The TOWNSHIP of WAINFLEET

THE CORPORATION OF THE TOWNSHIP OF WAINFLEET
SPECIAL MEETING OF COUNCIL AGENDA
FEBRUARY 12, 2025 – 6:00 P.M.
COUNCIL CHAMBERS

C03/26

1. Call to Order

2. Land Acknowledgement Statement

3. Disclosures of Interest and the General Nature Thereof

4. Staff Reports & Recommendations

a) DSR-003/2026 Re: Shafley Road Drain and Collver Drain Engineering Report Update

5. By-laws

a) By-law No. 007-2026 being a by-law to provide for drainage works in the Township of Wainfleet in the Region of Niagara (Shafley Road Drain) – Provisional Adoption Only.

b) By-law No. 008-2026 being a by-law to provide for drainage works in the Township of Wainfleet in the Region of Niagara (Collver Drain) – Provisional Adoption Only.

6. Closed Meeting

7. Rise & Report.

8. By-law to Confirm the Proceedings of Council

a) By-law No. 009-2026 being a by-law to adopt, ratify and confirm the proceedings of the Council of the Corporation of the Township of Wainfleet its Special Meeting of Council held February 12, 2026.

9. Adjournment

DRAINAGE STAFF REPORT **DSR-003/2026**

TO: Mayor Grant & Members of Council

FROM: Mark Jemison, Drainage Superintendent

DATE OF MEETING: February 12, 2026

SUBJECT: **Shafley Road Drain and Collver Drain Engineering Report Update**

RECOMMENDATION(S):

THAT Drainage Staff Report DSR-003/2026 respecting the Shafley Road Drain and Collver Drain Reports be received; and

THAT a By-law be given two readings to provisionally adopt the Shafley Drain Engineer's Report dated January 9, 2026, prepared by Headway Engineering, under Section 4, Chapter D. 17 of the *Drainage Act, R.S.O. 1990;* and

THAT a By-law be given two readings to provisionally adopt the Collver Drain Engineer's Report dated January 9, 2026, prepared by Headway Engineering, under Section 4, Chapter D. 17 of the *Drainage Act, R.S.O. 1990;* and

THAT Staff be directed to advance the Shafley Drain to that of the Court of Revision, as per Section 46(1) of the *Drainage Act, R.S.O. 1990;* and

THAT Staff be directed to advance the Collver Drain to that of the Court of Revision, as per Section 46(1) of the *Drainage Act, R.S.O. 1990;* and

THAT Councillor Anderson, Councillor MacLellan and Councillor Van Vliet be appointed as members to the Shafley Drain Court of Revision and Mayor Grant be appointed as an alternate member to be tentatively scheduled for March 11, 2026, at 4:00 p.m.; and

THAT Councillor Anderson, Councillor MacLellan and Councillor Van Vliet be appointed as members to the Collver Drain Court of Revision and Mayor Grant be appointed as an alternate member to be tentatively scheduled for March 11, 2026, at 4:30 p.m.

EXECUTIVE SUMMARY:

The *Meeting to Consider* provides property owners with an opportunity to ask questions of the engineer or express any concerns over the Engineer's Report related to design or any gross errors. Staff are recommending that the Engineer's report be adopted under a provisional By-law and proceed through the Drainage Act Process.

BACKGROUND:

The site meeting with impacted property owners was held on November 20, 2019. Numerous stakeholder meetings were held to discuss the project including October 19, 2022, November 3, 2023 and July 9, 2025. The project faced delays due to the province-wide legal dispute concerning railway cost responsibility and the Drainage Act.

The final reports were filed with the Township on January 9, 2026. The Meeting to Consider provides property owners with an opportunity to ask questions of the engineer or express any concerns over the Engineer's Report related to design or any gross errors.

At this meeting, Council will be given a presentation by the Engineer of Record, Steve Brickman, P. Eng., of Headway Engineering, outlining the project.

The property owners who were notified under Section 41(1) & 41(2) of the Drainage Act that choose to attend are to be provided an opportunity to ask questions of the Engineer or any concerns over the Engineer's Report related to design or any gross errors in the report. Should the Meeting to Consider reveal any errors in the Engineer's Report, Council may refer the report back to the Engineer for reconsideration.

However, under no circumstances is Council to refer the Report back to the Engineer regarding assessments. Concerns related to assessment are a function of the Court of Revision, with said process to occur within 60 days of the original *Meeting to Consider*.

Pending adoption of the provisional By-law, a Court of Revision shall be held as per Section 97 of the Drainage Act to address concerns with assessments. The Court of Revision shall be held on a day not earlier than twenty, but not later than thirty days, from the date the sending of the copies of the provisional by-law to the assessed properties was completed.

OPTIONS/DISCUSSION:

1. Staff be directed to advance the Shafley Drain Engineer's Report and Collver Drain Engineer's Report to that of the Court of Revision as per Section 46(1) of the Drainage Act, R.S.O. 1990. (Recommended)

2. Do not move forward with the Engineer's Report. (Not recommended).

FINANCIAL CONSIDERATIONS:

The engineer has estimated the Township's share of costs at $383,784 out of a total project cost of $1,928,267. In the 2026 capital budget, the Township allocated $72,000 for the Collver Drain and $280,880 for the Shafley Road Drain, a total of $352,880. Staff are therefore requesting that the 2026 capital budget project PW.1 be increased by $30,904 and be funded through the Infrastructure Reserve. The majority of the Township work will be completed adjacent to Smith Road, including the installation of 71m of 1200mm diameter culverts to protect Smith Road.

OTHERS CONSULTED:

☒ Chief Administrative Officer
☒ Clerks
☐ Community & Development Services
☐ Fire
☒ Finance
☐ Communications
☐ Operations
☐ Other:

ATTACHMENTS:

1) Appendix A – Collver Drain Report – Headway Engineering
2) Appendix B – Shafley Road Drain Report – Headway Engineering

Respectfully submitted by,

Mark Jemison
Drainage Superintendent

Approved by,

Mallory Luey
Chief Administrative Officer

APPENDIX “A”

This page has been intentionally left blank.

Collver Municipal Drain

December 18, 2025

Prepared for:

The TOWNSHIP of WAINFLEET

Headway Engineering
23-500 Fairway Road South
Suite 308
Kitchener, Ontario N2C 1X3
226 243 6614
www.headwayeng.ca

23-500 Fairway Road South
Suite 308
Kitchener, Ontario N2C 1X3
226 243 6614
www.headwayeng.ca

Kitchener, Ontario

December 18, 2025

To the Mayor and Members of Council:

Re: Collver Municipal Drain
Township of Wainfleet
Our Reference No. WNFLT-001

Headway Engineering is pleased to provide its report for the **Collver Municipal Drain** in the Township of Wainfleet.

The preparation of this report was authorized by resolutions of the Council of the Township of Wainfleet in September 2019 and on July 13, 2021, July 29, 2025, and September 9, 2025, under Sections 78 and 4 of the Drainage Act.

The primary objective of this report is to improve the existing Collver Municipal Drain by upgrading it to today's standards of drainage. The proposed work includes the enclosure of an open ditch, the installation of a pump system, and the replacement of a significant length of Regional Road culvert, as well as the replacement of several access culverts.

A summary of the assessments for this project are as follows:

Municipal Lands	$	810,504
Railway Companies	$	5,510
Privately Owned Non-Agricultural	$	28,166
Privately Owned Agricultural (Grantable)	$	551,820
Privately Owned Agricultural (Non-Grantable)	$	318,000
Total Estimated Assessments	**$**	**1,714,000**

Yours truly,

Stephen Brickman, P.Eng.
Project Engineer and Manager

Adam Hall
Project Coordinator
HEADWAY ENGINEERING

LICENSED PROFESSIONAL ENGINEER
Dec 18, 2025
S. G. R. BRICKMAN
100150920
PROVINCE OF ONTARIO

SB/

CONTENTS

SCHEDULES

SPECIFICATIONS FOR THE CONSTRUCTION OF MUNICIPAL DRAINAGE WORKS

23-500 Fairway Road South
Suite 308
Kitchener, Ontario N2C 1X3
226 243 6614
www.headwayeng.ca

1.0 INTRODUCTION AND LOCATION

The Council of the Township of Wainfleet has appointed Headway Engineering to investigate a request for improvements to the Collver Municipal Drain, along with two petitions for new drainage works that outlet to the Collver Municipal Drain.

The project services parts of Lots 38 to 40, Concessions 5, parts of Lots 36 to 42, Concession 6, and parts of Lots 38 to 41 Concession 7 in the Township of Wainfleet, Niagara Region.

The Drainage Area comprises of approximately 396 hectares, and land uses within the watershed consist mainly of agricultural lands, with significant areas of woodlots, roads and residential.

The attached Plans, Profiles, and Details; Drawing Numbers 1 to 11, and Specifications form part of this report. They show and describe in detail the location and extent of the work to be completed and the lands and roads which are affected.

2.0 AUTHORIZATION

Authority to prepare this report originates from several Council actions under the Drainage Act. These include the initial 2019 Section 78 appointment, the 2021 transition of the Engineer under Section 8(2), and the acceptance of two new petitions under Section 4 in 2025. Details are summarized in Table 1.

Date	Council Action	Drainage Act Section	Description
September, 2019	Initial Appointment	Section 78	Council appointed Deitrich Engineering Limited to prepare an Engineer's Report for improvements to the Collver Municipal Drain.
July 13, 2021	Appointment Transition	Section 8(2)	Council Transitioned its appointment of the Engineer from Dietrich Engineering to Headway Engineering.
July 29, 2025	Petition Accepted	Section 4	First petition for new drainage works (Part Lot 37, Concession 6) was accepted by Council.
September 9, 2025	Petition Accepted	Section 4	Second petition for new drainage works (Part Lot 40, Concession 5) was accepted by Council.

Table 1 - Council Actions Authorizing the Preparation of the Report

In accordance with Section 4 of the Drainage Act, the Areas Requiring Drainage associated with the two petitions comprise parts of Lots 36 and 37, Concession 6, and part of Lot 40, Concession 5. The lands requiring drainage in Concession 6 presently have a legal outlet into the Shafley Municipal Drain;

however, that outlet is insufficient. Given the proximity of planned works in the Collver Municipal Drain, the most practical outlet for these lands is now into the Collver Municipal Drain. The lands identified in Concession 5 require a continued legal outlet into the Collver Municipal Drain. Each petition is valid in accordance with Section 4(1)(a) and (b) of the Drainage Act.

3.0 DRAINAGE HISTORY

The historical records for the Collver Municipal Drain include several engineering reports and a significant road-related reconstruction. The earliest report, completed by George Ross in 1894, authorized the initial construction of the drain. A subsequent report by Ross and Scott in 1926 suggests that repairs were carried out, however detailed records are not available.

Sometime prior to the 1963 Engineer's Report, major works occurred along Wellandport Road (Regional Road 4), including the widening of the road and the relocation of the drain from the west side to the east side of the road allowance. These works are described in Clarke's 1963 report but no other record has been made available.

The table below summarizes all documented historical works identified to date.

Date	Event / Report	Notes (Based on Available Records)
1894	George Ross – Drainage Act Report	First documented construction of the Collver Municipal Drain.
1926	Ross and Scott – Drainage Act Report	Referenced as the last known repair prior to 1963.
Prior to 1963	Regional Road 4 Road Widening and Relocation Works	The 1963 report references a "recent widening" of County Road 22 and the relocation of the drain along the east side of the road.
November 1963	C.J. Clarke, P. Eng. – Drainage Act Report	Clarke indicates earlier road works and identifies that the relocated/existing roadworks section is in good condition, but the remaining upstream sections (on private property) were obstructed and needed repair.

Table 2 - Summary of Engineering Reports and Road-Related Works

4.0 MEETINGS AND PUBLIC ENGAGEMENTS

A series of technical, stakeholder, and statutory meetings have been held throughout the development of this report. These engagements involved landowners, municipal staff, regulatory authorities, the railway, and the Region. The meetings occurred as design options were refined, new information became available, and petitions were submitted. The key meetings are summarized in Table 3.

Meeting Date	Meeting Description	Summary
November 20, 2019	On-Site Meeting (Section 9(1) of the Drainage Act)	Preliminary plan circulated; meeting held to investigate the request for improvements.
October 19, 2022	Stakeholders Meeting 1	Review of options and alignments for the proposed drainage systems, including preliminary design considerations and associated cost distributions.
June 28, 2023	Canadian Pacific Railway	Meeting held to review the proposed design, the required rail crossings, and associated costs. Early

		coordination involved confirming whether CP or CN was the responsible authority; CP ultimately confirmed jurisdiction. CP claimed that they would not participate financially. The meeting concluded with CP's position noted and the process moved forward through later stakeholder discussions.
November 3, 2023	Stakeholders Meeting 2	The project status and possible next steps were reviewed. Pump options had been discussed previously, and at this meeting the proponent and Township confirmed that this was the direction to pursue.
January 9, 2025	Stakeholders Meeting 3	Several pump configurations—including a large single pump and a two-pump arrangement—had been examined. The preferred option (a single large pump) was presented with updated design details, revised draft costs, and proposed assessment distributions.
March 25, 2025	Niagara Region	The meeting provided a review of the existing infrastructure, proposed alignment, design standard and assessment for the Collver Drain (Open) along Regional Road 4.
July 9, 2025	Public Information Meeting	The meeting provided a review of the proposed design, estimated costs, and the proposed assessments, among other information. All meeting materials were posted online following the meeting, and all parties invited to attend the meeting were provided with access instructions to the meeting materials.
October 23, 2025	Petitioner/On-Site Meeting (Section 9(1) of the Drainage Act)	The petition and the landowner's needs were reviewed. Various options were discussed, including alternative outlets, additional depth, and a potential private pump approach.
November 7, 2025	Department of Fisheries and Oceans (DFO)	Headway Engineering met with DFO to review the proposed works and discuss how the project complies with the Fisheries Act and the Species at Risk Act. The proposal was presented and explained.
November 19, 2025	Niagara Region	Meeting held to determine whether the Region required any additional downstream ditch enclosure along the Collver Municipal Drain.

Table 3 – Summary of Meetings and Engagements.

5.0 FINDINGS

Based on the information collected during field investigations, surveys, public engagements, and review of documentation, the following summarizes Headway Engineering's findings:

5.1 Watershed Condition (Hydrology):

- The watershed was established through the analysis of tile drainage maps, previous engineers' reports for the Collver Drain and surrounding drainage systems, field investigations, surveys and data analysis of the LiDAR derived digital data from Land Information Ontario. The drainage area comprises of approximately 396 hectares

- Approximate proportions of land uses within the watershed are as follows:

- Agricultural: 64.9%
- Woodlot: 28.7%
- Roads: 5.1%
- Residential: 1.3%

- The Ontario Ministry of Agriculture, Food and Agribusiness's (OMAFA's) Agricultural Information Atlas describes the soil types within the watershed and along the routes of the drains as loamy phase.

5.2 Existing Drainage System:

- The Collver Municipal Drain was originally constructed in 1894 (131 years ago). It was subsequently repaired in 1926 (99 years ago), modified along the roadside as part of road works shortly before 1963, and the upper section was reconstructed in 1963 (62 years ago). Therefore, the *newest* section of the Collver Drain is about 62 years old.
- The drainage system is relatively flat throughout. The previous report notes extended sections at grades as low as about 0.048%.
- The Collver Drain is not of sufficient depth to provide adequate drainage for lands within the watershed.
- Many of the existing culverts are in poor states of repair or configuration and are of insufficient size and depth to convey flows from upstream lands at today's standards of drainage.
- Of special note is the culvert from Sta 0+358 to 0+567 within the Wellandport Road (Regional Road 4) road allowance. The culvert appears to have been installed in lieu of land acquisition. The culvert is in a poor configuration and condition, with a notable 'belly' through much of its length.
- The lands on Lots 36 and 37, Concession 6 are presently assessed into the Shafley Municipal Drain. Their existing outlet, for the portions located north of the railway, is provided through a pipe beneath the railway on Branch 'A' of the Shafley Drain.

5.3 Outlet:

- The outlet for the Collver Municipal Drain is the Big Forks Drain on the east side of Regional Road 4, Lot 39, Concession 5.
- The Big Forks Drain is of adequate depth to provide sufficient outlet for the Collver Municipal Drain. Likewise, no construction works are proposed in the Big Forks Drain under this report.

5.4 Other Noted Observations:

- The existing open ditch on the Hihojo Ltd. properties (Roll No. 12-195 and Roll No. 12-186) and Kevin and Vanessa Devries property (Roll No. 12-185-01) follows an irregular alignment, creating challenges for farming operations.

- Waters occasionally top the ditch banks on the Hihojo Ltd. properties (Roll No. 12-195 and 12-186) and Kevin and Vanessa Devries Property (Roll No. 12-185-01).
- In general, the lands located north of the former railway in Concession 5 have a very planar, yet pitted topography—overall flat with numerous local depressions. South of the former railway, the lands fall naturally toward the Big Forks Drain. Directing drainage from the northernmost areas toward this southern outlet, given the overall flatness, would require substantial depth as the system approaches the crest where the lands begin to fall toward the Big Forks Drain.
- Additional systematic tiling within the watershed is likely. For some lands, the capital cost of achieving a gravity outlet may make private pumping a more practical option.

5.5 Environmental Findings:

- The Department of Fisheries and Oceans (DFO) has classified the Collver Municipal Drain as "F Class", according to the OMAFA Agricultural Information Atlas, indicating an intermittently flowing watercourse with low fish habitat value.

6.0 DESIGN CONSIDERATIONS

6.1 Design Concepts Considered

Several design concepts were evaluated over the course of the design process. These options were developed in response to project needs, Landowner and Stakeholder direction, railway and Niagara Region considerations, petitions received and Township input. The major alternatives considered are summarized below.

6.1.1 Gravity Based (no pumping)

The first concept was a gravity-based reconstruction following the existing drainage pattern, using current alignments and providing gravity outlets throughout. This option essentially modernized the existing system to current standards. Gravity drainage remains preferable where feasible, as it avoids operation costs associated with pumping.

Under this concept:

- The Collver Drain crossing under the railway required significant deepening.
- The neighbouring Shafley Drain project would require two deeper and larger railway crossings.
- Railway requirements were reviewed at the June 28, 2023 meeting. The railway confirmed that the improved works could proceed provided safety and construction standards were met and the costs were borne by the drainage project (not the railway company). At the time, a province-wide legal dispute concerning railway cost responsibility was ongoing. Given the uncertainty, stakeholders discussed whether to wait for the outcome of the court case or proceed along an alternate path. At the Stakeholder Meeting No. 2 (November 3, 2023), the proponent and the Township indicated a preference to move forward and look at alternate concepts including pumping.

6.1.2 Pump Based

Several pump configurations were evaluated:

1. Pump for Collver Drain plus an additional pump for the Shafley Drain
2. A single pump for the Collver Drain with no additional pumps for the Shafley Drain.
3. Expansion of the Collver watershed area (including lands draining through the proposed Homan Branch).

Pump-based concepts offered several advantages:

- Reduced downstream excavation requirements.
- Improved and more maintainable pipe grades.
- Reduced pipe sizes.

These considerations led to the preferred pump arrangement incorporated in the proposed works (Collver & Shafley Municipal Drains).

6.1.3 Regional Road Realignment Options

At the Onsite Meeting held in 2019, Niagara Region noted that the existing enclosure crossing and then re-crossing the regional road required reconfiguration, and the costs would be borne appropriately. During the design process, the Region asked whether costs could be reduced by retaining more of the existing alignment or reducing enclosure. The options were examined, however the reductions in enclosure were minimal, and the costs were negligible.

6.1.4 Heeg Property Options

Upon receiving the Heeg petition, several outlet options were examined for the property (Roll No. 13-026):

1. Deepening the ditch along the Regional Road to obtain a gravity outlet.
2. Two alternative alignments to Wolf Creek as potential gravity outlets.
3. A pumped outlet to the Collver Drain. OMAFA was consulted regarding the grant eligibility of the pump. Since the pump is effectively similar to a lateral drain, the pump cannot be eligible for the Agriculture Drainage Infrastructure Program (ADIP) grant program.

Deepening the drain along the Regional Road would result in substantial additional costs, a significant portion of which would be assessed to the Heeg property. While Niagara Region may benefit from additional enclosure, much of the associated cost must still be assigned to the Heeg property.

Based on practicality and feasibility, the most appropriate option for the Heeg property (Roll No. 13-026) is a new outlet to the Collver Drain using a private pump.

6.2 Open Ditch Work:

The open ditch works have been designed to provide adequate depth for sufficient outlets to existing private tile drains, the proposed ditch enclosure, and improved tile drainage for workable areas adjacent to and upstream of the municipal drain. Where reasonable depth could be achieved, gravity drainage has been accommodated; however, given the local topography, some localized areas may not have enough elevation difference for a gravity outlet and may require pumping.

Provisions have been made in the proposed works to allow for the repair of areas of ditch that have experienced bank failure, erosion or slumping.

6.3 Culverts:

Access crossing culverts have been designed using a minimum event standard of a 5-year rainfall event, while the road culvert along Regional Road 4 was designed using a minimum event standard of a 10-year rainfall event.

6.4 Closed Drain Work:

The tile drainage systems were sized using the Drainage Coefficient method included in the OMAFA Publication 29 – 'Drainage Guide for Ontario'. The Drainage Coefficient describes a depth of water to be conveyed by the drainage works per a 24-hour period and is expressed in millimeters per 24 hours. The drainage coefficient design standard used for the works proposed in this report is 25mm per 24-hour period.

6.5 Pump System

A pump system has been incorporated into the design to provide a sufficient outlet for the proposed closed drain where gravity drainage is not practical. The pump selection and detailed design were completed by a pump manufacturer with extensive experience in agricultural drainage pumping systems. The pump system was designed to meet the same outlet design standard as the gravity system (25 mm per 24-hour drainage coefficient).

Design considerations also included:

- Required lift and total dynamic head needed to provide a sufficient outlet.
- Available electrical service at the proposed location.
- Use of a Variable Frequency Drive (VFD) to reduce mechanical stress.
- Debris and sediment management appropriate for a closed pipe system.
- Tank sizing to provide adequate drawdown time and reduce pump cycling.

6.6 Wetlands

The drainage system is designed to function collaboratively with the natural drainage features of the nearby wetlands. The design does not include any measures intended to alter or lower wetland water levels, and no changes have been introduced that increase this capability.

7.0 ENVIRONMENTAL CONSIDERATIONS

7.1 Department of Fisheries and Oceans (DFO)

The DFO has reviewed the Request for Review package sent to them on February 21, 2025, and considered in their review information presented during discussions and meetings that were held between Headway Engineering staff and DFO personnel on November 7, 2025.

7.2 Niagara Peninsula Region Conservation Authority (NPRCA)

The NPRCA has been included on the circulation list for this report and has been invited to all public engagements. Additionally, a permit application was submitted to the NPRCA on October 8, 2025.

7.3 Ministry of Natural Resources (MNR)

Headway Engineering completed a review of the Natural Heritage Information Centre mapping for Species at Risk in Ontario. NHIC mapping indicates the potential presence of Provincial Species at Risk within approximately one kilometer of the work area. Their occurrence within the project footprint is unlikely, as the preferred habitats for the identified species do not correspond with the conditions present at the work location and are instead associated with areas farther removed.

8.0 RECOMMENDATIONS

Headway Engineering recommends the following:

1. Collver Drain (Open)
    - Approximately 735 metres be cleaned out and/or deepened to improve outlet conditions for private farm tile and municipal systems within the watershed, where gravity drainage is achievable.
    - The replacement of three access culvert crossings.
    - The installation of 209 metres of corrugated steel road culvert including road restoration.
2. Collver Dain (Closed)
    - Approximately 2,170 metres of the Collver Drain (Open) be enclosed
    - The closed drainage system includes the installation of approximately 2,000 metres of 300mm to 1200mm diameter concrete field tile and HDPE pipe and the installation of five concrete catch basins
    - The installation of a pump system to facilitate the enclosure, maintain manageable drainage grades, and avoid excessive outlet depth.
3. Homan Branch
    - The tile drainage system includes the installation of approximately 434 metres of 300mm to 400mm diameter concrete field tile and the installation of one catch basin
4. Heeg Branch

- The drainage system includes the installation of approximately 25 metres of 300mm HDPE pipe and the installation of one concrete catch basin

5. New maintenance schedules be provided for the Collver Drain (Open), Collver Drain (Closed), Homan Branch, Heeg Branch and for the proposed culverts along the Collver Drain (Open).
6. The improved drainage system be known as the **Collver Municipal Drain**.
7. Headway Engineering also recommends the watersheds of the surrounding municipal drainage systems be updated when those drainage works require improvement in the future.

9.0 SUMMARY OF PROPOSED WORKS

The proposed work consists of:

1. The cleanout and/or deepening of approximately 735 metres of open ditch on the Collver Drain (Open).
2. The installation of three access culvert crossings, and the installation of 209 metres of corrugated metal culvert along Regional Road 4 on the Collver Drain (Open).
3. The enclosure of approximately 2,170 metres of Collver Drain (Closed).
4. The installation of a 500mm diameter – 50 horsepower pump on the Collver Drain (Closed).
5. The installation of approximately 2,000 metres of 300mm to 1200mm diameter concrete field tile and HDPE pipe and five inline concrete catch basins on the Collver Drain (Closed).
6. The installation of approximately 434 metres of 300mm to 400mm diameter concrete field tile and one inline concrete catch basin on the Homan Branch.
7. The installation of approximately 25 metres of 300mm HDPE pipe and one inline concrete catch basin on the Heeg Branch.

10.0 WORKING AREA AND ACCESS

Access to the working area shall be designated by the Landowners.

The working area shall be in accordance with the following average widths. The working width may be used for construction purposes including spreading or transporting excavated soil and supplying construction materials to the site.

Drain Segment and Station Range	Property Roll No.	Working side	Average Working Width for Construction	Average Working Width for Future Maintenance
Collver Drain (Open)				
0+031 to 0+358	12-118-02, 12-119	East	12m	10m
0+358 to 0+567	Regional Road 4	Centered	12m	10m
0+567 to 0+959	12-198, 13-998	East	12m	10m

0+959 to 1+010	Regional Road 4	Centered	12m	10m
1+010 to 1+065	12-195	East	12m	10m
Collver Drain (Closed)				
0+000 to 2+000	12-195, 12-186, 12-185-01 and Unopened Road Allowance	Centred	25m	10m
Existing Ditch Alignment (to be enclosed)	12-195, 12-186, 12-185-01	North and South	10m (both sides)	N.A.
Homan Branch				
0+000 to 0+434	Unopened Road Allowances, 12-183-01 and 12-184	Centred	25m	10m
Heeg Branch				
0+000 to 0+020	Regional Road 4	Centred	12m	10m

Table 4 - Summary of Working Area Descriptions

11.0 SCHEDULES

Four schedules are attached and form part of this report.

