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July 15, 2020

The Mayor and Council
Municipality of North Middlesex
229 Parkhill Main Street
Parkhill, ON
N0M 2K0

Gentlemen and Mesdames:

Re: Campbell Drain

In accordance with your instructions, I have undertaken an examination of the Campbell Drain with regards to completing improvements to the existing channel. The Campbell Drain is located in Lot 7 and Lot 8, Concession 15, Lot 7, Concession 14 and part of Lot 7 Concession 13 in The Municipality of North Middlesex.

Authorization under the Drainage Act

This Engineer's Report has been prepared under Section 78 of the Drainage Act as per the request of an affected Landowner.

Under Section 78 of the Drainage Act, Council may undertake and complete the maintenance or repair of any drainage works constructed under a bylaw passed under this Act or its predecessor. Section 78 is to be used where it is considered expedient to change the course of the drainage works, or to make a new outlet for the whole or any part of the drainage works, or to construct a tile drain under the bed of the whole or any part of the drainage works as ancillary thereto, or to construct, reconstruct or extend embankments, walls, dykes, dams, reservoirs, bridges, pumping stations, or other protective works as ancillary to the drainage works, or to otherwise improve, extend to an outlet or alter the drainage works or to cover the whole or any part of it, or to consolidate two or more drainage work; the Council whose duty it is to maintain and repair the drainage works or any part thereof may, without a petition required under Section 4 but on the report of an Engineer appointed by it, undertake and complete the drainage works as set forth in such report.

Existing Conditions

The Campbell Drain is an open channel which is located in Lot 7 and Lot 8, Concession 15, Lot 7, Concession 14 and part of Lot 7 Concession 13 in The Municipality of North Middlesex. The drain has steep channel banks that are experiencing erosion. The bank erosion is causing sediment to accumulate in the bottom of the channel and the sediment is obstructing flows in the Campbell Drain and the Watson Drain.

In 2017, the portion of the Campbell Drain that is located on the North side of Coldstream Road was enclosed privately outside of the Drainage Act. The private enclosure did not include any surface inlets for the flows generated within the north half of the Coldstream Road allowance between station 0+000 and Station 0+438. The water generated within the Coldstream Road allowance enters the system via a ditch inlet catch basin at Station 0+438.

The most recent Engineer's Report is dated 1965. Under this Report, the existing open channel was widened and deepened.

Drain Classification

The existing municipal drain is currently classified as a class "F" drain throughout its length according to the Ontario Ministry of Agriculture, Food and Rural Affairs Mapping. Class "F" drains are intermittent or ephemeral (dry for more than two consecutive months). The work area is to be maintained in a dry condition during construction by the Contractor.

On Site Meetings

Two site meetings were held at 27382 Coldstream Road. The first meeting was held on February 7, 2018 and the second meeting was held on April 17, 2018.

The following is a brief summary of the February 7, 2018 meeting:

- Attendance
  Jonathan Lampman – Municipality of North Middlesex
  Nelson McLachlan – Landowner
  Steve Willemse – Landowner
  Jack Willemse – Landowner
  Mike Gerrits – R. Dobbin Engineering Inc.

- The Landowner of Lot 7, Concession 15 (N&L McLachlan Farms Inc.) requested maintenance and improvements be made to the Campbell Drain under Section 74 of the Act. If improvements are to be made to the drain, a Report will need to be completed under Section 78 of the Act.
- A Landowner requested a ditch bottom clean out, channel realignment and bank erosion repairs. MG requested clarification on the realignment. NM said there is no realignment required.
- MG informed all present that the request had the realignment box and the ditch bottom cleanout box filled in which made it a Section 78 request; however, if it is only maintenance then the job should be completed under maintenance.
- The requesting Landowner removed the realignment request and all Landowners discussed maintenance with JL.
- The Section 78 request was withdrawn.

The following is a brief summary of the April 17, 2018 meeting:

- Attendance
  Glen Bullock – Municipality of North Middlesex
  Jonathan Lampman – Municipality of North Middlesex
  Pete DeGouw – Landowner
  Nelson McLachlan – Landowner
  Steve Willemse – Landowner
  Ted Van den boogaard – Landowner
  Robert Robinson – Contractor
  Josh Warner – R Dobbin Engineering Inc.
  Mike Gerrits – R. Dobbin Engineering Inc.

- MG explained that there was a site meeting on February 7, 2018 to address the request for maintenance. R. Dobbin Engineering understands the downstream

Landowner has requested additional maintenance. In addition to the maintenance, it is an opportunity to incorporate the private drain enclosure along the north side of Coldstream Road.

- MG confirmed he has the sketches provided by Robert Robinson for the enclosure.
- The Landowner of Lot 7, Concession 15 (N&L McLachlan Farms Inc.) requested maintenance and improvements be made to the Campbell Drain under Section 74 of the Act. If improvements are to be made to the drain, a Report will need to be completed under Section 78 of the Act.
- MG requested the Landowners confirm the watershed. The Landowners confirmed the limits of the watershed.
- MG requested downstream Landowners clarify any issues with the drain, grade, culverts and erosion.
- PD mentioned the drain requires a cleanout to his culvert. MG informed PD that the crossing was on the Watson Drain and not the Campbell Drain however we would investigate the request since they are connected and the report will ensure there is a sufficient outlet for the Campbell Drain improvements.
- MG will survey the Campbell Drain and Watson drain. The data will be reviewed and determined if the velocities are causing the erosion within the channel.
- SW needs a berm on his property to control surface water from the upstream lands. MG informed JW that he would need to petition for a drain if he wanted the berm to be part of the Municipal Drain; alternatively, he could construct the drain on his own.

Design

Open channel design criteria include an assumed minimum tile depth of 760mm plus diameter of tile, a minimum 300 mm freeboard to the design flow elevation and a minimum velocity of 0.6 m/s to keep sufficient flows to minimize the buildup of sediment. The channel bottom width varies from 1.5 m in the upper section to 1.0 m in the lower section; channel widths are detailed on the profile drawings.

The future culvert replacement of the Coldstream Road crossing has been designed to accommodate the 1 in 25 year storm event.

If required the downstream ditch will be cleaned out to provided a sufficient outlet for the Campbell Drain.

In order to minimize bank erosion, the backslope of the banks will be increased to a slope of 2 horizontal (H) metres for every vertical (V) meter of channel and a 2.0 m wide grassed buffer strip will be incorporated into the design.

Recommendations

It is therefore recommended that the following work be carried out:

1. Abandon the open channel between Station 0+120 to Station 0+432.

2. Prepare a new Report for the Campbell Drain c/w a Schedule of Assessment and Schedules of Maintenance for the drain.

3. Incorporate the section of drain that was enclosed privately between Station 0+120 to Station 0+438.

4. Prepare specifications for future maintenance and repair of the remaining access and road culverts along the length of the drainage works.

5. Review the existing Coldstream Road culvert and provide specifications and maintenance schedules for future maintenance and repair of the culvert.

Estimate of Cost

It is recommended that the work be carried out in accordance with the accompanying Specification of Work and Profile that forms part of this Report. There has been prepared an Estimate of Cost in the amount of $152,408, including engineering of the Report, attending the Meeting to Consider the Report, attending the Court of Revision and tendering. Appearances before appeal bodies have not been included in the cost estimate.

A plan has been prepared showing the location of the work and the approximate drainage area. A profile is included showing the depths and grades of the proposed work.

Assessment

As per Section 21 of the Drainage Act, the Engineer in their Report shall assess for benefit and outlet for each parcel of land and road liable for assessment.

Lands, roads, buildings, utilities, or other structures that are increased in value or are more easily maintained as a result of the construction, improvement, maintenance, or repair of a drainage works may be assessed for benefit. (Section 22)

Lands and roads that use a drainage works as an outlet, or for which, when the drainage works is constructed or improved, an improved outlet is provided either directly or indirectly through the medium of any other drainage works or of a swale, ravine, creek, or watercourse may be assessed for outlet. The assessment for outlet shall be based on the volume and rate of flow of the water artificially caused to flow into the drainage works from the lands and roads liable for such assessments. (Section 23)

The Engineer may assess for special benefit any lands for which special benefits have been provided by the drainage works. (Section 24)

A Schedule of Assessment for the lands and roads affected by the work and therefore liable for the cost thereof, will be prepared as per the Drainage Act, in addition, assessments may be made against any public utility or road authority, as per Section 26 of the Drainage Act, for any increased cost for the removal or relocation of any of its facilities that may be necessitated by the construction or maintenance of the drainage works. Items to be assessed under Section 26 shall be tendered separately with the actual cost plus a portion of the engineering (25% of the cost).

The cost of any approvals, permits or any extra work, beyond that specified in this Report that is required by any utility, conservation authority, government ministry or organization (federal or provincial), or road authority shall be assessed to that organization requiring the permit, approval, or extra work.

The estimated cost of the drainage works has been assessed in the following manner:

1. Incorporating the exiting tile has been assessed to the two Landowners who privately enclosed the drain with approx. 40% of the estimated cost assessed to the lands ending with an Area Roll Number 20-050 and 60% of the estimated cost assessed to the lands ending with an Area Roll Number 20-051.

