
December 23, 2021

The City of Kawartha Lakes
26 Francis Street
Lindsay, ON
K9V 5R8

Mayor, Council and Drainage Board,

Re: Hugh Davidson Drain

In accordance with your instructions, I have undertaken an examination of the Hugh Davidson Drain with regard to enclosing a portion of open channel on Part of the West ½ of Lot 19, Concession 8 (Area Roll Number 30-234) in the City of Kawartha Lakes.

The work includes the following:

- Preparing a new drain report to include the enclosure complete with maintenance specifications.
- Preparing updated Schedules of Maintenance for the drain.

Authorization under the Drainage Act

As per the request of an affected landowner, this Engineer's Report has been prepared under Section 78 of the Drainage Act by M. Gerrits Consulting Inc.

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 also 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 works; 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 Hugh Davidson Drain is 1,960m in length and is located in Part of Lots 18, 19, and 20 Concession 8, in the City of Kawartha Lakes. The drain commences at the north limit of the Highway 7 (Hwy 7) road allowance.

In July of 1977, H. M. Gibson prepared a drain report for the Hugh Davidson Drain. The drain was a combination of an open and closed drain. The closed drain commenced at the northern limits of the Hwy 7 corridor and extends 802m in a southwesterly direction outletting to an open channel just west of the Taylor Road road allowance. The closed drain has a grade of 0.2%.

The open ditch extends 1,158m in a southwesterly direction and discharges into the Mariposa Brook. The open channel has grades that range between 0.2% in the upper reaches and 0.95% in the lower reaches. At the time of the site investigation, the open channel was free flowing.

The report did not include access culverts. There is one access culvert on the drain which is located at station 1+335. The access services the lands ending with the Area Roll Number (ARN) 30-234. The culvert is in poor shape, does not have sufficient cover and is in need of replacement.

The open channel on Part of the East ½ of Lot 19, Concession 8 (ARN 30-235) was enclosed privately by a landowner. The date of the enclosure is unknown. It appears the landowner installed a 350mm dia. concrete tile c/w a 450mm dia. CSP outlet pipe. The outlet pipe has separated from the concrete tile and is in need of repair.

On Site Meeting

An onsite meeting was held on November 10, 2020 on Taylor Road where the drain crosses the road allowance. The following attended the meeting:

Mike Farquhar, City of Kawartha Lakes
Lucas Feitler, City of Kawartha Lakes
Brett Tregunno, Kawartha Conservation
Michael Gerrits, M. Gerrits Consulting Inc.
Dave Appleton, Landowner
Ed Bagshaw, Landowner
Jon Bagshaw, Landowner
Carol Garland, Landowner
Ashu Kahol, Enbridge
Steve Lancaster Landowner
Randy Page, Landowner

The following is a summary of the meeting:

- MG reviewed the Drainage Act.
- MG discussed the enclosure across the lands ending with the ARN 30-235. The enclosure is considered private since it was completed outside of the Drainage Act without a Drain Report. The landowners confirmed that the capacity of the drain is not an issue even with the enclosure on the lands ending with the ARN 30-235.
- MG explained that the cost associated with enclosing a drain will be assessed against the landowner enclosing the drain less costs such as ditch cleanouts, brushing etc. Most of the costs associated with the enclosure will not be grantable.
- MG informed landowners that the new tile will be designed to the 37.5m/24hr drainage coefficient.
- EB requested the new drain be located in the channel bottom. MG stated the new drain would need to be founded on native soil and this would be determined once the survey is completed.
- MG requested clarification on approvals. BT mentioned that Kawartha Conservation does not have any issues with the proposed work providing the spoils are free of contaminants.

After the meeting EB, JB LF and MG met at the proposed drain enclosure. EB confirmed the spoils were not contaminated and were subsoils. EB feels the existing channel downstream of the enclosure is stable and would prefer that the works not significantly alter the downstream channel. MG mentioned that the drains are typically designed with a freeboard and are extended to a sufficient outlet. MG will consider leaving the existing channel in its natural state providing there is a future maintenance clause in the report to ensure the drain will always have a sufficient outlet.

MG contacted Will MacArthur to discuss the drain. The MacArthurs are not interested in incorporating the drain at this time. The MacArthurs are aware that they may need to incorporate it in the future if the drain becomes a problem with capacity or lack of maintenance. All maintenance on this portion of the drain will be at the MacArthurs' expense and may include restoring it to the original open channel if the Landowner fails to maintain the drain.

Recommendations

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

- Prepare a new report to address the proposed enclosure complete with maintenance specifications.
- Prepare a new Schedule of Maintenance for the maintenance and repair of the drain.

Approvals

Kawartha Conservation is aware of the project and attended the site meeting. Kawartha Conservation has no objection to the proposed works. Approval from Kawartha Conservation was obtained prior to submitting this report.

The Department of Fisheries and Oceans has no objection to the proposed works. Approval from the Department of Fisheries and Oceans was obtained prior to submitting this report.

