Municipal Drain No. 24 - 2018
Town of Minto
County of Wellington

DIETRICH ENGINEERING LIMITED
CONSULTING ENGINEERS

Reference No. 1272 *June 22, 2018*

Municipal Drain No. 24 - 2018
Town of Minto
County of Wellington

Contents

DIETRICH ENGINEERING LIMITED
CONSULTING ENGINEERS

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

Kitchener, Ontario

June 22, 2018

Municipal Drain No. 24 - 2018
Town of Minto
County of Wellington

To the Mayor and Council
of the Town of Minto

Members of Council:

1.0 Introduction

We are pleased to present our report on the "Municipal Drain No. 24 - 2018", serving parts of:

Lots 104 to 110, Concession C
Lots 103 to 108, Concession D

in the Town of Minto, County of Wellington.

Authority to prepare this report was obtained by a resolution of the Town of Minto Council at its April 4, 2012 meeting to appoint Dietrich Engineering Limited to prepare an Engineer's Report.

In accordance with your instructions pursuant to a request received by Council under Section 78 of the Drainage Act, R.S.O. 1990, signed by Helmut Seebach, we have made an examination and survey of the affected area and submit herewith our Report which includes Plan, Profiles, Details and Specifications for this work.

The attached Plan, Profile, Details and Drawing No.'s 1 to 3, Reference No. 1272, 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 The Drainage Act

The "Drainage Act" provides a mechanism for the construction, improvement and maintenance of a drainage works. Procedures under the Drainage Act are designed to enable non-riparian landowners to obtain a legal drainage outlet while safeguarding the rights and property of riparian landowners through which the drainage system may be constructed. The Drainage Act definition of "drainage works" includes a drain constructed by any means, including the improvement of a natural watercourse, and includes works necessary to regulate the water table or water level within or on any lands or to regulate the waters of a drain, reservoir, lake or pond, and includes a dam, embankment, wall, protective works or any combination thereof.

Drains constructed under the Drainage Act, which are referred to as Municipal Drains, are user pay systems. This means the landowners within the watershed, including lands and roads, for the proposed drain will contribute a portion of costs towards the design, construction and maintenance of the municipal drain. The most common means of assessing project costs are through benefit and/or outlet liability assessments (Sections 22 & 23 of the Drainage Act R.S.O. 1990)

Aside from assessing costs, allowances are awarded to owners whose property is physically affected by the construction and maintenance of the drain. The most common sections under the Drainage Act to award allowances are; Section 29 for right-of-way, which awards costs based on the area of land required to construct, improve and maintain the drain in the future; and Section 30 for damages, which are awarded based on damages to the property during construction or improvements to the drain. For more specific details on allowances provided in this report see Section 13.

3.0 History

Municipal Drain No. 24 was originally constructed as the Charles H. Mutter Award Drain (Main Drain and Douglas Branch) under the Ditches and Watercourses Act, under the authority of a report prepared by C. D. Bowman, O.L.S., dated October 20, 1905.

The Main Drain was constructed from an outlet into Municipal Drain No. 5 in Lot 14, Concession 3, upstream approximately 13,666 feet (4,165 metres) to the head of the Main Drain at the property line between Lot 108 and Lot 109, Concession C.

The Douglas Branch, which would eventually become the upper end of Municipal Drain No. 24, commenced at an outlet into the Main Drain on the north side of Wellington Road 109 adjacent to Lot 105, Concession C, and proceeded upstream along the road to the eventual head of the drain at the property line between Lot 109 and Lot 110, Concession C. The total length of the Douglas Branch was approximately 6,604 feet (2,013 metres).

Under the authority of a report prepared by C. D. Bowman, O.L.S., dated March 3, 1928, the section of Mutter Award Drain (Main Drain) from the outlet into Municipal Drain No. 5 to the upstream side of Wellington Road 109, as well as the Douglas Branch, were incorporated under the Drainage Act as Municipal Drain No. 24.

Furthermore, this report provided for the deepening of approximately 1,231 feet (375 metres) of open ditch along the north side of Wellington Road 109 and 4,449 feet (1,356 metres) of open ditch downstream of Wellington Road 109, and the installation of approximately 3,346 feet (1,020 metres) of 6 inch to 12 inch (150 mm to 300 mm) diameter tile from Lot 108, Concession C, to the upstream side of 2nd Line.

Improvements to Municipal Drain No. 24 were made under the authority of a report prepared by James A. Howes, O.L.S., dated August 12, 1955. The report provided for the excavation of approximately 7,470 feet (2,277 metres) of existing open ditch and the enclosure of approximately 5,107 feet (1,557 metres) of existing open ditch from the property line between Lot 104 and Lot 105, Concession D, upstream to a point on Lot 108 approximately 100 metres northeast of the property Line between Lot 108 and Lot 109, Concession C.

The enclosure consisted of the installation of approximately 5,107 feet (1,557 metres) of 12 inch to 18 inch (300 mm to 450 mm) diameter tile.

A report prepared by J. R. Spriet, P.Eng., of Spriet Associates, dated June 9, 1982, provided for the enclosure of approximately 884 metres of existing open ditch and the installation of 21 inch and 24 inch (525 mm and 600 mm) diameter tile from part of Lot 103 to the south side of Wellington Road

109, and the excavation of approximately 666 metres of existing open ditch. Although the drain report prepared in 1955 provided for an enclosure of the existing open ditch from the south side of Wellington Road 109 to the property line between Lot 104 and Lot 105, Concession D, the report from 1982 also provided for the enclosure of the same section of drain, so it is assumed the enclosure of that section did not actually occurr as part of the 1955 drain report.

Branch "A" of Municipal Drain No. 24 was constructed under the authority of a report prepared by J. R. Spriet, P.Eng., of Spriet Associates, dated September 27, 1990, and provided for the installation of approximately 408 metres of 250 mm to 325 mm diameter tile and steel casing. Branch "A" commenced at an outlet into the Main Drain in the north-west corner of Lot 105, Concession D, and proceeded upstream through 3rd Line to the head of the drain on the south road limit for Wellington Road 109.

4.0 On-Site Meeting

In accordance with Section 9(1) of the Drainage Act, R.S.O. 1990, an on-site meeting was held on September 19, 2012. The place of meeting was on the 2nd Line road allowance where the drain crosses the road. Persons in attendance were:

Greg Nancekivell, C.E.T.	Dietrich Engineering Limited
Ed Delay	Dietrich Engineering Limited
Mike McIsaac	Road Foreman, Town of Minto
Keith Greenwood	Landowner *(Pt. Lot 105, Con. D)*
Helmut Seebach	Landowner *(Lot 108, Pt. 109 & Pt. 110, Con. C)*
Lloyd Greenwood	Former Landowner *(Lot 106 & 107, Con. D)*
Everett Grotenhuis	Landowner *(Lot 102, Con. D)*
Brad South	Landowner *(Lot 103 & 104, Con. C)*
Paul Martin	Landowner *(Lot 106 & 107, Con. C)*

Comments, concerns and issues that were discussed at the On-Site Meeting include:

- Mutter Award Drain is in poor condition
- Blowouts on the existing drain for several years
- Minimal cover on existing tile drain, about 7 or 8 inches
- Can't drive heavy equipment over existing tile drain
- Some lands may be drained out of the watershed and into Municipal Drain No. 3

5.0 Information Meeting No. 1

An information meeting was held on June 10, 2014, at the Town of Minto Municipal Office. The meeting provided a review of the design of the proposed drainage system, the estimated costs of the project and proposed assessment.

