

CARRUTHERS - HETZEL DRAIN 2023

Municipality of Strathroy-Caradoc



**SPRIET
ASSOCIATES**
ENGINEERS & ARCHITECTS

155 York Street
London, Ontario N6A 1A8
Tel. (519) 672-4100
Fax (519) 433-9351
E-mail MAIL@SPRIET.ON.CA

London, Ontario
September 20, 2023

CARRUTHERS - HETZEL DRAIN 2023

Municipality of Strathroy-Caradoc

To the Mayor and Council of
The Municipality of Strathroy-Caradoc

Mayor and Council:

We are pleased to present our report on the reconstruction and incorporation of parts of the Carruthers-Hetzel Municipal Drain serving parts of Lots 13 and 14, Concessions Range 1, North and South (geographic Caradoc) in the Municipality of Strathroy-Caradoc. The total watershed area contains approximately 34.2 hectares.

AUTHORIZATION

This report was prepared pursuant to Section 78 of the Drainage Act. Instructions were received from your Municipality with respect to a motion of Council. The work was initiated by a request signed by one of the affected landowners.

HISTORY

The Carruthers-Hetzel Drain was originally constructed pursuant to a report submitted by A.J. Graham, P. Eng. dated January 17, 1969 and consisted of 150mm to 300mm tile and improvements to the downstream open drain, the Christina Drain, that functions as its outlet.

The Carruthers-Hetzel Drain tile outlets into the Christina Drain in the west half of Lot 13, Range 1 North. It extends south and east from this outlet, crossing Highway No. 2, to its head in the north-west part of Lot 13, Range 1 South.

EXISTING DRAINAGE CONDITIONS

At a site meeting held with respect to the project and through later discussions, the owners reported the following:

- that they intend to tile a portion of the property in Lot 13, Range 1 South and the owner believes that the drain needs to be improved to accommodate this
- that in recent years, maintenance of the existing tile is becoming a regular occurrence due to its age and the tree roots entering the tile



EXISTING DRAINAGE CONDITIONS (cont'd)

- that due to recent blockage of the tile there has been more regular flooding of the fields upstream
- that the existing drain upstream be incorporated or replaced with a new tile sized to today's standard, if it is too small

A field investigation and survey were completed. Upon reviewing our findings, we note the following:

- that the existing drain is in a very poor state of repair due to both the age and pressure of the tree roots, as well as the damage due to recent utility installations in this area
- that there is significant sediment in the Christina Drain and it requires maintenance
- that the existing tile upstream of Longwoods Road is in good working condition

Preliminary design, cost estimates and assessments were prepared, and an informal public meeting was held to review the findings and preliminary proposals. Further input and requests were provided by the affected owners at that time and at later dates.

DESIGN CRITERIA AND CONSIDERATIONS

The Drainage Coefficient method contained in the "DRAINAGE GUIDE FOR ONTARIO", Publication 29 by the Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) is typically used to design municipal drains. The Drainage Coefficient defines a depth of water that can be removed in a 24-hour period and is expressed in millimetres per 24 hours. The coefficient used to design the new drain with respect to capacity was 38mm per 24 hrs and the existing drain can accommodate a 27mm coefficient.

We would like to point out that there have been no indications of any adverse soil conditions. It should be noted that no formal soil investigation has been made, with this information being provided by the owners.

The proposed design and report have been generally completed using the "GUIDE FOR ENGINEERS WORKING UNDER THE DRAINAGE ACT IN ONTARIO" OMAFRA Publication 852.

RECOMMENDATIONS

We are therefore recommending the following:

- that the existing ditch bottom of the Christina Drain be cleaned out where specified, as maintenance
- that the above ditch bottom be deepened slightly to provide a proper sub-surface drainage outlet
- that where specified, excavated material be levelled adjacent to the drain



RECOMMENDATIONS (cont'd)

- that where specified, excavated material be hauled to locations specified on the drawings and levelled
- that the working space and access route be cleared and grubbed of trees, brush and scrub where required for machines to access and complete the work on the ditch and the areas where excavated material is to be levelled
- that the stumps, logs, and brush be piled beyond this width
- that a portion of the existing Carruthers-Hetzel Drain be replaced with new 375mm to 450mm sewer pipe including related appurtenances,
- and that the existing municipal tile be abandoned under Section 19 of the Drainage Act. However, the owners may maintain it as a private drain.
- that catchbasins be installed at various locations on the proposed drains to allow direct surface water entry into the tiles and thereby reduce surface flow and erosion
- that the existing upstream privately installed tile be incorporated as part of the drain for future maintenance purposes

Due to the indications of poor soil conditions our design includes crushed stone bedding wrapped with geotextile.