2. The ditch cleanout, bank stabilization improvements and buffer strips have been assessed with approx. 50% of the estimated cost assessed as a benefit assessment and the remainder assessed as outlet assessment to the upstream properties based on equivalent hectares.
3. If required, the cost to cleanout a portion of the of the downstream Watson Drain to obtain a sufficient outlet for the Campbell Drain will be assessed to the Watson Drain.
4. The cost of repairing any tile outlets shall be assessed to property which the tile outlet is located on.

If a Landowner wishes to removes the spoils at their expense, the Landowner will be credited with the equivalent stripping beyond the 12 m width and the leveling of spoils costs within their lands as it will no longer be required as part of the drainage works.

Allowances

Under Section 29 of the Drainage Act, the Engineer in their Report shall estimate and allow in money to the Landowner of any land that it is necessary to use for the construction or improvement of a drainage works or for the disposal of material removed from drainage works. This shall be considered an allowance for right-of-way.

Under Section 30 of the Drainage Act, the Engineer shall determine the amount to be paid to persons entitled thereto for damage, if any, to ornamental trees, lawns, fences, land and crops occasioned by the disposal of material removed from a drainage works. This shall be considered an allowance for damages.

Under Section 31 of the Drainage Act, where an existing drain that was not constructed on requisition or petition under this Act or any predecessor of this Act is incorporated in whole or in part in a drainage works, the engineer in the Report shall estimate and allow in money to the owner of such drain or part the value to the drainage works of such drain or part and shall include such sum in the estimates of the cost of the construction, improvement, repair or maintenance of the drainage works.

Allowances have been made, where appropriate, as per Section 29 of the Drainage Act for right-of-way to account for the additional lands required to stabilize the bank and incorporate a buffer strip, as per Section 30 of the Drainage Act for damages to lands and crops and as per Section 31 of the Drainage Act for the private drain enclosure.

Allowances for loss of land due to the buffer strip and bank stabilization for right of way are based on a land value of $29,6405.00 per hectare ($12,000.00 per acre). Allowances for crop loss are based on $1,500.00 per hectare for the first year, $750.00 for the second year ($2,250.00 per hectare total). Allowances for the existing tile main are $7,367.00 and are based on 96% of the actual costs of the concrete tile main.

Access and Working Area

Access to the work site for construction and future maintenance shall gained from the Coldstream Road right of way and along existing accesses and tree lines or as approved by the Drainage Superintendent. Access shall generally be restricted to a width of 6 metres. The working area for the construction of the proposed open channel drain improvements shall be restricted to a width of 20m along the length of the drainage works from the top of the bank requiring minor widening (<1.0m) and 30m in areas where major widening is required (>1.0m). The working area for the construction of the closed drain restricted to a width of 20 metres along the length of the drainage works normally centred on the proposed tile drain. If required the working area shall extended to allow the delivery trucks to turn around.

If a Landowner wishes to remove the spoils at their expense the working area will be reduce to 12 m within their lands.

Approvals

The drain includes approvals from both the Ausable Bayfield Conservation Authority and the Department of Fisheries and Oceans Canada. Construction must be completed in accordance with the approvals

Restrictions

No trees and shrubs shall be planted nor shall permanent structures be erected within 20m of either side of the proposed drain without prior written permission of Council.

Work to be completed in accordance with the Fisheries and Oceans Letter of Advice which includes an in water work restriction timing window of April 1 to July 15.

Attention is also drawn to Sections 80 and 82 of the Drainage Act, which refer to the removal of obstructions in a drain and damage caused to a drain.

Agricultural Grant

If available, it is recommended that application for subsidy be made for eligible agricultural properties. Any assessments against non-agricultural properties are shown separately in the Schedule of Assessment.

Maintenance

Upon completion of the work, the Campbell Drain between Station 0+438 1+463 shall be maintained in the same relative proportions as contained in the Schedule of Assessment enclosed with this Report unless otherwise altered under provisions of the Drainage Act or as outlined below.

Station 0+000 to 0+438 shall be maintained with 40% of the maintenance costs assessed to the lands ending with an Area Roll Number 20-050 and the remainder assessed to the lands ending with an Area Roll Number 20-051. Station 0+438 to 0+464 shall be maintained with 95% of the maintenance costs assessed to the road authority and the remainder assessed as outlet assessment to the upstream properties based on equivalent hectares.

The drain shall be maintained as per the specifications and grades as shown on the Profile contained in this Engineer's Report. If a portion of the drain is replaced under maintenance, and in accordance with this Report, the existing tile shall be abandoned as part of the municipal drain and will no longer be maintained by the Municipality.

Yours truly,

July 15, 2020
2017-853

LICENSED PROFESSIONAL ENGINEER
M.R.M. GERRITS
July 15, 2020
2017-853
PROVINCE OF ONTARIO

Mike Gerrits, P. Eng.
R. Dobbin Engineering Inc.

Campbell Drain
Municipality of North Middlesex
July 15, 2020

ALLOWANCES

Allowances have been made as per Sections 29, 30 & 31 of the Drainage Act for damages to lands and crops including for future maintenance operations and for the incorporation of the existing main.

Conc.	Lot or part	Roll No.	Owner	Section 29	Section 30	Section 31	Total
Agricultural Lands							
13	7	20-018	DeGouw's Woodside	1,778	450		2,228
14	7	20-034	Pigs R Us S. Willemse	15,413	10,269		25,682
15	W 1/2 L 8	20-050	Vandenbogaard Farms			2,871	2,871
	7	20-051	N. & L. McLachlan Farms Inc.			4,496	4,496
			Total Allowances	$ 17,191	$ 10,719	$ 7,367	$ 35,277

Campbell Drain
Municipality of North Middlesex
July 15, 2020

ESTIMATE OF COST

	Quantity	Unit	Material	Labour	Total
Benchmark Loop	1	ea	-	250.00	250.00
Brush Existing Channel	1005	m	-	7,538.00	7,538.00
Ditch Excavation c/w Stripping and Channel Bank Slope Improvements	1005	m	-	15,075.00	15,075.00
Strip Working Area (12 m Width)	1005	m	-	14,070.00	14,070.00
Strip Working Area (Beyond 12 m Width)	775	m	-	8,496.00	8,496.00
Leveling of Spoils	1005	m	-	10,050.00	10,050.00
Rip Rap Protection (Station 0+464)	10	sq.m.	250.00	250.00	500.00
Rock Chute Rip Rap (Station 0+811)	30	sq.m.	750.00	750.00	1,500.00
Rip Rap Erosion Slope Protection (Station 0+881)	15	sq.m.	375.00	375.00	750.00
Rock Chute Rip Rap (Station 0+976)	15	sq.m.	375.00	375.00	750.00
Rock Chute Rip Rap (Station 1+127)	10	sq.m.	250.00	250.00	500.00
Rip Rap Protection (Station 1+443 Outlet to Watson Drain)	10	sq.m.	250.00	250.00	500.00
Repair Tile Outlet c/w 1 sq.m. of Rip Rap	5	ea	375.00	500.00	875.00
Channel Seeding (Station 0+464 to 1+343)	1005	m	6,030.00	6,030.00	12,060.00
Buffer Strip c/w Seeding (2 Side)	542	m	5,420.00	5,420.00	10,840.00
Buffer Strip c/w Seeding (1 Side)	463	m	2,315.00	2,315.00	4,630.00
Light Duty Silt Fence (Station 1+443 Outlet to Watson Drain)	1	ea	250.00	250.00	500.00
Relocate Fish as per DFO Letter of Advice (Provisional)	1	ea	0.00	250.00	250.00
Sub Total					$ 89,134.00
Allowances					$ 35,277.00
Miscellaneous					$ 4,461.00
Engineering					$ 17,827.00
Incorporate Existing Enclosure					$ 1,473.00
Tendering					$ 800.00
Contract Administration					$ 3,436.00
Total Estimate					$152,408.00

Campbell Drain
Municipality of North Middlesex
July 15, 2020

SCHEDULE OF ASSESSMENT

Conc.	Lot or Part	Affected Hect. (Ag)	(Bush)	Roll No.	Owner	Benefit	Outlet	Total	Affected Area (Ha.)
Agricultural Lands									
15	E1/2 L6	9.7		20-052	D. Arcuri	-	6,004	6,004	9.7
	7	32.3		20-051	N. & L. McLachlan Farms Inc.	5,247	26,711	31,959	32.3
	W 1/2 L 8	13.3		20-050	Vandenbogaard Farms	3,387	10,999	14,385	13.3
14	6	24.2		20-033	Pigs R Us S. Willemse	-	10,935	10,935	24.2
	7	39.37	14.2	20-034	Pigs R Us S. Willemse	64,665	7,230	71,895	39.37
	8	21.3	0.8	20-035	N. & L. McLachlan	-	10,748	10,748	21.3
13	7	0.9		20-018	DeGouw's Woodside	4,838	39	4,876	0.9
						$ 78,136	$ 72,667	$ 150,802	
					Total Benefit	78,136			
					Total Outlet	72,667			
					Total - Agricultural Lands	$ 150,802			
Public Lands									
Coldstream Road		1.9			Municipality of North Middlesex	-	1,529	1,529	1.9
Fort Rose Road		0.2			Municipality of North Middlesex	-	76	76	0.2
						$ -	$ 1,606	$ 1,606	2.1
					Total Benefit	-			
					Total Outlet	1,606			
					Total - Public Lands	$ 1,606			
					Total - Agricultural Lands	150,802			
					Total - Public Lands	1,606			
					Total Assessment	$ 152,408			

Campbell Drain
Municipality of North Middlesex
July 15, 2020

SPECIFICATION OF WORK

1. Location

The Campbell Drain is located in Lot 7 and Lot 8, Concession 15, Lot 7, Concession 14 and part of Lot 7 Concession 13 in The Municipality of North Middlesex. The work to be included but is not limited to the following:

- Brushing existing channel
- Ditch excavation c/w channel bank slope improvements
- Leveling of all spoils

2. General

Each tenderer must inspect the site prior to submitting their tender and satisfy themselves by personal examination as to the local conditions that may be encountered during this project. The Contractor shall make allowance in their tender for any difficulties which they may encounter. Quantities or any information supplied by the Engineer is not guaranteed and is for reference only.