Design

The proposed tile drain shall be designed to accommodate a drainage coefficient of 37mm/24 hours. This is generally acceptable for lands used for cash crops with provision for surface water. Tile design criteria includes an assumed minimum tile depth of 760mm plus diameter of tile. The downstream channel is free flowing and does not appear to have a significant amount of sediment and as such it is proposed to do minimal work within the downstream channel. The report does include a modified gradeline for future maintenance in the event the capacity of the downstream channel becomes reduced due to debris and sediment. Currently the existing channel is stable with minimal accumulation of sediment. The intention of the Drain Report is to minimize disturbance of the downstream channel.

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. An Estimate of Cost has been prepared in the amount of \$89,403 which includes engineering but does not include inspection during construction.

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 his 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)

The cost of any approvals, permits or any extra work (beyond that specified in this report), that is required by any utility or road authority shall be assessed to that organization requiring the permit, approval, or extra work under Section 26 of the Drainage Act.

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

1. The cost of working around an existing fence and removing and repairing in the CSP outlet pipe has been assessed with 100% of the costs applied as an outlet assessment to all upstream lands and roads based on equivalent hectares.
2. The costs of CB#1 have been assessed equally to the lands ending with the ARN 30-234 and ARN 30-235.
3. Access culverts are generally assessed with 50% of the cost applied as a benefit assessment to the benefiting landowner and the remaining costs assessed upstream based on equivalent hectares. The cost to replace the existing access culvert was estimated to be \$14,978. Since the enclosure eliminates the need for the access culvert at Station 1+335, 50% of the estimated costs of an access (\$7,489) has been assessed as an outlet assessment to all upstream lands and roads based on equivalent hectares. All remaining costs of the enclosure were assessed with 89% of the costs assessed against the benefiting landowner and the remainder of the costs applied as an outlet assessment to all upstream lands and roads based on equivalent hectares.
4. The costs to update the maintenance schedules has been assessed with 100% of the costs applied as an outlet assessment based on equivalent hectares for each schedule.

Agricultural Grant

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. The additional costs associated with the proposed enclosure on Bagshaw property has been assessed as special benefit and under the current ADIP policy, is not eligible for grant.

Access and Working Area

It is proposed to maintain the existing working area identified in the 1977 H. M. Gibson Ltd. drain report which includes a 21.5m (70') wide working area for open channels and a 30.5m (100') working area for closed drains. The open channel working area is located on the spoil side (South side) of the open ditch. The closed drain working area is centred on the drain.

Access to the work site shall be gained from road allowances when possible, along existing private lanes and along the fence lines. Access to the drainage works shall be supplied through each property. Access to the working area along the private lanes and fence lines shall be restricted to a width of 6m.

Allowances

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. Section 30 allowances for access will be paid at the crop rate regardless of the land use.

Allowances for crop loss are based on \$1,500.00 per hectare for the first year and \$750.00 for the second year (total \$2,250.00 per hectare).

Restrictions

No trees may be planted within 15m in the vicinity of the drainage works. If planted trees must be removed because they interfere with the drainage work or with access or other maintenance activities, they shall be removed at the expense of the Property Owner. Permanent structures are not to be erected within 10m of either side of the drainage works.

Existing Private Drainage

All existing subsurface drainage encountered during the construction shall be restored to the original condition or better.

Maintenance

Upon completion of the work, the drainage works shall be maintained as per the applicable Schedule of Maintenance enclosed with this Report unless otherwise altered under provisions of the Drainage Act or as outlined below.

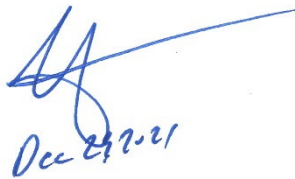
- The Hwy 7 road crossing including any ditching in the vicinity of the catch basin shall be maintained using the following cost distribution: 98% of the cost applied as a benefit assessment to the road authority and 2% of the costs applied as an outlet assessment to all upstream lands and roads based on equivalent hectares.

- The Taylor Road road crossing including any ditching in the vicinity of the catch basin shall be maintained using the following cost distribution: 95% of the cost applied as a benefit assessment to the road authority and 5% of the costs applied as an outlet assessment to all upstream lands and roads based on equivalent hectares.
- The closed drain between station 0+802 and Station 1+170 cannot be maintained under this report or the H. M. Gibson Ltd. report dated 1977 since it was enclosed privately. The drain must be maintained by the Landowner at their expense. If the drain is not maintained by the Landowner the drain may need to be restored to the original channel at the expense of the Landowner.
- Catch basin, CB#1, shall be maintained with 50% of the cost to the immediate upstream property and 50% to the immediate downstream property.

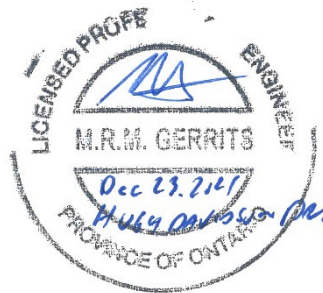
The open channel between 1+383 and 1+960 shall be maintained in accordance with the H. M. Gibson Ltd. report dated 1977.

All of the above is submitted for your consideration.

Yours truly,



Dec 23, 2021



Michael Gerrits, P. Eng.
M. Gerrits Consulting Inc..

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ALLOWANCES

Allowances have been made as per Sections 30 of the Drainage Act for damages to lands and crops including for future maintenance operations.