Persons in attendance were:

Greg Nancekivell, C.E.T.	Dietrich Engineering Limited
Ed Delay	Dietrich Engineering Limited
Mike McIsaac	Drainage Superintendent, Town of Minto
Alan Simpson	Landowner *(Lot 105, Con. C)*
Keith Greenwood	Landowner *(Pt. Lot 105, Con. D)*
Helmut Seebach	Landowner *(Lot 108, Pt. 109 & Pt. 110, Con. C)*
Paul Martin	Landowner *(Lot 106 & 107, Con. C)*
Representative	P. Ruest *(Lot 103, Con. D)*

Comments, concerns and issues that were discussed at the Information Meeting include:

- Attendees were presented with the proposed design, which consisted of the excavation of approximately 310 metres of existing open ditch, the installation of approximately 3,371 metres of 200 mm to 900 mm diameter concrete field tile, high density polyethylene pipe and smooth wall steel casing, and the installation of thirteen (13) concrete catch basins and three (3) reinforced concrete manholes.
- The tile drainage system installed under the 1982 report will be paralleled with the new tile drain from Wellington Road 109 downstream to the outlet into the open portion of Municipal Drain No. 24.
- Destroy the existing tile drain from the upstream side of Wellington Road 109 to the upper end of the drain at the east road limit of 2nd Line.
- Make sure the new tile drain is deep enough.
- Might be a good idea to have an item in the drainage report to install some of the new tile with an excavator on crushed stone bedding just in case some pockets with poor soil conditions are encountered during construction.
- The owner of Lots 108, part of 109 and part of 110, Concession C, has tile maps showing part of his lands are tiled out of the watershed and into Municipal Drain No. 3.

6.0 Information Meeting No. 2

A second information meeting was held on March 9, 2018 at the Town of Minto Municipal Office. The meeting provided a review of the design of the proposed drainage system, the estimated costs of the project and proposed assessment.

Persons in attendance were:

Greg Nancekivell, C.E.T.	Dietrich Engineering Limited
Michel Terzian	Dietrich Engineering Limited
Mike McIsaac	Road Foreman, Town of Minto
Walter Martin	Landowner *(Lot 111 & 112, Con. C)*
Douglas Martin	Landowner *(Pt. Lot 110, Con. C)*
Keith Greenwood	Landowner *(Pt. Lot 105, Pt. Lot 106 & Pt. Lot 107, Con. D)*
Helmut Seebach	Landowner *(Lot 108, Pt. 109 & Pt. 110, Con. C)*
Paul Martin	Landowner *(Lot 106 & 107, Con. C)*
John Black	Landowner *(Pt. Lot 104, Con. C)*
Philipp Ruest	Landowner *(Lot 103, Con. D)*

Comments, concerns and issues that were discussed at the 2nd Information Meeting include:

- Attendees were presented with the proposed design, which consisted of the excavation of approximately 310 metres of existing open ditch, the installation of approximately 3,371 metres of 200 mm to 900 mm diameter concrete field tile, high density polyethylene pipe and smooth wall steel casing, and the installation of fifteen (15) concrete catch basins and one (1) reinforced concrete manhole.
- The owners of Lot 111 and Lot 112, Concession C, would like to redirect the surface water from their lands, which naturally drains to the west and into the existing Municipal Drain No. 24, northerly out of the watershed and into the open ditch of Municipal Drain No. 3. The landowner stated they had the equipment to do the work and would install a catch basin

where the surface water naturally wants to drain to, which is to the east side of 2nd Line, to collect the surface water and tile it out of the watershed and into Drain 3.

- Currently Lot 111 and Lot 112, Concession C, has the subsurface water tiled to Municipal Drain No. 3 but the surface water from those properties drain westerly towards 2nd Line and into Municipal Drain No. 24.
- The owner of Lot 108, part of 109 and part of 110, Concession C, stated that the existing drain is too shallow and frequently requires repairs.
- South part of Lot 104, Concession C, the area within the watershed for Municipal Drain No. 24 that is west of the laneway, is systematically tiled out of the Municipal Drain 24 watershed.

7.0 Findings

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

1. The existing closed portion of Municipal Drain No. 24 from Lot 105 to Lot 110, Concession C, is in a poor state of repair and is neither of sufficient capacity nor depth to drain the surrounding and upstream lands within the watershed at today's standards of drainage.
2. The existing closed portion of Municipal Drain No. 24 from Lot 103 to Lot 105, Concession D, installed under the authority of a report prepared by J R. Spriet, P.Eng., of Spriet Associates, dated June 9, 1982, consisting of 525 mm and 600 mm diameter tile, is in satisfactory working condition.
3. The subsurface water from approximately 4.7 hectares (11.6 acres) of the south part of Lot 104, Concession C, is tiled out of the watershed for Municipal Drain No. 24.
4. The subsurface water from approximately 31.9 hectares (78.8 acres) of part of Lots 108, 109 and 110, Concession C, is tiled north-easterly out of the watershed for Municipal Drain No. 24 and into the open ditch of Municipal Drain No. 3.
5. The subsurface water from Lot 111, Concession C, and Lot 112, Concession C, is tiled north-easterly out of the watershed for Municipal Drain No. 24 and into the open ditch of Municipal Drain No. 3.
6. The owner of Lot 111 and 112, Concession C, intendeds to redirect the surface water from within the watershed for Municipal Drain No. 24, to Municipal Drain No. 3.
7. The outlet for Municipal Drain No. 24 is into Municipal Drain No. 5 in Lot 14, Concession 3.
8. According to the Ministry of Agriculture, Food and Rural Affairs online Agricultural Information Atlas, the open portion of Municipal Drain No. 24 is classified as "Not Rated" by the Department of Fisheries and Oceans Canada.

8.0 Recommendations

It is our recommendation that:

1. A new tile drainage system be constructed from its outlet into the open portion of Municipal Drain No. 24 on the P. Ruest property (Roll No. 4-019), Lot 103, Concession D, upstream approximately 3,340 metres to the West Road Limit of 2nd Line, in the Town of Minto, County of Wellington.
2. Approximately 310 metres of the open portion of Municipal Drain No. 24 on the P. Ruest property (Roll No. 4-019), Lot 103, Concession D, be excavated to provide a sufficient outlet for the new tile drainage system.

3. The existing tile drainage system (Main Drain) constructed under the authority of reports prepared by C. D. Bowman, O.L.S., dated March 3, 1928, and James A. Howes, O.L.S., dated August 12, 1955, shall be abandoned and destroyed, including the existing tile drainage system through 2nd Line, which shall be dug up, destroyed and have the existing catch basins removed and disposed of off-site.

4. The existing tile drainage system installed under the authority of a report prepared by J. R. Spriet, P.Eng., of Spriet Associates, dated June 9, 1982, consisting of approximately 884 metres of 525 mm and 600 mm diameter tile, shall remain a municipal drainage system as part of Municipal Drain No. 24 – 2018.

5. The new tile drainage system from the outlet into the open portion of Municipal Drain No. 24 in Lot 103, Concession D, to the downstream side of Wellington Road 109 be installed parallel to the existing tile drainage system installed under the authority of a report prepared by J. R. Spriet, P.Eng., of Spriet Associates, dated June 9, 1982, as per the attached set of plans.

6. As a result of the request made by the landowners of Lot 111 and Lot 112, Concession C, at Information Meeting No. 2 on March 9, 2018, lands east of 2nd Line road shall not be permitted to connect into the new tile drainage system under this report.

7. The drainage coefficient design standard used for this drain is 38.1 mm (1.5”) of rainfall per 24 hours.

8. The lower portion of this tile system south of Wellington Road 109 is designed to work in conjunction with the tile system that was installed under the 1982 report prepared by J. R. Spriet, P. Eng. dated June 9, 1982 to achieve the design standard of 38.1 mm (1.5”) of rainfall per 24 hours.