All work and materials shall be to the satisfaction of the Drainage Superintendent who may vary these specifications as to minor details but in no way decrease the proposed capacity of the drain.

The Contractor shall be responsible for the notification of all utilities prior to the start of construction.

Measurement for Payment Clauses have not been included in these specifications and will be part of the Construction document. If the Construction document has not identified Measurement for Payment Clauses, the Contractor must notify the Municipality of North Middlesex and request clarification 2 days prior to pricing the project.

3. Plans and Specifications

These specifications shall apply and be part of the Contract along with the General Specifications for Closed Drains and the General Specifications for Open Drains. This Specification of Work shall take precedence over all plans and general conditions pertaining to the Contract. The Contractor shall provide all labour, equipment, and supervision necessary to complete the work as shown in the Plans and described in these specifications. Any work not described in these specifications shall be completed according to the Ontario Provincial Standard Specifications and Standard Drawings.

Any reference to the Owner contained in these Contract Documents shall refer to The Municipality of North Middlesex or the Engineer authorized by The Municipality of North Middlesex to act on its behalf.

4. Health and Safety

The Contractor at all times shall be responsible for health and safety on the worksite including ensuring that all employees wear suitable personal protective equipment including safety boots and hard hats. The Contractor shall also ensure that only competent workers are employed onsite and that appropriate training and certification is supplied to all employees.

When applicable the Contractor shall be responsible for traffic control as per the Ontario Traffic Manual Book 7 – Temporary Conditions (latest revision).

The Contractor shall be responsible to ensure that all procedures are followed under the Occupational Health and Safety Act to ensure that work sites are safe and that accidents are prevented. In the event of a serious or recurring problem, a notice of non-compliance will be issued. The Contractor will be responsible for reacting immediately to any deficiency and correcting any potential health and safety risk. Continuous disregard for any requirement of the Occupational Health and Safety Act could be cause for the issuance of a stop work order or even termination of the Contract.

5. Workplace Safety and Insurance Board

The Contractor hereby certifies that all employees and officers working on the project are covered by benefits provided by the Contractor. The WSIB Clearance Certificate must be furnished prior to the execution of the Contract and updated every 90 days.

6. Pre-Construction Meeting

There is a requirement for a pre-construction meeting to be held prior to any construction taking place. The meeting shall be scheduled by the Contractor. The Landowners, Engineer, and the Municipality of North-Middlesex shall be notified of the pre-construction meeting at least one week prior.

7. Access and Working Area

Access to the work site for construction and future maintenance shall gained from the Coldstream Road right of way and along existing accesses and tree lines or as approved by the Drainage Superintendent. Access shall generally be restricted to a width of 6 metres. The working area for the construction of the proposed open channel drain improvements shall be restricted to a width of 20m along the length of the drainage works from the top of the bank requiring minor widening (<1.0m) and 30m in areas where major widening is required (>1.0m). The working area for the construction of the closed drain restricted to a width of 20 metres along the length of the drainage works normally centred on the proposed tile drain. If required the working area shall extended to allow the delivery trucks to turn around.

If a Landowner wishes to remove the spoils at their expense the working area will be reduce to 12 m within their lands.

8. Benchmarks

The benchmarks are based on geodetic elevations. Elevations are available at the locations shown on the Plan and Profile drawings. Where these elevations are on existing structures to be replaced, they shall be transferred by the Contractor prior to the removal.

The Contractor is required to complete a benchmark loop prior to construction to verify the benchmarks. If discrepancies exist, the Contractor must notify the Drainage Superintendent and Engineer prior to completing any work.

9. Brushing and Tree Removal

All brush, trees, woody vegetation, etc. shall be removed from the side slopes of the existing open channel within the top of the banks in accordance with OPSS 201. Other brush and trees may be removed from the side the equipment is operating on to allow access for the equipment and leveling of spoils. Brush shall be removed in their entirety including stumps.

- A mechanical grinder attached to an excavator shall be used for the removal of brush and trees in areas where the drain will not be widened.
- The trees and brush shall be piled in one pile for each property that requires brushing. The disposal of the trees and brush are the responsibility of the Landowner.
- Burning of the trees and brush is subject to local bylaws and guidelines of the Ministry of the Environment.
- Certain trees may be left in place at the direction of the Drainage Superintendent.

10. Strip Existing Channel

The existing channel and working area shall be stripped in accordance with OPSS 206. Topsoil shall be placed at the edge of the working area for restoration once leveling of the subsoils is complete.

The open channel shall be excavated and maintained to the depths and grades as per the profile and drawings as contained in this Engineer's Report. The channel shall be excavated to the proper depth using a laser or similar approved device with a labourer onsite to ensure correctness of grade and to confirm location of tile ends.

Widening of the channel to accommodate the proposed depth and bank stabilization shall be from both sides of the existing channel. The excavated material to deepen the open channel to the proposed new depths and grades shall be cast on private lands adjacent to the channel at least 2.0 metres clear of the bank. Excavated material shall not be placed in low runs or swales out letting surface water to the channel. If a

Landowner requests that the excavated material be trucked, the increased cost shall be borne by that Landowner.

11. Open Chanel Excavation

The open channel shall be constructed in accordance with OPSS 206. The channel shall be excavated and maintained to the depths and grades as per the profile and drawings as contained in this Engineer's Report. The channel shall be excavated to the proper depth using a laser or similar approved device with a labourer onsite to ensure correctness of grade and to confirm location of tile ends.

The channel back slopes must be 2H to 1V. The Contractor must review the drawings to confirm the channel width at each section.

Widening of the channel to accommodate the proposed depth shall be from both sides of the channel. The excavated material to deepen the open channel to the proposed new depths and grades shall be cast on private lands adjacent to the channel at least 1.5 metres clear of the bank. Excavated material shall not be placed in low runs or swales outletting surface water to the channel. The excavated material shall be levelled to a maximum depth of 200mm and left in a condition suitable for cultivation. The excavated material shall be tapers to the edge of the working area. If required the sediment between Station 1+463 and Station 1+710 shall be removed leaving a rounded bottom with the intent not to undercut the existing side slopes.

All large stones, rocks, branches and debris shall be picked up by the Contractor and disposed offsite. The leveled area must be left in a condition suitable for cultivation.

If a Landowner wishes to removes the spoils at their expense, the Contractor shall stockpile the spoils at the edge of the working area for use in the future by the Landowner. Excavated material shall not be stockpiled in low runs or swales out letting surface water to the channel. The Contractor is required to construct the 2.0 m buffer strip.

If a Landowner requests that the excavated material be hauled outside of the working area, the Landowner will need to have an agreement with the Contractor outside of the Drain Report/Contract.

12. Rip Rap Protection

Rip Rap erosion protection shall be made up of 100mm to 250mm quarry stone or approved equal. The area to receive the rip rap shall first be graded to allow the placement of the rip rap to a depth of 400mm below finished grade. After grading, a layer of filter fabric (Terrafix 270R or approved equal) is to be placed with any joints overlapped a minimum of 600mm. Rip rap shall then be placed with the smaller pieces placed in the gaps and voids to give it a uniform appearance. Rip rap shall be installed on:

- Rock Chutes on the channel side slope from the bottom of the channel to the top of the bank and for a distance of 3m on either side of the low run.
- Rip Rap on the channel side slope from the bottom of the channel to the top of the outlet pipe a distance of 1m on either side of the pipe. If the outlet pipe is located in a low run the distance shll be increased to 3m on either side of the outlet/low run.
- Areas of bank which are experiencing severe erosion from the bottom of the channel to the top of the bank.
- The channel bottom and 1.0 m of bank at the outlet to the Watson Drain.

13. Installation of Coldstream Road Culvert (Future Maintenance)

The Contractor shall supply, install, and backfill pipe culverts. High density polyethelyne (HDPE) smooth wall pipe (320 kPa) with coupler joints. Corrugated Steel Pipe (CSP) culverts shall be aluminized corrugated steel pipe with a minimum wall thickness of 2.8mm in all cases. All corrugation profiles shall be of helical lockseam manufacture using 68mm x 13mm corrugations for 1600mm diameter pipe and smaller and 125mm x 25mm corrugations for 1800mm diameter pipe and larger. Pipe with 125mm x 25mm corrugations shall be used if 68mm x 13mm corrugations are not available. Future culvert replacements shall be to the same specifications.