Conc.	Lot or part	Roll No.	Owner	Section 30 (\$)	Total (\$)
<u>Agricultural Lands</u>					
8	Pt Lot 19	30-234	E. Bagshaw	765	765
		30-235	B. MacArthur	412	412
Total Allowances				\$ 1,177	\$ 1,177

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ESTIMATE OF COST

	Quantity	Unit	Material	Labour	Total
Allowances:					1,177
Complete Benchmark Loop and Verify Benchmarks	1	ea	0	250	250
Remove Existing Outlet Pipe (Station 1+166)	1	ea	50	250	300
Remove Fence (1+170)	1	ea	0	150	150
Remove 800mm CSP Access Culvert (Station 1+335)	1	m	50	250	300
Brush Channel (Station 1+340 -to Station 1+346)	6	m	0	600	600
Strip Channel and Stockpile Material for Restoration	170	m	0	3,400	3,400
450mm HDPE Smooth Wall Tile (Station 1+166 to 1+170) c/w Bedding and Connection to Existing Concrete Tile	4	m	480	400	880
525mm HDPE Smooth Wall Tile (Station 1+170 to 1+340) c/w Bedding	170	m	22,950	19,550	42,500
600mm X900mm CB#1 (Station 0+1+170)	1	ea	2,300	680	2,980
Backfill and Restore Channel With Channel Excavation Material and Stockpiled Material	170	m	0	2,550	2,550
Ditch Grading (Station 1+340 to 1+346)	6	m	0	150	150
Rip Rap (Station 1+340)	6	sq.m.	210	210	420
Light Duty Silt Fencing (Station 1+346	5	m	75	75	150
Topsoil (Native) and Seed Disturbed Areas (Station 1+340 to Station 1+346)	6	m	48	120	168
Sub Total					55,975
Construction Contingency					5,477
Engineering					24,671
Schedule of Maintenance Update					750
Tendering Allowance					1,750
Contract Administration Allowance					780
Total Estimate					\$ 89,403

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SCHEDULE OF ASSESSMENT

Conc.	Lot or Part	Affected Hect.	Roll No.	Owner	Special Benefit (\$)	Benefit (\$)	Outlet (\$)	Update Maintenance Schedule (\$)	Total (\$)	Equivalent Ha.
<u>Agricultural Lands</u>										
9	Pt Lot 20	0.54	30-315	Mulock Farms Ltd.	-	-	120	5	125	0.5
	Pt Lot 20	9.50	30-322	B. Vandenberg	-	-	2,110	88	2,198	9.5
	Pt Lot 21	1.30	30-324	D. & D. Appleton	-	-	286	12	298	1.3
8	Pt Lot 19	6.36	30-234	E. Bagshaw	54,928	13,559	90	59	68,636	6.4
	Pt Lot 19	12.91	30-235	B. MacArthur	3,574	-	2,851	120	6,545	12.9
	Pt Lot 19	4.90	30-238	J. Marco	-	-	1,088	46	1,134	4.9
	Pt Lot 20	18.07	30-239	J. & C. Garland	-	-	4,013	168	4,181	18.1
	Pt Lot 20	7.16	30-240-02	Oakview Farms Ltd.	-	-	1,590	67	1,657	7.2
	Pt Lot 21	0.44	30-242	Oakview Farms Ltd.	-	-	98	4	102	0.4
					58502	13559	12246	569	84876	
Total Special Benefit					58,502					
Total Benefit					13,559					
Total Outlet					12,815					
Total - Agricultural Lands					\$ 84,876					

Conc.	Lot or Part	Affected Hect.	Roll No.	Owner	Special Benefit (\$)	Benefit (\$)	Outlet (\$)	Maintenance Schedule (\$)	Total (\$)	Equivalent Ha.
<u>Non Agricultural Lands</u>										
9	Pt Lot 20	0.001	30-319	1 - K. Sharpe & L. McGriskin	-	-	-	1	1	0.002
	Pt Lot 20	0.17	30-321	2 - B. & A. Kent	-	-	76	3	79	0.3
	Pt Lot 20	0.22	30-321-02	3- A. & L. Augustine	-	-	98	4	102	0.4
	Pt Lot 20	0.20	30-321-01	4 - R. Bassett & J. Vaillancourt	-	-	89	4	93	0.4
	Pt Lot 21	0.09	30-323	6 - C. & C. Hill	-	-	40	2	42	0.2
	Pt Lot 21	0.32	30-326	5 - D. & K. Doherty	-	-	142	6	148	0.6
8	Pt Lot 20	0.12	30-239-01	7 - J. Coppins	-	-	53	2	55	0.2
	Pt Lot 20	0.23	30-239-02	8 - S. & H. Hardy	-	-	102	4	106	0.5
	Pt Lot 20	1.76	30-240	9 - L. & S. Davidson	-	-	586	25	611	2.6
					-	-	1186	51	1237	
Total Special Benefit					-					
Total Benefit					-					
Total Outlet					1,237					
Total - Non Agricultural Lands					\$ 1,237					
<u>Public Lands</u>										
	Lot 19/20 Road Allowance	0.79		City of Kawartha Lakes	-	-	526	22	548	2.4
	Taylor Road	1.07		City of Kawartha Lakes	-	-	713	30	743	3.2
	Hwy 7	2.16		Ministry of Transportation Ont.	-	-	1,919	80	1,999	8.6
					-	-	3158	132	3290	
Total Special Benefit					-					
Total Benefit					-					
Total Outlet					3,290					
Total - Public Lands					\$ 3,290					
Total - Agricultural Lands					84,876					
Total - Non Agricultural Lands					1,237					
Total - Public Lands					3,290					
Total Assessment					\$ 89,403					