11.1 Schedule A – Schedule of Allowances

In accordance with Sections 29 and 30 of the Drainage Act, allowances are provided to affected Landowners for Right-of-Way, Damages to Lands and Crops and Loss of Access. Schedule A contains a table of the applicable allowances to Landowners.

11.2 Schedule B – Schedule of Estimated Construction Costs

An itemized cost estimate of the proposed construction work is included in detail in Schedule B.

11.3 Schedule C – Schedule of Assessment for Construction

Schedule C provides details of the distribution of the total estimated costs of the construction of the municipal drain.

11.4 Schedule D – Schedule of Assessment for Maintenance

Schedule D provides details of the distribution of future maintenance costs for the municipal drain. Maintenance assessments are expressed as a percentage of the total maintenance. Lands located upstream of the maintenance shall be determined by the Drainage Superintendent and assessed according to this schedule.

12.0 ALLOWANCES

In accordance with Sections 29 and 30 of the Drainage Act, Allowances payable to Landowners are calculated using the following methodology.

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

The Right-of-Way allowance compensates the lands for the right to enter onto the land at various times for the purpose of inspecting the drainage system and conducting maintenance activities.

The land value used for the Right-of-Way calculation is adjusted for closed drainage systems Collver Dain (Closed) to account for the continued use of the land after the construction.

The values used for calculating allowances for Right-of-Way are as follows:

Land Use	Land Value	Adjustment Factor for Drainage Act Right-of-Way	Adjusted Land Value for Drainage Act Right-of-Way Allowance
Agricultural Working Side of Ditch and Tile Drain	$50,000/Ha	25%	$12,500/Ha
Agricultural Additional Top Width	$50,000/Ha	100%	$50,000/Ha
Woodlot Working Side of Ditch	$15,000/Ha	25%	$3,750/Ha
Residential	$120,000/Ha	25%	$30,000/Ha

Table 5 - Land Values and Right-of-Way Allowances

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

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

Area values used for calculating allowances for Damages are as follows:

Land Use	Damage Value
Agricultural	$6,000/Ha
Woodlot	$3,000/Ha.
Residential	$12,000/Ha.

Table 6 - Standard Land Damage Values

Allowances payable to Landowners entitled thereto are as shown in Schedule A.

Total Allowances, under Sections 29, and 30 of the Drainage Act:

Collver Municipal Drain: **$ 79,750**

13.0 ESTIMATED CONSTRUCTION COSTS

Headway Engineering has made an estimate of the cost of the proposed construction work. A detailed description of the estimated construction costs can be found in Schedule B of this report.

A) Collver Drain (Open)	$	643,100
B) Collver Drain (Closed)	$	557,310
C) Homan Branch	$	40,500
D) Heeg Branch	$	19,200
E) Provisional Items	$	63,500
Total Estimated Construction Costs	**$**	**1,323,610**

14.0 SUMMARY OF ESTIMATED PROJECT COSTS

The total estimated project costs are as follows:

Allowances under Sections 29 and 30 of the Drainage Act (Refer to Schedule A)	$	79,750
Total Estimated Construction Costs (Refer to Schedule B)	$	1,323,610
Meetings, survey, design, preparation of preliminary cost estimates, preparation of final drainage report, consideration of report	$	136,800
Sub-Contractor – Pump Manufacturer Technical Consultation	$	5,800
Consultation with Environmental Agencies and Permitting Fees	$	5,500
Preparation of contract documents, contract administration, supervision, inspection of construction, and preparation of as recorded records	$	74,100
Contingencies, Interest and net H.S.T.	$	88,440
TOTAL ESTIMATED PROJECT COSTS – COLLVER MUNICIPAL DRAIN	**$**	**1,714,000**

The estimated cost of the work in the Township of Wainfleet is $1,714,000.

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

The above cost estimate does not include costs associated with defending the drainage report should appeals be filed with the Court of Revision, Drainage Tribunal and/or Drainage Referee. Should additional costs be incurred, unless otherwise directed, the additional costs would be distributed in a pro-rata fashion over the assessments contained in Schedule C and as may be varied under the Drainage Act.

15.0 ASSESSMENT

Headway Engineering assesses the cost of this work against the Lands and Roads as shown in Schedule C - Assessment for Construction.

Assessments were determined using the principles included in the 'Drainage Assessment Revisited' paper prepared by E.P. Dries and H.H. Todgham. These principles of assessment are recognized to be fair and equitable for determining cost distributions among those affected.

15.1 Benefit (Section 22)

Benefit assessment is applied to those properties receiving a benefit as defined in Section 1 of the Drainage Act which is extracted below:

> ***Benefit*** *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 or sub-surface water, or any other advantages relating to the betterment of lands, roads, buildings or other structures.*

Typically, properties which have direct, or near direct access to the proposed drain receive Benefit as defined above.

15.2 Outlet Liability (Section 23)

Outlet Liability is distributed to all properties within the watershed area on an adjusted area basis. The areas are adjusted to accurately reflect equivalent run-off rates relative to other lands and roads within the watershed. Due to development, roads have been assessed higher Outlet Liability rates relative to agricultural lands.

15.3 Special Benefit (Section 24)

The Special Benefit instrument of assessment was used to assess the increased costs of the pump system, enclosing the open ditch and installing a new tile drainage system to the properties who requested that the open ditch be enclosed. This assessment instrument was also used to separate the benefit portion of the new access culvert crossings from the remaining costs of the new crossings.

15.4 Special Assessment (Section 26)

Special Assessments apply to public utilities and roads which directly cause increased costs to the construction of a drainage works due to the existence and operation of the public utility or road.

Construction costs which are required solely because of the existence of Regional Road 4 are fully assessed to the road authority having jurisdiction over the road. The Special Assessment is calculated based on the actual costs of the proposed work, plus an allowance for administration, interest and Net HST as described below.

Road Name	Estimated Construction Costs	Plus, Estimated Administration Costs	Less Equivalent Drain Costs (Fixed)	Plus Estimated Interest, and Net HST	Estimated Special Assessment
Regional Road 4 (Collver Drain (Open))	$435,950	$138,090	$10,550	$23,910	$587,400
Regional Road 4 (Heeg Branch)	$11,900	$5,395	$1,045	$605	$16,855

Table 7 - Estimated Special Assessment Calculations.

Whether or not the Region of Niagara elects to do the work through Regional Road 4 they shall be assessed the actual increased costs to the drainage works due to the construction and operation of the above noted sections of the Collver Drain (Open) as a Special Assessment in addition to any benefit and outlet liability assessments.

If any additional work is required to construct or maintain the drainage works due to the existence of buried utilities, roads, railways, or if utilities require relocation or repair, then the extra costs incurred shall be borne by the utility, road or railway involved in accordance with the provisions of Section 26 of the Drainage Act.

16.0 GRANT ELIGIBILITY

The Province provides grants towards assessment to eligible properties for drainage improvements which meet the specific criteria. The provision of these grants for activities under the Drainage Act is called the *Agricultural Drainage Infrastructure Program* (ADIP).

A grant may be available for assessments to 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 Township to make application for this grant upon certification of completion. The Township will then deduct the grant from the assessments.

16.1 Municipal Drain Enclosure (Non-Grantable)

Following Policy No. 2.3.f) of the ADIP polices, we have determined that the costs of enclosing the existing municipal drain (Collver Drain (Closed)) is not eligible for ADIP grants. The costs of the municipal drain enclosure have been assessed using Special Benefit, Section 24 of the Drainage Act. The Special Benefit Assessment shall be proratable.

17.0 MAINTENANCE

After completion, this drain shall be maintained by the Township of Wainfleet at the expense of all the lands and roads assessed in the attached Schedule D - Assessment for Future Maintenance, and in the same relative proportions until such time as the assessment is changed under the Drainage Act, except for those portions of the drainage works crossing municipal or rail right-of-ways and the Regional Road Culvert from Sta. 0+358 to 0+567 Collver Drain (Open). These portions of the drain shall be maintained at the expense of the road authority having jurisdiction over said road.

Culvert sizes for the private crossings not being replaced under this report have been included in the drawing set for reference. Landowners and railway agencies are recommended to use these details when undertaking future replacements.

Schedule A

Schedule of Allowances

Schedule of Allowances
Collver Municipal Drain

Collver Drain (Open)

Property Details				Draiange Act Allowances		
Part Lot	Con.	Landowner	Roll Number	Right of Way (Sec. 29)	Damages (Sec. 30)	Total Allowances
Pt. 39	5	Hihojo Ltd.	12-118-02	$ 1,660	$ 680	$ 2,340
Pt. 39	5	R. & L. Reid	12-119	$ 1,280	$ 880	$ 2,160
Pt. 39	5	W., M., & B. Jongsma	12-198-20	$ -	$ 3,340	$ 3,340
Pt. 39	5	K. & V. Devries	12-198	$ 4,340	$ 4,910	$ 9,250
Pt. 39	6	Hihojo Ltd.	12-195	$ 810	$ 470	$ 1,280
Pt. 39	6	C. Ferguson & V. McGaw	12-197	$ -	$ 7,160	$ 7,160
Total Allowances Collver Drain (Open)				**$ 8,090**	**$ 17,440**	**$ 25,530**

Collver Drain (Closed)

Property Details				Draiange Act Allowances		
Part Lot	Con.	Landowner	Roll Number	Right of Way (Sec. 29)	Damages (Sec. 30)	Total Allowances
Pt. 37	6	W. Dobrucki	12-182	$ -	$ 750	$ 750
Pt. 38	6	K. & V. Devries	12-185-01	$ 2,690	$ 10,910	$ 13,600
Pt. 38	6	Hihojo Ltd.	12-186	$ 2,580	$ 5,650	$ 8,230
Pt. 38	6	K. Devries	12-187	$ -	$ 2,430	$ 2,430
Pt. 38	6	G. & M. Lambert	12-188	$ -	$ 1,210	$ 1,210
Pt. 39	6	Hihojo Ltd.	12-195	$ 5,130	$ 11,530	$ 16,660
Total Allowances Collver Drain (Closed)				**$ 10,400**	**$ 32,480**	**$ 42,880**

Homan Branch

Property Details				Draiange Act Allowances		
Part Lot	Con.	Landowner	Roll Number	Right of Way (Sec. 29)	Damages (Sec. 30)	Total Allowances
Pt. 36	6	Hihojo Ltd.	12-179-15	$ -	$ 500	$ 500
Pt. 37	6	D. & A. Homan	12-184	$ 2,540	$ 3,050	$ 5,590
Pt. 37	6	Hihojo Ltd.	12-183-01	$ 1,580	$ 3,170	$ 4,750
Total Allowances Homan Branch				**$ 4,120**	**$ 6,720**	**$ 10,840**

Heeg Branch	Property Details				Draiange Act Allowances		
	Part Lot	Con.	Landowner	Roll Number	Right of Way (Sec. 29)	Damages (Sec. 30)	Total Allowances
	Pt. 40	5	Heegview Farms Ltd.	13-026	$ -	$ 500	$ 500
	Total Allowances Heeg Branch				**$ -**	**$ 500**	**$ 500**

	Right of Way (Sec. 29)	Damages (Sec. 30)	Total Allowances
Total Allowances Collver Municipal Drain	**$ 22,610**	**$ 57,140**	**$ 79,750**

Schedule B

Schedule of Estimated Construction Costs

Schedule of Estimated Construction Costs

An estimate of the cost of the proposed work has been completed, which is outlined in detail as follows.

Part A - Collver Drain (Open)

	Description	Estimated Quantity		$/Unit	Total
1)	Clearing, brushing and mulching	l.s.			$ 10,040.00
2)	Open ditch excavation including cleanout through existing culverts (Sta. 0+031 to Sta. 0+358, Sta. 0+567 to Sta. 0+960, Sta. 1+010 to Sta. 1+065)	735	m	$ 20.00	$ 14,700.00
3)	Load excavated material (Note Part B - Item 14c) (approx. 2300m3)	735	m	$ 15.00	$ 11,025.00
4)	Hydro seed disturbed side slopes	2100	m2	$ 4.00	$ 8,400.00
5)	Supply 1-1600mm diameter, corrugated steel pipe laneway culvert (Hihojo Culv), 2.8mm thickness, 125x25mm corrugations, type II aluminzed coating.	25	m	$ 1,000.00	$ 25,000.00
	Installation of 1600mm diameter culvert at Sta. 0+112 complete with quarry stone rip-rap protection and geotextile material (25m2) including remove and dispose of existing culvert offsite	l.s.			$ 10,000.00
6)	Supply 1-1600mm diameter, corrugated steel pipe laneway culvert (DeVries Culv), 2.8mm thickness, 125x25mm corrugations, type II aluminzed coating.	12	m	$ 1,000.00	$ 12,000.00
	Installation of 1600mm diameter culvert at Sta. 0+775 complete with quarry stone rip-rap protection and geotextile material (25m2) including remove and dispose of existing culvert offsite	l.s.			$ 8,000.00

	Description	Estimated Quantity		$/Unit		Total
7)	Supply 1-1600mm diameter, corrugated steel pipe laneway culvert (Ferguson, McGaw Culv), 2.8mm thickness, 125x25mm corrugations, type II aluminzed coating.	50	m	$ 1,000.00	$	50,000.00
	Installation of 1600mm diameter culvert at Sta. 0+987 complete with quarry stone rip-rap protection and geotextile material (25m2) including remove and dispose of existing culvert offsite	l.s.			$	35,000.00
8)	Supply and install 1600mm diameter corrugated steel 45 degree bend, Sta. 0+964	l.s.			$	3,000.00
9)	Erosion and sediment control	l.s.			$	5,000.00
10)	Traffic Control	l.s.			$	14,985.00
Sub-Total - Non-Special Assessment					$	207,150.00
11)	Work on the Niagara Region Road Allowance (Road Pipe), (Sta. 0+710 to Sta. 0+738)					
a)	Supply 1-1600mm diameter, corrugated steel road culvert, 2.8mm thickness, 125x25mm corrugations, type II aluminzed coating.	209	m	$ 1,000.00	$	209,000.00
	Installation of 1600mm diameter culvert at Sta. 0+358 to 0+569 complete with quarry stone rip-rap protection and geotextile material (35m2)	209	m	$ 800.00	$	167,200.00
b)	Supply and install 1600mm diameter corrugated steel 15 degree bend, Sta. 0+378	l.s.			$	3,500.00
c)	Hold hydro pole	1	ea.	$ 5,000.00	$	5,000.00

	Description	Estimated Quantity		$/Unit	Total
d)	Road Restoration including:				
	Supply and Place 150mm thickness of Granular 'A' (50m2 x 0.15m thickness)	20	t	$ 60.00	$ 1,200.00
	Supply and place 100mm thickness (50mm HL8 and 50mm HL4) asphalt (40m2 x 0.1m thickness)	10	t	$ 500.00	$ 5,000.00
e)	Grout existing culvert (approx. 238m3)	l.s.			$ 40,000.00
f)	Traffic Control	l.s.			$ 5,050.00
	Sub-Total - Work on the Niagara Region Road Allowance (Special Assessment)				$ 435,950.00

Total Estimated Construction Costs
Part A - Collver Drain (Open)

$ 643,100.00

Part B - Collver Drain (Closed)

	Description	Estimated Quantity		$/Unit	Total
1)	Additional stripping width 10 metres (Sta. 0+018 to Sta. 0+831)	813	m	$ 12.50	$ 10,162.50
2)	Tile installation at additional depth	l.s.			$ 9,990.00
3)	Supply 750mm HDPE pipe (CSA B182.8)	6	m	$ 175.00	$ 1,050.00
	Installation (Sta. 0+018 to 0+024)	6	m	$ 125.00	$ 750.00
4)	Supply 750mm diameter concrete field tile	807	m	$ 107.00	$ 86,349.00
	Installation (Sta. 0+024 to Sta. 0+831)	807	m	$ 50.00	$ 40,350.00
5)	Supply 675mm diameter concrete field tile	369	m	$ 85.00	$ 31,365.00
	Installation (Sta. 0+831 to Sta. 1+200)	369	m	$ 47.00	$ 17,343.00
6)	Supply 525mm diameter concrete field tile	381	m	$ 50.00	$ 19,050.00
	Installation (Sta. 1+200 to Sta. 1+581)	381	m	$ 45.00	$ 17,145.00
7)	Supply 450mm diameter concrete field tile	201	m	$ 40.00	$ 8,040.00
	Installation (Sta. 1+581 to Sta. 1+782)	201	m	$ 40.00	$ 8,040.00

	Description	Estimated Quantity		$/Unit	Total
8)	Supply 300mm diameter concrete field tile	218	m	$ 25.00	$ 5,450.00
	Installation (Sta. 1+782 to Sta. 2+000)	218	m	$ 33.00	$ 7,194.00
9)	Supply and install 1200mm x 1200mm inline concrete catch basin at Sta. 0+831	1	ea.	$ 7,000.00	$ 7,000.00
10)	Supply and install 900mm X 1200mm inline concrete catch basin at Sta. 0+616, 1+200 and 1+581	3	ea.	$ 5,000.00	$ 15,000.00
11)	Supply and install 600mm X 600mm inline concrete catch basin at Sta. 2+000	1	ea.	$ 3,021.50	$ 3,021.50
12)	Supply and delivery of 500mm pump capable of pumping 9,750 GPM @ 3.8m TDH with 50HP, 900RPM, 3PH, 575V motor, including VFD 3HP out with load and line reactors		l.s.		$ 106,600.00
	Install complete pump station with 2200mm x 6m well, 1200mm x 18m HDPE reservoir pipe, pump well top frame, pump house, float system and 6m of 500mm dia. Discharge pipe and backwater gate		l.s.		$ 74,700.00
13)	Pump chamber excavation				$ 10,075.00
14)	Filling in existing ditch including:				
a)	Cleanout existing ditch of all available topsoil and stockpile - material to be spread over backfilled ditch	2170	m	$ 7.00	$ 15,190.00
b)	Move excess fill from tile installation (moving material only - this item excludes final placement of fill)	785	m3	$ 3.00	$ 2,355.00
c)	Supply fill (total estimated additional fill required: approx. 4,600m3 from Shafley excavation, additional 595m3)	5195	m3	$ 8.00	$ 41,560.00
d)	Placement of fill to backfill existing ditch (approx. 8310m3)	2170	m	$ 5.00	$ 10,850.00

	Description	Estimated Quantity		$/Unit	Total
e)	Fine grade topsoil on enclosed ditch and pipe installation	2170	m	$ 4.00	$ 8,680.00

Total Estimated Construction Costs
Part B - Collver Drain (Closed) **$ 557,310.00**

Part C - Homan Branch

	Description	Estimated Quantity		$/Unit	Total
1)	Additional topsoil stripping (6m width)	434	m	$ 6.00	$ 2,604.00
2)	Supply 400mm diameter concrete field tile	231	m	$ 35.00	$ 8,085.00
	Installation (Sta. 0+000 to Sta. 0+231)	231	m	$ 50.00	$ 11,550.00
3)	Supply 300mm diameter concrete field tile	203	m	$ 25.00	$ 5,075.00
	Installation (Sta. 0+231 to Sta. 0+434)	203	m	$ 50.00	$ 10,150.00
4)	Supply and install 600mm x 600mm concrete catch basin Sta. 0+434	1	ea.	$ 3,036.00	$ 3,036.00

Total Estimated Construction Costs
Part C - Homan Branch **$ 40,500.00**

Part D - Heeg Branch

	Description	Estimated Quantity		$/Unit	Total
1)	Supply 300mm diameter HDPE Pipe (CSA B182.6) outlet pipe complete with rodent grate	6	m	$ 50.00	$ 300.00
	Installation of 300mm diameter HDPE outlet pipe complete with quarry stone rip-rap protection and geotextile filter material (15m2) (Sta. 0+000 to Sta. 0+006)	l.s.			$ 4,000.00
2)	Supply 300mm HDPE pipe (CSA B182.8)	19	m	$ 50.00	$ 950.00
	Installation (Sta. 0+006 to 0+020)	19	m	$ 250.00	$ 4,750.00
3)	Supply and install 600mm x 600mm concrete catch basin Sta. 0+025	1	ea.	$ 3,000.00	$ 3,000.00

Description	Estimated Quantity	$/Unit	Total
4) Road Restoration including:			
Supply and Place 150mm thickness of Granular 'A' (50m2 x 0.15m thickness)	20 t	$ 60.00	$ 1,200.00
Supply and place 100mm thickness (50mm HL8 and 50mm HL4) asphalt (40m2 x 0.1m thickness)	10 t	$ 500.00	$ 5,000.00

Total Estimated Construction Costs
Part D - Heeg Branch

$ 19,200.00

Part E - Provisional Items

A Provisional Item is an item that may or may not be required as a part of the Contract. The decision as to whether a Provisional Item will form part of the Contract will be at the discretion of the engineer at time of construction. Payment for Provisional Items will only be made for work authorized in writing by the Engineer. Payment for work performed under a Provisional Item shall be based on the Unit Price bid in the Scope of Work below.

1) Additional costs associated with installation of tile drain on 19mm diameter crushed clear stone bedding. This includes the supply and placement of all stone, and additional labour and equipment required for installation in accordance with the Typical Pipe Installation on wrapped Stone Bedding Detail.

Description	Estimated Quantity	$/Unit	Total
300mm diameter pipe	25 m	$ 65.00	$ 1,625.00
450mm diameter pipe	25 m	$ 65.00	$ 1,625.00
600mm diameter pipe	40 m	$ 70.00	$ 2,800.00
675mm diameter pipe	40 m	$ 70.00	$ 2,800.00
750mm diameter pipe	100 m	$ 70.00	$ 7,000.00

2) Additional costs associated with installation of tile drain on 19mm diameter crushed clear stone bedding. This includes the supply and placement of all stone, and additional labour and equipment required for installation in accordance with the Typical Pipe Installation on Stone Bedding Detail (un-wrapped bedding).

Description	Estimated Quantity	$/Unit	Total
300mm diameter pipe	50 m	$ 40.00	$ 2,000.00
450mm diameter pipe	50 m	$ 40.00	$ 2,000.00
600mm diameter pipe	90 m	$ 45.00	$ 4,050.00
675mm diameter pipe	90 m	$ 50.00	$ 4,500.00
750mm diameter pipe	200 m	$ 50.00	$ 10,000.00

3)	Wheel machine lift outs due to stony conditions	15 ea.	$ 300.00	$ 4,500.00

4) Tile connections:

Description	Estimated	$/Unit	Total
100mm diameter	40 ea.	$ 90.00	$ 3,600.00
150mm diameter	20 ea.	$ 100.00	$ 2,000.00

*The Contractor shall be paid for the actual quantity of tile connections at the above fixed unit prices.