Excavation to be in accordance with OPSS 206, compaction to be in accordance with OPSS 501 (Prov.) and granular material to be in accordance with OPSS 1010.

Pipe culverts shall be constructed to the existing depths and grades. The bottom of the excavation shall be excavated to the required depth with any over excavation backfilled with granular material or drainage stone. When the pipe has been installed to the proper grade and depth, the excavation shall be backfilled with Granular "A" or drainage

stone from the bottom of the excavation to the springline of the pipe. The remainder of the backfill shall be Granular B. Care shall be taken to ensure that the backfill on either side of the culvert does not differ by more than 300mm so that the pipe is not displaced.

All granular bedding and backfill material shall be mechanically compacted to 95% modified standard proctor density. The top 300mm of Granular "B" material shall be mechanically compacted to 98% modified standard proctor density and the top 150mm of Granular "A" material shall be mechanically compacted to 100% modified standard proctor density.

End protection shall consist of rip rap ends with a minimum 1.5:1 sideslopes. The rip rap shall consist of 100mm x 250mm quarry stone or approved equal. The area to receive the rip rap shall be graded to a depth of 400mm below finished grade. Filter fabric (Terrafix 250R or approved equal) shall then be placed with any joints overlapped a minimum 600mm. The quarry stone shall then be placed with the smaller pieces placed in the gaps and voids to give it a uniform appearance.

Disturbed areas within the road right of way shall be restored with 100 mm of native topsoil and seed. Topsoil in accordance with OPSS 802. Seed in accordance with OPSS 804.

CULVERTS TO BE REPLACED IN THE FUTURE:

Culvert No. 1 – Coldstream Road (Station 0+452). The culvert is a 900mm dia. Corrugated Steel Pipe (CSP) culvert with a 1000mm dia. High Density Polyethylene extension on the north side. The culvert is 24m in length. The culvert is to be replaced in the future under this report with a 24m of 1200mm HDPE pipe culvert or approved CSP equivalent.

14. Installation of Tile (Future Maintenance)

The Contractor shall supply, install, and backfill the tile and pipe to the depths and grades as shown on the drawings. The alignment of any future tile shall be within 2 m of the existing concrete tile mains.

Concrete tile shall conform to ASTM C412, extra quality. Tile shall have a circular interior and exterior shape.

HDPE shall be smooth wall pipe (320 kPa).

The trenching and laying of the concrete tile shall be done by wheel machine. An excavator must be used in areas of soil instability, unless approved by the Engineer. All tile joints shall be wrapped with a minimum 300mm width of Terrafix 250R (or approved equal) filter fabric. The filter fabric shall be overlapped by 450mm at the top of the tile. The tile shall be laid in straight lines or on smooth gradual curves with a minimum radius or 25m.

Where approved by the Engineer (or specified) concrete tile may be laid in tighter curves by sawcutting joints. The maximum deflection of one concrete tile joint shall be 22 degrees. Turns of greater than 22 degrees shall require the use of manufactured bends (PE smooth wall).

Clear stone shall be placed as bedding for the concrete tile where poor soil conditions are encountered, where existing channels are crossed or as directed by the Drainage Superintendent.

Laser control shall be used to ensure proper grades. The grades calculated on the Profile are to the invert of the tile and pipe with allowances to be made by the Contractor for the wall thickness of the tile and pipe. The depths shown and figured are from ground level to the invert of the pipe along the line of the proposed drain. Should an error appear in the figured depth at any station or stations, the grade shall be made to correspond with that shown on the Profile without extra charge.

Trencher

A trencher shall be used to excavate the trench to allow for a round bottom. Prior to backfilling, the tile shall be covered manually to a depth of approx. 100mm over the pipe to ensure that the tile and pipe are not displaced by large clumps of earth. The trench shall be backfilled with excavated material free of stones, broken tile or other deleterious material. All stones larger than 100mm in diameter evident immediately after construction shall be picked up by the Contractor and disposed offsite. The Landowners are responsible for stones after that. The material shall be left windrowed over the trench to allow for settlement.

Excavator

When tile is installed with an excavator, the tile must be installed as per the manufacturer's recommendations. Prior to backfilling, the tile shall be covered manually to a depth of approx. 100mm over the pipe to ensure that the tile and pipe are not displaced by large clumps of earth. The trench shall be backfilled with excavated material free of stones, broken tile or other deleterious material. All stones larger than 100mm in diameter evident immediately after construction shall be picked up by the Contractor and disposed offsite. The Landowners are responsible for stones after that. The material shall be left windrowed over the trench to allow for settlement.

If the land level must be lowered in order to carry out trenching operations, then it is up to the Contractor to determine if it is necessary and include any extra cost involved. The Contractor shall first strip the topsoil to its full depth and stockpile it along one side of the working width and then grade the area to allow the trenching to be carried out. All excavated material shall be windrowed on the side opposite the trench that the topsoil is stockpiled. After trenching and backfilling operations are complete, the topsoil shall be spread to its original depth.

All areas disturbed by construction, except the material windrowed over the trench, shall be left in a condition suitable for cultivation. Final levelling or the removal of excess material shall be the responsibility of the Landowner.

The Contractor shall not operate any trenching or backfill equipment, delivery trucks or equipment, pickup trucks or other vehicles along or over the trench during or after construction. The Contractor shall be responsible for any damage caused by any equipment or vehicles operated over the trench. If the Contractor must cross the trench, he will do so in one area.

The Landowners are also warned not to operate farm equipment over the trench or along the length of the trench for 1 year after construction in order to protect the tile.

15. Catch Basins (Future Maintenance)

The catch basins shall be 900mm X 1200mm square precast concrete structures. The ditch inlet catch basins shall have a 2:1 sloped top with birdcage type grate. The catch basin shall be located in in the same location as the existing catch basin. The catch basin elevations shall be 50mm above grade.

The catch basins shall be made with the top sections separate from the base sections in order to allow riser sections to be installed or removed as necessary (i.e. the base section shall not extend for more than 150mm above the top of the highest opening in the base section). The wall thickness of all structures shall be 115mm and each shall have a 300mm sump. Birdcage grates shall be manufactured with a bar spacing no larger than 50mm.

The catch basins shall be set at the final elevations as directed by the Drainage Superintendent. The catch basins shall be set on a layer of clear stone. The clear stone shall be extended up to the spring line of the inlet and outlet pipe connections.

The tile at the connection to the ditch inlet catch basins shall be concreted on both the inside and outside prior to backfilling. Any pipe or tile shall not protrude more than 50mm inside the wall.

The Drainage Superintendent may change a birdcage type grate on a ditch inlet catch basin to a concrete lid or flat birdcage grate at the request of a Landowner.

16. Subsurface Drainage (Future maintenance)

All existing subsurface drains encountered during construction of the tile drains shall be reconnected to the proposed tile drain unless otherwise noted on the drawings or as directed by the Drainage Superintendent.

For 100mm and 150mm subsurface drains, the upstream end of the subsurface drain shall be connected to the tile drain at a 45 degree angle. A suitable length of equivalent sized PE agricultural tubing shall be used to connect the drains. Manufactured fittings shall connect the PE tile to the existing drain and to the concrete tile. The connections shall be carefully backfilled and wrapped with filter cloth to ensure there is adequate support under the pipe and large clumps of clay do not displace the tile. It is recommended that clear stone be used under the connections at the tile drain.

17. Silt Fence

A light duty silt fencing shall be installed at Station 1+712 for the duration of construction.

The light duty silt fencing shall be supplied and installed in accordance with OPSS 577 and OPSD 219.110. The light duty silt fencing shall be removed once the disturbed area has been re-vegetated.

18. Restoration

The open channel shall be restored with the following:

- Disturbed areas shall be restored in accordance with the specifications.
- Native topsoil to match existing depths. Topsoil in accordance with OPSS 802.
- Seed the 2m buffer in accordance with the contract drawings and OPSS 804.
- The sideslopes of the channel shall be hand seeded with premium seed on a daily basis.

19. Seeding

As excavation of the channel proceeds, the sideslopes shall be hand seeded on a daily basis. It is also intended to establish a buffer strip with a width of 2 metre along both sides of the channel except in forested areas as shown on the sectional plan, Drawing 5 of 5. The buffer strip shall be seeded.

Areas specified on the drawings or in these specifications shall be seeded upon completion of construction in accordance with OPSS 804. Application rates are as follows:

- Primary seed (85 kg/ha.) consisting of 50% red fescue, 40% perennial ryegrass and 5% white clover.
- Nurse crop consisting of Italian (annual) ryegrass at 25% of total weight.
- Fertilizer (300 kg/ha.) consisting of 8-32-16.

Hand seeding shall be spread on the channel sideslopes on a daily basis with the seed mixture, fertilizer and application rate as shown above. Spreading of the seed shall be by use of a mechanical spreader.