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SCHEDULE OF MAINTENANCE - SECTION 1

For maintaining the Hugh Davidson Drain between Hwy 7 (Station 0+000) and Taylor Road (Station 0+780). The Hwy 7 Road crossing shall be assessed in accordance with the report.

Conc.	Lot or Part	Affected Hect.	Roll No.	Owner	Benefit (\$)	Outlet (\$)	Total (\$)	Equivalent Ha.
<u>Agricultural Lands</u>								
9	Pt Lot 20	0.54	30-315	Mulock Farms Ltd.	-	61	61	0.5
	Pt Lot 20	9.50	30-322	B. Vandenberg	-	1,083	1,083	9.5
	Pt Lot 21	1.30	30-324	D. & D. Appleton	-	148	148	1.3
8	Pt Lot 20	18.07	30-239	J. & C. Garland	2,510	-	2,510	18.1
	Pt Lot 20	7.16	30-240-02	Oakview Farms Ltd.	1,205	509	1,714	7.2
	Pt Lot 21	0.44	30-242	Oakview Farms Ltd.	-	50	50	0.4
<u>Non Agricultural Lands</u>								
9	Pt Lot 20	0.17	30-321	2 - B. & A. Kent	-	39	39	0.3
	Pt Lot 20	0.22	30-321-02	3- A. & L. Augustine	-	50	50	0.4
	Pt Lot 20	0.20	30-321-01	4 - R. Bassett & J. Vaillancourt	-	46	46	0.4
	Pt Lot 21	0.09	30-323	6 - C. & C. Hill	-	21	21	0.2
	Pt Lot 21	0.32	30-326	5 - D. & K. Doherty	-	73	73	0.6
8	Pt Lot 20	0.12	30-239-01	7 - J. Coppins	-	27	27	0.2
	Pt Lot 20	0.23	30-239-02	8 - S. & H. Hardy	-	52	52	0.5
	Pt Lot 20	1.76	30-240	9 - L. & S. Davidson	-	301	301	2.6
<u>Public Lands</u>								
Lot 19/20 Road Allowance		0.79	City of Kawartha Lakes		-	270	270	2.4
Hwy 7		2.16	Ministry of Transportation Ont.		-	985	985	8.6

Total Assessment For Future Maintenance of Section 1

\$ 7,430

For maintaining the Hugh Davidson Drain between Taylor Road (Station 1+170) and the drain outlet (Station 1+383). The closed drain between Station 0+802 and Station 1+170 was enclosed outside of a report and is to be maintained by the landowner of the property which the drain is located on. The Taylor Road road crossing shall be assessed in accordance with the report.

Conc.	Lot or Part	Affected Hect.	Roll No.	Owner	Benefit (\$)	Outlet (\$)	Total (\$)	Equivalent Ha.
<u>Agricultural Lands</u>								
9	Pt Lot 20	0.54	30-315	Mulock Farms Ltd.	-	9	9	0.5
	Pt Lot 20	9.50	30-322	B. Vandenberg	-	164	164	9.5
	Pt Lot 21	1.30	30-324	D. & D. Appleton	-	22	22	1.3
8	Pt Lot 19	6.36	30-234	E. Bagshaw	845	37	882	6.4
	Pt Lot 19	12.91	30-235	B. MacArthur	-	223	223	12.9
	Pt Lot 19	4.90	30-238	J. Marco	-	85	85	4.9
	Pt Lot 20	18.07	30-239	J. & C. Garland	-	313	313	18.1
	Pt Lot 20	7.16	30-240-02	Oakview Farms Ltd.	-	124	124	7.2
	Pt Lot 21	0.44	30-242	Oakview Farms Ltd.	-	8	8	0.4

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SPECIFICATION OF WORK

1. Scope of Work

The work is to be completed in Part of Lot 19, Concession 8, in the City of Kawartha Lakes. The work includes the following:

- Grub and cleanout of the existing drainage course between Station 1+166 and 1+358.
- Remove and dispose of an existing 900 mm dia. CSP culvert at Station 1+335.
- Remove of an existing 450mm dia. CSP outlet pipe at Station 1+166.
- Install 4m of 450mm dia. smooth walled HDPE tile c/w bedding.
- Install 170m of 525mm dia. smooth walled HDPE tile c/w bedding.
- Install a 600mm X 900mm catch basin c/w birdcage grate.
- 18m of channel cleanout.

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 may be encountered. 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 City of Kawartha Lakes 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 1977 H.M. Gibson Ltd specifications, 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 with the applicable Ontario Provincial Standard Specifications and Standard Drawings.

Any reference to the Owner contained in these Contract Documents shall refer to the City of Kawartha Lakes or the Engineer authorized by the City of Kawartha Lakes 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 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.