5)	Quarry stone rip-rap including geotextile filter material	150 t	$ 100.00	$ 15,000.00

Total Estimated Construction Costs
Part E - Provisional Items **$ 63,500.00**

Summary of Estimated Construction Costs

Part A - Collver Drain (Open)	$ 643,100.00
Part B - Collver Drain (Closed)	$ 557,310.00
Part C - Homan Branch	$ 40,500.00
Part D - Heeg Branch	$ 19,200.00
Part E - Provisional Items	$ 63,500.00
Total Estimated Construction Costs	**$ 1,323,610.00**
Total Estimated Materials	$ 568,314.00
Total Estimated Labour and Equipment	$ 755,296.00

Total Estimated Construction Costs
COLLVER MUNICIPAL DRAIN **$ 1,323,610.00**

Schedule C

Schedule of Estimated Assessment for Construction

Schedule of Estimated Assessment for Construction
Collver Municipal Drain

	Property Details					Drainage Act Instruments of Assessment					For Information		
	Part Lot	Concession	Landowner	Roll Number	Approx. Ha. Affected	Benefit (Sec. 22)	Outlet Liability (Sec. 23)	Special Benefit (Sec. 24)	Special Assessment (Sec. 26)	Total Assessment	Less Gov't Grant	Less Allowances	Net Estimated Expense
Collver Drain (Open)	Pt. 38	5	K. & V. Devries	12-185	2.10	$ -	$ 326			$ 326	$ 109	$ -	$ 217
	Pt. 38	5	Hihojo Ltd.	12-186	4.96	$ -	$ 770			$ 770	$ 257	$ -	$ 513
	Pt. 39	5	Hihojo Ltd.	12-118-02	0.40	$ -	$ 4	$ 23,760		$ 23,764	$ 7,921	$ 2,340	$ 13,503
	Pt. 39	5	R. & L. Reid	12-119	1.50	$ 2,785	$ 2			$ 2,787	$ 929	$ 2,160	-$ 302
	Pt. 39	5	W., M., & B. Jongsma	12-198-20	0.47	$ -	$ 225	$ 3,500		$ 3,725	*	$ 3,340	$ 385
	Pt. 39	5	K. & V. Devries	12-198	19.20	$ 32,780	$ 2,080	$ 14,760		$ 49,620	$ 16,540	$ 9,250	$ 23,830
	Pt. 40	5	M. & A. Van Soelen	13-027	0.18	$ -	$ 54			$ 54	*	$ -	$ 54
	Pt. 40	5	Heegview Farms Ltd.	13-026	16.50	$ 6,228	$ 1,517			$ 7,745	$ 2,582	$ -	$ 5,163
	Pt 40	5	G. & A. Graszat	13-026-01	1.80	$ -	$ 17			$ 17	*	$ -	$ 17
	Pt 40	5	M. & A. Van Soelen	13-026-02	1.00	$ -	$ 10			$ 10	*	$ -	$ 10
	Pt. 36	6	Hihojo Ltd.	12-179-15	11.00	$ -	$ 329			$ 329	$ 110	$ -	$ 219
	Pt. 37	6	D. & A. Homan	12-184	14.60	$ -	$ 1,238			$ 1,238	$ 413	$ -	$ 825
	Pt. 37	6	Hihojo Ltd.	12-183-01	10.40	$ -	$ 939			$ 939	$ 313	$ -	$ 626
	Pt. 37	6	W. Dobrucki	12-182	21.93	$ -	$ 2,009			$ 2,009	$ 670	$ -	$ 1,339
	Pt. 38	6	K. & V. Devries	12-185-01	30.60	$ -	$ 4,046			$ 4,046	$ 1,349	$ -	$ 2,697
	Pt. 38	6	Hihojo Ltd.	12-186	9.60	$ -	$ 1,473			$ 1,473	$ 491	$ -	$ 982
	Pt. 38	6	K. Devries	12-187	19.40	$ -	$ 3,112			$ 3,112	$ 1,037	$ -	$ 2,075
	Pt. 38	6	G. & M. Lambert	12-188	0.40	$ -	$ 307			$ 307	*	$ -	$ 307
	Pt. 38	6	W. & J. Struyk	12-187-20	0.40	$ -	$ 307			$ 307	*	$ -	$ 307
	Pt. 38	6	J. & P. DeBoer	12-187-01	0.40	$ -	$ 307			$ 307	*	$ -	$ 307
	Pt. 39	6	Hihojo Ltd.	12-195	18.40	$ 34,546	$ 3,322			$ 37,868	$ 12,623	$ 1,280	$ 23,965
	Pt. 39	6	C. Ferguson & V. McGaw	12-197	0.09	$ -	$ 76	$ 10,384		$ 10,460	*	$ 7,160	$ 3,300
	Pt. 39	6	A. Pedro & A. St. Jean	12-196	0.40	$ -	$ 361			$ 361	*	$ -	$ 361
	Pt. 39	6	M. Mansoor & Z. Shaikh	12-194-03	4.10	$ -	$ 162			$ 162	*	$ -	$ 162
	Pt. 39	6	C. Ellens& M. Janssens-Ellens	12-194-02	4.10	$ -	$ 162			$ 162	$ 54	$ -	$ 108
	Pt. 39	6	L. Yan & D. Jin	12-194	4.10	$ -	$ 162			$ 162	$ 54	$ -	$ 108
	Pt. 39	6	T. Singhm, J. Sidhu and P. Grewal	12-194-01	4.10	$ -	$ 162			$ 162	*	$ -	$ 162
	Pt. 39	6	D. Wilfong & C. Macaulay	12-193	0.15	$ -	$ 91			$ 91	*	$ -	$ 91
	Pt. 39	6	D. Fansolato & M. Lum	12-194-05	4.50	$ -	$ 170			$ 170	*	$ -	$ 170
	Pt. 39	6	K. & K. Watts	12-191	9.00	$ -	$ 251			$ 251	*	$ -	$ 251
	Pt. 39	6	C. & K. Snip	12-194-04	4.60	$ -	$ 722			$ 722	*	$ -	$ 722
	Pt. 39	6	J. Usher & J. Kinnear	12-194-06	3.76	$ -	$ 1,040			$ 1,040	*	$ -	$ 1,040
	Pt. 39	6	J. & K. Davis	12-192-01	0.69	$ -	$ 101			$ 101	*	$ -	$ 101
	Pt. 39	6	C. & E. Sharpen	12-189	0.24	$ -	$ 97			$ 97	*	$ -	$ 97
	Pt. 39	6	N. Vandervelde & E. Jansen	12-190	0.41	$ -	$ 146			$ 146	*	$ -	$ 146
	Pt. 39	6	Township of Wainfleet	12-192	0.38	$ -	$ 141			$ 141	*	$ -	$ 141

Collver Drain (Open)

Property Details					Drainage Act Instruments of Assessment					For Information		
Part Lot	Concession	Landowner	Roll Number	Approx. Ha. Affected	Benefit (Sec. 22)	Outlet Liability (Sec. 23)	Special Benefit (Sec. 24)	Special Assessment (Sec. 26)	Total Assessment	Less Gov't Grant	Less Allowances	Net Estimated Expense
Pt. 39	6	C. & B. Matthews	12-192-02	0.42	$ -	$ 148			$ 148	*	$ -	$ 148
Pt. 40	6	Givens Farms ltd.	13-028	58.20	$ -	$ 3,658			$ 3,658	$ 1,219	$ -	$ 2,439
Pt. 40	6	J. & N. Bouffard	13-028-10	0.40	$ -	$ 144			$ 144	$ 48	$ -	$ 96
Pt. 41	6	Givens Farms ltd.	13-030	2.70	$ -	$ 78			$ 78	$ 26	$ -	$ 52
Pt. 41	6	G. & J. Pennings	13-029	28.20	$ -	$ 5,398			$ 5,398	$ 1,799	$ -	$ 3,599
Pt. 41	6	B. & A. Evers	13-029-01	0.40	$ -	$ 144			$ 144	*	$ -	$ 144
Pt. 42	6	1149959 Ontario Inc.	13-035	4.85	$ -	$ 1,092			$ 1,092	$ 364	$ -	$ 728
Pt. 42	6	E. & L. Cramp	13-035-20	0.50	$ -	$ 235			$ 235	*	$ -	$ 235
Pt. 38	7	R. & C. Snippe	12-255	4.30	$ -	$ 343			$ 343	*	$ -	$ 343
Pt. 38	7	C. Lavigne & L. Babin	12-254	12.60	$ -	$ 1,535			$ 1,535	$ 512	$ -	$ 1,023
Pt. 39	7	T. & H. Oosterhof	12-267	19.40	$ -	$ 1,300			$ 1,300	$ 433	$ -	$ 867
Pt. 39	7	J. & M. Reichheld	12-265	0.84	$ -	$ 15			$ 15	$ 5	$ -	$ 10
Pt. 39	7	P. Hessels	12-266-10	1.53	$ -	$ 235			$ 235	$ 78	$ -	$ 157
Pt. 40	7	T. & H. Oosterhof	13-067	13.10	$ -	$ 908			$ 908	*	$ -	$ 908
Pt. 40	7	Stefani Properties Inc.	13-068	2.96	$ -	$ 274			$ 274	$ 91	$ -	$ 183
Pt. 41	7	R. & C. Alders	13-082-01	1.00	$ -	$ 46			$ 46	*	$ -	$ 46
Total Assessments on Lands					**$ 76,339**	**$ 41,791**	**$ 52,404**	**$ -**	**$ 170,534**	**$ 50,027**	**$ 25,530**	**$ 69,454**
Wellandport Road (Regional Road 4)		Niagara Region		8.40	$ 41,877	$ 10,483	$ 65,136	$ 587,400	$ 704,896			$ 704,896
Zion Road		Township of Wainfleet		2.60	$ -	$ 2,347			$ 2,347			$ 2,347
Shafley Road North		Township of Wainfleet		0.70	$ -	$ 632			$ 632			$ 632
Willford Road		Township of Wainfleet		0.50	$ -	$ 238			$ 238			$ 238
Canada Southern Railway		Company	13-998	3.40	$ 2,414	$ 2,762			$ 5,176			$ 5,176
Concession 6 Road		Township of Wainfleet		3.10	$ -	$ 4,477			$ 4,477			$ 4,477
Total Assessments on Roads					**$ 44,291**	**$ 20,939**	**$ 65,136**	**$ 587,400**	**$ 717,766**			**$ 717,766**
Total Assessments Collver Drain (Open)					**$ 120,630**	**$ 62,730**	**$ 117,540**	**$ 587,400**	**$ 888,300**	**$ 50,027**	**$ 25,530**	**$ 787,220**

Collver Drain (Closed)

Property Details					Drainage Act Instruments of Assessment					For Information		
Part Lot	Concession	Landowner	Roll Number	Approx. Ha. Affected	Benefit (Sec. 22)	Outlet Liability (Sec. 23)	Special Benefit (Sec. 24)	Special Assessment (Sec. 26)	Total Assessment	Less Gov't Grant	Less Allowances	Net Estimated Expense
Pt. 36	6	Hihojo Ltd.	12-179-15	10.16	$ -	$ 871	$ 20,452		$ 21,323	$ 7,108	$ -	$ 14,215
Pt. 37	6	D. & A. Homan	12-184	12.95	$ -	$ 1,111	$ 30,640		$ 31,751	$ 10,584	$ -	$ 21,167
Pt. 37	6	Hihojo Ltd.	12-183-01	9.42	$ -	$ 808	$ 23,497		$ 24,305	$ 8,102	$ -	$ 16,203
Pt. 37	6	W. Dobrucki	12-182	21.93	$ 7,381	$ 5,099			$ 12,480	$ 4,160	$ 750	$ 7,570
Pt. 38	6	K. & V. Devries	12-185-01	28.10	$ 20,970	$ 4,264	$ 105,810		$ 131,044	$ 43,681	$ 13,600	$ 73,763
Pt. 38	6	K. & V. Devries (Non-Grantable)	12-185-01				$ 83,760		$ 83,760	*		$ 83,760
Pt. 38	6	Hihojo Ltd.	12-186	7.00	$ 12,772	$ 461	$ 14,637		$ 27,870	$ 9,290	$ 8,230	$ 10,350
Pt. 38	6	Hihojo Ltd. (Non-Grantable)	12-186				$ 82,660		$ 82,660	*		$ 82,660
Pt. 38	6	K. Devries	12-187	19.40	$ 12,996	$ 5,632			$ 18,628	$ 6,209	$ 2,430	$ 9,989
Pt. 38	6	G. & M. Lambert	12-188	0.40	$ 1,306	$ 645			$ 1,951	*	$ 1,210	$ 741
Pt. 38	6	W. & J. Struyk	12-187-20	0.40	$ -	$ 625			$ 625	*	$ -	$ 625
Pt. 38	6	J. & P. DeBoer	12-187-01	0.40	$ -	$ 555			$ 555	*	$ -	$ 555
Pt. 39	6	Hihojo Ltd.	12-195	14.90	$ 24,658	$ 607	$ 35,129		$ 60,394	$ 20,131	$ 16,660	$ 23,603
Pt. 39	6	Hihojo Ltd. (Non-Grantable)	12-195				$ 151,580		$ 151,580	*		$ 151,580
Pt. 39	6	M. Mansoor & Z. Shaikh	12-194-03	4.10	$ -	$ 61			$ 61	*	$ -	$ 61
Pt. 39	6	C. Ellens& M. Janssens-Ellens	12-194-02	4.10	$ -	$ 57			$ 57	$ 19	$ -	$ 38
Pt. 39	6	L. Yan & D. Jin	12-194	4.10	$ -	$ 53			$ 53	$ 18	$ -	$ 35
Pt. 39	6	T. Singhm, J. Sidhu and P. Grewal	12-194-01	4.10	$ -	$ 67			$ 67	*	$ -	$ 67
Pt. 39	6	D. Wilfong & C. Macaulay	12-193	0.15	$ -	$ 21			$ 21	*	$ -	$ 21
Pt. 39	6	D. Fansolato & M. Lum	12-194-05	4.50	$ -	$ 102			$ 102	*	$ -	$ 102
Pt. 39	6	K. & K. Watts	12-191	9.00	$ -	$ 397			$ 397	*	$ -	$ 397
Pt. 39	6	C. & K. Snip	12-194-04	4.60	$ -	$ 1,143			$ 1,143	*	$ -	$ 1,143
Pt. 39	6	J. Usher & J. Kinnear	12-194-06	3.76	$ -	$ 1,646			$ 1,646	*	$ -	$ 1,646
Pt. 39	6	J. & K. Davis	12-192-01	0.69	$ -	$ 160			$ 160	*	$ -	$ 160
Pt. 39	6	C. & E. Sharpen	12-189	0.24	$ -	$ 176			$ 176	*	$ -	$ 176
Pt. 39	6	N. Vandervelde & E. Jansen	12-190	0.41	$ -	$ 265			$ 265	*	$ -	$ 265
Pt. 39	6	Township of Wainfleet	12-192	0.38	$ -	$ 223			$ 223	*	$ -	$ 223
Pt. 39	6	C. & B. Matthews	12-192-02	0.42	$ -	$ 234			$ 234	*	$ -	$ 234
Pt. 40	6	Givens Farms ltd.	13-028	1.20	$ -	$ 343			$ 343	$ 114	$ -	$ 229
Pt. 38	7	R. & C. Snippe	12-255	4.30	$ -	$ 376			$ 376	*	$ -	$ 376
Pt. 38	7	C. Lavigne & L. Babin	12-254	12.60	$ -	$ 2,777			$ 2,777	$ 926	$ -	$ 1,851
Pt. 39	7	T. & H. Oosterhof	12-267	19.40	$ -	$ 2,386			$ 2,386	$ 795	$ -	$ 1,591
Pt. 39	7	J. & M. Reichheld	12-265	0.84	$ -	$ 27			$ 27	$ 9	$ -	$ 18
Pt. 39	7	P. Hessels	12-266-10	1.53	$ -	$ 425			$ 425	$ 142	$ -	$ 283
Pt. 40	7	T. & H. Oosterhof	13-067	0.15	$ -	$ 5			$ 5	*	$ -	$ 5
Total Assessments on Lands					**$ 80,083**	**$ 31,622**	**$ 548,165**	**$ -**	**$ 659,870**	**$ 111,288**	**$ 42,880**	**$ 505,702**

Collver Drain (Closed)

Property Details					Drainage Act Instruments of Assessment					For Information		
Part Lot	Concession	Landowner	Roll Number	Approx. Ha. Affected	Benefit (Sec. 22)	Outlet Liability (Sec. 23)	Special Benefit (Sec. 24)	Special Assessment (Sec. 26)	Total Assessment	Less Gov't Grant	Less Allowances	Net Estimated Expense
Wellandport Road (Regional Road 4)		Niagara Region		0.30	$ -	$ 786			$ 786			$ 786
Zion Road		Township of Wainfleet		2.60	$ 11,537	$ 3,283	$ 55,220		$ 70,040			$ 70,040
Concession 6 Road		Township of Wainfleet		1.40	$ 1,830	$ 4,574			$ 6,404			$ 6,404
Total Assessments on Roads					**$ 13,367**	**$ 8,643**	**$ 55,220**	**$ -**	**$ 77,230**			**$ 77,230**
Total Assessments Collver Drain (Closed)					**$ 93,450**	**$ 40,265**	**$ 603,385**	**$ -**	**$ 737,100**	**$ 111,288**	**$ 42,880**	**$ 582,932**

Homan Branch

Property Details					Drainage Act Instruments of Assessment					For Information		
Part Lot	Concession	Landowner	Roll Number	Approx. Ha. Affected	Benefit (Sec. 22)	Outlet Liability (Sec. 23)	Special Benefit (Sec. 24)	Special Assessment (Sec. 26)	Total Assessment	Less Gov't Grant	Less Allowances	Net Estimated Expense
Pt. 36	6	Hihojo Ltd.	12-179-15	10.16	$ 9,128	$ 9,599			$ 18,727	$ 6,242	$ 500	$ 11,985
Pt. 37	6	D. & A. Homan	12-184	12.95	$ 16,378	$ 9,281			$ 25,659	$ 8,553	$ 5,590	$ 11,516
Pt. 37	6	Hihojo Ltd.	12-183-01	9.42	$ 11,944	$ 2,670			$ 14,614	$ 4,871	$ 4,750	$ 4,993
Total Assessments Homan Branch					**$ 37,450**	**$ 21,550**	**$ -**	**$ -**	**$ 59,000**	**$ 19,666**	**$ 10,840**	**$ 28,494**

Heeg Branch

Property Details					Drainage Act Instruments of Assessment					For Information		
Part Lot	Concession	Landowner	Roll Number	Approx. Ha. Affected	Benefit (Sec. 22)	Outlet Liability (Sec. 23)	Special Benefit (Sec. 24)	Special Assessment (Sec. 26)	Total Assessment	Less Gov't Grant	Less Allowances	Net Estimated Expense
Pt. 40	5	Heegview Farms Ltd.	13-026	16.50	$ 5,022	$ 3,853			$ 8,875	$ 2,958	$ 500	$ 5,417
Pt 40	5	G. & A. Graszat	13-026-01	1.80	$ -	$ 44			$ 44	*	$ -	$ 44.00
Pt 40	5	M. & A. Van Soelen	13-026-02	1.00	$ -	$ 24			$ 24	*	$ -	$ 24.00
Total Assessments on Lands					**$ 5,022**	**$ 3,921**	**$ -**	**$ -**	**$ 8,943**	**$ 2,958**	**$ 500**	**$ 5,417**
Wellandport Road (Regional Road 4)		Niagara Region		0.75	$ 2,738	$ 730		$ 16,855	$ 20,323			$ 20,323
Canada Southern Railway Company				0.55	$ -	$ 334			$ 334			$ 334
Total Assessments on Roads					**$ 2,738**	**$ 1,064**	**$ -**	**$ 16,855**	**$ 20,657**			**$ 20,657**
Total Assessments Heeg Branch					**$ 7,760**	**$ 4,985**	**$ -**	**$ 16,855**	**$ 29,600**	**$ 2,958**	**$ 500**	**$ 26,074**

	Drainage Act Instruments of Assessment					For Information		
	Benefit (Sec. 22)	Outlet Liability (Sec. 23)	Special Benefit (Sec. 24)	Special Assessment (Sec. 26)	Total Assessment	Less Gov't Grant	Less Allowances	Net Estimated Expense
Total Assessments Collver Municipal Drain	**$ 259,290**	**$ 129,530**	**$ 720,925**	**$ 604,255**	**$ 1,714,000**	**$ 183,939**	**$ 79,750**	**$ 1,424,720**

Schedule of Estimated Assessment for Construction
Collver Municipal Drain

Property Details					Summary of Assessment					For Information		
Part Lot	Concession	Landowner	Roll Number	Approx. Ha. Affected	Collver Drain (Open)	Collver Drain (Closed)	Homan Branch	Heeg Branch	Total Assessment	Less Gov't Grant	Less Allowances	Net Estimated Expense
Pt. 38	5	K. & V. Devries	12-185	2.10	$ 326	$ -	$ -	$ -	$ 326	$ 109	$ -	$ 217
Pt. 38	5	Hihojo Ltd.	12-186	4.96	$ 770	$ -	$ -	$ -	$ 770	$ 257	$ -	$ 513
Pt. 39	5	Hihojo Ltd.	12-118-02	0.40	$ 23,764	$ -	$ -	$ -	$ 23,764	$ 7,921	$ 2,340	$ 13,503
Pt. 39	5	R. & L. Reid	12-119	1.50	$ 2,787	$ -	$ -	$ -	$ 2,787	$ 929	$ 2,160	-$ 302
Pt. 39	5	W., M., & B. Jongsma	12-198-20	0.47	$ 3,725	$ -	$ -	$ -	$ 3,725	*	$ 3,340	$ 385
Pt. 39	5	K. & V. Devries	12-198	19.20	$ 49,620	$ -	$ -	$ -	$ 49,620	$ 16,540	$ 9,250	$ 23,830
Pt. 40	5	M. & A. Van Soelen	13-027	0.18	$ 54	$ -	$ -	$ -	$ 54	*	$ -	$ 54
Pt. 40	5	Heegview Farms Ltd.	13-026	16.50	$ 7,745	$ -	$ -	$ 8,875	$ 16,620	$ 5,540	$ 500	$ 10,580
Pt 40	5	G. & A. Graszat	13-026-01	1.00	$ 17	$ -	$ -	$ 44	$ 61	*	$ -	$ 61
Pt 40	5	M. & A. Van Soelen	13-026-02	1.00	$ 10	$ -	$ -	$ 24	$ 34	*	$ -	$ 34
Pt. 36	6	Hihojo Ltd.	12-179-15	11.00	$ 329	$ 21,323	$ 18,727	$ -	$ 40,379	$ 13,460	$ 500	$ 26,419
Pt. 37	6	D. & A. Homan	12-184	14.60	$ 1,238	$ 31,751	$ 25,659	$ -	$ 58,648	$ 19,549	$ 5,590	$ 33,509
Pt. 37	6	Hihojo Ltd.	12-183-01	10.40	$ 939	$ 24,305	$ 14,614	$ -	$ 39,858	$ 13,286	$ 4,750	$ 21,822
Pt. 37	6	W. Dobrucki	12-182	21.93	$ 2,009	$ 12,480	$ -	$ -	$ 14,489	$ 4,830	$ 750	$ 8,909
Pt. 38	6	K. & V. Devries	12-185-01	30.60	$ 4,046	$ 131,044	$ -	$ -	$ 135,090	$ 45,030	$ 13,600	$ 76,460
Pt. 38	6	K. & V. Devries (Non-Grantable)	12-185-01			$ 83,760		$ -	$ 83,760	*	$ -	$ 83,760
Pt. 38	6	Hihojo Ltd.	12-186	9.60	$ 1,473	$ 27,870	$ -	$ -	$ 29,343	$ 9,781	$ 8,230	$ 11,332
Pt. 38	6	Hihojo Ltd. (Non-Grantable)	12-186			$ 82,660		$ -	$ 82,660	*		$ 82,660
Pt. 38	6	K. Devries	12-187	19.40	$ 3,112	$ 18,628	$ -	$ -	$ 21,740	$ 7,247	$ 2,430	$ 12,063
Pt. 38	6	G. & M. Lambert	12-188	0.40	$ 307	$ 1,951	$ -	$ -	$ 2,258	*	$ 1,210	$ 1,048
Pt. 38	6	W. & J. Struyk	12-187-20	0.40	$ 307	$ 625	$ -	$ -	$ 932	*	$ -	$ 932
Pt. 38	6	J. & P. DeBoer	12-187-01	0.40	$ 307	$ 555	$ -	$ -	$ 862	*	$ -	$ 862
Pt. 39	6	Hihojo Ltd.	12-195	18.40	$ 37,868	$ 60,394	$ -	$ -	$ 98,262	$ 32,754	$ -	$ 65,508
Pt. 39	6	Hihojo Ltd. (Non-Grantable)	12-195			$ 151,580		$ -	$ 151,580	*	$ 17,940	$ 133,640
Pt. 39	6	C. Ferguson & V. McGaw	12-197	0.09	$ 10,460	$ -	$ -	$ -	$ 10,460	*	$ 7,160	$ 3,300
Pt. 39	6	A. Pedro & A. St. Jean	12-196	0.40	$ 361	$ -	$ -	$ -	$ 361	*	$ -	$ 361
Pt. 39	6	M. Mansoor & Z. Shaikh	12-194-03	4.10	$ 162	$ 61	$ -	$ -	$ 223	*	$ -	$ 223
Pt. 39	6	C. Ellens& M. Janssens-Ellens	12-194-02	4.10	$ 162	$ 57	$ -	$ -	$ 219	$ 73	$ -	$ 146
Pt. 39	6	L. Yan & D. Jin	12-194	4.10	$ 162	$ 53	$ -	$ -	$ 215	$ 72	$ -	$ 143
Pt. 39	6	T. Singhm, J. Sidhu and P. Grewal	12-194-01	4.10	$ 162	$ 67	$ -	$ -	$ 229	*	$ -	$ 229
Pt. 39	6	D. Wilfong & C. Macaulay	12-193	0.15	$ 91	$ 21	$ -	$ -	$ 112	*	$ -	$ 112
Pt. 39	6	D. Fansolato & M. Lum	12-194-05	4.50	$ 170	$ 102	$ -	$ -	$ 272	*	$ -	$ 272

Collver Municipal Drain

Part Lot	Concession	Landowner	Roll Number	Approx. Ha. Affected	Collver Drain (Open)	Collver Drain (Closed)	Homan Branch	Heeg Branch	Total Assessment	Less Gov't Grant	Less Allowances	Net Estimated Expense
Pt. 39	6	K. & K. Watts	12-191	9.00	$ 251	$ 397	$ -	$ -	$ 648	*	$ -	$ 648
Pt. 39	6	C. & K. Snip	12-194-04	4.60	$ 722	$ 1,143	$ -	$ -	$ 1,865	*	$ -	$ 1,865
Pt. 39	6	J. Usher & J. Kinnear	12-194-06	3.76	$ 1,040	$ 1,646	$ -	$ -	$ 2,686	*	$ -	$ 2,686
Pt. 39	6	J. & K. Davis	12-192-01	0.69	$ 101	$ 160	$ -	$ -	$ 261	*	$ -	$ 261
Pt. 39	6	C. & E. Sharpen	12-189	0.24	$ 97	$ 176	$ -	$ -	$ 273	*	$ -	$ 273
Pt. 39	6	N. Vandervelde & E. Jansen	12-190	0.41	$ 146	$ 265	$ -	$ -	$ 411	*	$ -	$ 411
Pt. 39	6	Township of Wainfleet	12-192	0.38	$ 141	$ 223	$ -	$ -	$ 364	*	$ -	$ 364
Pt. 39	6	C. & B. Matthews	12-192-02	0.42	$ 148	$ 234	$ -	$ -	$ 382	*	$ -	$ 382
Pt. 40	6	Givens Farms ltd.	13-028	58.20	$ 3,658	$ 343	$ -	$ -	$ 4,001	$ 1,334	$ -	$ 2,667
Pt. 40	6	J. & N. Bouffard	13-028-10	0.40	$ 144	$ -	$ -	$ -	$ 144	$ 48	$ -	$ 96
Pt. 41	6	Givens Farms ltd.	13-030	2.70	$ 78	$ -	$ -	$ -	$ 78	$ 26	$ -	$ 52
Pt. 41	6	G. & J. Pennings	13-029	28.20	$ 5,398	$ -	$ -	$ -	$ 5,398	$ 1,799	$ -	$ 3,599
Pt. 41	6	B. & A. Evers	13-029-01	0.40	$ 144.00	$ -	$ -	$ -	$ 144.00	*	$ -	$ 144.00
Pt. 42	6	1149959 Ontario Inc.	13-035	4.85	$ 1,092	$ -	$ -	$ -	$ 1,092	$ 364	$ -	$ 728
Pt. 42	6	E. & L. Cramp	13-035-20	0.50	$ 235	$ -	$ -	$ -	$ 235	*	$ -	$ 235
Pt. 38	7	R. & C. Snippe	12-255	4.30	$ 343	$ 376	$ -	$ -	$ 719	*	$ -	$ 719
Pt. 38	7	C. Lavigne & L. Babin	12-254	12.60	$ 1,535	$ 2,777	$ -	$ -	$ 4,312	$ 1,437	$ -	$ 2,875
Pt. 39	7	T. & H. Oosterhof	12-267	19.40	$ 1,300	$ 2,386	$ -	$ -	$ 3,686	$ 1,229	$ -	$ 2,457
Pt. 39	7	J. & M. Reichheld	12-265	0.84	$ 15	$ 27	$ -	$ -	$ 42	$ 14	$ -	$ 28
Pt. 39	7	P. Hessels	12-266-10	1.53	$ 235	$ 425	$ -	$ -	$ 660	$ 220	$ -	$ 440
Pt. 40	7	T. & H. Oosterhof	13-067	13.10	$ 908	$ 5	$ -	$ -	$ 913	*	$ -	$ 913
Pt. 40	7	Stefani Properties Inc.	13-068	2.96	$ 274	$ -	$ -	$ -	$ 274	$ 91	$ -	$ 183
Pt. 41	7	R. & C. Alders	13-082-01	1.00	$ 46	$ -	$ -	$ -	$ 46	*	$ -	$ 46
Total Assessments on Lands					**$ 170,534**	**$ 659,870**	**$ 59,000**	**$ 8,943**	**$ 898,347**	**$ 183,940**	**$ 79,750**	**$ 634,657**
Wellandport Road (Regional Road 4)		Niagara Region		8.40	$ 704,896	$ 786		$ 20,323	$ 726,005			$ 726,005
Zion Road		Township of Wainfleet		2.60	$ 2,347	$ 70,040		$ -	$ 72,387			$ 72,387
Shafley Road North		Township of Wainfleet		0.70	$ 632	$ -		$ -	$ 632			$ 632
Willford Road		Township of Wainfleet		0.50	$ 238	$ -		$ -	$ 238			$ 238
Canada Southern Railway Company				3.40	$ 5,176	$ -		$ 334	$ 5,510			$ 5,510
Concession 6 Road		Township of Wainfleet		3.10	$ 4,477	$ 6,404		$ -	$ 10,881			$ 10,881
Total Assessments on Roads					**$ 717,766**	**$ 77,230**	**$ -**	**$ 20,657**	**$ 815,653**			**$ 815,653**
Total Assessments Collver Municipal Drain					**$ 888,300**	**$ 737,100**	**$ 59,000**	**$ 29,600**	**$ 1,714,000**	**$ 183,940**	**$ 79,750**	**$ 1,450,310**

Notes:
1 '*' Denotes Lands not eligible for ADIP Grants.
2 The Special Benefit Assessment (Sec. 24) has been used to separate the benefit portion of culvert crossings, the pump system, and the ditch enclosure from the normal benefit assessments.
3 The Special Assessments (Sec. 26) shall be a non-proratable assessment. All other assessments are proratable.
4 The Net Estimated Expense is the Total Assessment less gov't grants and allowances (if applicable).