20. Environmental Considerations

The Contractor shall take care to adhere to the following considerations:

- Operate machinery in a manner that minimizes disturbance to the banks of the watercourse.
- Erosion and sediment control measures must be installed prior to construction to prevent sediment from entering the water body.
- Material shall not be placed in areas regulated by the Conservation Authority or Ministry of Natural Resources.
- All granular and erosion control materials shall be stockpiled a minimum of 3.0m from the top of the bank or excavation. Material shall not be placed in surface water runs or open inlets that enter the channel.
- All activities, including maintenance procedures, shall be controlled to prevent the entry of petroleum products, debris, rubble, concrete, or other deleterious substances into the water. Vehicle and equipment refuelling and maintenance shall be conducted away from the channel, any surface water runs, or open inlets. All waste materials shall be stockpiled well back from the top of the bank and all surface water runs and open inlets that enter the drain.
- When possible, all construction within the open channel shall be carried out during periods of low flow or in dry conditions.
- The Contractor shall conduct regular inspections and maintain erosion and sediment control measures and structures during the course of construction.
- The Contractor shall repair erosion and sediment control measures and structures if damage occurs.
- The Contractor shall remove non-biodegradable erosion and sediment control materials once site is stabilized.
- Remove all construction materials from site upon project completion.
- If water is present in the channel at the time of construction the work must be isolated into sections with silt fencing installed immediately downstream of each section. Any fish encountered within the isolated area shall be relocated upstream of the isolated area.

Fisheries and Oceans Canada
Pêches et Océans Canada

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

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

June 26, 2020

Our file *Notre référence*
PATH # 20-HCAA-00859

Michael Gerrits
4218 Oil Heritage Rd.,
P.O. Box 1928, Petrolia, ON,
N0N 1R0

Subject: DRAIN, AUSABLE RIVER, PARKHILL (PATH # 20-HCAA-00859) – Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

Dear Michael Gerrits:

The Fish and Fish Habitat Protection Program (the Program) of Fisheries and Oceans Canada (DFO) received your proposal on April 21, 2020. We understand that you propose to:

- increase the bank slope to 2H:1V to stabilize the banks
- install riprap protection in the channel bottom and 1 m of bank at the outlet
- seed the disturbed portion of the channel
- clean-out/deepen/widen a large portion of the drain
- repair drain tiles near the outlet
- remove brush and trees using a mechanical grinder

Our review considered the following information:

- Request for Review form and associated documents submitted on April 21, 2020.

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

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

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

Canada

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

- Plan in-water works, undertakings and activities to respect timing windows to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed and migrate.
    - No in-water work between April 1st and July 15th
- Conduct in-water undertakings and activities during periods of low flow
- Isolate the work area and conduct a fish rescue/relocation if fish are present
- Limit the duration of in-water works, undertaking and activities so that it does not diminish the ability of fish to carry out one or more of their life processes (spawning, rearing, feeding, migrating)
- Develop and implement an erosion and sediment control plan to minimize the introduction of sediment into any waterbody during all phases of the work, undertaking or activity;
    - Monitor the watercourse to observe signs of sedimentation during all phases of the work, undertaking or activity and take corrective action
    - Operate machinery on land or from barges
    - Use biodegradable erosion and sediment control materials whenever possible
- Replace/restore any other disturbed habitat features and remediate any areas impacted by the work, undertaking or activity
- Stabilize any waste materials removed from the work site to prevent them from entering the watercourse
- Do not deposit any deleterious substances in the water body
- Develop and implement a response plan to avoid a spill of deleterious substances

Provided that you incorporate these measures into your plans, the Program is of the view that your proposal will not require an authorization under the *Fisheries Act*, the *Aquatic Invasive Species Regulations* or the *Species at Risk Act.*

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

It is also your *Duty to Notify* DFO if you have caused, or are about to cause, the death of fish by means other than fishing and/or the harmful alteration, disruption or destruction of fish habitat. Such notifications should be directed to (http://www.dfo-mpo.gc.ca/pnw-ppe/CONTACT-eng.html).

We recommend that you notify this office at least 10 days before starting your project and that a copy of this letter be kept on site while the work is in progress. It remains your

.../3

responsibility to meet all other federal, territorial, provincial and municipal requirements that apply to your proposal.

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

Yours sincerely,

Samantha Ramirez
Biologist, Triage and Planning
Fish and Fish Habitat Protection Program

AUSABLE BAYFIELD CONSERVATION

CREATING AWARENESS | TAKING ACTION

May 12, 2020

File: L.2.11.

Municipality of North Middlesex
Attn: Glen Bullock Drainage Superintendent
229 Main St, Box 9
Parkhill, ON
N0M 2K0

Adelaide Metcalfe

Bluewater

Dear Mr. Bullock:

Central Huron

Re: Final Report for the Campbell Drain
Lot 7 & 8, Concession 14 & 15 ECR
Municipality of North Middlesex, (Former Township of East Williams)

Huron East

We acknowledge receipt of your correspondence regarding the above-noted matter and we advise of the following comments:

Lambton Shores

Lucan Biddulph

Ontario Regulation 147/06 (Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses

Middlesex Centre

We have no concerns with the scope of the work as presented in the report submitted to this office with regards to Ontario Regulation 147/06. We would like to remind the Municipality that as of February 2004, the ABCA has been charging a review fee of $300 for reviews under Section 28 of the Conservation Authorities Act pertaining to new Municipal Drainage Reports. An invoice pertaining to this review is attached.

North Middlesex

Perth South

As we understand, the works consist of the improvement and incorporation of the Campbell Drain in the above mentioned area. The Campbell Drain will consist of approximately 300m of 300-450mm tile from its outlet into the open channel at Coldstream Road, and 999m of open channel to the confluence and outlet with the Watson drain. A drainage coefficient was not provided for the incorporated tile; however, it does include one catch basin.

South Huron

Warwick

Open Channel Construction:

West Perth

The open channel downstream of Coldstream Road will require a deepening for approximately 999m. To facilitate a stable bank throughout, side-slopes will be a 2:1, with a 1-1.5m bottom. The drain will include 2m wide buffers on each side of the drain extending from the top of bank. Further, included in the report (Specifications of Works – Item 10) is the provision to keep the spoils away from the low-runs to ensure that surface flows can enter the drain.

Culvert Replacement:

The existing culvert across Coldstream Road at Station 0+452 will be replaced under this report (see measures outlined below specific to these works)

Recent Enclosure:

Further to the proposed works, the open channel from Station 0+120 to Station 0+432 will be abandoned. It is our understanding that this Municipal Drain was an open channel, and was enclosed in or around 2017, without any permissions under the Drainage Act, or the Conservation Authorities Act. As such, it is considered to be in violation to both of the aforementioned Acts.

This may affect the eligibility for grants as they relate to the enclosed portion - including the abandoned channel, and the required deepening of the receiving channel.

The following mitigation measures, in respect to Ontario Regulation 147/06 are intended to minimize the threat of downstream and site impacts, including erosion and flooding concerns. They are listed below for your information:

(i) In accordance to Ontario Regulation 147/06 (Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses), all spoil materials hauled away from the work site are to be taken to a non-regulated area unless prior written permission is given from an Officer of the ABCA.

(ii) To minimize potentially negative impacts to the downstream water quality and in the receiving watercourse, works should take place during dry conditions.

(iii) As noted in the report, erosion and sediment control measures should be installed prior to construction and remain in place until vegetation cover and work site becomes stabilized.

(iv) There will be no increase in flows resulting from this drainage works. No increased erosion shall occur in the receiving watercourse as a result of these works.

(v) ***Placement of the one (1) catch basin's invert inverts should ensure that minor attenuation of surface flows is permitted in order that minimal top soil from upstream lands is lost and conveyed directly into the tile system during large runoff events.***

Specific to works in the open channel portion (Maintenance and Construction):

(vi) Place brush, debris and sediment outside of the floodplain area in such a location as to minimize entry into the channel.

(vii) Leveled spoil should be gapped in low run areas, as noted in the report to allow for drainage of flood waters back into the watercourse.

(viii) Perform work in appropriate flow conditions to minimize debris movement and erosion.

(ix) Limit soil movement and erosion; use appropriate control measures before work begins and inspect and maintain those measures regularly until all disturbed areas are stabilized.

(x) Any natural areas of disturbed or bare soil around the outlet should be seeded with native, non-invasive herbaceous material while the ground is moist and conditions are appropriate for germination.

Specific to Culvert Removal and Installation at Coldstream Road (Station 0+452):

(xi) The existing 900mm (with a 1000mm extension) culvert will be replaced and improved with a 1200mm HDPE or an approved CSP equivalent at a future time. If the replacement should occur over 1 year past the date of this letter, please notify the ABCA of the proposed works.

(xii) The final approved culvert shall avoid flooding impacts upstream and downstream

(xiii) As a perched culvert, appropriately sized and placed erosion protection will be installed.

(xiv) Sediment and erosion features shall be installed prior to the removal of the existing culvert, and remain until the site has become stabilized after construction.

Section 35: Federal Fisheries Act

This ABCA advice shall not be construed as any form of review or advice in regard to compliance with requirements under the Federal Fisheries Act. Please refer to the following links in regard to the requirements of the Federal Fisheries Act or Self Assessment process for project proponents.

http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html
fisheriesprotection@dfo-mpo.gc.ca
Phone: 1-855-852-8320

Further, this correspondence does not release the proponent of the responsibility for obtaining any other permits that may be required under federal, provincial or municipal legislation.