In accordance with the principals of Section 14(2) of the Drainage Act, the existing surface waterway along the route of the tile drain(s) shall be part of the drainage works for future maintenance. The width available for the waterway shall be equal to the maintenance working width as noted on the Contract Drawings.

It is recommended that basement, cellar, or crawlspace drains be directed to a sump and then discharged onto the ground surface well away from foundations and septic systems or should owners desire to connect these drains to the new outlet drain, then it is suggested that they not be directly connected to the drains. Rather it is suggested that such a connection be made by an indirect method such as by sump pump with an open-air connection such as a mini-catchbasin, crushed stone filled excavation connected to a storm P.D.C. and should include a check valve and be piped above foundation level. It is noted that there is still a risk of flooding even with indirect methods of connection and any/all responsibility shall be borne by the owner. Downspouts from eavestroughs should be directed onto the ground surface well away from foundations and septic systems and are **not** permitted to be connected to the Municipal Drain.

ENVIRONMENTAL CONSIDERATIONS AND MITIGATION MEASURES

Based on the information available, there are no significant wetlands, sensitive areas, or endangered species along the route of the drains. The proposed construction of the Carruthers-Hetzel Drain includes quarry stone outlet protection and surface inlets which greatly help reduce the overland surface flows and any subsequent erosion. A temporary flow check of silt fencing is to be installed in the ditch downstream of the tile outlet for the duration of the construction.



SUMMARY OF PROPOSED WORK

The proposed work consists of approximately 240 lineal meters of open ditch cleanout including bank seeding; approximately 107 lineal meters of 375mm to 450mm sewer pipe and 457mm smooth wall steel pipe including related appurtenances, and the incorporation of 483 lineal meters of 300mm to 375mm tile and sewer pipe.

SCHEDULES

Three schedules are attached hereto and form part of this report, being Schedule 'A' - Allowances, Schedule 'B' - Cost Estimate, and Schedule 'C' - Assessment for Construction.

Schedule 'A' - Allowances. In accordance with Sections 29, 30, and 31 of the Drainage Act, allowances are provided for right-of-way and damages to lands and crops along the route of the drain and existing drain as defined below.

Schedule 'B' - Cost Estimate. This schedule provides for a detailed cost estimate of the proposed work which is in the amount of \$114,500.00. This estimate includes engineering and administrative costs associated with this project.

Schedule 'C' - Assessment for Construction. This schedule outlines the distribution of the total estimated cost of construction over the roads and lands which are involved.

Drawing No. 1, Job No. 222289 and specifications form part of this report. They show and describe in detail the location and extent of the work to be done and the lands which are affected.

ALLOWANCES

RIGHT-OF-WAY: Section 29 of the Drainage Act provides for an allowance to the owners whose land must be used for the construction, repair, or future maintenance of a drainage works.

For tile drains where the owners will be able to continue to use the land, the allowance provides for the right to enter upon such lands, and at various times for the purpose of inspecting such drain, removing obstructions, and making repairs. Also, the allowance provides for the restrictions imposed on those lands to protect the right-of-way from obstruction or derogation. The amounts granted for right-of-way on tile drains is based on a percentage of the value of the land designated for future maintenance. Therefore, the amounts granted are based on \$9,000.00/ha. through cropped lands. This value is multiplied by the hectares derived from the width granted for future maintenance and the applicable lengths.

For open ditches, the allowance provides for the loss of land due to the construction provided for in the report. The amounts granted are based on the value of the land, and the rate used was \$60,000.00/ha. When any buffer strip is incorporated and/or created, the allowance granted is for any land beyond a 1.8-meter width deemed to have always been part of the drain. For existing open ditches, the right-of-way to provide for the right to enter and restrictions imposed on those lands is deemed to have already been granted.



