+500 INSTALL 900mm X 1200mm J.B.

STA. 0+265 INSTALL 525mm DIA. H.D.P.E. 45° ELBOW
STA. 0+264 SOUTH ROAD LIMIT
INSTALL 900mm X 1200mm D.I.C.B.
LOW WALL ELEV. = 250.60
STA. 0+254 ℄ CONCESSION RD. 16
STA. 0+244 NORTH ROAD LIMIT
STA. 0+232 VAN NES DRAIN (CLOSED)
OUTLETS INTO VAN NES DRAIN (OPEN)
CONSTRUCT PLUNGE POOL

STA. 0+019 VAN NES DRAIN OUTLETS INTO TEESWATER RIVER



PROFILE

PROFILE SCALES

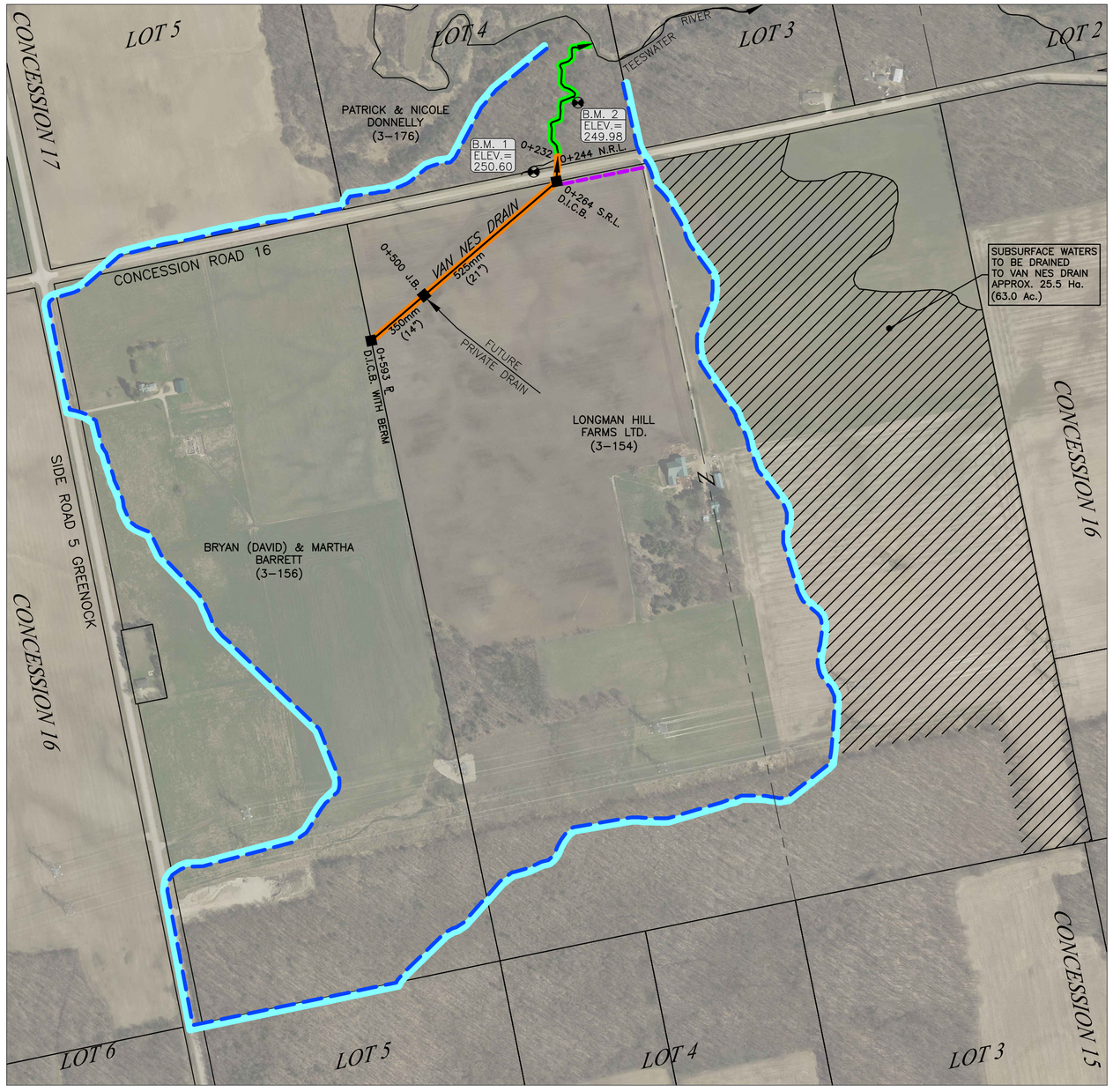
HORZ. 0 100 200 300 400m

VERT. 0 1 2 3 4m

TILE SIZES

No.	ITEM	SIZE (mm)	STATION	LENGTH (m)
1.	HIGH DENSITY POLYETHYLENE OUTLET PIPE	750	0+232 – 0+238	6
2.	HIGH DENSITY POLYETHYLENE PIPE	750	0+238 – 0+264	26
3.	HIGH DENSITY POLYETHYLENE PIPE	525	0+264 – 0+270	6
4.	CONCRETE FIELD TILE	525	0+270 – 0+500	230
3.	CONCRETE FIELD TILE	350	0+500 – 0+593	93

MUNICIPALITY OF BROCKTON
(FORMER TOWNSHIP OF GREENOCK)
COUNTY OF BRUCE



PLAN

PLAN SCALE

0 100 200 300 400m

NOTES:

1. ALL 750mm DIA. HIGH DENSITY POLYETHYLENE PIPE SHALL BE BELL & SPIGOT CSA B182.6 UNLESS OTHERWISE NOTED.
2. ALL 525mm DIA. HIGH DENSITY POLYETHYLENE PIPE SHALL BE SPLIT COUPLER CSA B182.8 UNLESS OTHERWISE NOTED.