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).

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. Access and Working Area

It is proposed to maintain the existing working area identified in the 1977 H. M. Gibson Ltd. drain report which includes a 21.5m (70') wide working area for open channels and a 30.5m (100') working area for closed drains. The open channel working area is located on the spoil side (South side) of the open ditch. The closed drain working area is centred on the drain.

Access to the work site shall be gained from road allowances when possible, along existing private lanes and along the fence lines. Access to the drainage works shall be supplied through each property. Access to the working area along the private lanes and fence lines shall be restricted to a width of 6m.

7. Benchmarks

The benchmarks are based on geodetic elevations (GVD28:78).

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.

The primary benchmark for this project is a nail on the north side of a hydro pole on the east side of Taylor Road where the drain crosses Taylor Road. Elevations and secondary benchmarks are located on the profile drawings.

8. Removals

The existing fence, access culvert, outlet pipe, and end protection (rip rap) shall be removed in their entirety from the open channel. The fence wire and posts, culvert, and rip rap shall be disposed offsite at the expense of the Contractor. Suitable backfill shall be stockpiled adjacent to the site for reuse during installation of the proposed enclosure. Any material not suitable for use shall be disposed offsite by the Contractor.

The Contractor will not be required to restore the fence.

Removals shall be in accordance with OPSS 510.

9. Brushing and Tree Removal

Station 1+170 and Station 1+340

All brush, trees, woody vegetation, etc. shall be removed from the side slopes of the existing channel within the working area using a mechanical grinder mounted on an excavator. Larger trees, brush and stumps shall be burned onsite subject to municipal bylaws and MOE guidelines. The Contractor shall be responsible for obtaining all necessary burning permits.

Station 1+340 and Station 1+383

If the channel between Station 1+340 and Station 1+383 becomes obstructed, the channel can be maintained as per the future gradeline identified on the profile drawings. In the future, tree removal between Station 1+340 and Station 1+383 should be kept to the minimum required to compete maintenance. Tree removal on this section of drain will require approval from the Kawartha Regional Conservation Authority

Brushing and clearing shall be in accordance with OPSS MUNI 201.

10. Strip Existing Channel

The existing channel shall be stripped of organic matter. Topsoil shall be placed on the south side of the drain between Station 1+166 and 1+340 and the material must be used as part of the final restoration.

Stripping shall be in accordance with OPSS 206.

11. Excavation of Channel

The open channel shall be excavated and maintained to the depths and grades as per the profile and drawings as contained in this Engineers 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.

All excavated materials which are excess to the requirements of the contract shall be levelled within the working area. Suitable organic material can be used for restoration. Spoils shall be placed a minimum of 1.5m back from the top of the bank. The excavated material shall be placed and levelled to a maximum depth of two hundred millimetres (200mm) and shall not impede overland drainage.

Minor ditch bottom cleanout of the existing channel between Station 1+340 and 1+346 will be completed under this report. When possible, the cleanout shall be completed with no disturbance to the existing channel banks and treed area.

If the channel between Station 1+340 and Station 1+383 becomes obstructed, the channel can be maintained as per the future gradeline identified on the profile drawings. Tree removal between Station 1+340 and Station 1+383 should be kept to the minimum required to compete maintenance. Tree removal will require approval from the Kawartha Regional Conservation Authority.

Restoration shall be in accordance with the restoration specification.

Excavation shall be in accordance with OPSS 206.

12. Expose Existing Drain

The existing tile drain shall each be exposed at Station 1+166 prior to the start of construction and the invert elevation verified. The Contractor shall notify the Drainage Superintendent or Engineer if there are any discrepancies between their elevation and the elevation listed on the profile.

13. Installation of Tile

The Contractor shall supply, install, and backfill the specified sizes of tile and pipe to the depths and grades as shown on the drawings. HDPE shall be smooth wall gasketed pipe with bell and spigot joints (320 kPa)/coupler joint (320 kPa). The joints between the existing concrete tile and the proposed HDPE tile shall be wrapped with filter cloth.

It is intended that the proposed tile drain be located in the bottom of the channel providing the tile bedding can be founded on native substrate. If the tile bedding cannot be founded on native substrate, the Contractor must notify the Drainage Superintendent or Engineer to determine if additional granular material will be installed or if the drain alignment is to be moved south into the existing channel bank.

The tile must be installed as per the manufacturers' recommendations with Granular "A" bedding from the native soil to the springline of the tile. 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 to a depth of approx. 500mm over the pipe 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 of offsite. The Landowners are responsible for the remainder of stone.

The material shall be left windrowed over tile to allow for settlement.

All areas disturbed by construction, except the material windrowed over the tile 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 advised 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.

The existing open channel shall be filled in with material currently stockpiled on the north side of the drain. Backfill material shall be mechanically compacted to 95% standard proctor maximum dry density. Any backfill material that appears to be

contaminated material must not be used for backfill and will be disposed off offsite by the Landowner.

Restoration shall be in accordance with the restoration specification.