Schedule D

Schedule of Assessment for Future Maintenance

Schedule of Assessment for Future Maintenance
Collver Municipal Drain

Collver Municipal Drain

Property Details						Proportion of Maintenance Assessment							
						Open Ditches & Closed Pipes				Municipal Drain Crossings and Pump			
Part Lot	Concession	Landowner		Roll Number	Approx. Ha. Affected	Collver Drain (Open)	Collver Drain (Closed)	Homan Branch	Heeg Branch	Sta. 0+114	Sta. 0+771	Sta. 0+996	Pump Sta. 1+065
Pt. 38	5	K. & V. Devries		12-185	2.10	0.54%				0.22%	0.24%		
Pt. 38	5	Hihojo Ltd.		12-186	4.96	1.27%				0.53%	0.58%		
Pt. 39	5	Hihojo Ltd.		12-118-02	0.40	0.01%				60.04%			
Pt. 39	5	R. & L. Reid		12-119	1.50	0.01%				0.02%			
Pt. 39	5	W., M., & B. Jongsma	*	12-198-20	0.47	0.37%				0.25%			
Pt. 39	5	K. & V. Devries		12-198	19.20	3.43%				2.05%	60.00%		
Pt. 40	5	M. & A. Van Soelen	*	13-027	0.18	0.09%				0.10%			
Pt. 40	5	Heegview Farms Ltd.		13-026	16.50	0.72%			67.97%	0.49%			
Pt 40	5	G. & A. Graszat	*	13-026-01	1.80	0.03%			1.24%				
Pt 40	5	M. & A. Van Soelen	*	13-026-02	1.00	0.02%			0.69%				
Pt. 36	6	Hihojo Ltd.		12-179-15	11.00	0.54%	1.59%	31.23%		0.29%	0.32%	0.17%	
Pt. 37	6	D. & A. Homan		12-184	14.60	2.04%	7.98%	39.81%		1.45%	1.58%	0.85%	
Pt. 37	6	Hihojo Ltd.		12-183-01	10.40	1.55%	6.10%	28.96%		1.11%	1.21%	0.65%	
Pt. 37	6	W. Dobrucki		12-182	21.93	1.58%	3.11%			0.56%	0.62%	0.33%	1.84%
Pt. 38	6	K. & V. Devries		12-185-01	30.60	6.65%	11.68%			2.39%	2.61%	1.40%	24.19%
Pt. 38	6	Hihojo Ltd.		12-186	9.60	2.43%	3.26%			0.87%	0.95%	0.51%	6.76%
Pt. 38	6	K. Devries		12-187	19.40	5.13%	10.11%			1.84%	2.01%	1.08%	20.95%
Pt. 38	6	G. & M. Lambert	*	12-188	0.40	0.51%	1.00%			0.18%	0.20%	0.11%	0.59%
Pt. 38	6	W. & J. Struyk	*	12-187-20	0.40	0.51%	1.00%			0.18%	0.20%	0.11%	0.59%
Pt. 38	6	J. & P. DeBoer	*	12-187-01	0.40	0.51%	1.00%			0.18%	0.20%	0.11%	0.59%
Pt. 39	6	Hihojo Ltd.		12-195	18.40	5.47%	8.74%			1.96%	2.14%	1.15%	18.10%
Pt. 39	6	C. Ferguson & V. McGaw	*	12-197	0.09	0.12%				0.05%	0.05%	11.00%	
Pt. 39	6	A. Pedro & A. St. Jean	*	12-196	0.40	0.59%				0.21%	0.23%	0.13%	
Pt. 39	6	M. Mansoor & Z. Shaikh	*	12-194-03	4.10	0.27%	0.53%			0.10%	0.11%	0.06%	0.31%
Pt. 39	6	C. Ellens& M. Janssens-Ellens		12-194-02	4.10	0.27%	0.53%			0.10%	0.11%	0.06%	0.31%
Pt. 39	6	L. Yan & D. Jin		12-194	4.10	0.27%	0.53%			0.10%	0.11%	0.06%	0.31%

Collver Municipal Drain

Property Details						Proportion of Maintenance Assessment							
						Open Ditches & Closed Pipes				Crossings and Pump			
Part Lot	Concession	Landowner		Roll Number	Approx. Ha. Affected	Collver Drain (Open)	Collver Drain (Closed)	Homan Branch	Heeg Branch	Sta. 0+114	Sta. 0+771	Sta. 0+996	Pump Sta. 1+065
Pt. 39	6	T. Singhm, J. Sidhu and P. Grewal	*	12-194-01	4.10	0.27%	0.53%			0.10%	0.11%	0.06%	0.31%
Pt. 39	6	D. Wilfong & C. Macaulay	*	12-193	0.15	0.15%	0.30%			0.05%	0.06%	0.03%	0.18%
Pt. 39	6	D. Fansolato & M. Lum	*	12-194-05	4.50	0.28%	0.55%			0.10%	0.11%	0.06%	0.33%
Pt. 39	6	K. & K. Watts	*	12-191	9.00	0.41%	0.81%			0.15%	0.16%	0.09%	0.48%
Pt. 39	6	C. & K. Snip	*	12-194-04	4.60	1.19%	2.35%			0.43%	0.47%	0.25%	1.39%
Pt. 39	6	J. Usher & J. Kinnear	*	12-194-06	3.76	1.71%	3.38%			0.61%	0.67%	0.36%	2.00%
Pt. 39	6	J. & K. Davis	*	12-192-01	0.69	0.17%	0.33%			0.06%	0.07%	0.04%	0.19%
Pt. 39	6	C. & E. Sharpen	*	12-189	0.24	0.16%	0.32%			0.06%	0.06%	0.03%	0.19%
Pt. 39	6	N. Vandervelde & E. Jansen	*	12-190	0.41	0.24%	0.47%			0.09%	0.09%	0.05%	0.28%
Pt. 39	6	Township of Wainfleet	*	12-192	0.38	0.23%	0.46%			0.08%	0.09%	0.05%	0.27%
Pt. 39	6	C. & B. Matthews	*	12-192-02	0.42	0.24%	0.48%			0.09%	0.10%	0.05%	0.29%
Pt. 40	6	Givens Farms ltd.		13-028	58.20	6.03%	0.70%			2.16%	2.36%	1.27%	0.42%
Pt. 40	6	J. & N. Bouffard		13-028-10	0.40	0.24%	0.29%			0.08%	0.09%	0.05%	0.17%
Pt. 41	6	Givens Farms ltd.		13-030	2.70	0.13%	0.00%			0.05%	0.05%	0.03%	0.08%
Pt. 41	6	G. & J. Pennings		13-029	28.20	8.89%	3.40%			3.18%	3.48%	1.87%	2.01%
Pt. 41	6	B. & A. Evers	*	13-029-01	0.40	0.24%	0.29%			0.08%	0.09%	0.05%	0.17%
Pt. 42	6	1149959 Ontario Inc.		13-035	4.85	1.80%	0.88%			0.64%	0.70%	0.38%	0.52%
Pt. 42	6	E. & L. Cramp	*	13-035-20	0.50	0.39%	0.59%			0.14%	0.15%	0.08%	0.35%
Pt. 38	7	R. & C. Snippe	*	12-255	4.30	0.56%	1.11%			0.20%	0.22%	0.12%	0.66%
Pt. 38	7	C. Lavigne & L. Babin		12-254	12.60	2.53%	4.98%			0.91%	0.99%	0.53%	2.95%
Pt. 39	7	T. & H. Oosterhof		12-267	19.40	2.14%	4.22%			0.77%	0.84%	0.45%	2.50%
Pt. 39	7	J. & M. Reichheld		12-265	0.84	0.03%	0.05%			0.01%	0.01%	0.00%	0.03%
Pt. 39	7	P. Hessels		12-266-10	1.53	0.39%	0.76%			0.14%	0.15%	0.08%	0.45%
Pt. 40	7	T. & H. Oosterhof	*	13-067	13.10	1.67%	0.01%			0.60%	0.66%	0.35%	
Pt. 40	7	Stefani Properties Inc.		13-068	2.96	0.45%				0.16%	0.18%	0.10%	
Pt. 41	7	R. & C. Alders	*	13-082-01	1.00	0.07%				0.03%	0.03%	0.02%	
Total Assessments on Lands						**65.51%**	**84.40%**	**100.00%**	**69.90%**	**86.21%**	**85.41%**	**24.21%**	**90.76%**

Collver Municipal Drain

Property Details			Proportion of Maintenance Assessment							
			Open Ditches & Closed Pipes				Crossings and Pump			
Road Name	Authority	Approx. Ha. Affected	Collver Drain (Open)	Collver Drain (Closed)	Homan Branch	Heeg Branch	Sta. 0+114	Sta. 0+771	Sta. 0+996	Pump Sta. 1+065
Wellandport Road (Regional Road 4)	Niagara Region	8.40	17.27%	1.41%		20.64%	7.16%	7.81%	73.21%	0.83%
Zion Road	Township of Wainfleet	2.60	3.87%	7.62%			1.39%	1.51%	0.81%	4.51%
Shafley Road North	Township of Wainfleet	0.70	1.04%				0.37%	0.41%	0.22%	
Willford Road	Township of Wainfleet	0.50	0.39%				0.43%			
Canada Southern Railway Company		3.40	4.55%			9.46%	1.81%	1.98%		
Concession 6 Road	Township of Wainfleet	3.10	7.37%	6.57%			2.64%	2.88%	1.55%	3.89%
Total Assessments on Roads			**34.49%**	**15.60%**	**0.00%**	**30.10%**	**13.79%**	**14.59%**	**75.79%**	**9.23%**
Total Assessments Collver Municipal Drain			**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Notes: 1 '*' Denotes Lands not eligible for ADIP Grants.
2 All maintenance activities crossing road or rail right-of-ways, and from Sta. 0+358 to Sta. 0+567 shall be completed at the expense of the road authority having jurisdiction over the road.
3 Lands located upstream of the maintenance shall be determined by the Drainage Superintendent.

Specifications for the Construction of Municipal Drainage Works

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

DIVISION A

General Conditions

CONTENTS

DIVISION A – GENERAL CONDITIONS

A.1. Scope

The work to be done under this contract consists of supplying all labour, equipment and materials to construct the drainage work as outlined in the Scope of Work, Drawings, General Conditions and other Specifications.

A.2. Tenders

Tenders are to be submitted on a lump sum basis for the complete works or a portion thereof, as instructed by the Municipality. The Scope of Work must be completed and submitted with the Form of Tender and Agreement. A certified cheque is required as Tender Security, payable to the Treasurer of the Municipality.

All certified cheques, except that of the bidder to whom the work is awarded will be returned within ten (10) days after the tender closing. The certified cheque of the bidder to whom the work is awarded will be retained as Contract Security and returned when the Municipality receives a Completion Certificate for the work.

A certified cheque is not required if the Contractor provides an alternate form of Contract Security such as a Performance Bond for 100% of the amount of the Tender or other satisfactory security, if required/permitted by the Municipality. A Performance Bond may also be required to insure maintenance of the work for a period of one (1) year after the date of the Completion Certificate.

A.3. Examinations of Site, Drawings, and Specifications

The Tenderer must examine the premises and site to compare them with the Drawings and Specifications in order to satisfy himself of the existing conditions and extent of the work to be done before submission of his Tender. No allowance shall subsequently be made on behalf of the Contractor by reason of any error on his part. Any estimates of quantities shown or indicated on the Drawings, or elsewhere are provided for the convenience of the Tenderer. Any use made of these quantities by the Tenderer in calculating his Tender shall be done at his own risk. The Tenderer for his own protection should check these quantities for accuracy.

The standard specifications (Divisions B through G) shall be considered complementary and where a project is controlled under one of the Divisions, the remaining Divisions will apply for miscellaneous works.

In case of any inconsistency or conflict between the Drawings and Specifications, the following order of precedence shall apply:

- Direction of the Engineer
- Special Provisions (Division H)
- Scope of Work
- Contract Drawings
- Standard Specifications (Divisions B through G)
- General Conditions (Division A)

A.4. Payment

Progress payments equal to 87±% of the value of work completed and materials incorporated in the work will be made to the Contractor monthly. An additional ten per cent (10±%) will be paid 60 days after the final acceptance by the Engineer, and three per cent (3±%) of the Contract price may be reserved by the Municipality as a maintenance holdback for a one (1) year period from the date of the Completion Certificate. A greater percentage of the Contract price may be reserved by the Municipality for the same one (1) year period if in the opinion of the Engineer, particular conditions of the Contract requires such greater holdback.

After the completion of the work, any part of this reserve may be used to correct defects developed within that time from faulty workmanship and materials, provided that notice shall first be given to the Contractor and that he may promptly make good such defects.

A.5. Contractor's Liability Insurance

Prior to commencement of any work, the Contractor shall file with the Municipality evidence of compliance with all Municipality insurance requirements (Liability Insurance, WSIB, etc.) for no less than the minimum amounts as stated in the Purchasing Procedures of the Municipality. All insurance coverage shall remain in force for the entire contract period including the warranty period which expires one year after the date of the Completion Certificate.

The following are to be named as co-insured:

- Successful Contractor
- Sub-Contractor
- Municipality
- Headway Engineering

A.6. Losses Due to Acts of Nature, Etc.

All damage, loss, expense and delay incurred or experienced by the Contractor in the performance of the work, by reason of unanticipated difficulties, bad weather, strikes, acts of nature, or other mischances shall be borne by the Contractor and shall not be the subject of a claim for additional compensation.

A.7. Commencement and Completion of Work

The work must commence as specified in the Form of Tender and Agreement. If conditions are unsuitable due to poor weather, the Contractor may be required, at the discretion of the Engineer to postpone or halt work until conditions become acceptable and shall not be subject of a claim for additional compensation.

The Contractor shall give the Engineer a minimum of 48 hours notice before commencement of work. The Contractor shall then arrange a meeting to be held on the site with Contractor, Engineer, and affected Landowners to review in detail the construction scheduling and other details of the work.

If the Contractor leaves the job site for a period of time after initiation of work, he shall give the Engineer and the Municipality a minimum of 24 hours notice prior to returning to the project. If any work is commenced without notice to the Engineer, the Contractor shall be fully responsible for all such work undertaken prior to such notification.

The work must proceed in such a manner as to ensure its completion at the earliest possible date and within the time limit set out in the Form of Tender and Agreement.

A.8. Working Area and Access

Where any part of the drain is on a road allowance, the road allowance shall be the working area. For all other areas, the working area available to the Contractor to construct the drain is specified in the Special Provisions (Division H).

Should the specified widths become inadequate due to unusual conditions, the Contractor shall notify the Engineer immediately. Where the Contractor exceeds the specified working widths without authorization, he shall be held responsible for the costs of all additional damages.

If access off an adjacent road allowance is not possible, each Landowner on whose property the drainage works is to be constructed, shall designate access to and from the working area. The Contractor shall not enter any other lands without permission of the Landowner and he shall compensate the Landowner for damage caused by such entry.

A.9. Sub-Contractors

The Contractor shall not sublet the whole or part of this Contract without the approval of the Engineer.

A.10. Permits, Notices, Laws and Rules

The Contractor shall obtain and pay for all necessary permits or licenses required for the execution of the work (but this shall not include MTO encroachment permits, County Road permits permanent easement or rights of servitude). The Contractor shall give all necessary notices and pay for all fees required by law and comply with all laws, ordinances, rules and regulations relating to the work and to the preservation of the public's health and safety.

A.11. Railways, Highways, and Utilities

A minimum of 72 hours' notice to the Railway or Highways, exclusive of Saturdays, Sundays, and Statutory Holidays, is required by the Contractor prior to any work activities on or affecting the applicable property. In the case of affected Utilities, a minimum of 48 hours' notice to the utility owner is required.

A.12. Errors and Unusual Conditions

The Contractor shall notify the Engineer immediately of any error or unusual conditions which may be found. Any attempt by the Contractor to correct the error on his own shall be done at his own risk. Any additional cost incurred by the Contractor to remedy the wrong decision on his part shall be borne by the Contractor. The Engineer shall make the alterations necessary to correct errors or to adjust for unusual conditions during which time it will be the Contractor's responsibility to keep his men and equipment gainfully employed elsewhere on the project.

The Contract amount shall be adjusted in accordance with a fair evaluation of the work added or deleted.

A.13. Alterations and Additions

The Engineer shall have the power to make alterations in the work shown or described in the Drawings and Specifications and the Contractor shall proceed to make such changes without causing delay. In

every such case, the price agreed to be paid for the work under the Contract shall be increased or decreased as the case may require according to a fair and reasonable evaluation of the work added or deleted. The valuation shall be determined as a result of negotiations between the Contractor and the Engineer, but in all cases the Engineer shall maintain the final responsibility for the decision. Such alterations and variations shall in no way render the Contract void. No claims for a variation or alteration in the increased or decreased price shall be valid unless done in pursuance of an order from the Engineer and notice of such claims made in writing before commencement of such work. In no such case shall the Contractor commence work which he considers to be extra before receiving the Engineer's approval.

A.14. Supervision

The Contractor shall give the work his constant supervision and shall keep a competent foreman in charge at the site.

A.15. Field Meetings

At the discretion of the Engineer, a field meeting with the Contractor or his representative, the Engineer and with those others that the Engineer deems to be affected, shall be held at the location and time specified by the Engineer.

A.16. Periodic and Final Inspections

Periodic inspections by the Engineer will be made during the performance of the work. If ordered by the Engineer, the Contractor shall expose the drain as needed to facilitate inspection by the Engineer.

Final inspection by the Engineer will be made within twenty (20) days after he has received notice from the Contractor that the work is complete.

A.17. Acceptance By the Municipality

Before any work shall be accepted by the Municipality, the Contractor shall correct all deficiencies identified by the Engineer and the Contractor shall leave the site neat and presentable.

A.18. Warranty

The Contractor shall repair and make good any damages or faults in the drain that may appear within one (1) year after its completion (as dated on the Completion Certificate) as the result of the imperfect or defective work done or materials furnished if certified by the Engineer as being due to one or both of these causes; but nothing herein contained shall be construed as in any way restricting or limiting the liability of the Contractor under the laws of the Country, Province or Locality in which the work is being done. Neither the Completion Certificate nor any payment there under, nor any provision in the Contract Documents shall relieve the Contractor from his responsibility.

A.19. Termination of Contract By The Municipality

If the Contractor should be adjudged bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should refuse or fail to supply enough properly skilled workmen or proper materials after having received seven (7) days notice in writing from the Engineer to supply additional workmen or materials to commence or complete the works, or if he should fail to make prompt payment to Sub-Contractors, or for material, or labour, or persistently disregards laws, ordinances, or the instruction of the Engineer,

or otherwise be guilty of a substantial violation of the provisions of the Contract, then the Municipality, upon the certificate of the Engineer that sufficient cause exists to justify such action, may without prejudice to any other right or remedy, by giving the Contractor written notice, terminate the employment of the Contractor and take possession of the premises, and of all materials, tools and appliances thereon, and may finish the work by whatever method the Engineer may deem expedient but without delay or expense. In such a case, the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Contract price will exceed the expense of finishing the work including compensation to the Engineer for his additional services and including the other damages of every name and nature, such excess shall be paid by the Contractor. If such expense will exceed such unpaid balance, the Contractor shall pay the difference to the Municipality. The expense incurred by the Municipality, as herein provided, shall be certified by the Engineer.

If the Contract is terminated by the Municipality due to the Contractor's failure to properly commence the works, the Contractor shall forfeit the certified cheque bid deposit and furthermore shall pay to the Municipality an amount to cover the increased costs, if any, associated with a new Tender for the Contract being terminated.

If any unpaid balance and the certified cheque do not match the monies owed by the Contractor upon termination of the Contract, the Municipality may also charge such expense against any money which may thereafter be due to the Contractor from the Municipality.

A.20. Tests

The cost for the testing of materials supplied to the job by the Contractor shall be borne by the Contractor. The Engineer reserves the right to subject any lengths of any tile or pipe to a competent testing laboratory to ensure the adequacy of the tile or pipe. If any tile supplied by the Contractor is determined to be inadequate to meet the applicable A.S.T.M. standards, the Contractor shall bear full responsibility to remove and/or replace all such inadequate tile in the Contract with tile capable of meeting the A.S.T.M. Standards.

A.21. Pollution

The Contractor shall keep their equipment in good repair. The Contractor shall refuel or repair equipment away from open water.

If polluted material from construction materials or equipment is caused to flow into the drain, the Contractor shall immediately notify the Ministry of the Environment, and proceed with the Ministry's protocols in place to address the situation.

A.22. Species and Risk

If a Contractor encounters a known Species at Risk as designated by the MNR or DFO, the Contractor shall notify the Engineer immediately and follow the Ministry's guidelines to deal with the species.

A.23. Road Crossings

This specification applies to all road crossings (Municipality, County, Regional, or Highway) where no specific detail is provided on the drawings or in the standard specifications. This specification in no way limits the Road Authority's regulations governing the construction of drains on their Road Allowance.

A.23.1. Road Occupancy Permit

Where applicable, the Contractor must submit an application for a road occupancy permit to the Road Authority and allow a minimum of five (5) working days for its review and issuance.

A.23.2. Road Closure Request and Construction Notification

The Contractor shall submit written notification of construction and request for road closure (if applicable) to the Road Authority and the Engineer for review and approval a minimum of five (5) working days prior to proceeding with any work on the road allowance. The Contractor shall be responsible for notifying all applicable emergency services, schools, etc. of the road closure or construction taking place.

A.23.3. Traffic Control

The Contractor shall supply flagmen, and warning signs and ensure that detour routes are adequately signed in accordance with no less than the minimum standards as set out in the Ontario Traffic Manual's Book 7.

A.23.4. Weather

No construction shall take place during inclement weather or periods of poor visibility.

A.23.5. Equipment

No construction material and/or equipment is to be left within three (3) metres of the travelled portion of the road overnight or during periods of inclement weather.

If not stated on the drawings, the road crossing shall be constructed by open cut method. Backfill from the top of the cover material over the subsurface pipe or culvert to the under side of the road base shall be Granular "B". The backfill shall be placed in lifts not exceeding 300mm in thickness and each lift shall be thoroughly compacted to 98% Standard Proctor. Granular "B" road base for County Roads and Highways shall be placed to a 450mm thickness and Granular "A" shall be placed to a thickness of 200mm. Granular road base materials shall be thoroughly compacted to 100% Standard Proctor.

Where the road surface is paved, the Contractor shall be responsible for placing HL-8 Hot Mix Asphalt patch at a thickness of 50mm or of the same thickness as the existing pavement structure. The asphalt patch shall be flush with the existing roadway on each side and without overlap.

Excavated material from the trench beyond 1.25 metres from the travelled portion or beyond the outside edge of the gravel shoulder may be used as backfill in the trench in the case of covered drains. The material shall be compacted in lifts not exceeding 300mm.

A.24. Laneways

All pipes crossing laneways shall be backfilled with material that is clean, free of foreign material or frozen particles and readily tamped or compacted in place unless otherwise specified. Laneway culverts on open ditch projects shall be backfilled with material that is not easily erodible. All backfill material shall be thoroughly compacted as directed by the Engineer.

Culverts shall be bedded with a minimum of 300mm of granular material. Granular material shall be placed simultaneously on each side of the culvert in lifts not exceeding 150mm in thickness and compacted to 95% Standard Proctor Density. Culverts shall be installed a minimum of 10% of the

culvert diameter below design grade with a minimum of 450mm of cover over the pipe unless otherwise noted on the Drawings.

The backfill over culverts and subsurface pipes at all existing laneways that have granular surfaces on open ditch and closed drainage projects shall be surfaced with a minimum of 300mm of Granular "B" material and 150mm of Granular "A" material. All backfill shall be thoroughly compacted as directed by the Engineer. All granular material shall be placed to the full width of the travelled portion.

Any settling of backfilled material shall be repaired by or at the expense of the Contractor during the warranty period of the project and as soon as required.

A.25. Fences

No earth is to be placed against fences and all fences removed by the Contractor shall be replaced by him in as good a condition as found. Where practical the Contractor shall take down existing fences in good condition at the nearest anchor post and roll it back rather than cutting the fence and attempting to patch it. The replacement of the fences shall be done to the satisfaction of the Engineer. Any fences found in such poor condition where the fence is not salvageable, shall be noted and verified with the Engineer prior to commencement of work.