Please note that this review does not release the proponent of the responsibility for obtaining any other permits that may be required under federal, provincial or municipal legislation. Please be advised that Endangered Species could be present in this area and are protected under the *Endangered Species Act* (ESA 2007). Contact your local Ontario Ministry of the Environment, Conservation and Parks office to ensure your proposal does not contravene the ESA 2007. Additional information on species at risk can be found at **https://www.ontario.ca/page/species-risk**

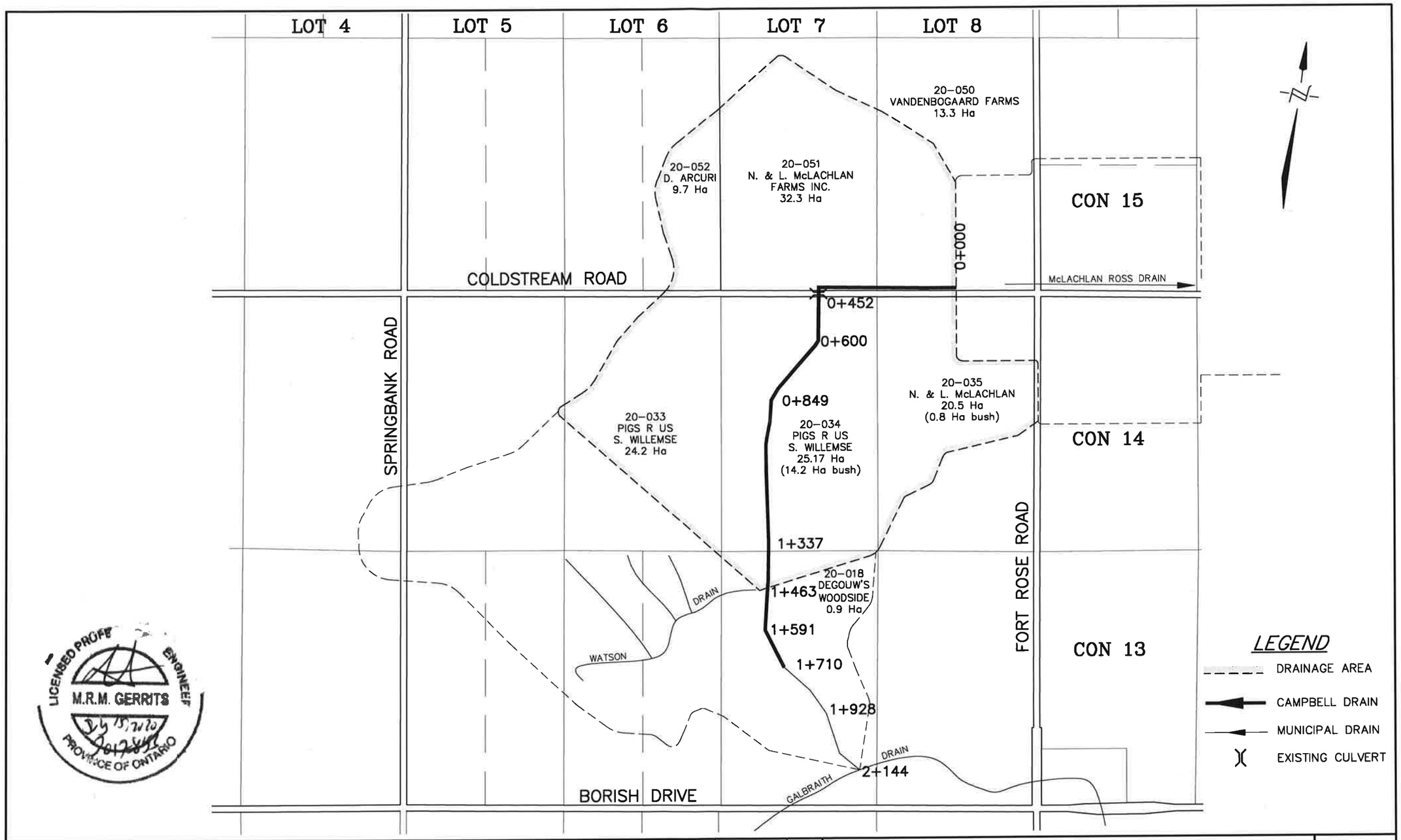
I trust this information is clear. However, if you have any questions regarding the above, please do not hesitate to contact the undersigned at our office.

Yours truly,

AUSABLE BAYFIELD CONSERVATION AUTHORITY

Davin Heinbuck
Water Resources Coordinator
DH:dh

cc. R. Dobbin Engineering, Att: Michael Gerrits, P. Eng.



LICENSED PROFESSIONAL ENGINEER
M.R.M. GERRITS
PROVINCE OF ONTARIO

Dobbin Engineering Inc.
4218 Oil Heritage Road
Petrolia Ontario, N0N 1R0
Phone: (519) 882-0032 Fax: (519) 882-2233

DRAWING NAME: Campbell Drain Plan

PROJECT No. 2017-853

APPROVED	M. GERRITS
CHECKED	J. WARNER
DRAWN	B. VAN RUITENBURG

NO.	REVISIONS	DATE	BY
1	FINAL REPORT	JULY 15, 2020	MG

SCALE: 1:12,000
0 120 240 360m

MUNICIPALITY of NORTH-MIDDLESEX

CAMPBELL DRAIN PLAN

Last Updated: July 14, 2020

GENERAL NOTES

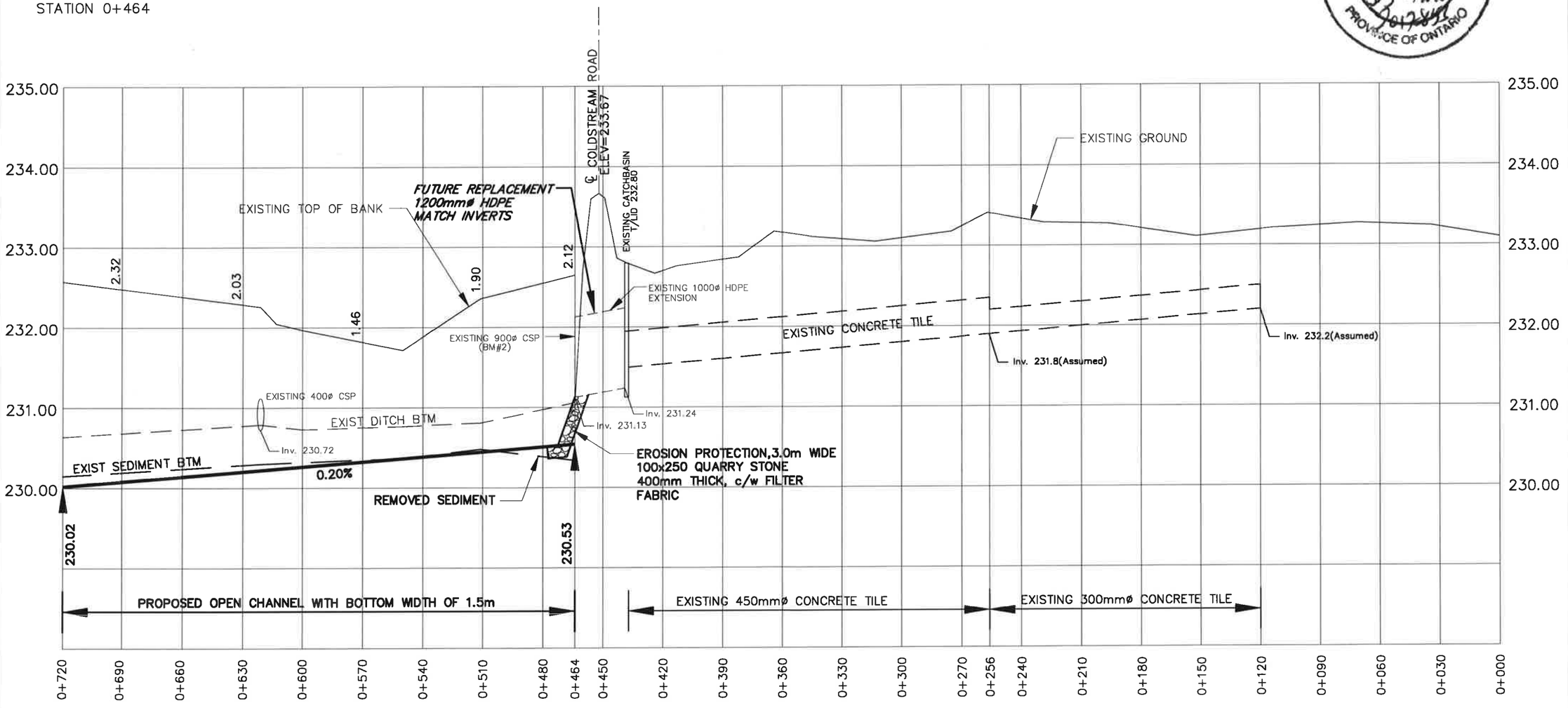
1. BENCHMARK No.1 ELEV. 232.506
   TOP OF EXISTING CSP CULVERT
   CROSSING FORT ROSE ROAD
   205m EAST OF STATION 0+000

   BENCHMARK No.2 ELEV. 232.005
   TOP OF EXISTING 900ø HDPE
   CROSSING COLDSTREAM ROAD
   STATION 0+464

2. UPPER NUMBERS ARE DEPTH FROM TOP OF BANK TO BOTTOM OF NEW CHANNEL.

3. ALL EXISTING ROCK CHUTES OR OVERLAND SWALES THAT DISCHARGE DIRECTLY INTO THE DRAIN, TO BE RESTORED TO CURRENT SPECIFICATION.