9. The new drainage system shall be known as **“Municipal Drain No. 24 - 2018”.**

9.0 Summary of Proposed Works

The proposed work consists of the installation of approximately 3,261 metres of 200 mm to 750 mm diameter concrete field tile and high density polyethylene pipes; the excavation of approximately 310 metres of existing open ditch; the construction of a plunge pool at the outlet of the new tile drainage system; the installation of fourteen (14) concrete catch basins and one (1) reinforced concrete manhole; and the installation of 39 metres of 750 mm O.D. and 40 metres of 900 mm O.D. smooth wall steel casing by the boring method.

10.0 Working Area

The working area for construction purposes along the Main Drain (Closed) shall be a width of twenty-five (25) metres. The working area for construction purposes along the Main Drain (Open) shall be a width of ten (10) metres on the working side of the ditch.

The working area for maintenance purposes shall be a width of ten (10) metres.

Each landowner shall designate access to and from the working area

11.0 Watershed Characteristics

The Drainage Area comprises approximately 157.4 hectares (389 acres). Land use within the watershed is primarily agricultural.

The watersheds were established using historic drainage reports, field investigations, Global Positioning System (G.P.S.) surveys and Southwestern Ontario Orthophotography Project (SWOOP) data.

12.0 Soil Characteristics

The Ontario Ministry of Agriculture, Food and Rural Affairs Agricultural Information Atlas, available online, describes the soil types within the watershed mostly as Listowel Silt Loam with areas of Parkhill Loam, Huron Loam and Perth Loam.

13.0 Allowances

In accordance with Sections 29 and 30 of the Drainage Act, R.S.O. 1990, we determine the allowances payable to Owners entitled thereto as follows.

Lot or Part	Con.	Owner	Roll No.	Right-of-Way (Section 29)	Damages to Lands & Crops (Section 30)	Total Allowances
103	D	P. Ruest	4-019	$4,560	$5,290	$9,850
104 & Pt. 105	D	Martin Holsteins 1996 Ltd.	4-020	$4,650	$4,130	$8,780
Pt. 105	D	K. & M. Greenwood	4-021	$740	$660	$1,400
105	C	D. & E. Simpson	4-107	$3,600	$3,200	$6,800
106 & 107	C	P. & E. Martin	4-108	$8,990	$8,490	$17,480
108	C	H. & H. Seebach	4-109	$4,590	$4,080	$8,670
Pt. 109	C	T. Popp & E. Pacheco	4-109-05	$640	$570	$1,210
Pt. 109 & Pt. 110	C	H., H. & T. Seebach	4-110	$7,610	$6,770	$14,380
Pt. 110	C	D. & C. Martin	4-111	$1,310	$1,910	$3,220
TOTAL ALLOWANCES, MUNICIPAL DRAIN No. 24 - 2018				**$36,690**	**$35,100**	**$71,790**

Total Allowances under Sections 29 and 30 of the Drainage Act, R.S.O. 1990, Municipal Drain No. 24 - 2018 **$71,790**

Calculation of Allowances

Section 29 (Right-of-Way)

The agricultural land value used for calculating allowances for Right-of-Way was $45,000/ha ($18,212/acre).

Section 29 Right-of-Way has been calculated based on 25% of the estimated land value, $11,250/ha. ($4,553/acre) for a 10 metre Right-of-Way.

Section 30 (Damages)

Damages have been calculated based on $4,000/ha. ($1,619/acre).

An allowance for damages for fences in good working condition that interfere with the construction of the new tile drainage system has been provided at the rate of $250 per fence.

14.0 Estimated Construction Costs

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

Labour, Equipment and Materials

	Description	Quantity	$/Unit	Total
1)	Open Ditch Excavation (Sta. 0+000 to Sta. 0+310)	70 m3	$ 5.00	$ 350.00
2)	Levelling of Excavated Material (Sta. 0+000 to Sta. 0+310)	70 m3	$ 3.00	$ 210.00
3)	Construction of plunge pool at the outlet (Sta. 0+000 to Sta. 0+010)	l.s.		$ 2,000.00
4)	Stripping and stock piling of topsoil, including levelling	l.s.		$ 17,000.00
5)	Supply 750mm diameter, H.D.P.E. solid outlet pipe complete with rodent grate (320 kPa, CSA B182.8, bell and spigot joining system)	6 m	$ 170.00	$ 1,020.00
	Installation of 750mm diameter H.D.P.E. outlet pipe (Sta. 0+000 to Sta. 0+006)	l.s.		$ 1,000.00
6)	Quarry stone rip-rap protection and geotextile filter material at the outlet Sta. 0+000 (Mirafi 180N or equivalent, approximately 40m^2)	l.s.		$ 1,500.00
7)	Supply 600mm diameter concrete field tile (2400D)	800 m	$ 37.00	$ 29,600.00
	Installation of 600mm diameter concrete field tile by means of a wheel trencher (Sta. 0+006 to Sta. 0+399, Sta. 0+411 to Sta. 0+818)	800 m	$ 27.00	$ 21,600.00
8)	Supply 600mm diameter H.D.P.E. solid pipe (320 kPa, CSA B182.6, bell and spigot joining system)	78 m	$ 120.00	$ 9,360.00
	Installation of 600mm H.D.P.E. diameter pipe by means of excavator on crushed stone bedding (Sta. 0+399 to Sta. 0+411, Sta. 0+818 to Sta. 0+884)	78 m	$ 50.00	$ 3,900.00
9)	Supply 675mm diameter concrete field tile (2400D)	320 m	$ 50.00	$ 16,000.00
	Installation of 675mm diameter concrete field tile by means of a wheel trencher (Sta. 0+924 to Sta. 1+244)	320 m	$ 30.00	$ 9,600.00

10)	Supply 525mm diameter concrete field tile (2000D)	601	m	$ 30.00	$ 18,030.00
	Installation of 525mm diameter concrete field tile by means of a wheel trencher (Sta. 1+283 to Sta. 1+884)	601	m	$ 25.00	$ 15,025.00
11)	Supply 450mm diameter concrete field tile (2000D)	785	m	$ 24.00	$ 18,840.00
	Installation of 450mm diameter concrete field tile by means of a wheel trencher (Sta. 1+884 to Sta. 2+669)	785	m	$ 24.00	$ 18,840.00
12)	Supply 300mm diameter concrete field tile (2000D)	555	m	$ 16.00	$ 8,880.00
	Installation of 300mm diameter concrete field tile by means of a wheel trencher (Sta. 2+669 to Sta. 3+224)	555	m	$ 20.00	$ 11,100.00
13)	Supply 200mm diameter concrete field tile (2000D)	116	m	$ 11.00	$ 1,276.00
	Installation of 200mm diameter concrete field tile by means of a wheel trencher (Sta. 3+224 to Sta. 3+340)	116	m	$ 20.00	$ 2,320.00
14)	Supply & Install 900 mm x 1200 mm inline concrete catch basins (Sta. 0+405, 0+818, 1+884, 2+082, 2+303, 2+490 & 2+669)	7	ea.	$ 3,000.00	$ 21,000.00
15)	Supply & Install 900 mm x 1200 mm inline concrete ditch inlet catch basin (Sta. 0+600)	1	ea.	$ 3,000.00	$ 3,000.00
16)	Supply & Install 600 mm x 600 mm inline concrete catch basin (Sta. 3+224)	1	ea.	$ 2,000.00	$ 2,000.00
17)	Supply & Install 900 mm x 1200 mm concrete ditch inlet catch basin offset 43 metres south-west of Sta. 0+405	1	ea.	$ 3,000.00	$ 3,000.00
18)	Supply 200mm diameter H.D.P.E. solid pipe (320 kPa, CSA B182.8, bell and spigot joining system)	43	m	$ 15.00	$ 645.00
	Installation of 200mm diameter H.D.P.E. pipe by means of excavator on crushed stone bedding (Offset D.I.C.B. lead at Sta. 0+405)	43	m	$ 45.00	$ 1,935.00
19)	Supply & Install 600mm 45 degree elbows (Sta. 0+405, 0+600, 0+818 & 0+884)	4		$ 500.00	$ 2,000.00
20)	Tile Connections		l.s.		$ 3,049.00
	Sub-Total				**$ 244,080.00**