Fences damaged beyond repair by the Contractor's negligence shall be replaced with new materials, similar to those materials of the existing fence, at the Contractor's expense. The replacement of the fences shall be done to the satisfaction of the Landowner and the Engineer.

Any fences paralleling an open ditch that are not line fences that hinder the proper working of the excavating machinery, shall be removed and rebuilt by the Landowner at his own expense.

The Contractor shall not leave fences open when he is not at work in the immediate vicinity.

A.26. Livestock

The Contractor shall provide each landowner with 48 hours notice prior to removing any fences along fields which could possibly contain livestock. Thereafter, the Landowner shall be responsible to keep all livestock clear of the construction areas until further notified. The Contractor shall be held responsible for loss or injury to livestock or damage caused by livestock where the Contractor failed to notify the Landowner, or through negligence or carelessness on the part of the Contractor.

A.27. Standing Crops

The Contractor shall be responsible for damages to standing crops which are ready to be harvested or salvaged along the course of the drain and access routes if the Contractor has failed to notify the Landowners 48 hours prior to commencement of the work on that portion of the drain.

A.28. Surplus Gravel

If as a result of any work, gravel or crushed stone is required and not all the gravel or crushed stone is used, the Contractor shall haul away such surplus material.

A.29. Iron Bars

The Contractor is responsible for the cost of an Ontario Land Surveyor to replace any iron bars that are altered or destroyed during the course of the construction.

A.30. Rip-Rap

Rip-rap shall be quarry stone rip-rap material and shall be the sizes specified in the Special Provisions. Broken concrete shall not be used as rip-rap unless otherwise specified.

A.31. Clearing, Grubbing and Brushing

This specification applies to all brushing where no specific detail is provided on the drawings or in the Special Provisions.

The Contractor shall clear, brush and stump trees from within the working area that interfere with the installation of the drainage system.

All trees, limbs and brush less than 150mm in diameter shall be mulched. Trees greater than 150mm in diameter shall be cut and neatly stacked in piles designated by the Landowners.

A.32. Restoration of Lawns

This specification applies to all lawn restoration where no specific detail is provided on the drawings or in the Special Provisions and no allowance for damages has been provided under Section 30 of the Drainage Act RSO 1990 to the affected property.

The Contractor shall supply “high quality grass seed” and the seed shall be broadcast by means of an approved mechanical spreader. All areas on which seed is to be placed shall be loose at the time of broadcast to a depth of 25mm. Seed and fertilizer shall be spread in accordance with the supplier’s recommendations unless otherwise directed by the Engineer. Thereafter it will be the responsibility of the Landowner to maintain the area in a manner so as to promote growth

END OF DIVISION

DIVISION B

Specifications for Open Drains

CONTENTS

DIVISION B – SPECIFICATIONS FOR OPEN DRAINS

B.1. Alignment

The drain shall be constructed in a straight line and shall follow the course of the present drain or water run unless noted on the drawings. Where there are unnecessary bends or irregularities on the existing course of the drain, the Contractor shall contact the Engineer before commencing work to verify the manner in which such irregularities or bends may be removed from the drain. All curves shall be made with a minimum radius of fifteen (15) metres from the centre line of the drain.

B.2. Profile

The Profile Drawing shows the depth of cuts from the top of the bank to the final invert of the ditch in metres and decimals of a metre, and also the approximate depth of excavated material from the bottom of the existing ditch to the final invert of the ditch. These cuts are established for the convenience of the Contractor; however, bench marks (established along the course of the drain) will govern the final elevation of the drain. The location and elevation of the bench marks are given on the Profile Drawing. Accurate grade control must be maintained by the Contractor during ditch excavation.

B.3. Excavation

The bottom width and the side slopes of the ditch shall be those shown on the drawings. If the channel cross-section is not specified it shall be a one metre bottom width with 1.5(h):1(v) side slopes. At locations along the drain where the cross section dimensions change, there shall be a transitional length of not less than 10:1 (five metre length to 0.5 metre width differential). Where the width of the bottom of the existing ditch is sufficient to construct the design width, then construction shall proceed without disturbing the existing banks.

Where existing side slopes become unstable, the Contractor shall immediately notify the Engineer. Alternative methods of construction and/or methods of protection will then be determined prior to continuing work.

Where an existing drain is being relocated or where a new drain is being constructed, the Contractor shall strip the topsoil for the full width of the drain, including the location of the spoil pile. Upon completion of levelling, the topsoil shall be spread to an even depth across the full width of the spoil.

An approved hydraulic excavator shall be used to carry out the excavation of the open ditch unless otherwise directed by the Engineer.

B.4. Excavated Material

Excavated material shall be placed on the low side of the drain or opposite trees and fences. The Contractor shall contact all Landowners before proceeding with the work to verify the location to place and level the excavated material.

No excavated material shall be placed in tributary drains, depressions, or low areas which direct water behind the spoil bank. The excavated material shall be placed and levelled to a maximum depth of 200 mm, unless instructed otherwise and commence a minimum of one (1) metre from the top of the bank. The edge of the spoil bank away from the ditch shall be feathered down to the existing ground; the edge of the spoil bank nearest the ditch shall have a maximum slope of 2(h):1(v). The material shall be levelled such that it may be cultivated with ordinary farm equipment without causing undue

hardship to the farm machinery and farm personnel. No excavated material shall cover any logs, brush, etc. of any kind.

Any stones or boulders which exceed 300mm in diameter shall be removed and disposed of in a location specified by the Landowner.

Where it is necessary to straighten any unnecessary bends or irregularities in the alignment of the ditch or to relocate any portion or all of an existing ditch, the excavated material from the new cut shall be used for backfilling the original ditch. Regardless of the distance between the new ditch and the old ditch, no extra compensation will be allowed for this work and must be included in the Contractor's lump sum price for the open work.

B.5. Excavation at Existing Bridge and Culvert Sites

The Contractor shall excavate the drain to the full specified depth under all bridges and to the full width of the structure. Temporary bridges may be carefully removed and left on the bank of the drain but shall be replaced by the Contractor when the excavation is complete. Permanent bridges must, if at all possible, be left intact. All necessary care and precautions shall be taken to protect the structure. The Contractor shall notify the Landowner if excavation will expose the footings or otherwise compromise the structural integrity of the structure.

The Contractor shall clean through all pipe culverts to the grade and width specified on the profile.

B.6. Pipe Culverts

All pipe culverts shall be installed in accordance with the standard detail drawings. If couplers are required, five corrugation couplers shall be used for up to and including 1200mm diameter pipes and 10 corrugation couplers for greater than 1200mm diameter pipes.

When an existing crossing is being replaced, the Contractor may backfill the new culvert with the existing native material that is free of large rocks and stones. The Contractor is responsible for any damage to a culvert pipe that is a result of rocks or stones in the backfill.

B.7. Rip-Rap Protection For Culverts

Quarry stone rip-rap shall be used as end treatment for new culverts and placed on geotextile filter material (Mirafi 160N or approved equal). The rip-rap shall be adequately keyed in along the bottom of the slope, and shall extend to the top of the pipe or as directed on the drawings. The maximum slope for rip-rap shall be 1(h):1(v) or as directed by the Engineer.

The Contractor shall be responsible for any defects or damages that may develop in the rip-rap or the earth behind the rip-rap that the Engineer deems to have been fully or partially caused by faulty workmanship or materials.

B.8. Clearing, Grubbing and Mulching

Prior to excavation, all trees, scrub, fallen timber and debris shall be removed from the side slopes of the ditch and for such a distance on the working side so as to eliminate any interference with the construction of the drain or the spreading of the spoil. The side slopes shall be neatly cut and cleared flush with the slope whether or not they are affected directly by the excavation. With the exception of large stumps causing damage to the drain, the side slopes shall not be grubbed. All other cleared areas shall be grubbed and the stumps put into piles for disposal by the Landowner.

All trees or limbs 150mm or larger, that is necessary to remove, shall be cut, trimmed and neatly stacked in the working width for the use or disposal by the Landowner. Brush and limbs less than 150mm in diameter shall be mulched. Clearing, grubbing and mulching shall be carried out as a separate operation from the excavation of the ditch, and shall not be completed simultaneously at the same location.

B.9. Tributary Tile Outlets

All tile outlets in existing ditches shall be marked by the Landowner prior to excavation. The Contractor shall guard against damaging the outlets of tributary drains. Any tile drain outlets that were marked or noted on the drawings and are subsequently damaged by the Contractor shall be repaired by the Contractor at his expense. The Landowner shall be responsible for repairs to damaged tile outlets that were not marked.

B.10. Seeding

The side slopes where disturbed shall be seeded using an approved grass seed mixture. The grass seed shall be applied the same day as the excavation of the open ditch.

Grass seed shall be fresh, clean and new crop seed, meeting the requirements of the MTO and composed of the following varieties mixed in the proportion by weight as follows:

- 55% Creeping Red Fescue
- 40% Perennial Rye Grass
- 5% White Clover

Grass seed shall be applied at the rate of 100 kg/ha.

B.11. Hydro Seeding

The areas specified in the contract document shall be hydro seeded and mulched upon completion of construction in accordance with O.P.S.S. 572.

B.12. Hand Seeding

Placement of the seed shall be of means of an approved mechanical spreader.

B.13. Completion

At the time of completion and final inspection, all work in the Contract shall have the full dimensions and cross-sections specified without any allowance for caving of banks or sediment in the ditch bottom.

END OF DIVISION

DIVISION C

Specifications for Tile Drains

CONTENTS

DIVISION C – SPECIFICATIONS FOR TILE DRAINS

C.1. Pipe Materials

Concrete Tile

Concrete drain tile shall conform to the requirements of the most recent A.S.T.M. specification for Heavy-Duty Extra Quality drain tile. All tile with diameters less than 600mm shall have a pipe strength of 1500D. All tile with diameters 600mm or larger shall have a pipe strength of 2000D.

All tile furnished shall be subject to the approval of the Engineer. All rejected tile are to be immediately removed from the site.

High Density Polyethylene (HDPE) Pipe

All HDPE pipe shall be dual-wall corrugated drainage pipe with a smooth inner wall. HDPE pipe shall have a minimum stiffness of 320 kPa at 5% deflection.

Unless otherwise noted, all sealed HDPE pipe shall have a water tight gasketed bell and spigot joining system meeting the minimum requirements of CSA B182.8. Perforated HDPE pipe shall have a soil tight joining system, and shall be enveloped in non-woven geotextile filter sock.

C.2. Alignment

The Contractor shall contact the Engineer to establish the course of the drain. Where an existing drain is to be removed and replaced by the new drain, or where the new drain is to be installed parallel to an existing drain, the Contractor shall locate the existing drain (including repairing damaged tile caused by locating) at intervals along the course of the drain. The costs of locating shall be included in the tender price.

The drain shall run in as straight a line as possible throughout its length, except that at intersections of other watercourses or at sharp corners, it shall run on a curve of at least 15 metres radius. The new tile drain shall be constructed at an offset from and parallel with any ditch or defined watercourse in order that fresh backfill in the trench will not be eroded by the flow of surface water.

The Contractor shall exercise care not to disturb any existing tile drain or drains which parallel the course of the new drain, particularly where the new and existing tile act together to provide the necessary capacity. Where any such existing drain is disturbed or damaged, the Contractor shall perform the necessary repair at his expense.

C.3. Profile

Benchmarks have been established along the course of the drain which are to govern the elevations of the drain. The location and elevations of the benchmarks are shown on the drawings. Tile is to be installed to the elevation and grade shown on the profiles. Accurate grade control must be maintained by the Contractor at all times.

When installing a drain towards a fixed point such as a bore pipe, the Contractor shall uncover the pipe and confirm the elevation a sufficient distance away from the pipe in order to allow for any necessary minor grade adjustments to be made.

C.4. Excavation

Wheel machine

Unless otherwise specified, all trenching shall be carried out with a wheel machine approved by the Engineer. The wheel machine shall shape the bottom of the trench to conform to the outside diameter of the pipe. The minimum trench width shall be equal to the outside diameter of the pipe plus 100mm on each side of the pipe, unless otherwise specified. The maximum trench width shall be equal to the outside diameter of the pipe plus 300mm on each side of the pipe, unless otherwise specified.

Scalping

Where the depths of cuts in isolated areas along the course of the drain as shown on the profile exceed the capability of the Contractor's wheel machine, he shall lower the surface grade in order that the wheel machine may trench to the correct depth. Topsoil is to be stripped over a sufficient width that no subsoil will be deposited on top of the topsoil. Subsoil will then be removed to the required depth and piled separately. Upon completion, the topsoil will then be replaced to an even depth over the disturbed area. The cost for this work shall be included in his tender price.

Excavator

Where the use of an excavator is used in-lieu of a wheel machine, the topsoil shall be stripped and replaced in accordance with Item C.4.2. All tile shall be installed on 19mm clear crushed stone bedding placed to a minimum depth of 150mm which has been shaped to conform to the bottom of the pipe. The Contractor shall include the costs of this work in his tender price.

C.5. Installation

Concrete Tile

The tile is to be laid with close joints and in regular grade and alignment in accordance with the drawings. The tiles are to be bevelled, if necessary to ensure close joints. The inside of the tile is to be kept clear when laid. The sides of the tile are to be supported by partial filling of the trench (blinding) prior to inspection by the Engineer. No tile shall be backfilled until inspected by the Engineer unless otherwise permitted by the Engineer. The tile shall be backfilled such that a sufficient mound of backfill is placed over the trench to ensure that no depression remains after settling occurs in the backfill.

Where a tile connects to a catch basin or similar structure, the Contractor shall include in his tender price for the supply and placement of compacted Granular 'A' bedding or 19mm clear crushed stone under areas backfilled from the underside of the pipe to undisturbed soil. Where a tile drain passes through a bore pit, the Contractor shall include in his tender price for the supply and placement of compacted Granular 'A' bedding or 19mm clear crushed stone from the underside of the pipe down to undisturbed soil with the limits of the bore pit.

The Contractor shall supply and wrap all concrete tile joints with Mirafi 160N geotextile filter material as part of this contract. The width of the filter material should be:

- 300mm wide for tile sizes 150mm diameter to 350mm diameter.
- 400mm wide for tile sizes 400mm diameter to 750mm diameter.
- 500mm wide for tile sizes larger than 750mm diameter.

The filter material shall completely cover the tile joint and shall have a minimum overlap of 300mm. The type of filter material shall be.

HDPE Pipe

HDPE pipe shall be installed using compacted Granular 'A' bedding or 19mm clear crushed stone bedding from 150mm below the pipe to 300mm above the pipe. All granular material shall be compacted using a suitable mechanical vibratory compactor. Granular bedding and backfill shall be placed in lifts not exceeding 300mm and compacted to at least 95% Standard Proctor Maximum Dry Density (SPMDD).

Where a pipe connects to a catch basin or similar structure, the Contractor shall include in his tender price for the supply and placement of compacted Granular 'A' bedding or 19mm clear crushed stone under areas backfilled from the underside of the pipe to undisturbed soil. Where a pipe passes through a bore pit, the Contractor shall include in his tender price for the supply and placement of compacted Granular 'A' bedding or 19mm clear crushed stone from the underside of the pipe down to undisturbed soil with the limits of the bore pit.

As determined by the Engineer, unsuitable backfill material must be hauled off-site by the Contractor and Granular "B" shall be used as replacement backfill material.

C.6. Trench Crossings

The Contractor shall not cross the backfilled trench with any construction equipment or vehicles, except by one designated crossing location on each property. The Contractor shall ensure that the bedding and backfill material at this designated crossing location is properly placed and compacted so as to adequately support the equipment and vehicles that may cross the trench. The Contractor may undertake any other approved work to ensure the integrity of the tile at the crossing location. The Contractor shall ensure that no equipment or vehicles travel along the length of the trench. The Contractor shall be responsible for any damage to the new tile caused by the construction of the drain.

C.7. Outlet Protection

A tile drain outlet into a ditch shall be either HDPE pipe or corrugated steel pipe and shall include a hinged grate for rodent protection. The maximum spacing between bars on the rodent grate shall be 40mm. All corrugated steel outlet pipes shall be bevelled at the end to generally conform to the slope of the ditch bank.

Quarry stone rock rip-rap protection and geotextile filter material (Mirafi 160N), shall be installed around the outlet pipe and extended downstream a minimum distance of three metres, unless otherwise specified. The protection shall extend to the top of the backfilled trench and below the pipe to 300 mm under the streambed. The protection shall also extend 600mm into undisturbed soil on either side of the backfilled trench. In some locations, rip-rap may be required on the bank opposite the outlet.

Where the outlet occurs at the upper end of an open ditch, the rip-rap protection will extend all around the end of the ditch and to a point 800mm downstream on either side. Where heavy overflow is likely to occur, sufficient additional rip-rap and filter material shall be placed as directed by the Engineer to prevent the water cutting around the protection.

C.8. Catch Basins and Junction Boxes

Unless otherwise noted, catch basins shall be in accordance with OPSD 705.010 and 705.030. The catch basin grate shall be a "Birdcage" type substantial steel grate, removable for cleaning and shall be inset into a recess provided around the top of the structure. The grate shall be fastened to the catch basin with bolts into the concrete. Spacing of bars on grates for use on 600mmX600mm

structures shall be 65mm centre to centre. Spacing of bars on grates for use on structures larger than 600mmX600mm shall be 90mm.

All catch basins shall be backfilled with compacted Granular 'A' or 19mm clear crushed stone placed to a minimum width of 300mm on all sides. If settling occurs after construction, the Contractor shall supply and place sufficient granular material to maintain the backfill level flush with adjacent ground. The riser sections of the catch basin shall be wrapped with filter cloth.

Quarry stone rip-rap protection shall be placed around all catch basins and shall extend a minimum distance of one (1) metre away from the outer edge of each side of the catch basin, and shall be placed so that the finished surface of the rip-rap is flush with the existing ground.

If there are no existing drains to be connected to the catch basin at the top end of the drain, a plugged tile shall be placed in the upstream wall with the same elevations as the outlet tile.

Junction boxes shall have a minimum cover over the lid of 450mm.

The Contractor shall include in his tender price for the construction of a berm behind all ditch inlet structures. The berm shall be constructed of compacted clay keyed 300mm into undisturbed soil. The top of the spill way of the earth berm shall be the same elevation as the high wall of the ditch inlet catch basin. The earth berm shall be covered with 100mm depth of topsoil and seeded with an approved green seed mixture. The Contractor shall also include for regrading, shaping and seeding of road ditches for a maximum of 15 metres each way from all catch basins.

The Contractor shall clean all catch basin sumps after completion of the drain installation. Catch basin markers shall be placed beside each catch basin.

C.9. Tributary Drains

Any tributary tile encountered in the course of the drain is to be carefully taken up by the Contractor and placed clear of the excavated earth. If the tributary drains encountered are clean or reasonably clean, they shall be connected into the new drain in accordance with the typical tile drain connection detail. Tributary tile drain connections into the new drain shall be made using high density polyethylene agricultural drain tubing installed on and backfilled with 19mm clear crushed stone. All tile drain connections into the new drain shall be either a cored hole with an insert coupler or a manufactured tee.

Where the existing drains are full of sediment, the decision to connect the tributary drain to the new drain shall be left to the Engineer. The Contractor shall be paid for each tributary drain connection as outlined in the Form of Tender and Agreement.

The Contractor shall be responsible for all tributary tile connections for a period of one year from the date of the Completion Certificate. After construction, any missed tile connections required to be made into the new drain shall be paid at the same rate as defined in the Form of Tender and Agreement. The Contractor will have the option to make any subsequent tile connections or have the Municipality make the required connections and have the cost of which deducted from the holdback.

Where an open ditch is being replaced by a new tile drain, existing tile outlets entering the ditch from the side opposite the new drain shall be extended to the new drain.

Where the Contractor is required to connect an existing tile which is not encountered in the course of the drain, the cost of such work shall constitute an extra to the contract.

C.10. Clearing, Grubbing and Mulching

The Contractor shall clear, brush and stump trees from within the working area.

All trees or limbs 150mm or larger, that is necessary to remove, shall be cut, trimmed and neatly stacked in the working width for the use or disposal by the Landowner. Brush and limbs less than 150mm in diameter shall be mulched.

Clearing, grubbing and mulching shall be carried out as a separate operation from installing the drain, and shall not be completed simultaneously at the same location.

C.11. Roads and Laneway Sub-Surface Crossings

All roads and laneway crossings may be made with an open cut. The Contractor may use original ground as backfill to within 600mm of finished grade only if adequate compaction and if the use of the original ground backfill has been approved beforehand by the Engineer.

C.12. Filling In Existing Ditches

The Contractor shall backfill the ditch sufficiently for traversing by farm equipment. If sufficient material is available on-site to fill in the existing ditch, the topsoil shall be stripped and the subsoil shall be bulldozed into the ditch and the topsoil shall then be spread over the backfilled waterway. The Contractor shall ensure sufficient compaction of the backfill and if required, repair excess settlement up to the end of the warranty period.

C.13. Construction of Grassed Waterways

Where the Contractor is required to construct a grassed waterway, the existing waterway shall be filled in, regraded, shaped and a seed bed prepared prior to applying the grass seed. The grass seed shall be fresh, clean and new crop seed, meeting the requirements of the MTO.

- 55% Creeping Red Fescue
- 15% Perennial Rye Grass
- 27% Kentucky Bluegrass
- 3% White Clover

Grass seed shall be applied at the rate of 100 kg/ha.

C.14. Unstable Soil

The Contractor shall immediately contact the Engineer if unstable soil is encountered. The Engineer shall, after consultation with the Contractor, determine the action necessary and a price for additions or deletions shall be agreed upon prior to further drain installation.

C.15. Rocks

The Contractor shall immediately contact the Engineer if boulders of sufficient size and number are encountered such that the Contractor cannot continue trenching with a wheel machine. The Engineer shall determine the action necessary and a price for additions or deletions shall be agreed upon prior to further drain installation.

If only scattered large stone or boulders are removed on any project, the Contractor shall either excavate a hole to bury same adjacent to the drain, or he shall haul the stones or boulders to a location designated by the Landowner.

C.16. Broken or Damaged Tile

The Contractor shall remove and dispose of all broken (existing or new), damaged or excess tile off site.

C.17. Recommended Practice For Construction of Sub-Surface Drainage Systems

Drainage Guide for Ontario, Ministry of Agriculture, Food and Rural Affairs, Publication 29 and its amendments, dealing with the construction of Subsurface Drainage Systems, shall be the guide to all methods and materials to be used in the construction of tile drains except where superseded by other Specifications of the Contract.

END OF DIVISION

SPECIAL PROVISIONS

Collver Municipal Drain

CONTENTS

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

1.0 GENERAL

The Contractor shall notify the Landowner, the Drainage Superintendent, the Road authorities and the Engineer 48 hours prior to construction.

The Contractor shall arrange a pre-construction meeting and shall invite the Landowners on whose property work will take place, the Engineer, the Drainage Superintendent and road authority for the Region of Niagara.

The Contractor shall verify the location of the new drainage systems with the Engineer and Landowners prior to construction.

The Contractor shall check and verify all dimensions and elevations and report any discrepancies to the Engineer prior to proceeding with the work.

The Contractor shall be responsible for settlement within the warranty period.

The Contractor shall notify all emergency services and local district school boards of any road closures.

Detour routes and plans shall be provided to all relevant local authorities in accordance with their respective notification protocols (if applicable).

The Contractor shall be responsible to arrange all traffic control signals, signs and devices that are required for safe and proper traffic management during the installation of the drainage system. The Contractor shall contact the road authorities for specific local procedures, guidelines, and timelines. Traffic control shall meet the standards of Book 7 of the Ontario Traffic Manual.

2.0 UTILITIES

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

The locations and elevations of all utilities shown on the drawings are approximate locations. Actual locations and elevations of all utilities must be verified by the Contractor prior to construction.

The Contractor shall arrange to have a representative of the utility owner on site during construction if it is a requirement by the utility owner.

3.0 WORKING AREA AND ACCESS

Access to the working area shall be designated by the Landowners where no access route is defined.

The working area shall be in accordance with the following average widths. The working width may be used for construction purposes including spreading or transporting excavated soil and supplying construction materials to the site.

Drain Segment and Station Range	Property Roll No.	Working side	Average Working Width for Construction	Average Working Width for Future Maintenance
Collver Drain (Open)				
0+031 to 0+358	12-118-02, 12-119	East	12m	10m
0+358 to 0+567	Regional Road 4	Centered	12m	10m
0+567 to 0+959	12-198, 13-998	East	12m	10m
0+959 to 1+010	Regional Road 4	Centered	12m	10m
1+010 to 1+065	12-195	East	12m	10m
Collver Drain (Closed)				
0+000 to 2+000	12-195, 12-186, 12-185-01 and Unopened Road Allowance	Centred	25m	10m
Existing Ditch Alignment (to be enclosed)	12-195, 12-186, 12-185-01	North and South	10m (both sides)	N.A.
Homan Branch				
0+000 to 0+434	Unopened Road Allowances, 12-183-01 and 12-184	Centred	25m	10m
Heeg Branch				
0+000 to 0+020	Regional Road 4	Centred	12m	10m

4.0 CLEARING BRUSHING AND MULCHING

The Contractor shall clear, brush and mulch trees from within the working area that interfere with the construction of the drainage system. The Contractor shall not clear all trees within the working area unless the full working width in a specific section is required for the installation of the drain and unless the Engineer has authorized the full clearing of the trees.

Clearing and brushing shall be done prior to the construction of the drain.

Trees and branches greater than 150mm in diameter shall be cut into lengths no greater than four metres and placed in nearby stacks designated by the Landowner.

Trees removed from road right-of-ways shall be mulched or disposed of offsite by the Contractor.

5.0 EROSION AND SEDIMENT CONTROL

The Contractor shall provide adequate erosion and sediment control for the duration of the construction including monitoring and maintenance of the control measures put in place. The Contractor shall inspect the erosion and sediment control measures regularly, and specifically before predicted rainfall events, and after rainfall events.

6.0 TOPSOIL STRIPPING

The contractor shall strip topsoil from the side slopes and streambed of the ditches prior to the ditch cleanouts/excavations. The topsoil shall later be spread back on the side slopes of the disturbed ditches.

For the construction of Branch 'A', the Contractor shall strip the topsoil for a width equal to the top width of the trench where the drain is installed by means of an approved hydraulic excavator (due to poor soil conditions). Where the drain is to be installed by means of an approved wheel trencher, the Contractor shall strip the topsoil for a minimum of four metres, centred on the trench.