LICENSED PROFESSIONAL ENGINEER
M.R.M. GERRITS
July 15, 2020
PROVINCE OF ONTARIO



Dobbin Engineering Inc.
4218 Oil Heritage Road
Petrolia Ontario, N0N 1R0
Phone: (519) 882-0032 Fax: (519) 882-2233

DRAWING NAME: Campbell Drain Profile 1

PROJECT No. 2017-853

APPROVED	NO.	REVISIONS	DATE	BY
M. GERRITS				
CHECKED	1	FINAL REPORT	JULY 15, 2020	MG
J. WARNER				
DRAWN				
B. VAN RUITENBURG				

SCALE: 1:2,000
0 20 40 60m

MUNICIPALITY of NORTH MIDDLESEX

CAMPBELL DRAIN
PROFILE

Last Updated: July 14, 2020

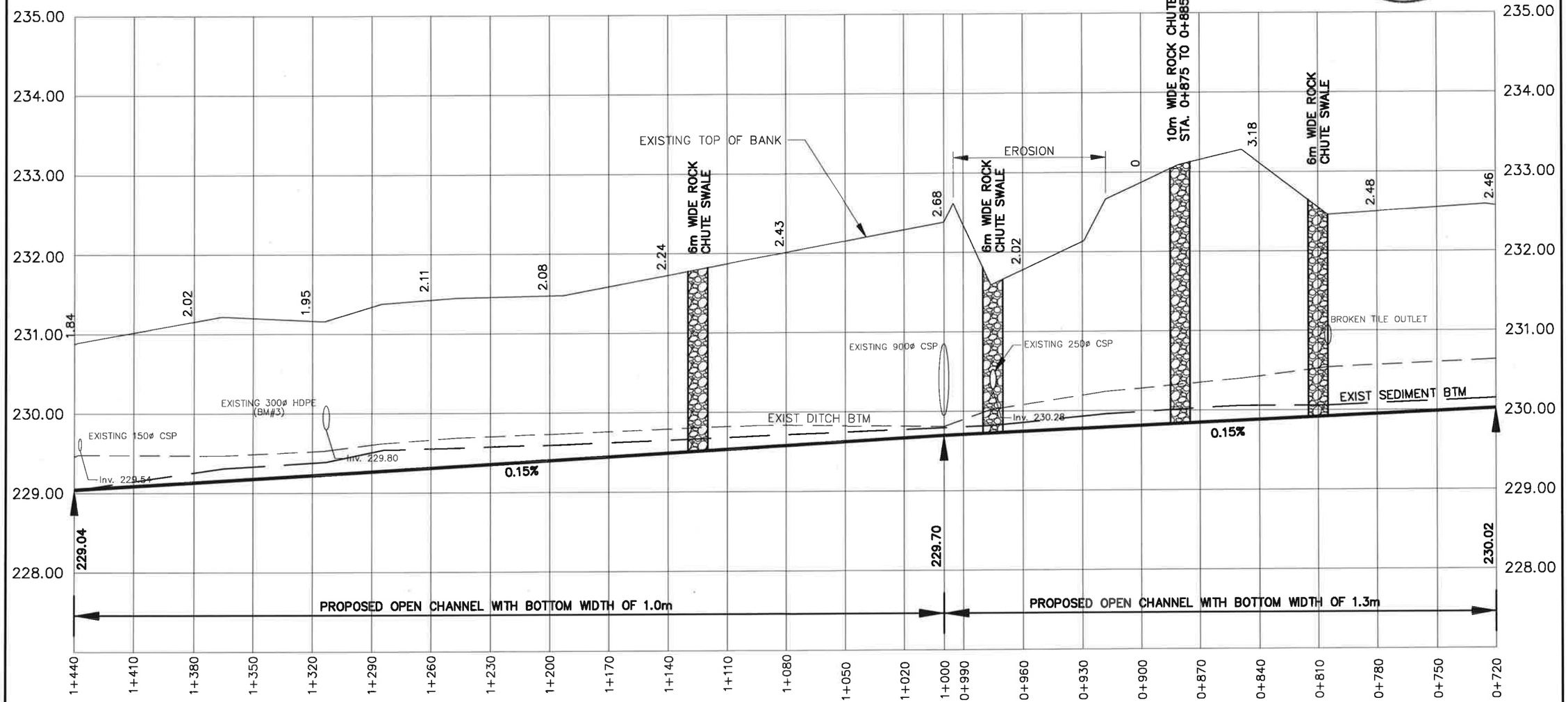
GENERAL NOTES

1. BENCHMARK No.1 ELEV. 232.506
   TOP OF EXISTING CSP CULVERT
   CROSSING FORT ROSE ROAD
   205m EAST OF 0+000

   BENCHMARK No.3 ELEV. 230.128
   TOP OF EXISTING 300ø HDPE
   TILE OUTLET STATION 1+313

2. UPPER NUMBERS ARE DEPTH FROM
   TOP OF BANK TO BOTTOM OF NEW CHANNEL.

LICENSED PROFESSIONAL ENGINEER
M.R.M. GERRITS
PROVINCE OF ONTARIO



Dobbin Engineering Inc.
4218 Oil Heritage Road
Petrolia Ontario, N0N 1R0
Phone: (519) 882-0032 Fax: (519) 882-2233

DRAWING NAME: Campbell Drain Profile 2

PROJECT No. 2017-853

APPROVED	NO.	REVISIONS	DATE	BY
M. GERRITS				
CHECKED	1	FINAL REPORT	JULY 15, 2020	MG
J. WARNER				
DRAWN				
B. VAN RUITENBURG				

SCALE: 1:2,000
0 20 40 60m

MUNICIPALITY of NORTH MIDDLESEX

CAMPBELL DRAIN
PROFILE

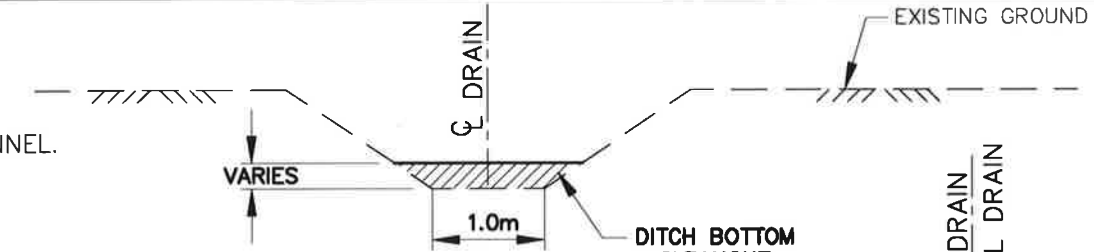
Last Updated: July 14, 2020

GENERAL NOTES

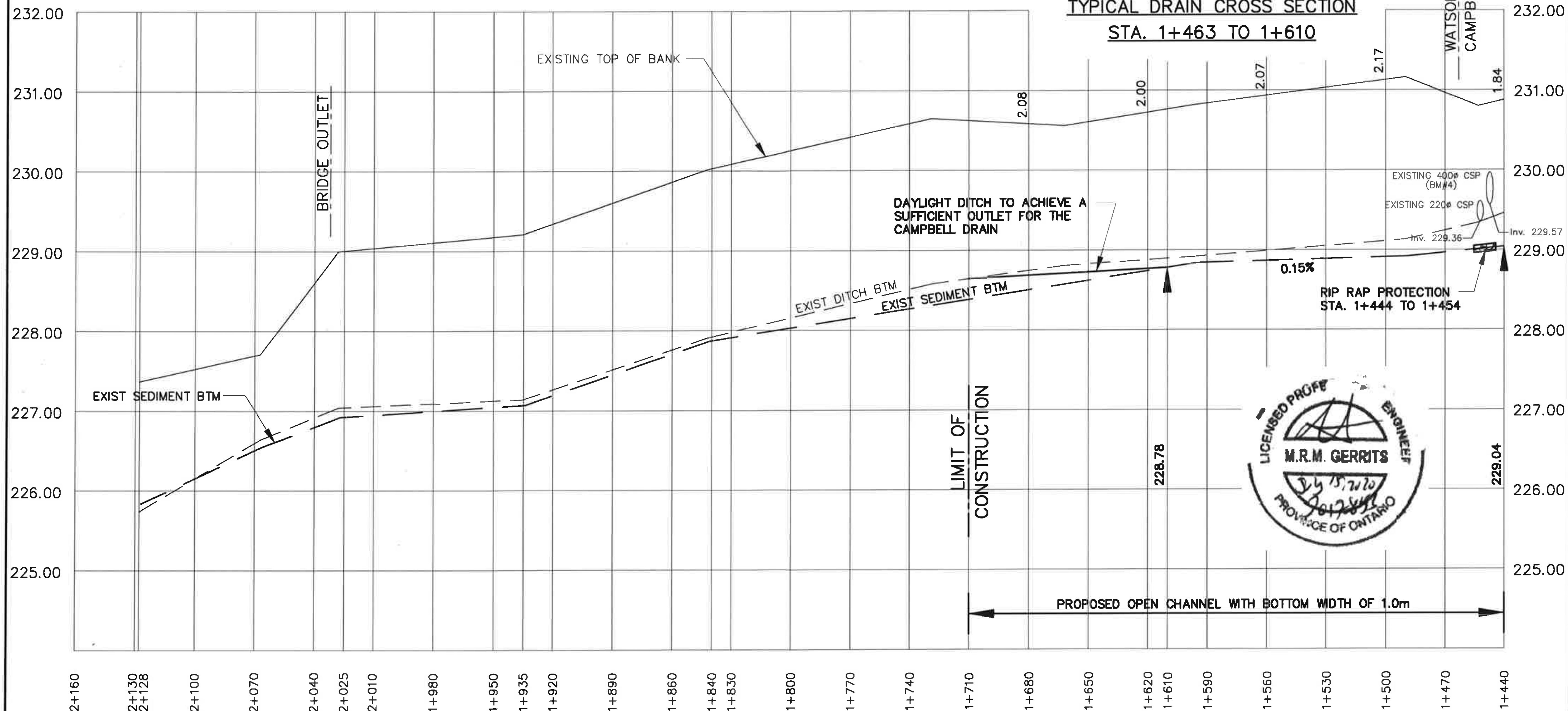
1. BENCHMARK No.1 ELEV. 232.506
   TOP OF EXISTING CSP CULVERT CROSSING FORT ROSE ROAD 205m EAST OF 0+000