21)	Work to be done on the Wellington Road 109 Road Allowance (Sta. 0+884 to Sta. 0+924)			
a)	Supply 900 mm O.D. smooth wall steel casing 9.5mm (0.37") wall thickness	40 m	$ 400.00	$ 16,000.00
	Installation of 900mm O.D. smooth wall steel casing by jack & bore method	40 m	$ 825.00	$ 33,000.00
b)	Supply and Install 1500 mm dia. reinforced concrete manhole (Sta. 0+924) including the removal and offsite disposal of the existing catch basin and manhole at Sta. 0+916	1 ea.	$ 4,500.00	$ 4,500.00
c)	Supply & Install 900 mm x 2400 mm inline concrete ditch inlet catch basin (Sta. 0+884) including the removal and offsite disposal of the existing catch basin at Sta. 0+887	1 ea.	$ 4,500.00	$ 4,500.00
	Sub-Total			**$ 58,000.00**
22)	Work to be done on the 4th Line Road Allowance (Sta. 1+244 to Sta. 1+283)			
a)	Supply 750 mm O.D. smooth wall steel casing 9.5mm (0.37") wall thickness	39 m	$ 280.00	$ 10,920.00
	Installation of 750mm O.D. smooth wall steel casing by jack & bore method	39 m	$ 600.00	$ 23,400.00
b)	Supply & Install 900 mm x 1200 mm inline concrete ditch inlet catch basins (Sta. 1+244 & Sta. 1+283)	2 ea.	$ 3,000.00	$ 6,000.00
	Sub-Total			**$ 40,320.00**
23)	Work to be done on the 2nd Line Road Allowance (Sta. 3+340 to Sta. 3+360)			
a)	Removal and disposal of existing 150 mm diameter tile drainage system, existing catch basins and backfill and including the supply, placement and compaction of new Granular "B" backfill and 200 mm of Granular "A" surface layer	l.s.		$ 2,000.00
b)	Supply & Install 600 mm x 600 mm inline concrete catch basin (Sta. 3+340)	1 ea.	$ 2,000.00	$ 2,000.00
	Sub-Total			**$ 4,000.00**
TOTAL ESTIMATED CONSTRUCTION COSTS MUNICIPAL DRAIN NO. 24 - 2018				**$ 346,400.00**

Total Estimated Materials	$ 129,006.00
Total Estimated Labour and Equipment	$ 217,394.00
TOTAL ESTIMATED CONSTRUCTION COSTS MUNICIPAL DRAIN NO. 24 - 2018	**$ 346,400.00**

15.0 SUMMARY OF ESTIMATED COSTS

Allowances under Sections 29 and 30 of the Drainage Act, R.S.O. 1990	$ 71,790.00
Total Estimated Construction Costs	$ 346,400.00
Meetings, survey, design, preparation of preliminary cost estimates and reports, preparation of final drainage report, consideration of report and court of revision	$ 58,500.00
Preparation of contract documents, contract administration, supervision and inspection of construction	$ 28,000.00
Contingencies, Interest, Soils Investigation and net H.S.T.	$ 12,510.00
TOTAL ESTIMATED COSTS MUNICIPAL DRAIN NO. 24 - 2018	**$ 517,200.00**

The estimated cost of the work in the Town of Minto is $ 517,200.00.

16.0 Assessment

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

Whether or not the County of Wellington elects to do the work on their property, Wellington Road 109, Sta. 0+884 to Sta. 0+924, they shall be assessed the actual increased costs to the drainage works due to the construction and operation of the road 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.

Whether or not the Town of Minto elects to do the work on their property, 4th Line, Sta. 1+244 to Sta. 1+283, they shall be assessed the actual increased costs to the drainage works due to the construction and operation of the road 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.

Whether or not the Town of Minto elects to do the work on their property, 2nd Line, Sta. 3+340 to Sta. 3+360, they shall be assessed the actual increased costs to the drainage works due to the construction and operation of the road 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.

17.0 Maintenance

After completion, this tile drain and the tile drain south of Wellington Road 109 installed under the 1982 Report shall be maintained by the Town of Minto at the expense of all the lands and roads assessed in the attached Schedule of Assessment for Maintenance and in the same relative proportions until such time as the assessment is changed under the Drainage Act, with the exception of items included under Section **14.0 Estimated Construction Costs** for road works Item **21)**, **22)** and **23)** which shall be maintained by the Town of Minto at the expense of the road authority having jurisdiction over the road.

Future maintenance of the open ditch portion of Municipal Drain 24 has not been included in this report and it is recommended that the Drainage Superintendent request a Section 76 (1) prior to any maintenance being carried out.

Respectfully submitted,

DIETRICH ENGINEERING LIMITED

W. J. Dietrich, P.Eng.

WJD:mt

SCHEDULE OF ASSESSMENT
Municipal Drain No. 24 - 2018
Town of Minto

	LOT OR PART	CON.	APPROX. HECTARES AFFECTED	OWNER	ROLL NO.	(SECTION 22) BENEFIT	(SECTION 23) OUTLET LIABILITY	(SECTION 26) SPECIAL ASSESSMENT	TOTAL ASSESSMENT	LESS 1/3 GOV'T GRANT	LESS ALLOWANCES	NET ASSESSMENT
	S. Pt. 104	C	7.9	J. Black	4-106	$1,000	$1,875		$2,875	$958		$1,917
	105	C	8.0	D. & E. Simpson	4-107	$23,600	$3,509		$27,109	$9,036	$6,800	$11,273
	106 & 107	C	36.4	P. & E. Martin	4-108	$54,500	$22,262		$76,762	$25,587	$17,480	$33,695
	108	C	25.7	H. & H. Seebach	4-109	$18,000	$12,749		$30,749	$10,250	$8,670	$11,829
*	Pt. 109	C	1.0	T. Popp & E. Pacheco	4-109-05	$600	$1,545		$2,145		$1,210	$935
	Pt. 109 & 110	C	36.9	H., H. & T. Seebach	4-110	$30,000	$34,058		$64,058	$21,353	$14,380	$28,325
*	Pt. 110	C	4.2	D. & C. Martin	4-111	$5,000	$6,314		$11,314		$3,220	$8,094
	103	D	7.2	P. Ruest	4-019	$20,000	$336		$20,336	$6,779	$9,850	$3,707
	104	D	7.5	Martin Holsteins 1996 Ltd.	4-020	$25,800	$1,615		$27,415	$9,138	$8,780	$9,497
	105	D	1.8	K. & M. Greenwood	4-021	$5,900	$716		$6,616	$2,205	$1,400	$3,011
*	Pt. 106	D	0.2	D. Greenwood	4-022		$83		$83			$83
	Pt. 106 & 107	D	7.9	K. & M. Greenwood	4-023	$1,000	$3,230		$4,230	$1,410		$2,820
*	Pt. 107	D	0.4	W. & J. Bauman	4-024		$184		$184			$184
	108	D	2.5	D. & J. Martin	4-025		$2,432		$2,432	$811		$1,621
	Total Assessment on Lands					**$185,400**	**$90,908**		**$276,308**	**$87,527**	**$71,790**	**$116,991**
	Wellington Road 109		8.0	County of Wellington		$75,000	$12,977	$71,000	$158,977			$158,977
	2nd Line		0.5	Town of Minto		$10,000	$2,280	$5,200	$17,480			$17,480
	4th Line		1.3	Town of Minto		$12,000	$2,160	$50,275	$64,435			$64,435
	Total Assessment on Roads					**$97,000**	**$17,417**	**$126,475**	**$240,892**			**$240,892**
	Total Assessment on Lands and Roads, Municipal Drain No. 24 - 2018					**$282,400**	**$108,325**	**$126,475**	**$517,200**	**$87,527**	**$71,790**	**$357,883**