The Contractor shall stockpile the topsoil and later spread it over the backfilled trench. The Contractor shall ensure that the topsoiled trench is left in a condition that the Landowner can perform final restoration using nothing more than farm equipment.

7.0 OPEN DITCH EXCAVATION

An approved hydraulic excavator shall be used to carry out the excavation of the open ditches. The Collver Drain (Open) shall have a 900mm bottom width. All bottom widths shall be parabolic in shape. The side slopes shall be a 1.5H:1V or flatter for all open ditch works.

8.0 EXCAVATED MATERIAL

Excavated material shall from the Collver Drain (Open) shall be hauled to the Collver Drain (Closed) for the ditch enclosure as noted in the attached drawing set.

9.0 PIPE AND INSTALLATION

9.1 Concrete Field Tile

An approved wheel trencher shall be used to install the concrete field tile whenever possible.

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

Concrete field tile installed by means of a wheel machine shall be backfilled using suitable native material. The backfill shall not be compacted but a sufficient mound shall be left over the trench by the Contractor to allow for settlement flush with adjacent lands.

Concrete field tile installed by means of an approved hydraulic excavator shall be installed using 19mm crushed stone bedding from a minimum of 150mm below the pipe to the springline of the pipe. Suitable native material shall be used as backfill from the springline to the underside of the topsoil.

The Contractor shall supply and wrap all concrete joints with geotextile filter material. The width of the filter material shall be 400mm wide with 400mm overlap.

The filter material shall completely cover the tile joint.

The Contractor shall be responsible for all trench settlement within the warranty period.

9.2 High Density Polyethylene Pipe (HDPE)

All HDPE pipe shall be CSA B182.8 with soil tight (couplers) jointing systems.

All HDPE pipe shall be installed using 19mm crushed stone bedding (or approved equivalent) from a minimum of 150mm below the pipe to 150mm above the pipe. Suitable native material shall be used as backfill from 150mm above the pipe to the underside of the topsoil.

The Contractor shall be responsible for all trench settlement within the warranty period.

9.3 Poor Soil Conditions

The Contractor shall submit a unit price for installation of the pipe per the detail on wrapped crushed stone bedding as a provisional item. The provisional amount for installation on wrapped crushed stone bedding shall include the supply and installation of all additional labour, equipment and materials required for the installation of the pipe by this method.

If poor soil conditions are encountered, the Contractor shall install the pipe in accordance with the detail for wrapped crushed stone bedding and shall be entitled to the provisional tender amount, in addition to the tendered standard installation price. The Contractor shall be paid for the actual lengths installed in this condition.

10.0 EXISTING DRAINS/TILE CONNECTIONS

The Contractor shall locate the existing drains prior to the installation of the new drainage systems.

The Contractor shall make all tributary tile drain connections.

The Contractor shall be responsible for all tile connections for a period of one year after the issuance of the completion certificate. Tile connections required to be made within this warranty period shall be made at the expense of the Contractor. After construction, the Contractor will be given the option to make any subsequent tile connections or have the County make said connections and have the costs of which deducted from the holdback.

The Contractor shall supply all necessary materials to complete the connections of the existing drains to the new drain. The type of materials used to make the tributary drain connections shall be verified with the engineer.

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

11.0 CATCH BASINS

All catch basins shall be precast concrete catch basins and shall have a 300mm sump.

All catch basin grates shall be fastened to the new catch basin and shall be hot dipped galvanized bird cage grates. Catch basin marker signs shall be erected at all catch basins.

All existing catch basins that are to be removed shall be disposed of offsite by the Contractor.

The catch basin grate elevations shall be set to the satisfaction of the Engineer. Lifts shall be placed by the Contractor on all catch basins if necessary to achieve the desired elevation when field setting the structures.

All catch basins shall be installed using 19mm crushed stone bedding from 150mm below the structure to 150mm above the top of the highest pipe entering or exiting the structure. Structures on private property shall be backfilled using approved native material up to the underside of the topsoil layer. All backfill material shall be placed and thoroughly compacted evenly around each structure in lifts not exceeding 300mm to minimize settlement around the structures.

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

The Contractor shall place quarry stone rip-rap material around all sides of the catch basins and shall be placed on geotextile filter material in accordance with the attached set of drawing plans.

All holes for catch basin pipe connections to be cored by the manufacturer. All pipes entering or exiting a catch basin or shall be installed such that the face of the pipe is flush with the inside wall of the structure.

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

12.0 SEEDING

Any areas disturbed shall be hydroseeded with an approved grass seed mixture (OPS 803 – Standard Roadside Mix).

All seed shall be applied using the manufacturer's application instructions and recommendations.

13.0 DRIVEWAY RESTORATIONS

The Contractor shall use approved native material to backfill the trench to 150mm from finished grade. Should the material not be suitable for reuse as backfill, as determined by the engineer, the Contractor shall supply and place approved Granular material as backfill material. Unusable native material shall be hauled offsite by the Contractor.

Granular 'A' shall be used as the 150mm finished surface course.

14.0 BANK REPAIR

In areas where high levels of erosion have occurred, the Contractor shall reshape the sideslopes and the banks to match the "Typical Proposed Drain Section" detail included in the drawing set, as directed by the Engineer. The Contractor shall then place geo-textile filter material and stone riprap for long term bank stabilization as required by the Engineer.

15.0 ROAD WORKS/CROSSING

15.1 Notice

The Contractor shall notify the Engineer and road authority a minimum of 48 hours prior to the scheduled road crossing.

The Contractor shall notify all emergency services and local district school boards of the road closure.

Detour routes and plans shall be provided to all relevant local authorities in accordance with their respective notification protocols.

15.2 Traffic Control

The Contractor shall be responsible to arrange all traffic control signals, signs and devices that are required for safe and proper traffic management during the installation of the drainage system. The Contractor shall contact the road authority for specific local procedures, guidelines, and timelines. Traffic control shall meet the standards of Book 7 of the Ontario Traffic Manual.

15.3 Pipe Installation

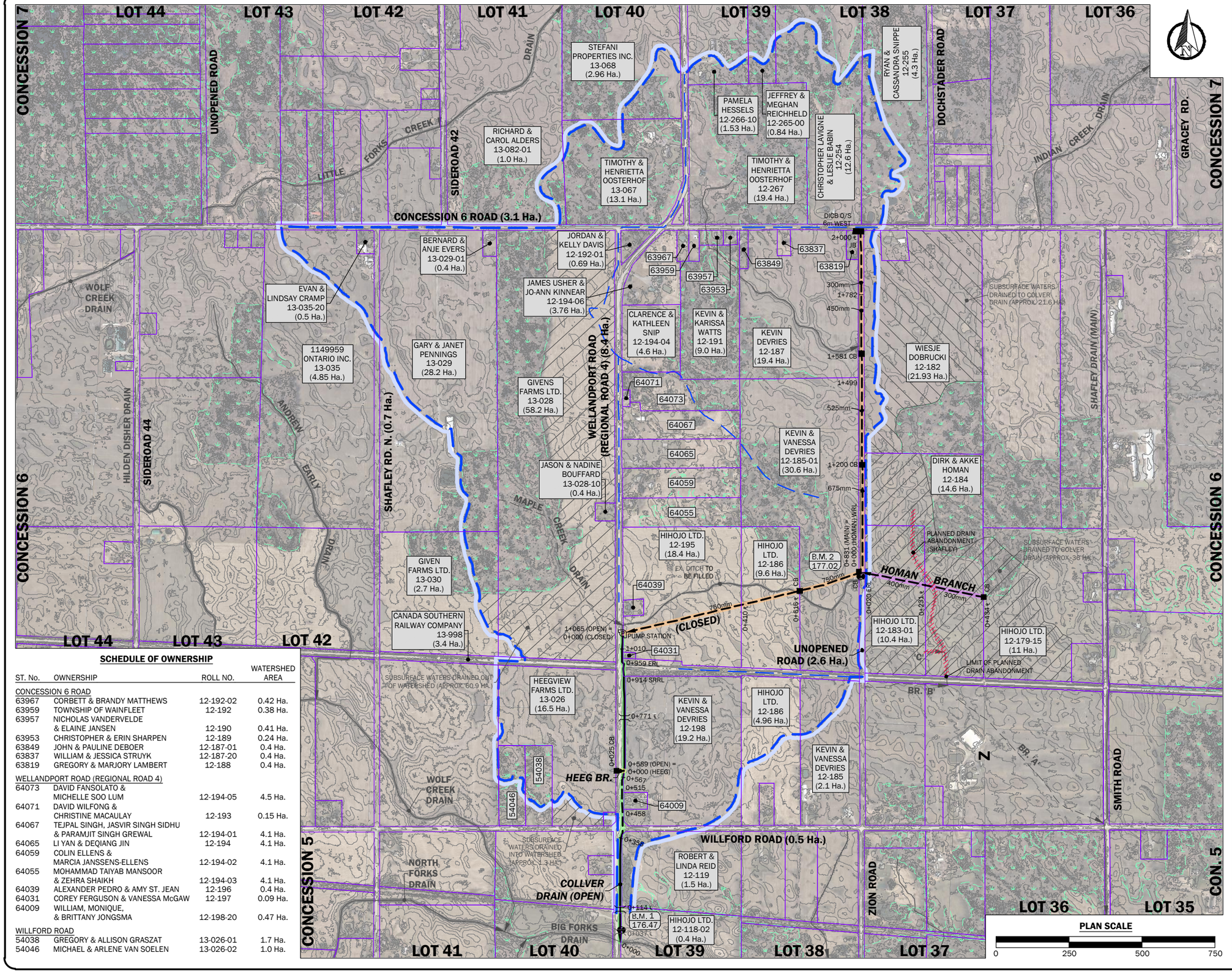
The Contractor shall install the proposed 1800mm diameter CSP culvert by means of the open cut method in accordance with the attached set of drawing plans, using OPSD specifications where noted.

15.4 Road Restoration

The Contractor shall remove and dispose of offsite, all excavated material unsuitable for use as backfill.

The Contractor shall grade the road ditches to the ditch. Any areas disturbed within the Road Right-of-Way shall be topsoiled and hydroseeded with an approved grass seed mixture (OPS 803 – Standard Roadside Mix).

The Contractor shall review and comply with Niagara Region Construction Encroachment & Reinstatement Specifications, including milling asphalt 600 mm beyond saw-cut limits. Refer to: https://www.niagararegion.ca/living/roads/permits/construction-encroachment-specifications.aspx



SCHEDULE OF OWNERSHIP

ST. No.	OWNERSHIP	ROLL NO.	WATERSHED AREA
CONCESSION 6 ROAD			
63967	CORBETT & BRANDY MATTHEWS	12-192-02	0.42 Ha.
63959	TOWNSHIP OF WAINFLEET	12-192	0.38 Ha.
63957	NICHOLAS VANDERVELDE & ELAINE JANSEN	12-190	0.41 Ha.
63953	CHRISTOPHER & ERIN SHARPEN	12-189	0.24 Ha.
63849	JOHN & PAULINE DEBOER	12-187-01	0.4 Ha.
63837	WILLIAM & JESSICA STRUYK	12-187-20	0.4 Ha.
63819	GREGORY & MARJORY LAMBERT	12-188	0.4 Ha.
WELLANDPORT ROAD (REGIONAL ROAD 4)			
64073	DAVID FANSOLATO & MICHELLE SOO LUM	12-194-05	4.5 Ha.
64071	DAVID WILFONG & CHRISTINE MACAULAY	12-193	0.15 Ha.
64067	TEJPAL SINGH, JASVIR SINGH SIDHU & PARAMJIT SINGH GREWAL	12-194-01	4.1 Ha.
64065	LI YAN & DEQIANG JIN	12-194	4.1 Ha.
64059	COLIN ELLENS & MARCIA JANSSENS-ELLENS	12-194-02	4.1 Ha.
64055	MOHAMMAD TAIYAB MANSOOR & ZEHRA SHAIKH	12-194-03	4.1 Ha.
64039	ALEXANDER PEDRO & AMY ST. JEAN	12-196	0.4 Ha.
64031	COREY FERGUSON & VANESSA McGAW	12-197	0.09 Ha.
64009	WILLIAM, MONIQUE, & BRITTANY JONGSMA	12-198-20	0.47 Ha.
WILLFORD ROAD			
54038	GREGORY & ALLISON GRASZAT	13-026-01	1.7 Ha.
54046	MICHAEL & ARLENE VAN SOELEN	13-026-02	1.0 Ha.

The TOWNSHIP of WAINFLEET

COLLVER MUNICIPAL DRAIN

Watershed Plan

NOTES:

1. THIS MAP WAS CREATED USING NIAGARA REGION GEOGRAPHIC INFORMATION SYSTEM DIGITAL DATA. THIS MAP IS A SECONDARY PRODUCT WHICH HAS NOT BEEN VERIFIED BY NIAGARA REGION.
2. THE CONTOURS WERE CREATED USING IMAGERY DERIVED DIGITAL DATA (2015) FROM LAND INFORMATION ONTARIO.

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 **ELEV.=176.47**
TOP SOUTHWEST CORNER OF UTILITY PEDESTAL 3m EAST OF STA. 0+043 (COLLVER OPEN)

BENCHMARK No. 2 **ELEV.=177.02**
TOP CENTER OF CONCRETE RETAINING WALL ON DOWNSTREAM END OF 900mmØ CSP CULVERT 24m SOUTH OF STA. 0+840 (COLLVER CLOSED)

LEGEND

- LOT/CONCESSION LINE
- PROPERTY LINE
- MAJOR WATERSHED BOUNDARY
- MINOR WATERSHED BOUNDARY
- WETLAND LIMIT
- BENCHMARK LOCATION
- B.M. 1 123.45 — BENCHMARK No. / BENCHMARK ELEVATION
- JOHN & JANE SMITH 12-345 (12.3 Ha.) — LANDOWNER NAME(S) / ASSESSMENT ROLL No. (ABBREVIATED) / AREA WITHIN WATERSHED

EXISTING FEATURES:
- DRAIN NAME — OPEN DRAIN WITH CROSSING AND FLOW DIRECTION
- DRAIN NAME — CB / MH — CLOSED DRAIN WITH CATCH BASIN, MANHOLE AND FLOW DIRECTION
- OVERLAND FLOW PATH

PROPOSED FEATURES:
- DRAIN NAME — OPEN DRAIN WITH CROSSING AND FLOW DIRECTION
- DRAIN NAME — CB / MH — CLOSED DRAIN WITH CATCH BASIN, MANHOLE AND FLOW DIRECTION

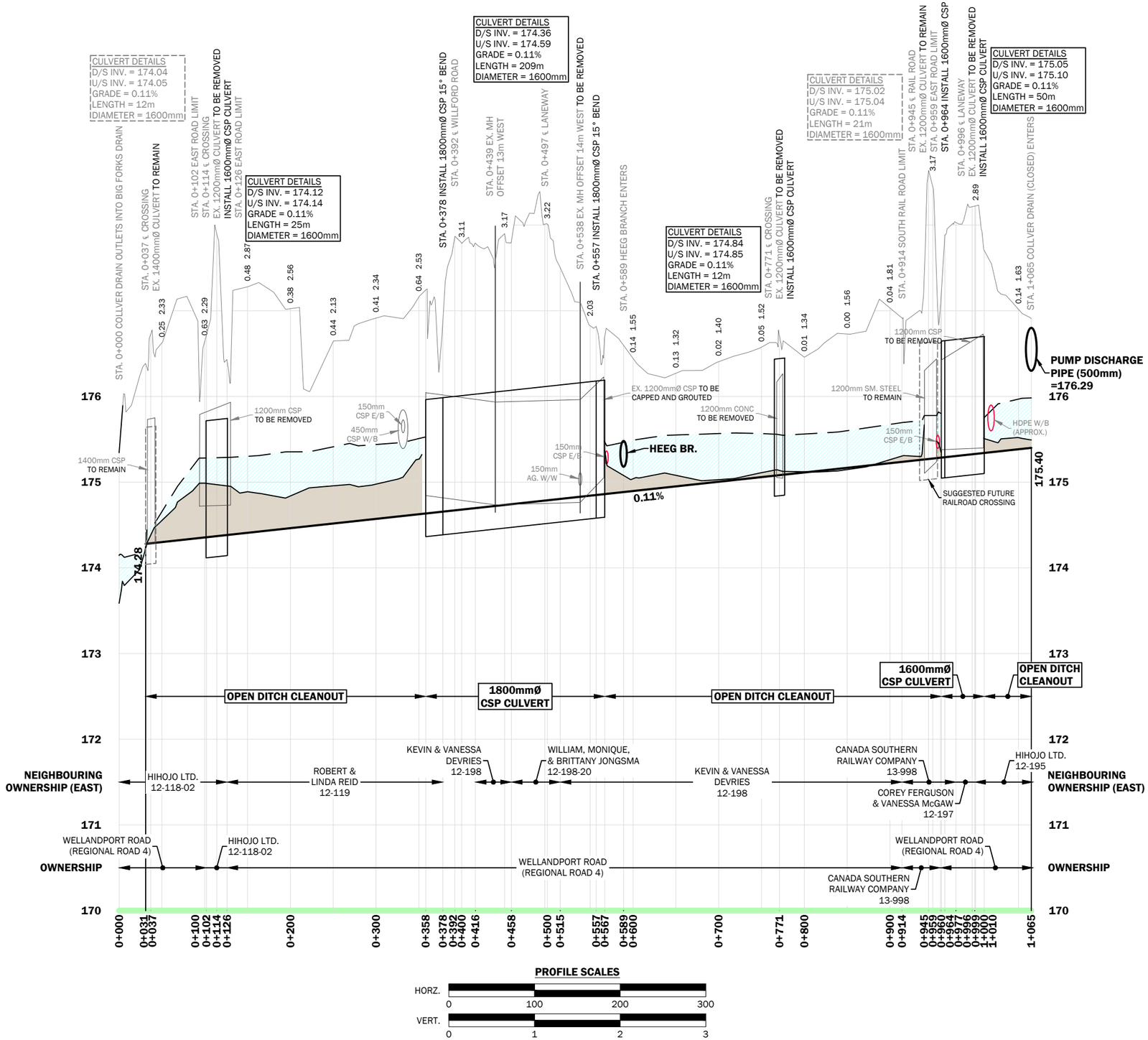
PLAN SCALE
0 250 500 750

No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

LICENSED PROFESSIONAL ENGINEER — Dec. 17, 2025 — S. G. R. BRICKMAN — 100150920 — PROVINCE OF ONTARIO

Headway Engineering

DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	1 OF 11
DATE: 2025-12-18	REFERENCE No. WNFLT-001		



PROFILE SCALES

HORZ. 0 100 200 300

VERT. 0 1 2 3

The TOWNSHIP of WAINFLEET

COLLVER MUNICIPAL DRAIN

Main Drain (Open) Profile

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 **ELEV.=176.47**
TOP SOUTHWEST CORNER OF UTILITY PEDESTAL 3m EAST OF STA. 0+043 (COLLVER OPEN)

BENCHMARK No. 2 **ELEV.=177.02**
TOP CENTER OF CONCRETE RETAINING WALL ON DOWNSTREAM END OF 900mmØ CSP CULVERT 24m SOUTH OF STA. 0+840 (COLLVER CLOSED)

LICENSED PROFESSIONAL ENGINEER Dec. 17, 2025 S.G.R. BRICKMAN 100150920 PROVINCE OF ONTARIO

No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

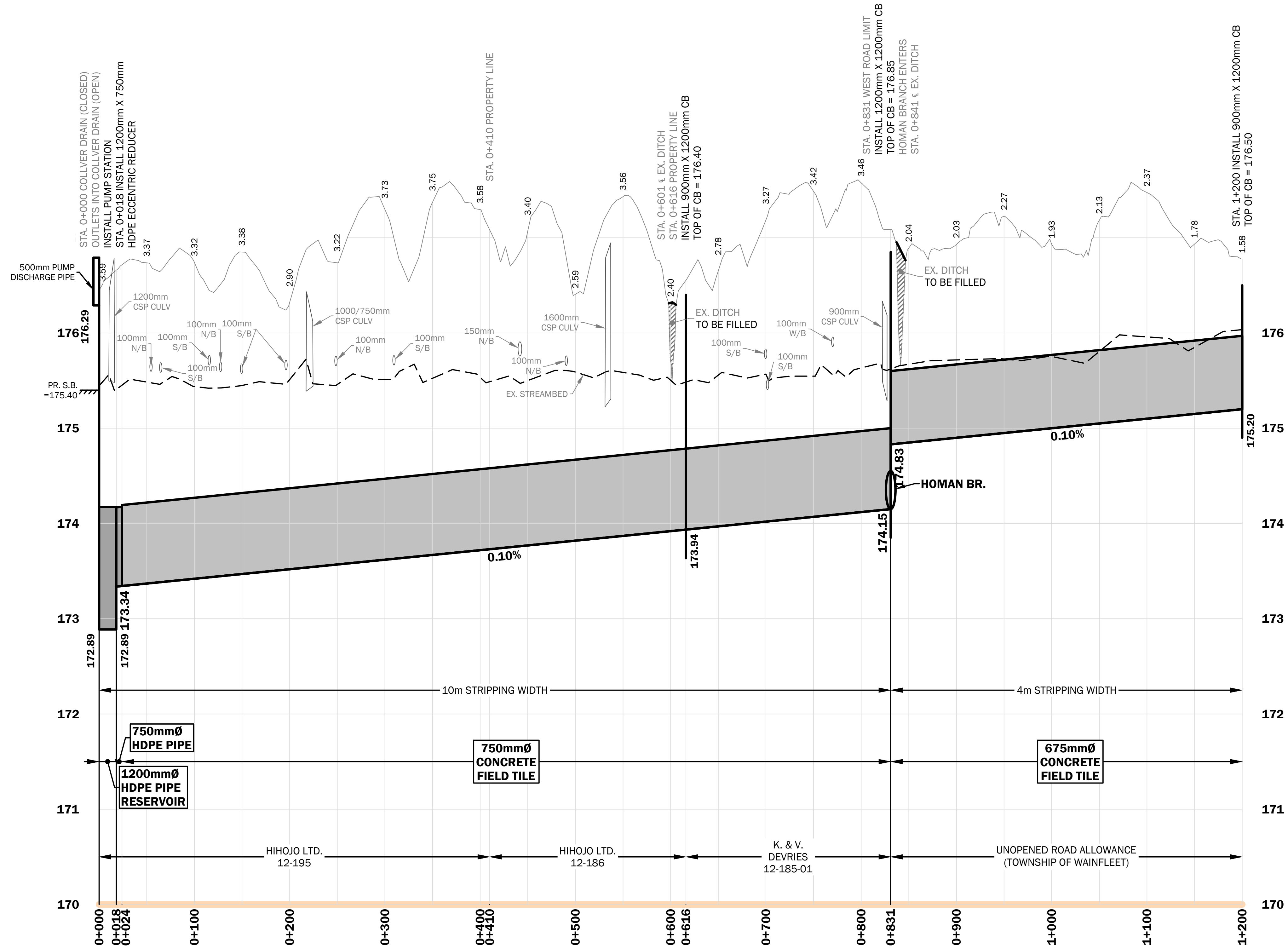
Headway Engineering

DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	2 OF 11
DATE: 2025-12-18	REFERENCE No. WNFLT-001		

The TOWNSHIP of WAINFLEET

COLLVER MUNICIPAL DRAIN

Main Drain (Closed) Profile (Sta. 0+000 to Sta. 1+200)



PROFILE SCALES

HORZ. 0 100 200 300

VERT. 0 1 2 3

SCHEDULE OF PIPE MATERIALS

	MATERIAL	DIAMETER (mm)	STATION RANGE	LENGTH (m)
1.	HIGH DENSITY POLYETHYLENE PIPE (RESERVOIR)	1200	0+000 - 0+018	18
2.	HIGH DENSITY POLYETHYLENE PIPE	750	0+018 - 0+024	6
3.	CONCRETE FIELD TILE	750	0+024 - 0+831	807
4.	CONCRETE FIELD TILE	675	0+831 - 1+200	369

PUMP STATION DETAILS:

HYDRAULIC REQUIREMENTS
- FLOW RATE : 9,750 gpm
- TOTAL DYNAMIC HEAD: 3.8m
- TYPE: AXIAL FLOW

MOTOR AND ELECTRICAL
- POWER: 50 hp
- SPEED: 900 rpm
- VOLTAGE: 575 v
- PHASE: 3 PHASE
- VARIABLE FREQUENCY DRIVE: YES
  - 3 PHASE INPUT AND OUTPUT
  - LINE LOAD REACTORS

SYSTEM INTEGRATION & COMPONENTS
- PUMP STATION: 2200mmØ X 6m VERTICAL CSP
- RESERVOIR: 1200mmØ X 18m LENGTH HDPE WITH END CAP
- DISCHARGE : 500mmØ X 9.5mm THICKNESS STEEL PIPE
- BACKWATER GATE: FLAP VALVE
- ACCESSORIES: FLOAT CONTROL SYSTEM, PUMP WELL TOP FRAME, PUMP HOUSE ENCLOSURE
- WIRING: PRE-INSTALLED

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 **ELEV.=176.47**
TOP SOUTHWEST CORNER OF UTILITY PEDESTAL 3m EAST OF STA. 0+043 (COLLVER OPEN)