14. Catch Basins

The catch basin shall be installed to the elevation and in the location shown on the drawings as follows:

Structure	Station	Type (mm)	Top Elev. (m)	Outlet Pipe Elev. (m)	Inlet Pipe Elev. (m)
CB#1	1+170	600X900	265.73	264.36 (525mm)	264.50 (450mm)

The catch basin shall be 600mm x 900mm precast concrete structures as noted above. The catchbasin shall have a flat top with birdcage type grate.

The catchbasins 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 600mm sump. Birdcage grates shall be manufactured with a bar spacing no larger than 50mm.

The catchbasin 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 springline of the inlet and outlet pipe connections.

The tile/pipe at the connection to the catch basin 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.

15. Subsurface Drainage

For 100mm and 150mm subsurface drains, the upstream end of the subsurface drain shall be connected to the tile drain at an angle not exceeding 45 degrees. 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 to ensure there is adequate support under the pipe and large clumps of clay do not displace the tile. It is recommended that drainage stone be used under the connections at the tile drain.

16. Outlet Works

The proposed outlet works consists of rip rap and filter fabric and shall be installed on the channel side slope from the bottom of the channel to the top of the bank and for a distance of 1m on either side of the outlet pipe. Rip rap shall be made up of 200mm nominal 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 300mm above the obvert of the tile. After grading, a layer of filter fabric (Mirafi P150 or approved equal) is to be placed with any joints overlapping 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.

17. Silt Fence

Light duty silt fencing shall be installed immediately downstream of any channel works for the duration of construction. The silt fence shall consist of filter fabric or manufactured silt fence supported with posts.

The light duty silt fencing shall be in accordance with OPSS 577 and OPSD 219.110. The light duty silt fencing shall be removed once the disturbed area has been revegetated.

18. Restoration

Restoration shall be in accordance with the following:

Disturbed channel banks shall be restored in with seed. The enclosure will require a layer of topsoil. Topsoil will be native soil generated on site.

Application rates are as follows:

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

Hand seeding shall be spread on the affected areas on a daily basis with the seed mixture, fertilizer and application rate as shown above.

Topsoil is to be placed in accordance with OPSS 802. Seed is to be supplied and placed in accordance with OPSS 804.

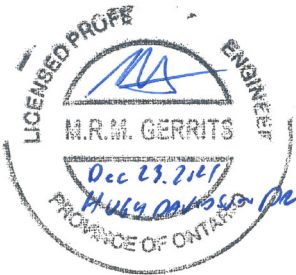
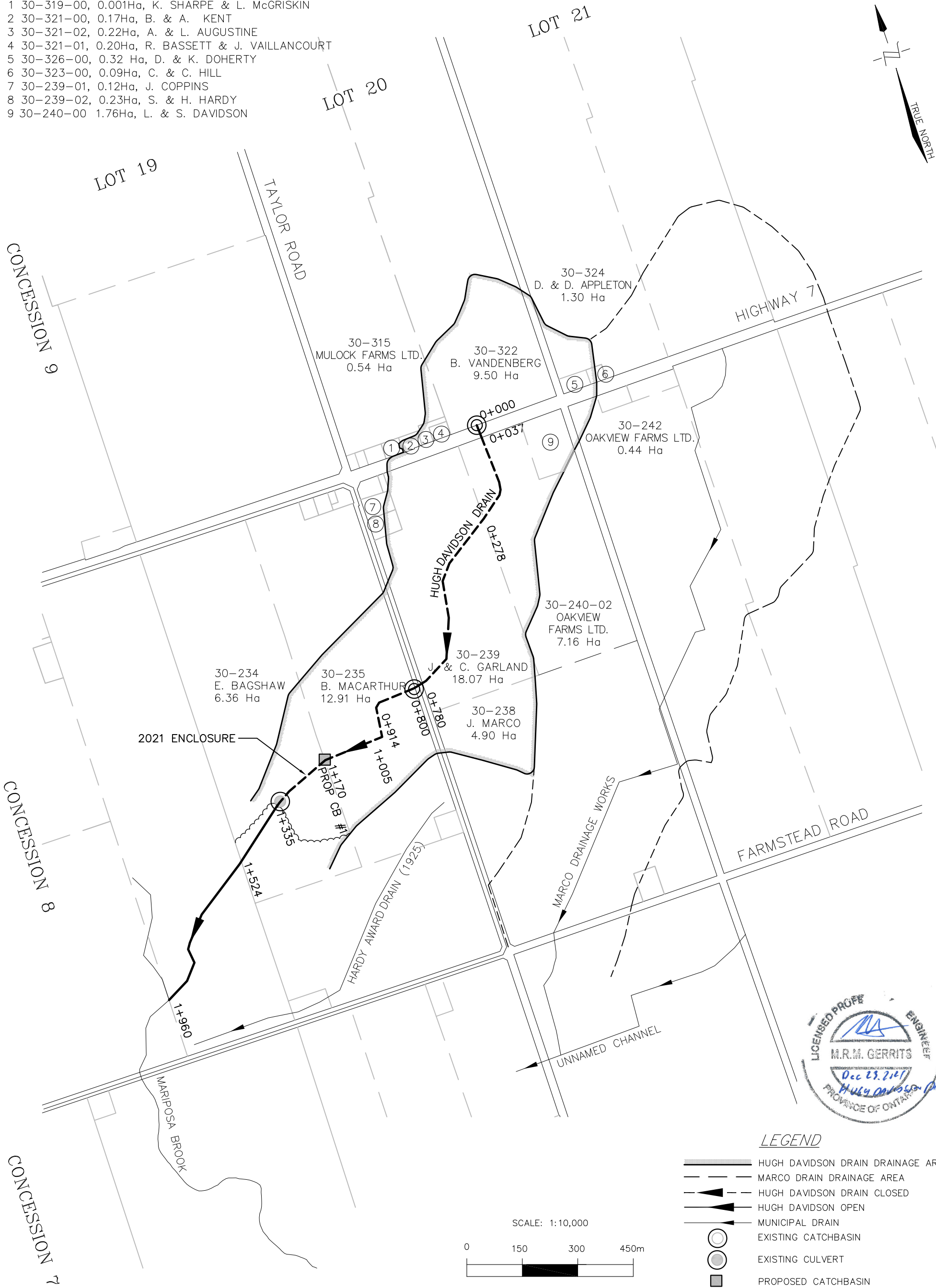
19. Environmental Considerations