NOTES: 1. * Denotes lands not 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 OF ASSESSMENT FOR MAINTENANCE
Municipal Drain No. 24 - 2018
Town of Minto

	LOT OR PART	CON.	APPROX. HECTARES AFFECTED	OWNER	ROLL NO.	PORTION OF MAINTENANCE COST
	S. Pt. 104	C	7.9	J. Black	4-106	3.3%
	105	C	8.0	D. & E. Simpson	4-107	4.8%
	106 & 107	C	36.4	P. & E. Martin	4-108	21.8%
	108	C	25.7	H. & H. Seebach	4-109	9.8%
*	Pt. 109	C	1.0	T. Popp & E. Pacheco	4-109-05	0.8%
	Pt. 109 & 110	C	36.9	H., H. & T. Seebach	4-110	18.1%
*	Pt. 110	C	4.2	D. & C. Martin	4-111	2.5%
	103	D	7.2	P. Ruest	4-019	4.3%
	104	D	7.5	Martin Holsteins 1996 Ltd.	4-020	4.5%
	105	D	1.8	K. & M. Greenwood	4-021	1.1%
*	Pt. 106	D	0.2	D. Greenwood	4-022	0.1%
	Pt. 106 & 107	D	7.9	K. & M. Greenwood	4-023	4.8%
*	Pt. 107	D	0.4	W. & J. Bauman	4-024	0.3%
	108	D	2.5	D. & J. Martin	4-025	1.5%
	Total Assessment on Lands					77.7%
	Wellington Road 109		8.0	County of Wellington		19.1%
	2nd Line		0.5	Town of Minto		0.9%
	4th Line		1.3	Town of Minto		2.3%
	Total Assessment on Roads					22.3%
	Total Assessment for Maintenance, Municipal Drain No. 24 - 2018					**100.0%**

NOTES: 1. * Denotes lands not 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 E – Specification for Drainage Crossings by the Boring Method

DIVISION H – Special Provisions

DIVISION A
GENERAL CONDITIONS

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 of the time the Contract is awarded. 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 AT 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

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 EXISITING 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

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 SUBSURFACE 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 E
SPECIFICATIONS FOR DRAINAGE CROSSINGS BY THE BORING METHOD

DIVISION E
SPECIFICATIONS FOR DRAINAGE CROSSINGS BY THE BORING METHOD

E.1 GENERAL REQUIREMENTS

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

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

E.2 NOTIFICATION

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

E.3 PIPE

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

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

E.4 INSTALLATION

The pipe or casing shall be placed by means of continuous flight augering inside the casing and simultaneous jacking to advance the casing immediately behind the tip of the auger. Complete augering of a tunnel slightly larger than the pipe and placing the entire length by pulling or jacking after completion of the tunnel will not be acceptable unless the method to be adopted is approved in advance by both the Engineer and the Authority responsible for the lands being crossed.

E.5 AUGER PIT

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

The pit shall be left open for an absolute minimum of time, and if at all possible work shall be so scheduled so that excavation, placement of pipe and backfilling take place in one (1) working day. If this is not possible, every effort should be made to schedule the work so that the pit is not left open for more than one (1) day before and one (1) day after the boring operation.

E.6 CONSTRUCTION

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

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

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

E.7 ACCEPTANCE

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

DIVISION H
SPECIAL PROVISIONS

DIVISION H
SPECIAL PROVISIONS

Municipal Drain No. 24 - 2018
Town of Minto **Reference No. 1272**

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

H.1 GENERAL

The Contractor shall notify the Landowners, the Township Road Foreman (Mike McIsaac) and the Engineer forty-eight (48) hours prior to construction and arrange a pre-construction meeting.

The Contractor shall verify the location of the new drainage system with the Engineer 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.

All objects or obstructions within the construction working area such as signs, mailboxes, fences, 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 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 Town of Minto for specified local procedures, guidelines and timelines. Traffic control shall meet the standards of Book 7 of the Ontario Traffic Manual.

The Contractor shall be responsible for notifying the public of any road closures or detours unless otherwise stated by the Town of Minto.

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

The Contractor shall be responsible for all trench settlement.

H.2 UTILITIES

All utilities shall be located and uncovered in the affected areas 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

The working area for construction purposes along the Main Drain (Closed) shall be a width of twenty-five (25) metres. The working area for construction purposes along the Main Drain (Open) shall be a width of ten (10) metres.

The working area for maintenance purposes shall be a width of ten (10) metres.

Each landowner shall designate access to and from the working area.

H.4 TOPSOIL

The Contractor shall strip the topsoil for a minimum width of 10 metres along the route of the proposed tile drainage system except from Sta. 2+082 to Sta. 3+340 where the stripping width shall be 6 metres.

In areas of deep cuts or in the event of poor soil conditions the Contractor shall strip topsoil wider than 10 metres to ensure no contamination of topsoil with subsoil.

The Contractor shall strip the topsoil for a maximum depth of 0.3 metres. In the event that topsoil is greater in depth than 0.3 metres, the Contractor shall make every reasonable effort to not mix the topsoil and subsoil during the backfilling of the trench.

The Contractor shall stockpile the topsoil and later spread it over the backfilled trench.

The Contractor shall use a trim dozer to finely grade the topsoil once it has been placed over the backfilled trench.

Under no circumstances will the Contractor attempt to place frozen topsoil over the backfilled trench.

H.5 RIP-RAP

All stone rip-rap material to be used around catch basins shall be quarry stone 150 mm to 300 mm dia. and placed to a depth of 450 mm. All rip-rap material shall be placed on geo-textile filter material (Mirafi 180N).

Under no circumstances shall the Contractor substitute broken concrete for rip-rap.

H.6 EXISTING DRAINS/TILE CONNECTIONS

The Contractor shall uncover the existing drain in several locations prior to the commencement of construction.

The Contractor shall make all tributary tile drain connections in accordance with the Typical Tile Connection Detail on Drawing No. 3.

The Contractor shall be responsible for all tile connections for a period of one year after the issuance of the completion certificate. The 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 Town of Minto make said connections and have the costs of which deducted from the holdback.

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

H.7 PIPE, INSTALLATION, BEDDING & BACKFILL

H.7.1 Concrete Field Tile

All concrete tile shall meet or exceed the strength of 2000D Heavy-Duty Extra Quality Concrete Drain Tile.

Concrete field tile installed by means of an approved hydraulic excavator shall be installed using 19mm (3/4") crushed stone bedding and backfill from 150mm below the pipe to the spring line of the pipe, as per the detail on Drawing No. 3.

Approved native material shall be used as backfill from the spring line to the underside of the topsoil. 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.

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 400mm wide.