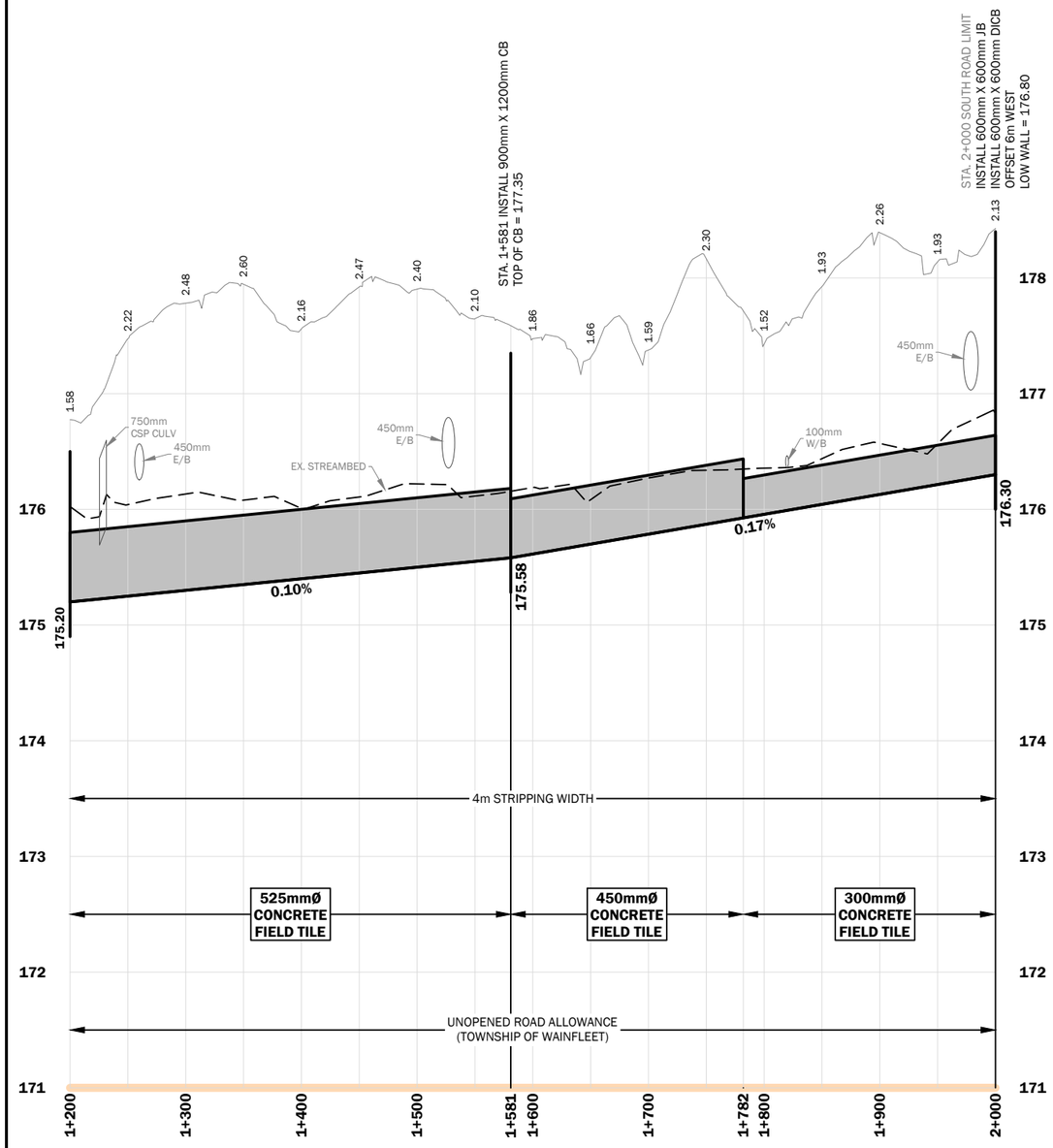
BENCHMARK No. 2 **ELEV.=177.02**
TOP CENTER OF CONCRETE RETAINING WALL ON DOWNSTREAM END OF 900mmØ CSP CULVERT 24m SOUTH OF STA. 0+840 (COLLVER CLOSED)

LICENSED PROFESSIONAL ENGINEER Dec 17, 2025 S.G.R. BRICKMAN 100150920 PROVINCE OF ONTARIO

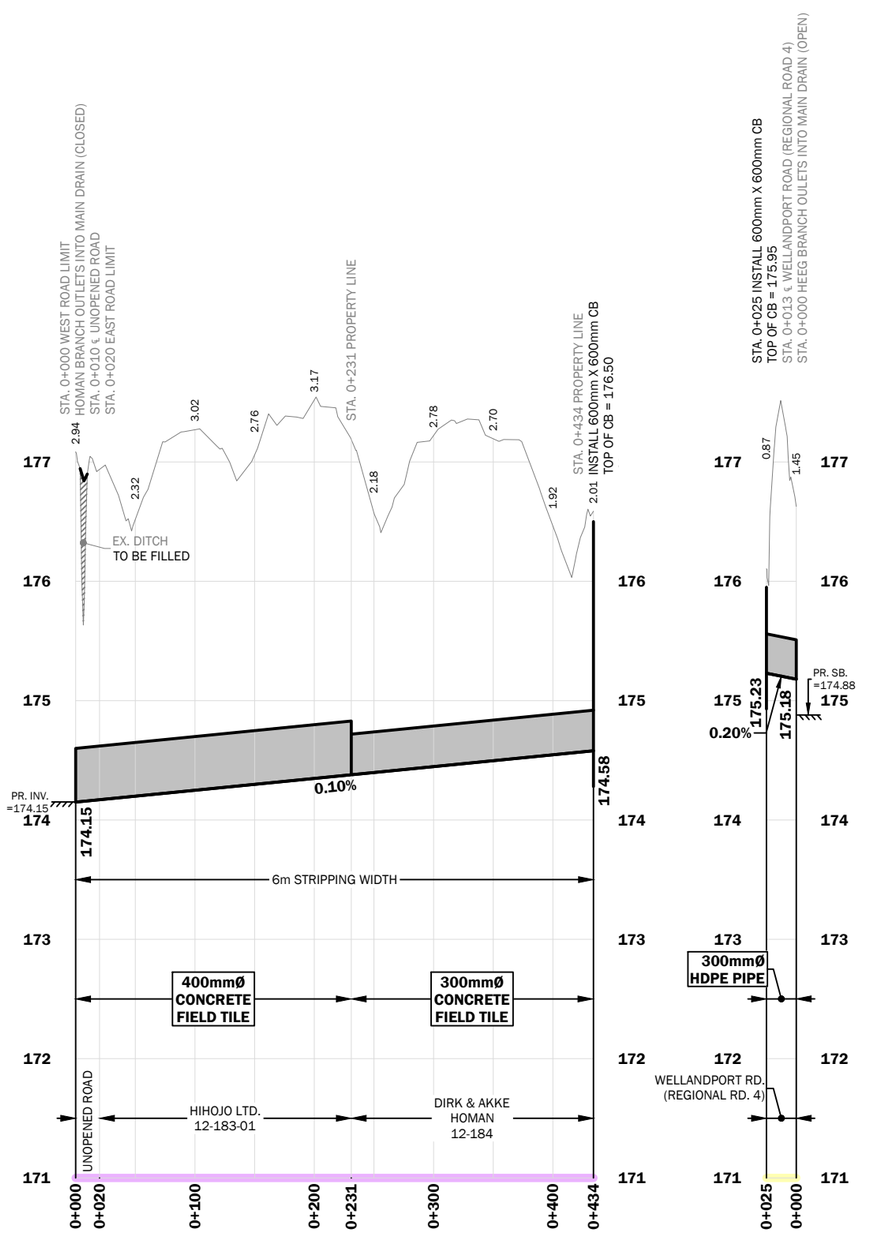
No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

Headway Engineering

DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	3 OF 11
DATE: 2025-12-18	REFERENCE No. WNFLT-001		



MAIN DRAIN (CLOSED) PROFILE



HOMAN BRANCH PROFILE

HEEG BRANCH PROFILE

PROFILE SCALES

HORZ. 0 100 200 300

VERT. 0 1 2 3

SCHEDULE OF PIPE MATERIALS (MAIN DRAIN)

	MATERIAL	DIAMETER (mm)	STATION RANGE	LENGTH (m)
1.	CONCRETE FIELD TILE	525	1+200 - 1+581	381
2.	CONCRETE FIELD TILE	450	1+581 - 1+782	201
3.	CONCRETE FIELD TILE	300	1+782 - 2+000	218

SCHEDULE OF PIPE MATERIALS (HOMAN BR.)

	MATERIAL	DIAMETER (mm)	STATION RANGE	LENGTH (m)
1.	CONCRETE FIELD TILE	400	0+000 - 0+231	231
2.	CONCRETE FIELD TILE	300	0+231 - 0+434	203

SCHEDULE OF PIPE MATERIALS (HEEG BR.)

	MATERIAL	DIAMETER (mm)	STATION RANGE	LENGTH (m)
1.	HIGH DENSITY POLYETHYLENE PIPE	300	0+000 - 0+025	25

The TOWNSHIP of WAINFLEET

COLLVER MUNICIPAL DRAIN

Main Drain (Closed) Profile
(Sta. 1+200 to Sta. 2+000),
Homan Br. & Heeg Br. Profiles

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 **ELEV.=176.47**
TOP SOUTHWEST CORNER OF UTILITY PEDESTAL 3m EAST OF STA. 0+043 (COLLVER OPEN)

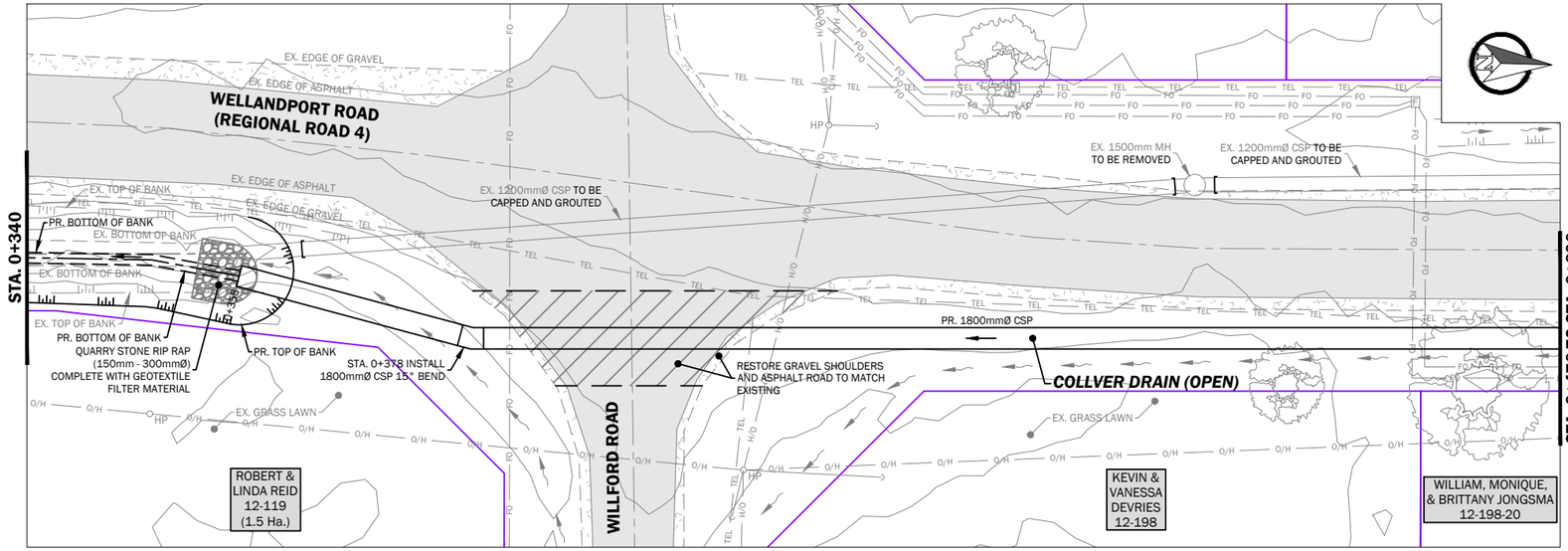
BENCHMARK No. 2 **ELEV.=177.02**
TOP CENTER OF CONCRETE RETAINING WALL ON DOWNSTREAM END OF 900mmØ CSP CULVERT 24m SOUTH OF STA. 0+840 (COLLVER CLOSED)

LICENSED PROFESSIONAL ENGINEER S.G.R. BROWMAN 100159520 PROVINCE OF ONTARIO Dec. 17, 2025

No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

Headway Engineering

DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	4 OF 11
DATE: 2025-12-18	REFERENCE No. WNFLT-001		



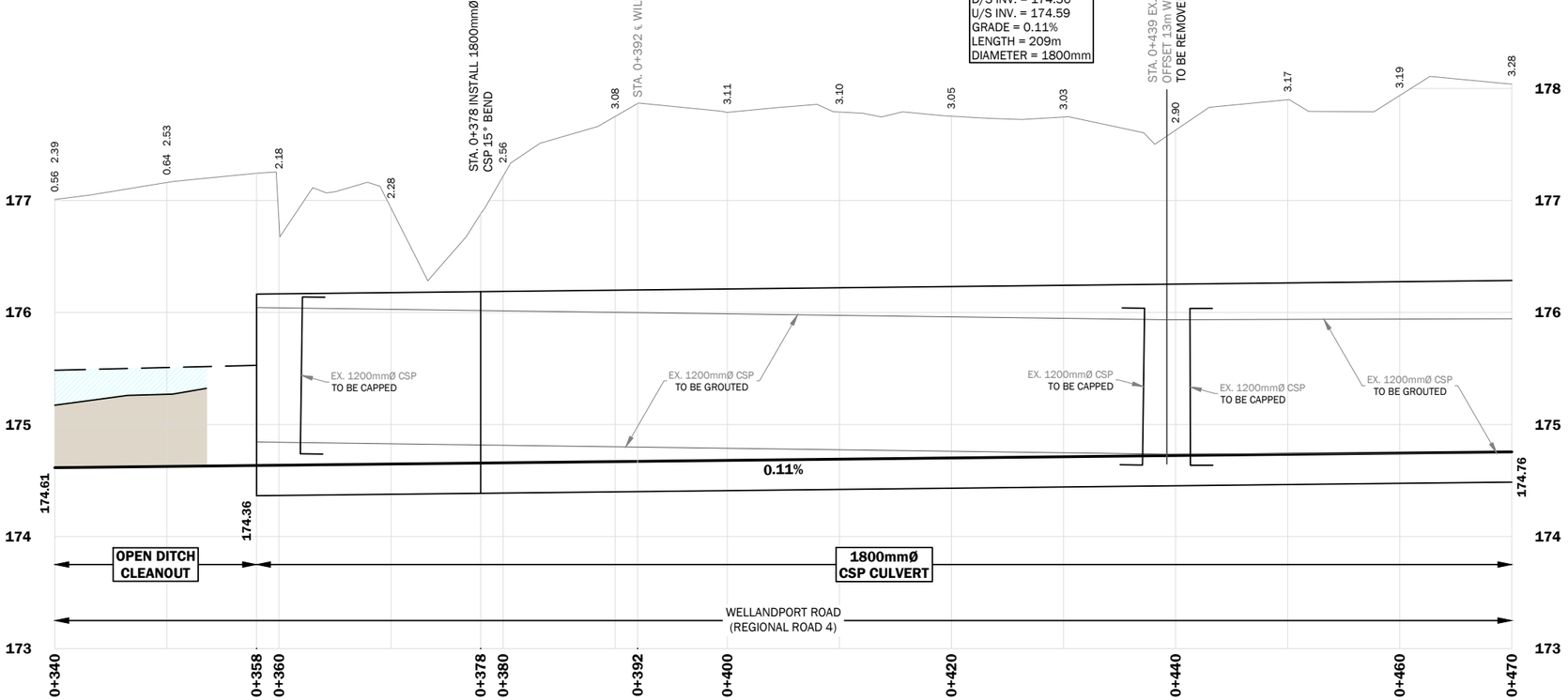
PLAN SCALE

0 10 20 30

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 **ELEV.=176.47**
TOP SOUTHWEST CORNER OF UTILITY PEDESTAL 3m EAST OF STA. 0+043 (COLLVER OPEN)

BENCHMARK No. 2 **ELEV.=177.02**
TOP CENTER OF CONCRETE RETAINING WALL ON DOWNSTREAM END OF 900mmØ CSP CULVERT 24m SOUTH OF STA. 0+840 (COLLVER CLOSED)



PROFILE SCALES

HORZ. 0 10 20 30

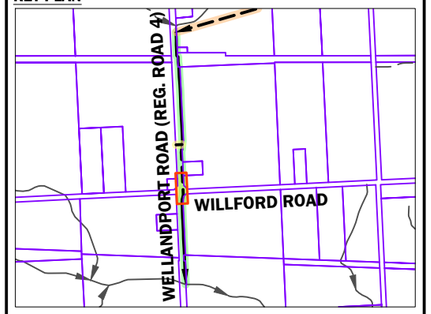
VERT. 0 1 2 3

The TOWNSHIP of WAINFLEET

COLLVER MUNICIPAL DRAIN

Plan & Profile
(Sta. 0+340 to Sta. 0+470)

KEY PLAN



NOTES:

1. THIS MAP WAS CREATED USING NIAGARA REGION GEOGRAPHIC INFORMATION SYSTEM DIGITAL DATA. THIS MAP IS A SECONDARY PRODUCT WHICH HAS NOT BEEN VERIFIED BY NIAGARA REGION.
2. THE CONTOURS WERE CREATED USING IMAGERY DERIVED DIGITAL DATA (2015) FROM LAND INFORMATION ONTARIO.
3. CONTRACTOR TO REVIEW AND COMPLY WITH NIAGARA REGION CONSTRUCTION ENCROACHMENT & REINSTATEMENT SPECIFICATIONS, INCLUDING MILLING ASPHALT 600mm BEYOND SAW-CUT LIMITS. REFER TO: https://www.niagararegion.ca/living/roads/permits/construction-encroachment-specifications.aspx

LEGEND

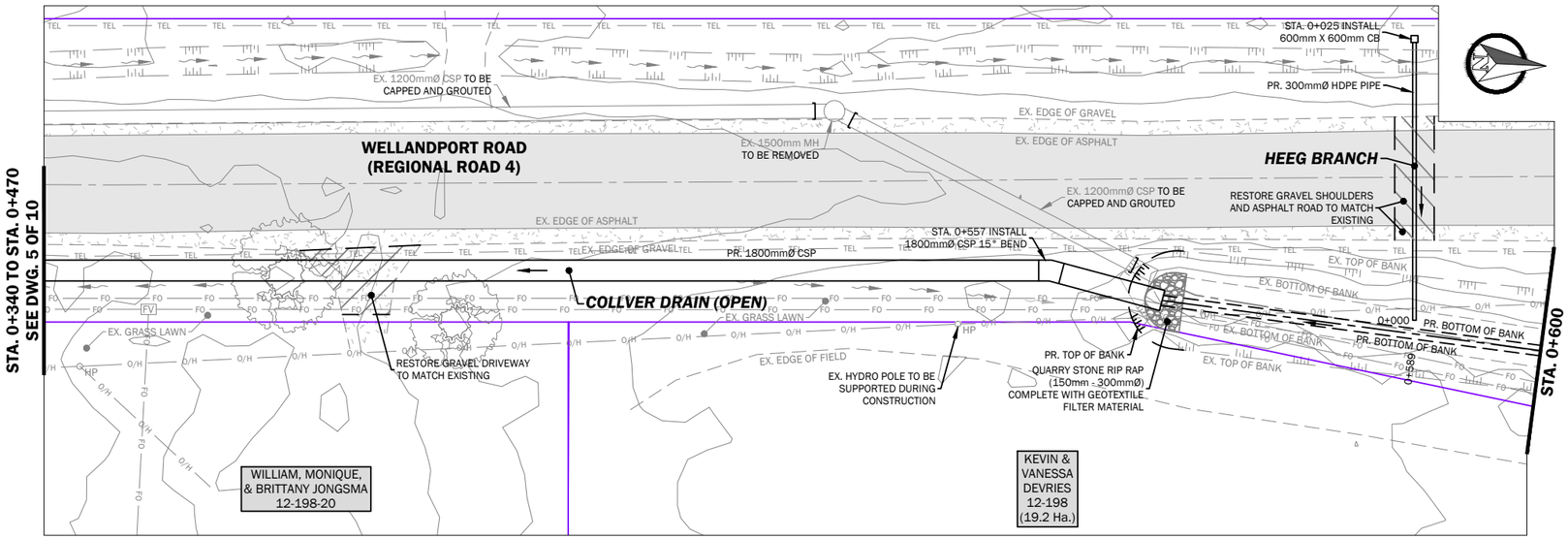
- PROPERTY LINE
- FO FO — FIBER OPTIC LINE
- O/H O/H — OVERHEAD UTILITY LINE
- TEL TEL — TELEPHONE LINE
- HP — HYDRO POLE WITH GUY WIRE
- T F — TELEPHONE AND FIBER OPTIC PEDESTALS
- BENCHMARK LOCATION
- B.M. 1 — BENCHMARK No.
- 123.45 — BENCHMARK ELEVATION
- JOHN & JANE SMITH — LANDOWNER NAME(S)
- 12-345 — ASSESSMENT ROLL No. (ABBREVIATED)
- (12.3 Ha.) — AREA WITHIN WATERSHED

LICENSED PROFESSIONAL ENGINEER
Dec. 17, 2025
S.G.R. BRICKMAN
100150920
PROVINCE OF ONTARIO

No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

Headway Engineering

DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	5 OF 11
DATE: 2025-12-18	REFERENCE No. WNFLT-001		



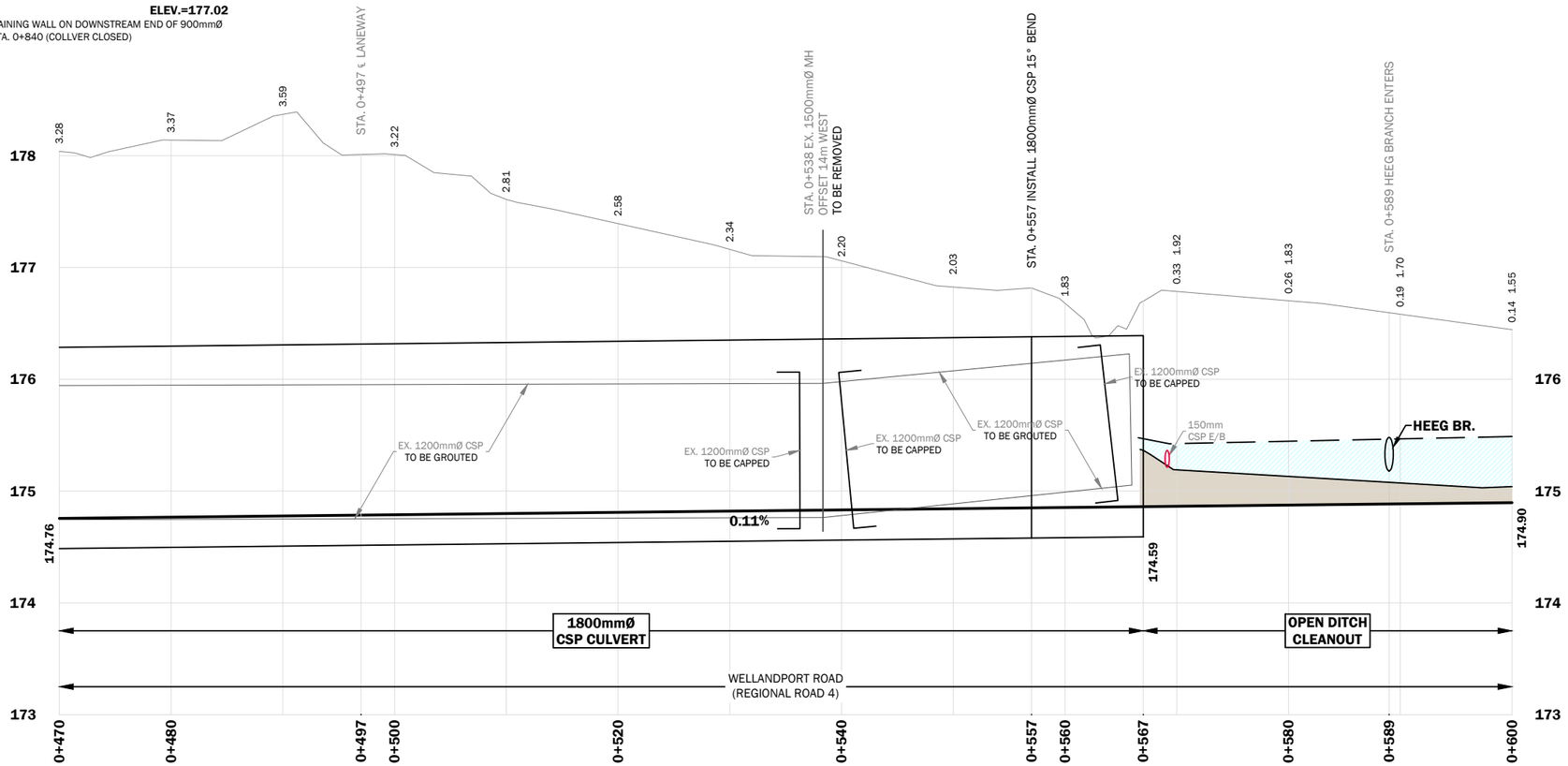
PLAN SCALE

0 10 20 30

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 **ELEV.=176.47**
TOP SOUTHWEST CORNER OF UTILITY PEDESTAL 3m EAST OF STA. 0+043 (COLLVER OPEN)

BENCHMARK No. 2 **ELEV.=177.02**
TOP CENTER OF CONCRETE RETAINING WALL ON DOWNSTREAM END OF 900mmØ CSP CULVERT 24m SOUTH OF STA. 0+840 (COLLVER CLOSED)



PROFILE SCALES

HORZ. 0 10 20 30

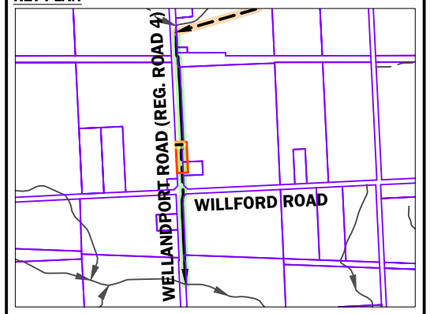
VERT. 0 1 2 3

The TOWNSHIP of WAINFLEET

COLLVER MUNICIPAL DRAIN

Plan & Profile
(Sta. 0+470 to Sta. 0+600)

KEY PLAN



NOTES:

1. THIS MAP WAS CREATED USING NIAGARA REGION GEOGRAPHIC INFORMATION SYSTEM DIGITAL DATA. THIS MAP IS A SECONDARY PRODUCT WHICH HAS NOT BEEN VERIFIED BY NIAGARA REGION.
2. THE CONTOURS WERE CREATED USING IMAGERY DERIVED DIGITAL DATA (2015) FROM LAND INFORMATION ONTARIO.
3. CONTRACTOR TO REVIEW AND COMPLY WITH NIAGARA REGION CONSTRUCTION ENCROACHMENT & REINSTATEMENT SPECIFICATIONS, INCLUDING MILLING ASPHALT 600mm BEYOND SAW-CUT LIMITS. REFER TO: https://www.niagararegion.ca/living/roads/permits/construction-encroachment-specifications.aspx