BENCHMARK No. 1 ELEV.=250.60
NAIL IN SOUTH FACE OF HYDROPOLE 32 METRES WEST OF STA. 0+246

BENCHMARK No. 2 ELEV.=249.98
NAIL IN WEST FACE OF 350mm DIA. TREE 10 METRES SOUTHEAST OF STA. 0+128

LEGEND:

- DRAIN NAME — EXISTING MUNICIPAL DRAIN
- INTERIOR/EXTERIOR WATERSHED BOUNDARY
- PROPERTY BOUNDARY
- LOT OR CONCESSION BOUNDARY
- TOWNSHIP BOUNDARY
- EXISTING CATCH BASIN OR JUNCTION BOX
- DRAIN NAME — MUNICIPAL DRAIN (AREA OF WORK)
- WATERSHED BOUNDARY
- CONSTRUCTION ACCESS
- PROPOSED CATCH BASIN OR JUNCTION BOX
- BENCHMARK LOCATION — B.M. 1 ELEV.= 50.00 — BENCHMARK No. / BENCHMARK ELEVATION

No.	ISSUES AND REVISIONS	DATE	BY
3.	REPORT SUBMISSION	2019-06-27	DEL
2.	INFORMATION MEETING	2019-06-18	DEL
1.	ON-SITE MEETING	2018-12-07	DEL

LICENSED PROFESSIONAL ENGINEER
S.G.R. BRICKMAN
100150920
PROVINCE OF ONTARIO

Brockton
Come home to community

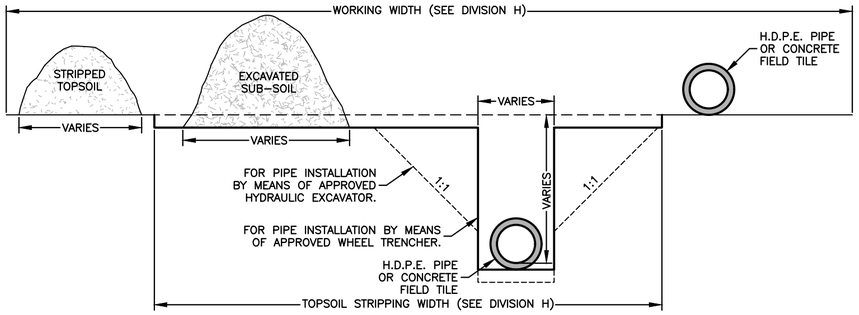
PROJECT:
VAN NES MUNICIPAL DRAIN 2019

DRAWING:
Plan & Profile

DIETRICH ENGINEERING LIMITED
CONSULTING ENGINEERS
10 Alpine Court, Kitchener, ON, N2E 2M7