The filter material shall completely cover the tile joint and shall have a minimum overlap of 300mm. The type of filter material shall be Mirafi 140NC for clay or loam soil conditions and Mirafi 160N for sandy or silty soil conditions.

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 H.D.P.E. pipe shall be BOSS 2000 (or equivalent) CSA B182.8/320 KPa.

All H.D.P.E. pipe shall be installed using 19mm (3/4") crushed stone bedding from 150mm below the pipe to the spring line of the pipe. Suitable native material shall be used as backfill from the spring line to the underside of the topsoil. 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.

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.8 CATCH BASINS & MANHOLES

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

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

All catch basins and manholes 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 have hot dipped galvanized bird cage grates as per Coldstream Concrete Ltd. (or approved equal).

Knockouts shall be provided in all catch basins.

All catch basins shall be installed using 19mm (3/4") crushed stone bedding from 150mm below the structure to the underside of all pipes entering and exiting the structure. See the "Typical Catch Basin Installation Detail" on Drawing 3 in the set of plans.

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

Lifts (modulocs) shall be placed by the Contractor on all catch basins if necessary to achieve the desired elevation when field setting the structures.

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 Contractor shall be responsible for all settlement around the catch basins. Should the area around the catch basins settle after construction, the Contractor shall be responsible for providing the additional rip-rap required so that the top of the rip-rap is flush with the surrounding existing ground.

All pipes entering or exiting a catch basin, ditch inlet catch basin or junction box shall be installed such that the face of the pipe is flush with the inside wall of the structure.

All manholes to be precast reinforced concrete manholes and shall be installed using 19mm (3/4") crushed stone bedding from 150mm below the structure to the underside of all pipes entering and exiting the structure.

The grate for the 1500 mm dia. precast reinforced concrete manhole at Sta. 0+924 shall be a Type A closed cover cast iron grate as per O.P.S.D. 401.010.

The 1500 mm dia. precast reinforced concrete manhole at Sta. 0+924 shall include circular aluminum maintenance hole steps as per O.P.S.D. 405.010.

H.9 PLUNGE POOL

The Contractor shall construct a plunge pool in the Main Drain (Open) from Sta. 0+000 to Sta. 0+010. The plunge pool shall be lined with quarry-stone rip rap protection 150mm to 300mm in diameter placed 450mm deep and placed 1m up the side slopes of the ditch and around the new outlet pipe for Main Drain (Closed). The rip-rap shall be placed on an approved geotextile filter material (Mirafi 160N or approved equivalent).

The plunge pool shall be constructed in accordance with the Plunge Pool Detail on Drawing 3 in the set of plans.

.

TOWN OF MINTO
COUNTY OF WELLINGTON

N

CON. C
LOT 102
LOT 103
LOT 104
LOT 105
LOT 6
LOT 5
LOT 4
CONCESSION D
CONCESSION 4
DRAIN NO. 35
UNOPENED ROAD ALLOWANCE
4TH LINE
ROAD
ALLOWANCE
DRAIN NO. 3
LOT 106
LOT 107
LOT 108
LOT 109
LOT 110
LOT 111
LOT 112
DRAIN NO. 1
ARTHUR
J. BLACK
(4–106)
SUBSURFACE WATERS
DRAINED TO DRAIN NO. 3
(APPROX. 4.7 Ha.)
D. & E.
SIMPSON
(4–107)
B.M. 2
ELEV.=
408.29
0+405 R
C.B.
24" CONC.
21"
D.I.C.B.
EX. 525mm
TILE DRAIN
TO REMAIN
0+600
D.I.C.B.
24" CONC.
21"
24" CONC.
21"
0+924
N.R.L.
M.H.
B.M. 1
ELEV.=
402.54
0+000
DRAIN NO. 24
(OPEN)
0+310
DRAIN
NO. 110
MARTINS HOLSTEINS
1996 LTD.
(4–020)
P. RUEST
(4–019)
0+818 R
C.B.
0+884
S.R.L.
D.I.C.B.
BRANCH 'A'
(1990)
B.M. 3
ELEV.=
408.63
27" CONC.
1+244 W.R.L.
D.I.C.B.
1+283 E.R.L.
D.I.C.B.
21" CONC. DRAIN NO. 24 (CLOSED)
WELLINGTON ROAD 109
P. & E.
MARTIN
(4–108)
MUTTER AWARD
SUBSURFACE WATERS
DRAINED TO DRAIN NO. 3
(APPROX. 18.7 Ha.)
H. & H.
SEEBACH
(4–109)
SUBSURFACE WATERS
DRAINED TO DRAIN NO. 3
(APPROX. 13.2 Ha.)
K. & M.
GREENWOOD
(4–021)
D. GREENWOOD
(4–022)
1+884
C.B.
18" CONC.
2+082 R
C.B.
18" CONC.
2+305 C.B.
18" CONC.
2+490 R
C.B.
K. & M.
GREENWOOD
(4–023)
J. MARTIN
(4–024)
3RD LINE
UNOPENED
LOT 104
LOT 105
LOT 106
LOT 107
LOT 108
LOT 109
LOT 110
LOT 111
LOT 112
LOT 103
LOT 12
LOT 11
LOT 10
LOT 9
LOT 8
CON. 2
CON. D
CON. C
CONCESSION 3
DRAIN NO. 5
ROAD
ALLOWANCE
3RD LINE
GREEN LANE
2ND LINE
1ST LINE
DRAIN NO. 103
D. & J.
MARTIN
(4–025)
B.M. 4
ELEV.=
413.17
T. POPP &
E. PACHECO
(4–109–05)
2+612 R
C.B.
2+669 R
C.B.
12" CONC.
H., H. & T.
SEEBACH
(4–110)
3+224 R
C.B.
8"
C.B.
3+340 E.R.L.
D. & C.
MARTIN
(4–111)
W. & M.
MARTIN
(4–112)
SURFACE AND SUBSURFACE WATERS
DRAINED TO DRAIN NO. 3 BY OWNER
W. MARTIN
(4–113)

PLAN
PLAN SCALE
0 150 300 450 600m

BENCHMARK No. 1 ELEV.=402.54
TOP OF 500mm DIA. C.M.P. OUTLET PIPE (MIDDLE PIEP) AT STA. 0+000 (MAIN DRAIN)

BENCHMARK No. 2 ELEV.=408.29
TOP CENTRE DOWNSTREAM END OF CONCRETE BOX CULVERT 6m EAST OF STA. 0+891 (MAIN DRAIN)

BENCHMARK No. 3 ELEV.=408.63
TOP CENTRE DOWNSTREAM END OF CONCRETE BOX CULVERT 10m SOUTH OF STA. 1+254 (MAIN DFRAIN)

BENCHMARK No. 4 ELEV.=413.17
NAIL IN NORTH FACE OF HYDRO POLE 7 METRES SOUTH OF STA. 2+490 (MAIN DRAIN)

LEGEND:

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

No.	ISSUES AND REVISIONS	DATE	BY
4.	REPORT SUBMISSION	2018–06–22	DEL
3.	INFORMATION MEETING NO. 2	2018–03–09	DEL
2.	INFORMATION MEETING NO. 1	2014–06–10	DEL
1.	ON–SITE MEETING	2012–09–19	DEL