ALLOWANCES (cont'd)

DAMAGES: Section 30 of the Drainage Act provides for the compensation to landowners along the drain for damages to lands and crops caused by the construction of the drain. The amounts granted are based on \$5,500.00/ha for closed drains. This base rate is multiplied by the hectares derived from the working widths shown on the plans and the applicable lengths.

EXISTING DRAIN: Section 31 of the Drainage Act provides for the compensation to landowners for the value of existing private drains which are incorporated through this report as part of these drainage works.

ASSESSMENT DEFINITIONS

In accordance with the Drainage Act, lands that make use of a drainage works are liable for assessment for part of the cost of constructing and maintaining the system. These assessments are known as benefit, outlet liability and special benefit as set out under Sections 22 and 23 of the Act.

SECTION 22

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

SECTION 23

Outlet liability is assessed to lands or roads that may make use of a drainage works as an outlet either directly or indirectly through the medium of any other drainage works or of a swale, ravine, creek, or watercourse.

In addition, a Public Utility or Road Authority shall be assessed for and pay all the increased cost to a drainage works due to the construction and operation of the Public Utility or Road Authority. This may be shown as either benefit or special assessment.

ASSESSMENT

A modified "Todgham Method" is typically used to calculate the assessments shown on Schedule 'C'- Assessment for Construction. This entails breaking down the costs of the drain into sections along its route where warranted and then extracting Special Assessments and Special Benefit Assessments from each section.

The remainder is then separated into Benefit and Outlet Assessments. The Benefit is distributed to those properties receiving benefit as defined under "Assessment Definitions", with such properties usually being located along or close to the route of the drain. The Outlet is distributed to all properties within the watershed area of that section on an adjusted basis. The areas are adjusted for location along that section and relative run-off rates. Due to their different relative run-off rates forested lands are assessed for outlet at lower rates than cleared lands. Also, roads and residential properties are assessed for outlet at higher rates than cleared farmlands.



ASSESSMENT (cont'd)

For this drain a portion of the open channel work is deemed as maintenance and therefore an assessment against the Christina Drain which has been included to be billed out in accordance with the current by-law.

The actual cost of the work involving this report, with the exception of Special Assessments, is to be assessed on a pro-rata basis against the lands and roads liable for assessment for benefit and outlet as shown on Schedule 'C' - Assessment for Construction. The Special Assessments shall be levied as noted in the Section "Special Assessment".

Special Benefit assessments have been made for the increased cost of hauling excavated material and is assessed to those lands receiving the hauling as shown in Schedule 'C' - Assessment for Construction.

The cost to restore water supply for any well determined to be impacted by any construction covered under this report shall become part of this report and be pro-rated with the costs provided for in this report.

SPECIAL ASSESSMENT

In accordance with Section 26 of the Drainage Act, a Special Assessment has been made against the County of Middlesex being the increased cost to the drainage work for boring a 457mm smooth wall steel pipe across their road allowance, due to the construction and operation of Longwoods Road (County Road No. 2). The Special Assessments shall be made up of the actual cost of this work and both the final and estimated values of the Special Assessment are to be calculated as follows:

Drain	Cost of Work	Less Equivalent Drain Cost (Fixed)	Plus Administration Cost	Plus Interest, Contract Security, & Net H.S.T.	Special Assessment
457mm	\$32,500.00	\$2,460.00	\$3,950.00	\$1,700.00	\$35,690.00

In accordance with Section 26 of the Drainage Act, a Special Assessments has been made against Enbridge Gas for the cost of locating and determining the elevation of their gasmain on the Longwoods Road right-of-way, and the cost of installing larger sewer pipe at a flatter grade downstream of the gasmain in order to provide clearance under the gasmain, being the increased cost to the drainage works due to the construction and operation of their utilities. The Special Assessments shall be as shown on Schedule 'C'.