   BENCHMARK No.4 ELEV. 229.977
   TOP OF EXISTING 400ø CSP TILE OUTLET STATION 1+447

2. UPPER NUMBERS ARE DEPTH FROM TOP OF BANK TO BOTTOM OF NEW CHANNEL.



TYPICAL DRAIN CROSS SECTION
STA. 1+463 TO 1+610



R Dobbin Engineering Inc.
4218 Oil Heritage Road
Petrolia Ontario, N0N 1R0
Phone: (519) 882-0032 Fax: (519) 882-2233

DRAWING NAME: Campbell Drain Profile 3

PROJECT No. 2017-853

APPROVED M. GERRITS

CHECKED J. WARNER

DRAWN B. VAN RUITENBURG

NO.	REVISIONS	DATE	BY
1	FINAL REPORT	JULY 15, 2020	MG

SCALE: 1:2,000
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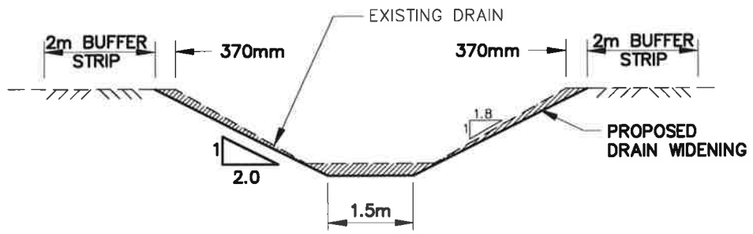
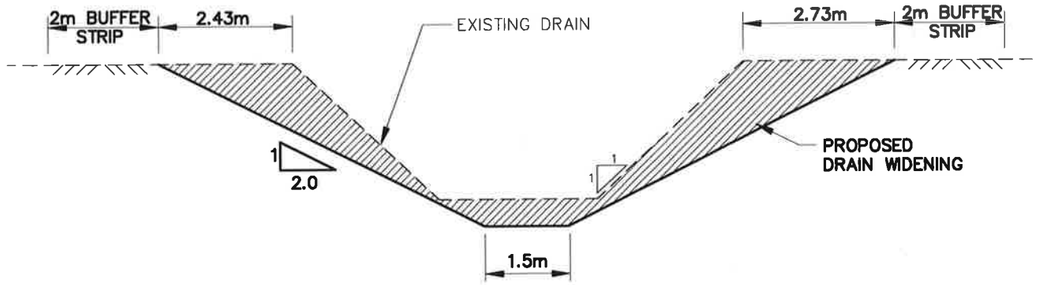
MUNICIPALITY of NORTH MIDDLESEX

CAMPBELL DRAIN
PROFILE

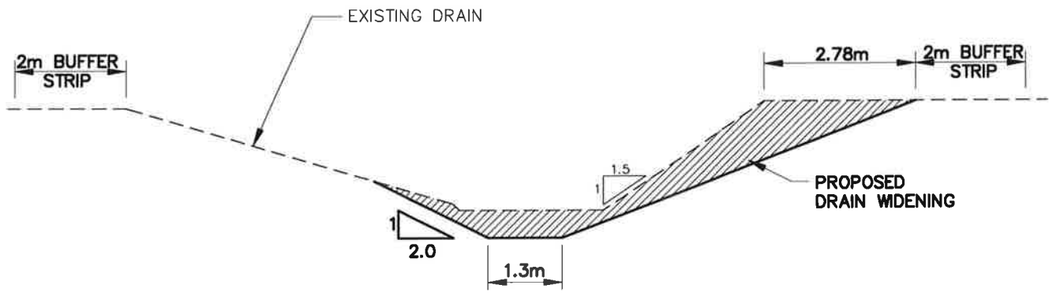
Last Updated: July 14, 2020



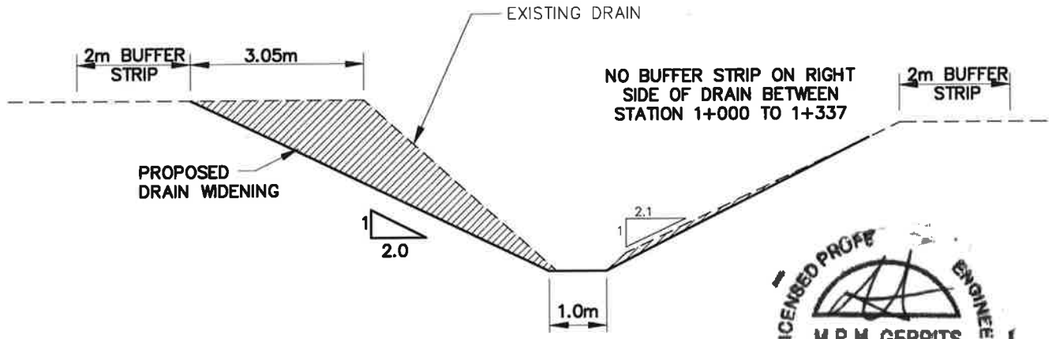
DRAIN SECTION 0+510



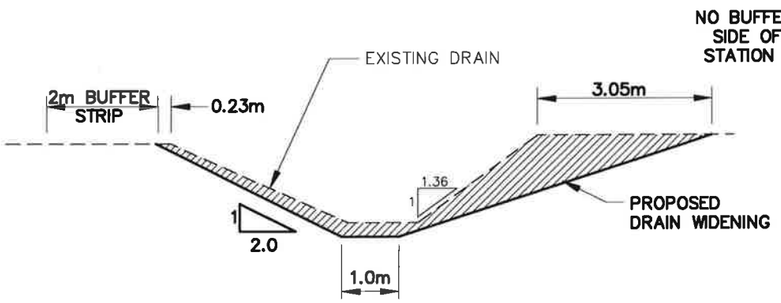
DRAIN SECTION 0+725



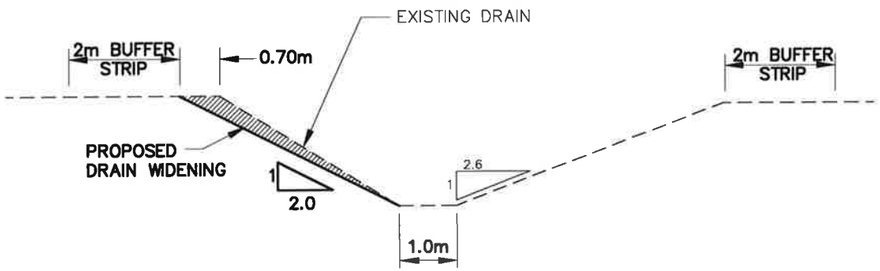
DRAIN SECTION 0+805



DRAIN SECTION 1+000



DRAIN SECTION 1+313



DRAIN SECTION 1+448

Dobbin Engineering Inc.
4218 Oil Heritage Road
Petrolia Ontario, N0N 1R0
Phone: (519) 882-0032 Fax: (519) 882-2233

DRAWING NAME: Campbell Drain Typical Sections

PROJECT No. 2017-853

APPROVED M. GERRITS	NO.	REVISIONS	DATE	BY
CHECKED J. WARNER	1	FINAL REPORT	JULY 15, 2020	MG
DRAWN B. VAN RUITENBURG	SCALE: 1:100 0 1 2 3m			

MUNICIPALITY of NORTH MIDDLESEX

CAMPBELL DRAIN
TYPICAL SECTIONS

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