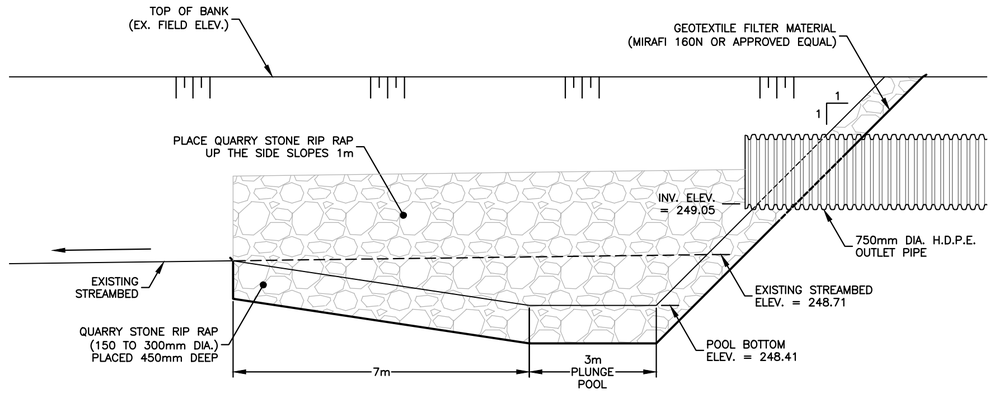
PROJ. MGR: GN	DESIGNED BY: GN	DRAWN BY: BM	CHECKED BY: GN
DRAWING SCALE: AS NOTED	DATE: 2019-05-23	PROJECT No. 1846	DRAWING No. 1 of 2

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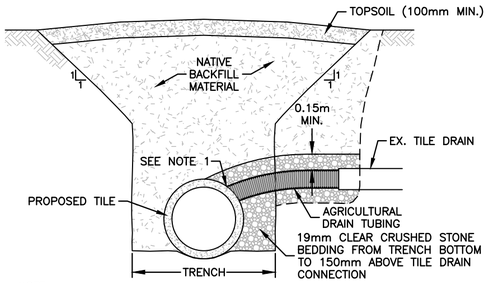
TYPICAL WORKING CORRIDOR DETAIL

N.T.S.



TYPICAL PLUNGE POOL DETAIL

N.T.S.

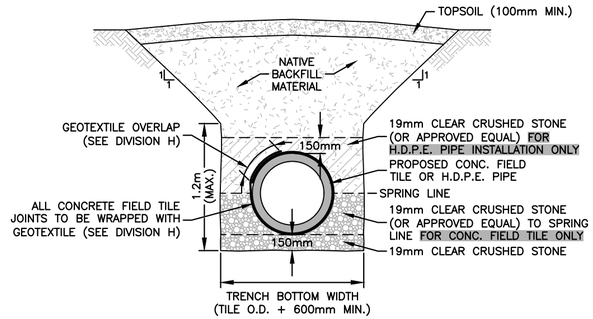


NOTE:

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

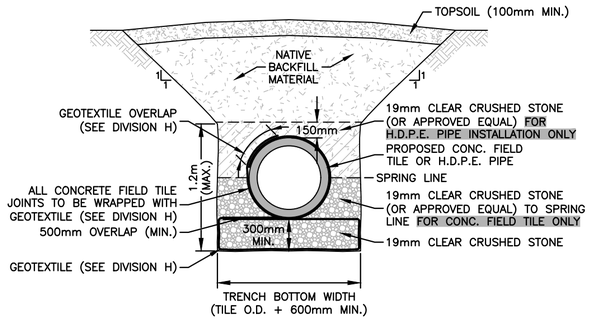
TYPICAL TILE CONNECTION DETAIL

N.T.S.