In accordance with Section 26 of the Drainage Act, a Special Assessments has been made against Eh!Tel Networks Inc. for the cost of locating and determining the elevation of their fibre optic cable on the Longwoods Road right-of-way, being the increased cost to the drainage works due to the construction and operation of their utilities. The Special Assessments shall be as shown on Schedule 'C'.

If any additional work is required to the drainage works due to the existence of buried utilities such as gas/water/oil pipelines, communications cables, etc. or if any of the utilities require relocation or repair, then, the extra costs incurred shall be borne by the utility involved in accordance with the provisions of Section 26 of the Drainage Act.



GRANTS

In accordance with the provisions of Section 85 of the Drainage Act, a grant **may** be available for assessments against privately owned parcels of land which are used for agricultural purposes and eligible for the Farm Property Class Tax rate. Section 88 of the Drainage Act directs the Municipality to make application for this grant upon certification of completion of this drain. The Municipality will then deduct the grant from the assessments prior to collecting the final assessments.

MAINTENANCE

Upon completion of construction, all owners are hereby made aware of Sections 80 and 82 of the Drainage Act which forbid the obstruction of or damage or injury to a municipal drain. This includes tree roots penetrating tiles from trees planted by owners or naturally occurring. For tiles through bush areas, we recommend the owner maintain the cleared space by either mowing (hay) or growing a crop over it. If no maintenance is completed over several years, we recommend the Municipality complete the mowing/clearing as part of maintenance at the discretion of the Drainage Superintendent.

After completion, the Carruthers-Hetzel Drain shall be maintained by the Municipality of Strathroy-Caradoc at the expense of all upstream lands and roads assessed in Schedule 'C' - Assessment for Construction and in the same relative proportions until such time as the assessment is changed under the Drainage Act.

Special Assessments shall **not** be pro-rated for future maintenance purposes but shall be applied as an actual cost special if part of the maintenance. The Special Benefit Assessments shall not apply for future maintenance.

Repairs or improvements to any road culvert shall be the responsibility of the applicable Road Authority, entirely at their cost.

Respectfully submitted,

SPRIET ASSOCIATES LONDON LIMITED

M.P. DeVos, P. Eng.



MPD:ms



SCHEDULE 'A' - ALLOWANCES

CARRUTHERS - HETZEL DRAIN 2023

Municipality of Strathroy-Caradoc

In accordance with Sections 29 and 30 of the Drainage Act, we determine the allowances payable to owners entitled thereto as follows:

CON.	LOT	ROLL NUMBER (Owner)	Section 31 Existing Drain	Section 29 Right-of-Way	Section 30 Damages	TOTALS
<i>Geographic Caradoc</i>						
R1N	S½12	014-020-054 (D. Noxell)	\$	\$	\$ 200.00	\$ 200.00
R1N	S½13	014-010-170 (Middlesex County)			70.00	70.00
R1N	S½13	014-010-171 (R. Hawkins)			40.00	40.00
R1N	S½13	014-010-169 (D. Kohlsmith)		610.00	1,430.00	2,040.00
R1S	N½13	014-010-174 (Tulip Acres Inc.)	7,114.00	2,750.00	70.00	9,934.00
R1S	N½14	014-010-175 (Brenair Farms Inc.)	6,106.00			6,106.00
Total Allowances			13,220.00	\$ 3,360.00	\$ 1,810.00	\$ 18,390.00
TOTAL ALLOWANCES ON THE CARRUTHERS - HETZEL DRAIN 2023					\$	<u>18,390.00</u>