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

- All work to be completed in accordance with the Department of Fisheries and Oceans Canada, June 1, 2021, Letter of Advices (21-HCAA-0073).
- No in-water work will be permitted between March 15 and July 15 of any calendar year.
- 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.
- The Contractor shall maintain a dry working area during construction.
- All construction in the channel shall be carried out during periods of low flow.

LANDOWNER IDENTIFICATION INDEX

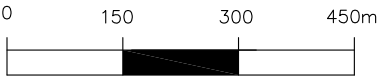
- 1 30-319-00, 0.001Ha, K. SHARPE & L. McGRISKIN
- 2 30-321-00, 0.17Ha, B. & A. KENT
- 3 30-321-02, 0.22Ha, A. & L. AUGUSTINE
- 4 30-321-01, 0.20Ha, R. BASSETT & J. VAILLANCOURT
- 5 30-326-00, 0.32 Ha, D. & K. DOHERTY
- 6 30-323-00, 0.09Ha, C. & C. HILL
- 7 30-239-01, 0.12Ha, J. COPPINS
- 8 30-239-02, 0.23Ha, S. & H. HARDY
- 9 30-240-00 1.76Ha, L. & S. DAVIDSON



LEGEND

- HUGH DAVIDSON DRAIN DRAINAGE AREA
- MARCO DRAIN DRAINAGE AREA
- HUGH DAVIDSON DRAIN CLOSED
- HUGH DAVIDSON OPEN
- MUNICIPAL DRAIN
- EXISTING CATCHBASIN
- EXISTING CULVERT
- PROPOSED CATCHBASIN