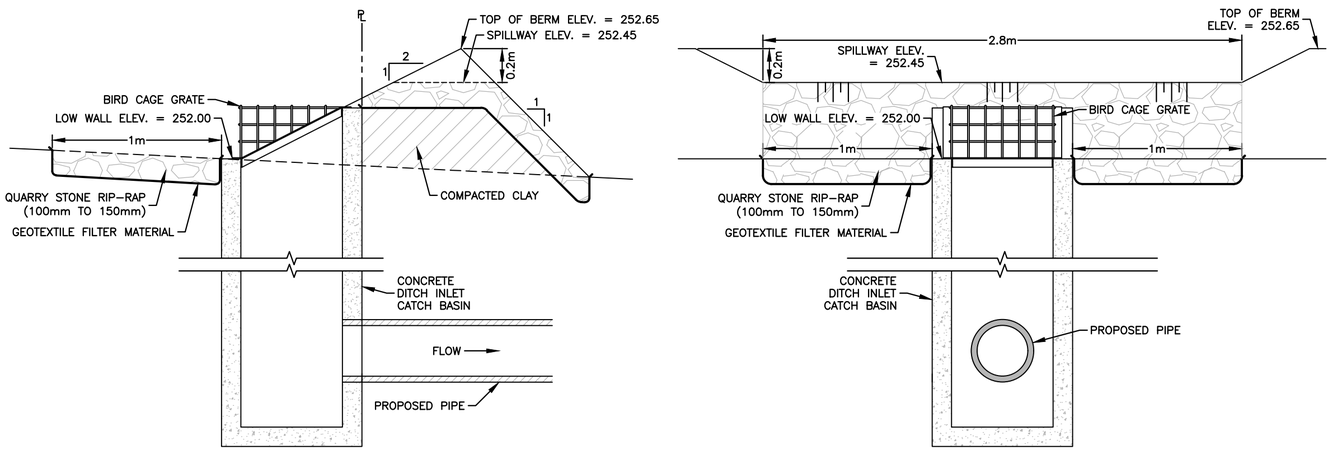
TYPICAL DRAIN INSTALLATION ON STONE BEDDING DETAIL

N.T.S.



TYPICAL DRAIN INSTALLATION ON WRAPPED STONE BEDDING DETAIL (PROVISIONAL ITEM)

N.T.S.



D.I.C.B. AND BERM (STA. 0+593) INSTALLATION DETAIL

N.T.S.

NOTES:

1. ALL 750mm DIA. HIGH DENSITY POLYETHYLENE PIPE SHALL BE BELL & SPIGOT CSA B182.6 UNLESS OTHERWISE NOTED.
2. ALL 525mm DIA. HIGH DENSITY POLYETHYLENE PIPE SHALL BE SPLIT COUPLER CSA B182.8 UNLESS OTHERWISE NOTED.

LEGEND:

No.	ISSUES AND REVISIONS	DATE	BY
3.	REPORT SUBMISSION	2019-06-27	DEL
2.	INFORMATION MEETING	2019-06-18	DEL
1.	ON-SITE MEETING	2018-12-07	DEL

LICENSED PROFESSIONAL ENGINEER — June 27, 2019 — S.G.R. BRICKMAN 100150920 — PROVINCE OF ONTARIO

Brockton — Come home to community

PROJECT: VAN NES MUNICIPAL DRAIN 2019

DRAWING: Details

DIETRICH ENGINEERING LIMITED
CONSULTING ENGINEERS
10 Alpine Court, Kitchener, ON, N2E 2M7

PROJ. MGR:	DESIGNED BY:	DRAWN BY:	CHECKED BY:
GN	GN	BM	GN

DRAWING SCALE:	DATE:	PROJECT No.	DRAWING No.
AS NOTED	2019-05-23	1846	2 of 2

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