REGISTERED PROFESSIONAL ENGINEER W. J. DIETRICH PROVINCE OF ONTARIO

Town of Minto

PROJECT:
MUNICIPAL DRAIN NO. 24 - 2018

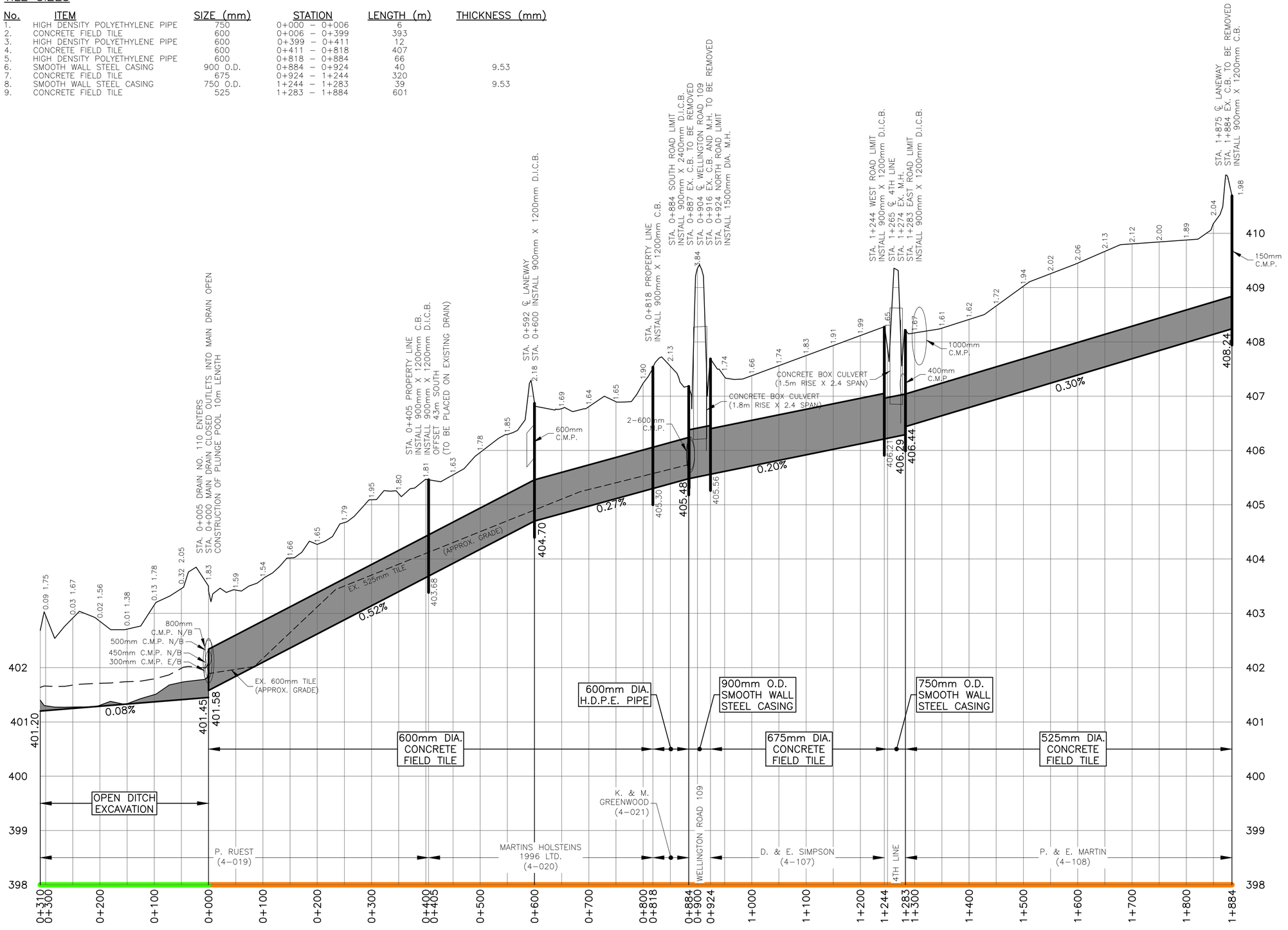
DRAWING:
Plan

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

PROJ. MGR: G.N.	DESIGNED BY: G.N.	DRAWN BY: G.C.	CHECKED BY: G.N.
DRAWING SCALE: AS NOTED	DATE: JUNE 22, 2018	PROJECT No. 1272	DRAWING No. 1 of 3

TILE SIZES

No.	ITEM	SIZE (mm)	STATION	LENGTH (m)	THICKNESS (mm)
1.	HIGH DENSITY POLYETHYLENE PIPE	750	0+000 – 0+006	6	
2.	CONCRETE FIELD TILE	600	0+006 – 0+399	393	
3.	HIGH DENSITY POLYETHYLENE PIPE	600	0+399 – 0+411	12	
4.	CONCRETE FIELD TILE	600	0+411 – 0+818	407	
5.	HIGH DENSITY POLYETHYLENE PIPE	600	0+818 – 0+884	66	
6.	SMOOTH WALL STEEL CASING	900 O.D.	0+884 – 0+924	40	9.53
7.	CONCRETE FIELD TILE	675	0+924 – 1+244	320	
8.	SMOOTH WALL STEEL CASING	750 O.D.	1+244 – 1+283	39	9.53
9.	CONCRETE FIELD TILE	525	1+283 – 1+884	601	



PROFILE

BOTTOM WIDTH

0.9m

SIDE SLOPES

1.5:1

PROFILE SCALES

HORZ. 0 100 200 300 400m

VERT. 0 1 2 3 4m

NOTES:

1. ALL SOLID HIGH DENSITY POLYETHYLENE PIPE SHALL BE BELL & SPIGOT CSA B182.8 JOINING SYSTEMS UNLESS OTHERWISE NOTED.
2. ALL PERFORATED HIGH DENSITY POLYETHYLENE PIPE SHALL BE EXTERNAL SPLIT COUPLER JOINING SYSTEMS UNLESS OTHERWISE NOTED.

No.	ISSUES AND REVISIONS	DATE	BY
4.	REPORT SUBMISSION	2018–06–22	DEL
3.	INFORMATION MEETING NO. 2	2018–03–09	DEL
2.	INFORMATION MEETING NO. 1	2014–06–10	DEL
1.	ON–SITE MEETING	2012–09–19	DEL

REGISTERED PROFESSIONAL ENGINEER W. J. DIETRICH PROVINCE OF ONTARIO

Town of Minto

PROJECT:

MUNICIPAL DRAIN NO. 24 - 2018

DRAWING:

Profile (1 of 2)