SCALE: 1:10,000



No.	REVISIONS	DATE	BY
1	FOR REVIEW	DEC. 23, 2021	MG

HUGH DAVIDSON DRAIN
CITY OF KAWARTHA LAKES

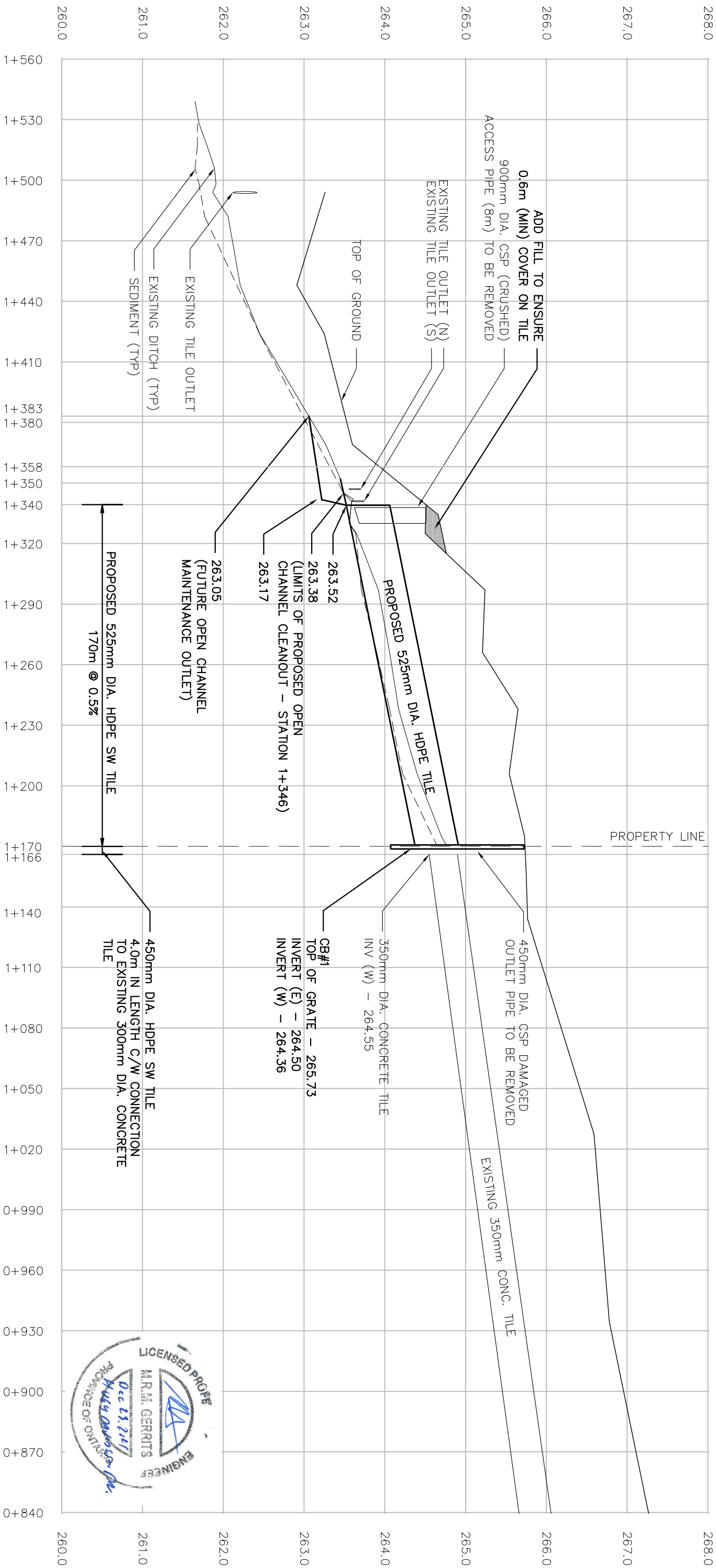
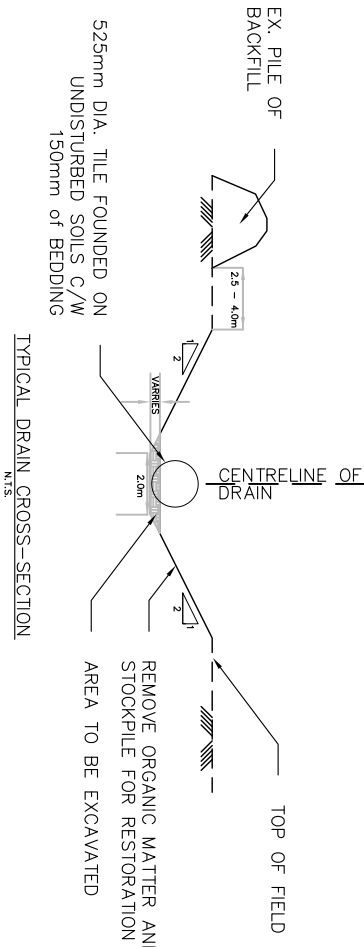
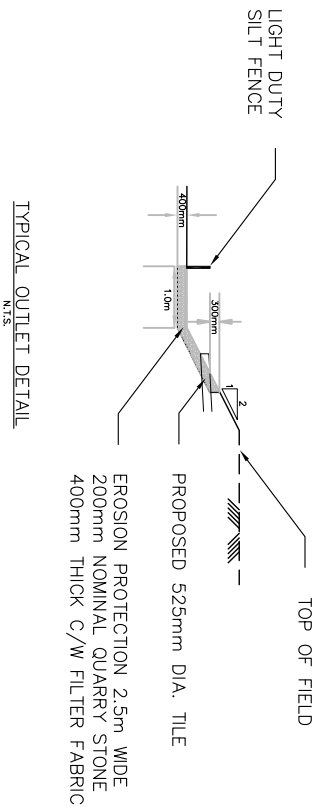
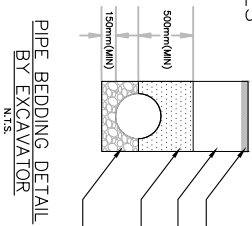
OVERALL PLAN

DRAWN	MG
CHECKED	EG
DATE	DEC. 23, 2021
PROJECT NO.	2020-043
SHEET	1 OF 2



GENERAL NOTES

1. PRIMARY BENCHMARK #1 ELEV. 267.87
 NAIL IN NORTH SIDE OF HYDRO POLE ON EAST
 SIDE OF TAYLOR ROAD WHERE THE DRAIN CROSSES
 TAYLOR ROAD
 2. BENCHMARK #2 ELEV. 265.542
 NAIL IN NORTH SIDE OF TREE ON NORTH SIDE
 OF CHANNEL AT STATION 1+332.
 3. BENCHMARK #3 ELEV. 266.56
 NAIL IN WEST SIDE OF STUMP ON SOUTH SIDE
 OF CHANNEL AT STATION 1+155.
-
- PIPE BEDDING DETAIL
- 50mm(MIN)
- 150mm(MIN)
- 150mm(MIN)
- NATIVE TOPSOIL
- SUITABLE BACKFILL
- SELECT BACKFILL FREE OF STONES
- GRANULAR "A" BEDDING TO SPRINGLINE OF PIPE



No.	REVISIONS	DATE	BY
1	FOR REVIEW	DEC. 23, 2021	MG

HUGH DAVIDSON DRAIN

CITY OF KAWARTHA LAKES

PROFILE

SCALE	H 1:2000
DRAWN	MG
CHECKED	EG
DATE	DEC. 23, 2021
PROJECT NO.	2020-043
SHEET	2 OF 2