SCHEDULE 'B' - COST ESTIMATE

CARRUTHERS - HETZEL DRAIN 2023

Municipality of Strathroy-Caradoc

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

CONSTRUCTION

Mobilization of equipment	\$	1,000.00
240 meters of open ditch cleanout and reconstuction (Approx. 210m ³)	\$	1,800.00
Seeding of ditch banks and buffer strips (Approx. 780m ²)	\$	940.00
Hauling of a portion of the excavated material (Aprrox. 90m ³)	\$	1,350.00
Levelling of excavated material	\$	500.00
Supply & install 6 meters of 450mm dia., H.D.P.E. outlet pipe including rodent gate and quarry stone rip-rap protection around pipe and end of ditch (Approximately 3m ³ quarry stone req'd)	\$	2,180.00
Supply & Installation of the following sewer pipe (with rubber gaskets) across existing treed area including bedding and backfill materials.		
10 meters of 375mm dia. sewer pipe	\$	1,650.00
64 meters of 450mm dia. sewer pipe	\$	5,700.00
Supply of the above listed sewer pipe	\$	6,770.00
Supply & Installation of the following sewer pipe (with rubber gaskets) across under existing 75mm steel gas main including bedding & backfill materials		
4 meters of 450mm dia. PVC SDR 35 sewer pipe	\$	1,300.00
Supply of the above listed sewer pipe	\$	1,800.00
Strip, stockpile and relevel topsoil from tile trench and adjacent working area (4m wide) specified on drawings (approx. 74m)	\$	440.00
23.0 meters of 457mm dia., 9.5mm thickness smooth wall steel pipe		
Supply	\$	12,000.00
Installation under Longwoods Road by boring	\$	18,000.00
Disconnect exist. 300mm± subsurface road crossing and fill with cement grout	\$	2,500.00
Supply and install two standard 600mm x 600mm catchbasins including ditching, grates and removal and disposal of existing catchbasin	\$	7,100.00
Exposing and locating existing tile drains (report)	\$	715.00
Exposing and locating existing utilities (report)	\$	930.00
(construction)	\$	600.00

SCHEDULE 'B' - COST ESTIMATE

CARRUTHERS - HETZEL DRAIN 2023
Municipality of Strathroy-Caradoc**CONSTRUCTION (cont'd)**

Clearing & grubbing	\$ 4,000.00
Tile connections as noted on plan	\$ 700.00
Contract security financing	\$ 1,000.00
Tile connections and contingencies	\$ 1,750.00
Allowances under Section 31 of the Drainage Act	\$ 13,220.00
Allowances under Sections 29 & 30 of the Drainage Act	\$ 5,170.00

ADMINISTRATION

Conservation Authority Review Fee	\$ 300.00
Interest and Net Harmonized Sales Tax	\$ 3,623.00
Survey, Plan and Final Report	\$ 13,688.00
Expenses	\$ 1,274.00
Supervision and Final Inspection	\$ <u>2,500.00</u>

TOTAL ESTIMATED COST **\$ 114,500.00**

\$ 114,500.00

SCHEDULE OF NET ASSESSMENT

CARRUTHERS - HETZEL DRAIN 2023

Municipality of Strathroy-Caradoc

Job No. 222289

September 20, 2023

* = Non-agricultural

ROLL NUMBER (OWNER)	TOTAL ASSESSMENT	GRANT	ALLOWANCES	APPROX. NET
* 014-020-054(D. & S. Noxell)	\$ 150.00	\$	\$ 200.00	\$ -50.00
* 014-010-170 (Middlesex County)	70.00		70.00	
* 014-010-171(R. Hawkins)	40.00		40.00	
014-010-169 (D. Kohlsmith)	6,429.00	2,143.00	2,040.00	\$ 2,246.00
014-010-174 (Tulip Acres Inc.)	29,538.00	9,846.00	9,934.00	9,758.00
* 014-010-172 (M. & R. Van Beers)	192.00			192.00
* 014-010-173 (M. Timmermans))	169.00			169.00
014-010-175 (Brenair Farms Inc.)	16,450.00	5,483.00	6,106.00	4,861.00
* 014-010-175-15 (M. Batata)	813.00			813.00
* Longwoods Road	\$ 9,713.00	\$	\$	\$ 9,713.00
* Christina Road	576.00			576.00
<u>Non-Prorated Special Assessments</u>				
* County of Middlesex - SMSP	35,690.00			35,690.00
* Enbridge Gas - Gasmain	7,590.00			7,590.00
* Eh!tel Networks Inc - Fibre Optic	1,650.00			1,650.00
* Maintenance Cleanout	5,430.00			5,430.00
	<u>\$ 114,500.00</u>	<u>\$ 17,472.00</u>	<u>\$ 18,390.00</u>	<u>\$ 78,638.00</u>