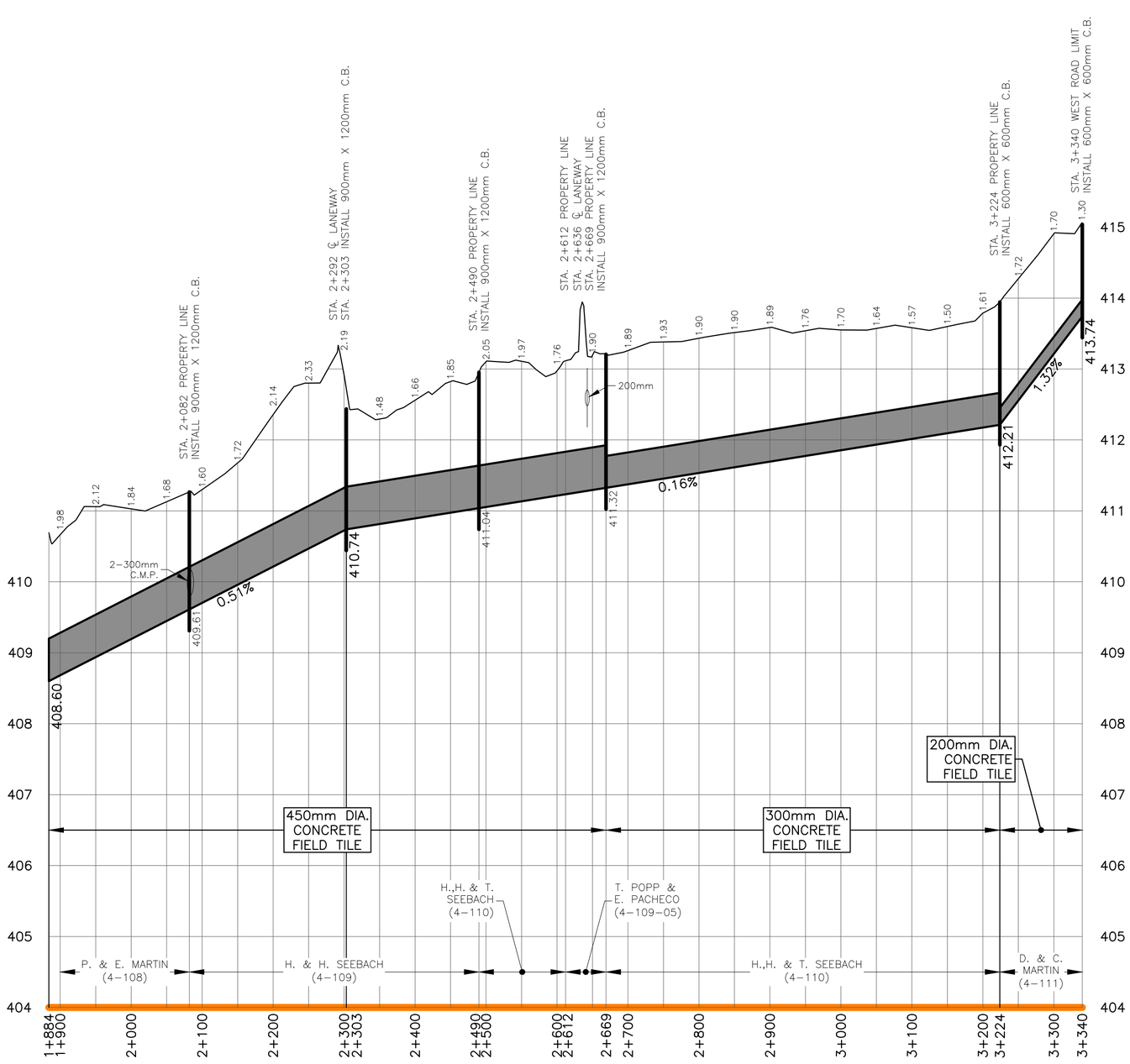
DIETRICH ENGINEERING LIMITED
CONSULTING ENGINEERS
10 Alpine Court, Kitchener, ON, N2E 2M7

PROJ. MGR: G.N.	DESIGNED BY: G.N.	DRAWN BY: G.C.	CHECKED BY: G.N.
DRAWING SCALE: AS NOTED	DATE: JUNE 22, 2018	PROJECT No. 1272	DRAWING No. 2 of 3

TILE SIZES

MAIN DRAIN (cont'd)

No.	ITEM	SIZE (mm)	STATION	LENGTH (m)
6.	CONCRETE FIELD TILE	450	1+884 – 2+669	785
7.	CONCRETE FIELD TILE	300	2+669 – 3+224	555
8.	CONCRETE FIELD TILE	200	3+224 – 3+340	116

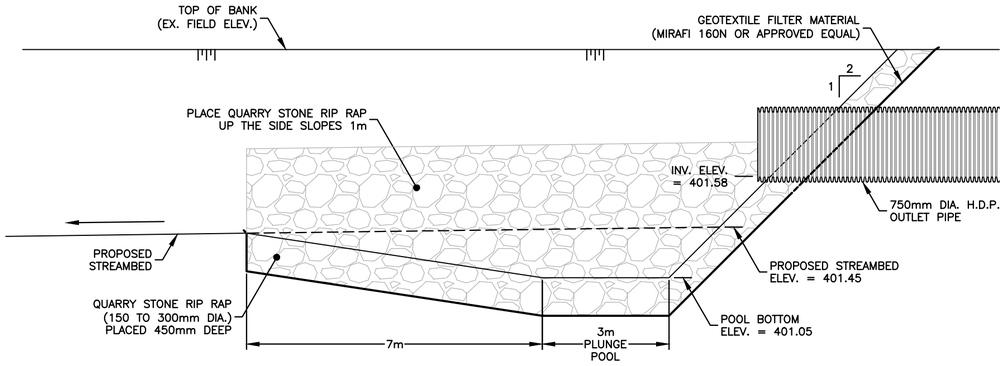


PROFILE

PROFILE SCALES

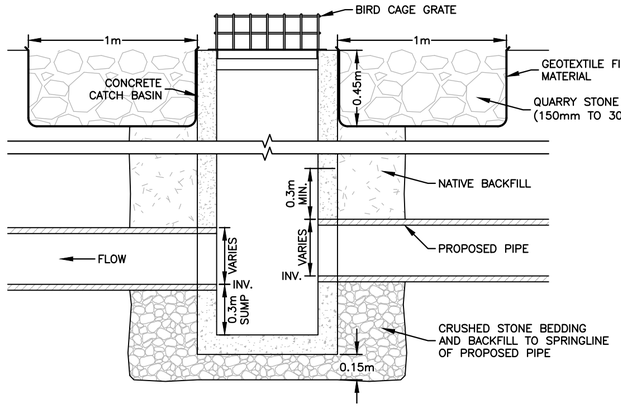
HORZ. 0 100 200 300 400m

VERT. 0 1 2 3 4m



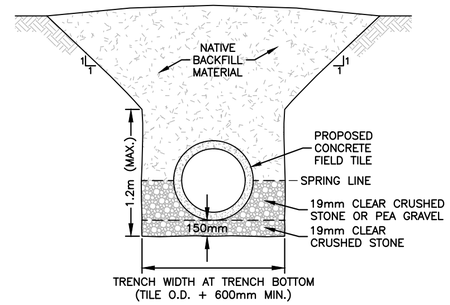
PLUNGE POOL DETAIL

N.T.S.



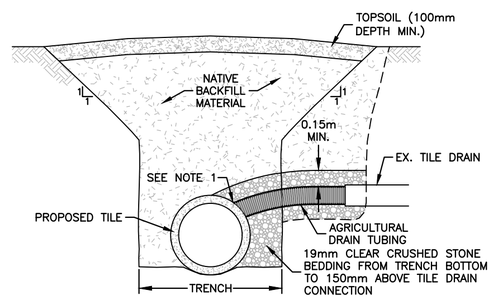
TYPICAL CATCH BASIN INSTALLATION DETAIL

N.T.S.



TYPICAL CONC. TILE INSTALLATION ON STONE BEDDING 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.

No.	ISSUES AND REVISIONS	DATE	BY
4.	REPORT SUBMISSION	2018–06–22	DEL
3.	INFORMATION MEETING NO. 2	2018–03–09	DEL
2.	INFORMATION MEETING NO. 1	2014–06–10	DEL
1.	ON–SITE MEETING	2012–09–19	DEL

REGISTERED PROFESSIONAL ENGINEER — W. J. DIETRICH — PROVINCE OF ONTARIO

Town of Minto

PROJECT: MUNICIPAL DRAIN NO. 24 - 2018

DRAWING: Profile (2 of 2) & Details

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

PROJ. MGR: G.N.	DESIGNED BY: G.N.	DRAWN BY: G.C.	CHECKED BY: G.N.
DRAWING SCALE: AS NOTED	DATE: JUNE 22, 2018	PROJECT No. 1272	DRAWING No. 3 of 3