LEGEND

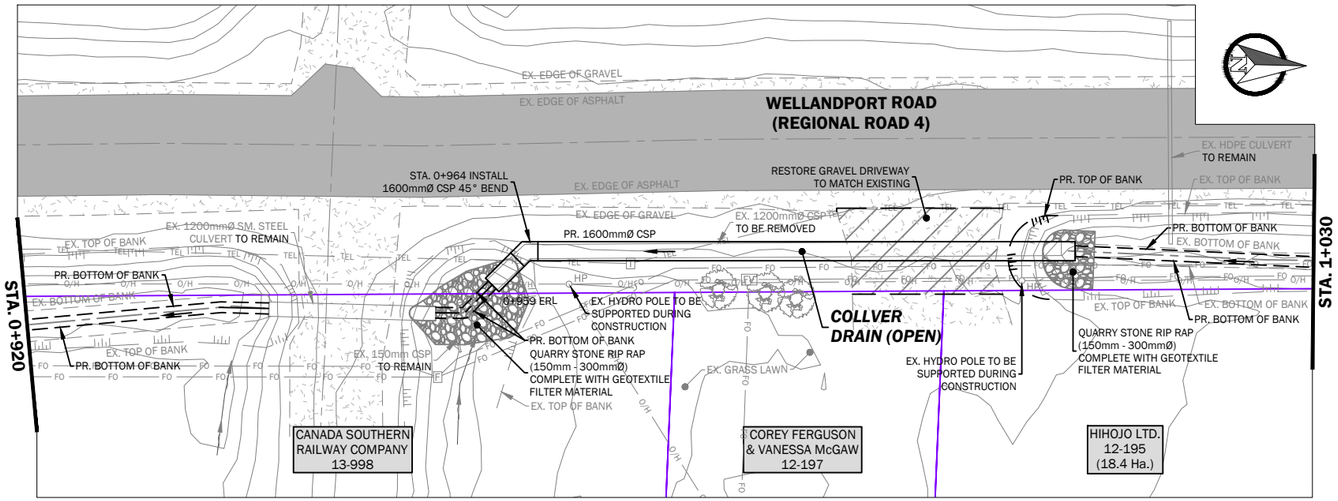
- PROPERTY LINE
- FO FO — FIBER OPTIC LINE
- O/H O/H — OVERHEAD UTILITY LINE
- TEL TEL — TELEPHONE LINE
- HP — HYDRO POLE WITH GUY WIRE
- T F — TELEPHONE AND FIBER OPTIC PEDESTALS
- FV — FIBER OPTIC VAULT
- BENCHMARK LOCATION
- B.M. 1 — BENCHMARK No.
- 123.45 — BENCHMARK ELEVATION
- JOHN & JANE SMITH — LANDOWNER NAME(S)
- 12-345 — ASSESSMENT ROLL No. (ABBREVIATED)
- (12.3 Ha.) — AREA WITHIN WATERSHED

LICENSED PROFESSIONAL ENGINEER
Dec. 17, 2025
S.G.R. BRIDGMAN
100150920
PROVINCE OF ONTARIO

No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

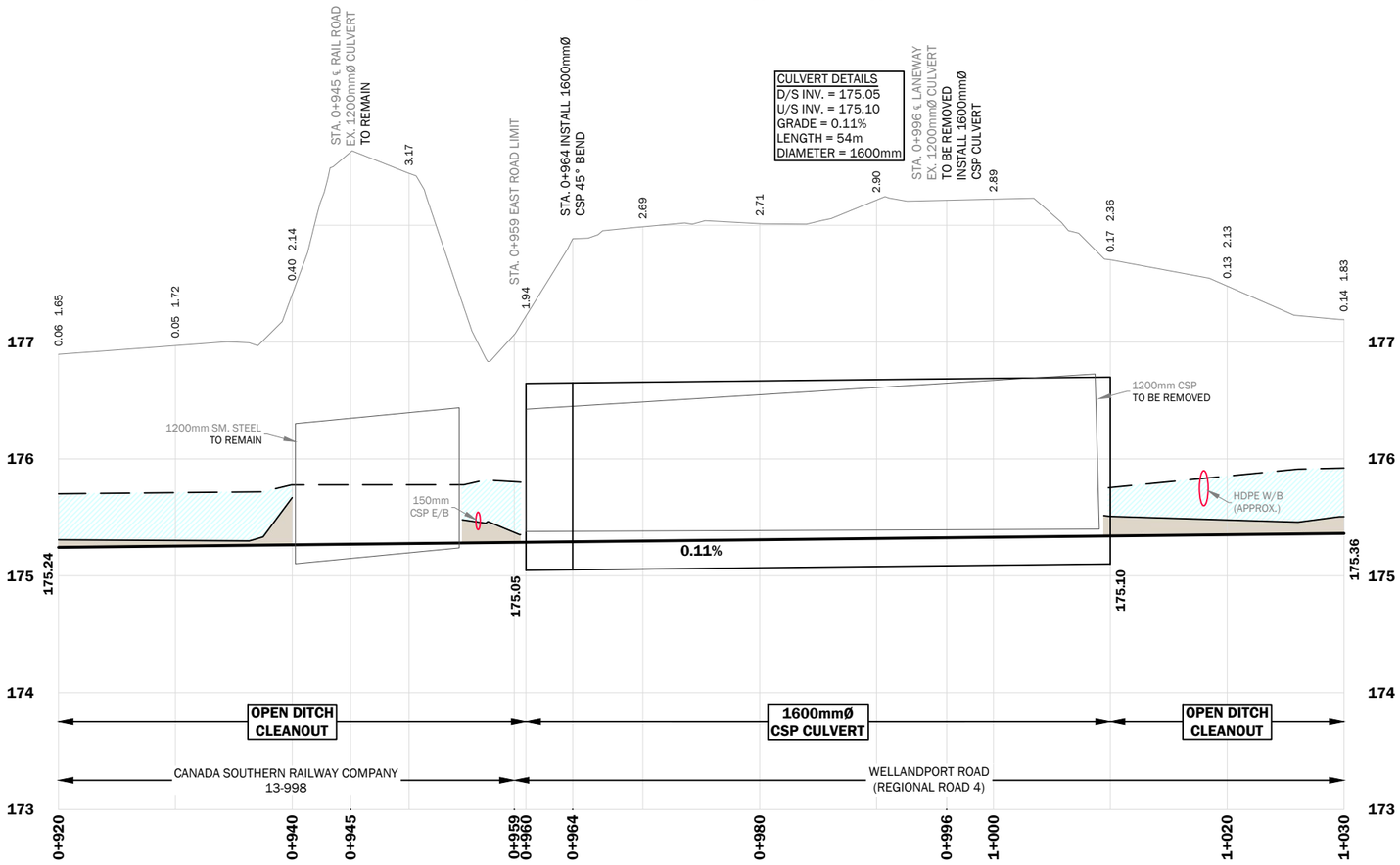
Headway Engineering

DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	6 OF 11
DATE: 2025-12-18	REFERENCE No. WNFLT-001		



PLAN SCALE

0 10 20 30



PROFILE SCALES

HORZ. 0 10 20 30

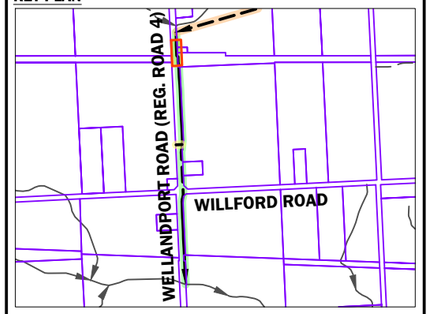
VERT. 0 1 2 3

The TOWNSHIP of WAINFLEET

COLLVER MUNICIPAL DRAIN

Plan & Profile
(Sta. 0+920 to Sta. 1+030)

KEY PLAN



NOTES:

1. THIS MAP WAS CREATED USING NIAGARA REGION GEOGRAPHIC INFORMATION SYSTEM DIGITAL DATA. THIS MAP IS A SECONDARY PRODUCT WHICH HAS NOT BEEN VERIFIED BY NIAGARA REGION.
2. THE CONTOURS WERE CREATED USING IMAGERY DERIVED DIGITAL DATA (2015) FROM LAND INFORMATION ONTARIO.
3. CONTRACTOR TO REVIEW AND COMPLY WITH NIAGARA REGION CONSTRUCTION ENCROACHMENT & REINSTATEMENT SPECIFICATIONS, INCLUDING MILLING ASPHALT 600mm BEYOND SAW-CUT LIMITS. REFER TO: https://www.niagararegion.ca/living/roads/permits/construction-encroachment-specifications.aspx

LEGEND

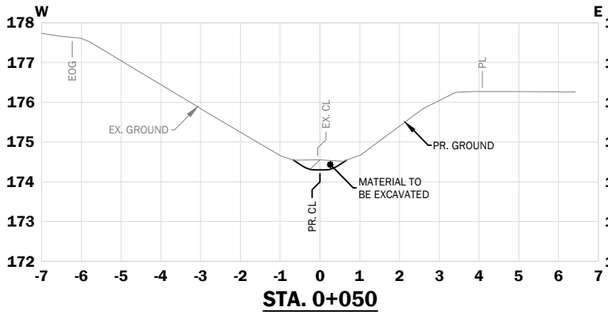
- PROPERTY LINE
- FO FO — FIBER OPTIC LINE
- O/H O/H — OVERHEAD UTILITY LINE
- TEL TEL — TELEPHONE LINE
- HP — HYDRO POLE WITH GUY WIRE
- T E — TELEPHONE AND FIBER OPTIC PEDESTALS
- FV — FIBER OPTIC VAULT
- BENCHMARK LOCATION
- B.M. 1 / 123.45 — BENCHMARK No. / BENCHMARK ELEVATION
- JOHN & JANE SMITH / 12-345 / (12.3 Ha.) — LANDOWNER NAME(S) / ASSESSMENT ROLL No. (ABBREVIATED) / AREA WITHIN WATERSHED

LICENSED PROFESSIONAL ENGINEER
Dec. 17, 2025
S.G.R. BUCKMAN
100156920
PROVINCE OF ONTARIO

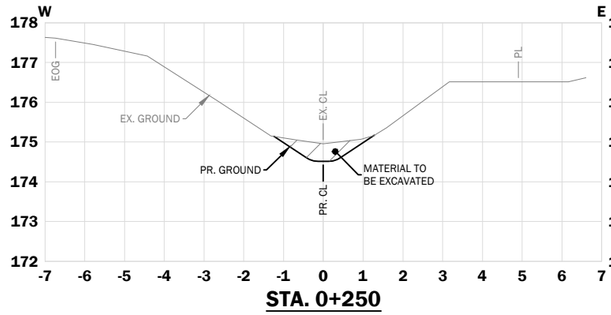
No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

Headway Engineering

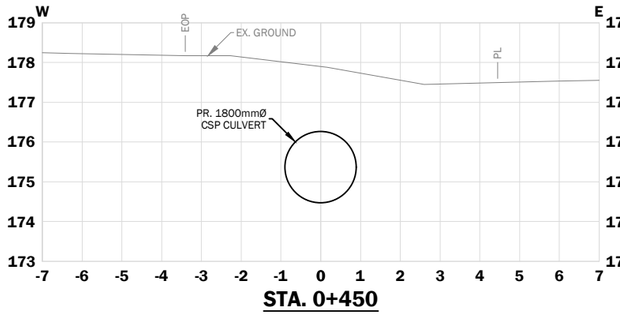
DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	7 OF 11
DATE: 2025-12-18	REFERENCE No. WNFLT-001		



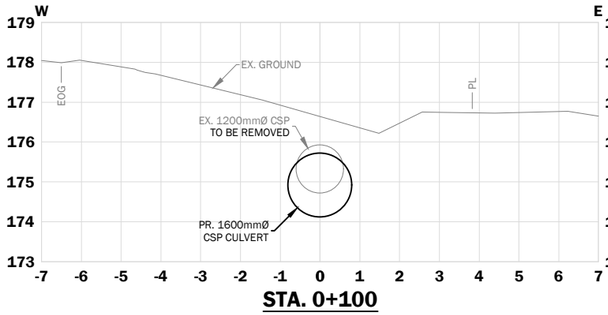
STA. 0+050



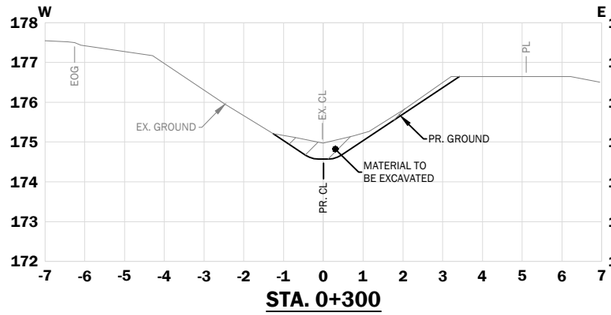
STA. 0+250



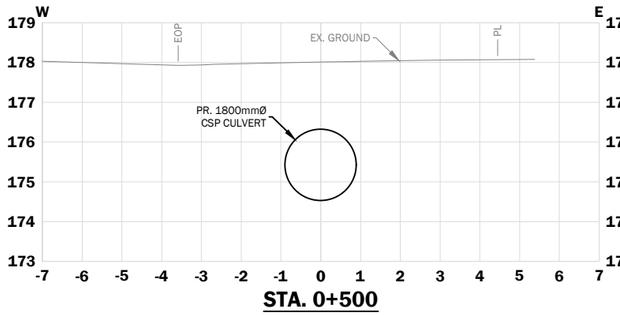
STA. 0+450



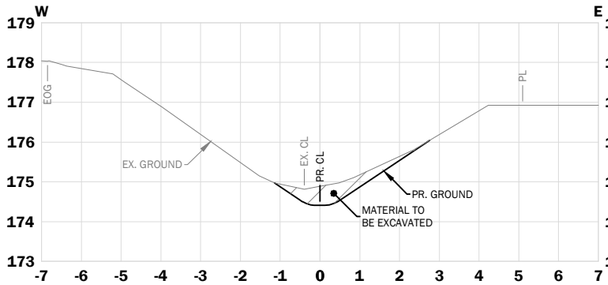
STA. 0+100



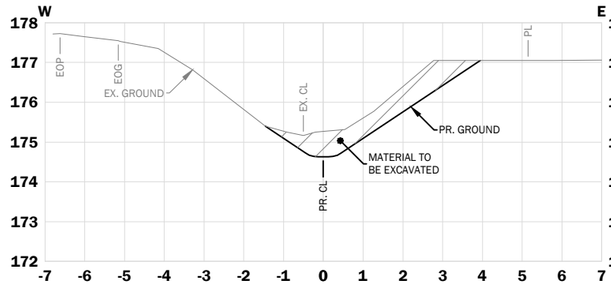
STA. 0+300



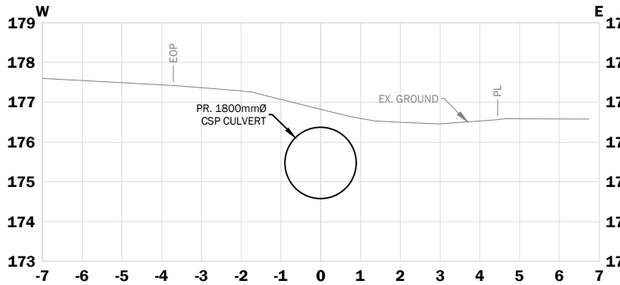
STA. 0+500



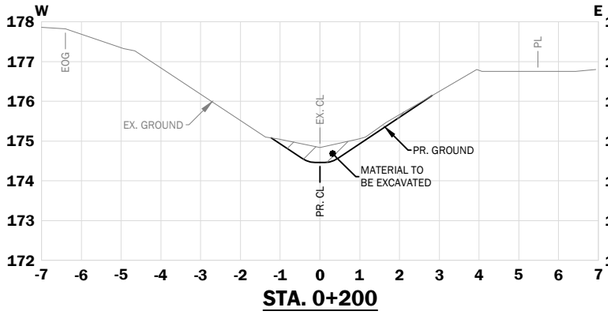
STA. 0+150



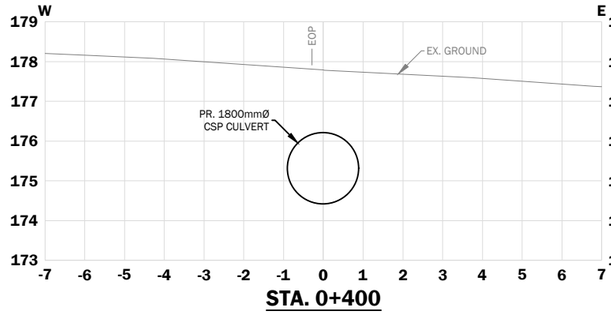
STA. 0+350



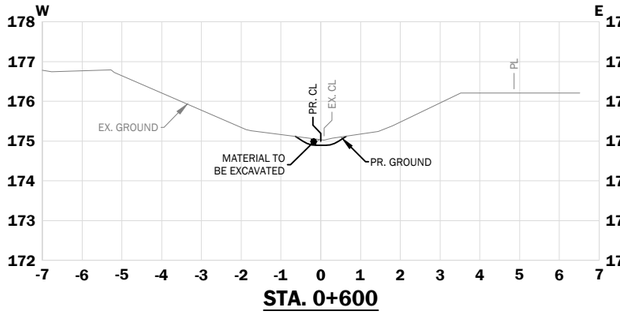
STA. 0+550



STA. 0+200



STA. 0+400



STA. 0+600

SECTION SCALE

The TOWNSHIP of WAINFLEET

COLLVER MUNICIPAL DRAIN

Sections - Collver Drain (Open) (Sta. 0+050 to Sta. 0+600)

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 **ELEV.=176.47**
TOP SOUTHWEST CORNER OF UTILITY PEDESTAL 3m EAST OF STA. 0+043 (COLLVER OPEN)

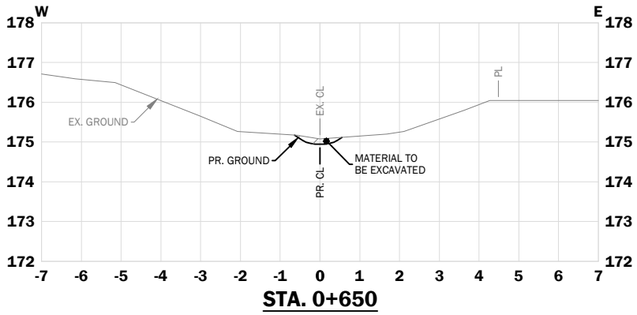
BENCHMARK No. 2 **ELEV.=177.02**
TOP CENTER OF CONCRETE RETAINING WALL ON DOWNSTREAM END OF 900mmØ CSP CULVERT 24m SOUTH OF STA. 0+840 (COLLVER CLOSED)

LICENSED PROFESSIONAL ENGINEER
Dec. 17, 2025
S.G.R. BRICKMAN
100150920
PROVINCE OF ONTARIO

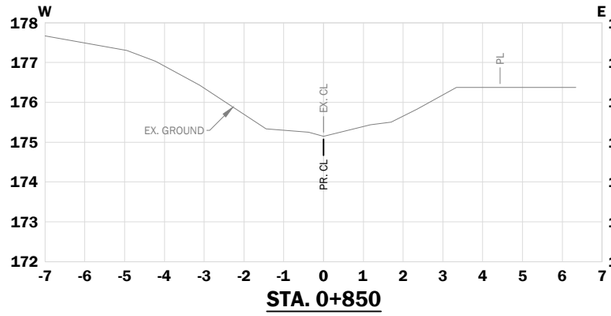
No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

Headway Engineering

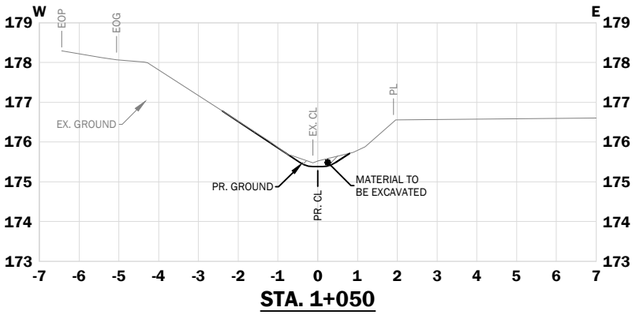
DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	8 OF 11
DATE: 2025-12-18	REFERENCE No. WNFLT-001		



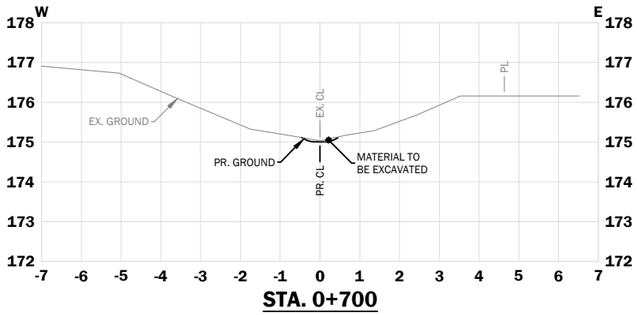
STA. 0+650



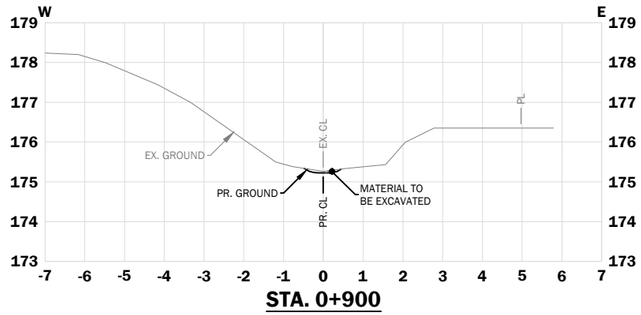
STA. 0+850



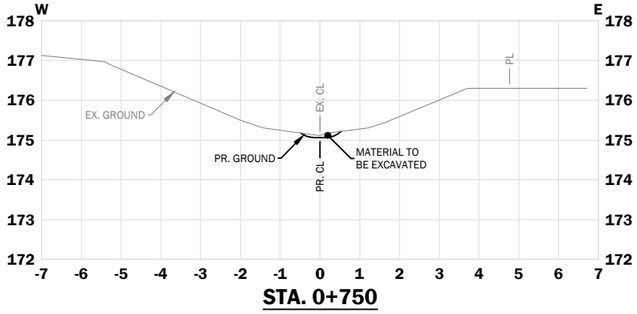
STA. 1+050



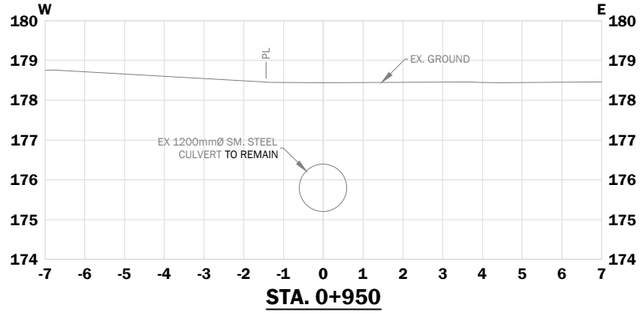
STA. 0+700



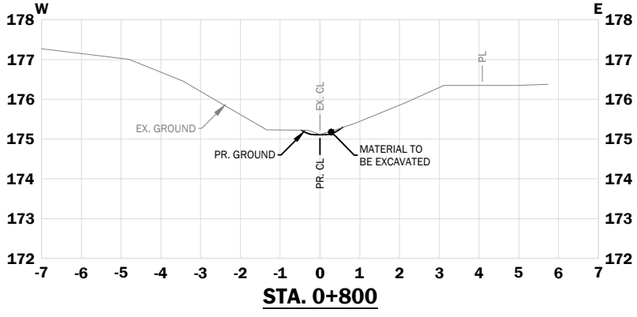
STA. 0+900



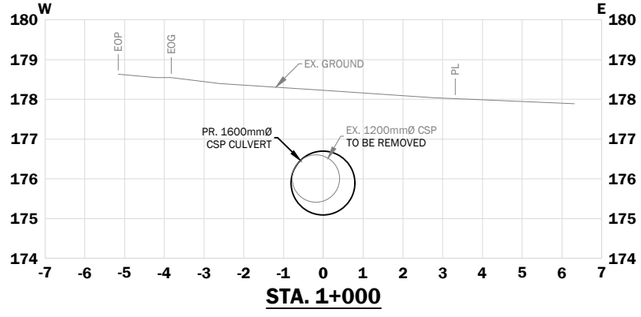
STA. 0+750



STA. 0+950



STA. 0+800



STA. 1+000

SECTION SCALE

0 3 6 9

The TOWNSHIP of WAINFLEET

COLLVER MUNICIPAL DRAIN

Sections - Collver Drain (Open) (Sta. 0+650 to Sta. 1+050)

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 **ELEV.=176.47**
TOP SOUTHWEST CORNER OF UTILITY PEDESTAL 3m EAST OF STA. 0+043 (COLLVER OPEN)

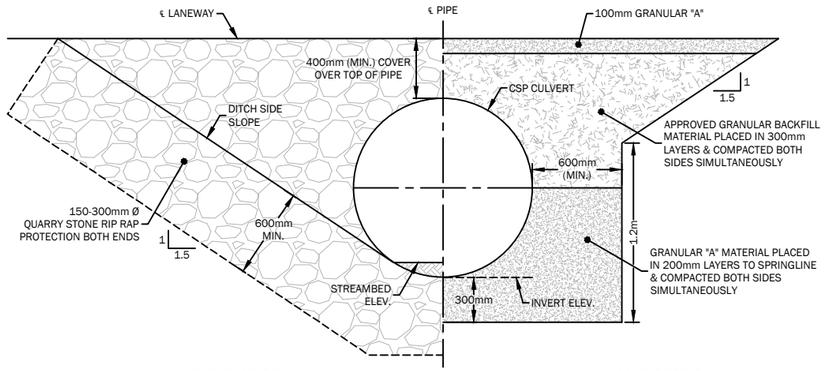
BENCHMARK No. 2 **ELEV.=177.02**
TOP CENTER OF CONCRETE RETAINING WALL ON DOWNSTREAM END OF 900mmØ CSP CULVERT 24m SOUTH OF STA. 0+840 (COLLVER CLOSED)

LICENSED PROFESSIONAL ENGINEER
Dec. 17, 2025
S.G.R. BRICKMAN
100150920
PROVINCE OF ONTARIO

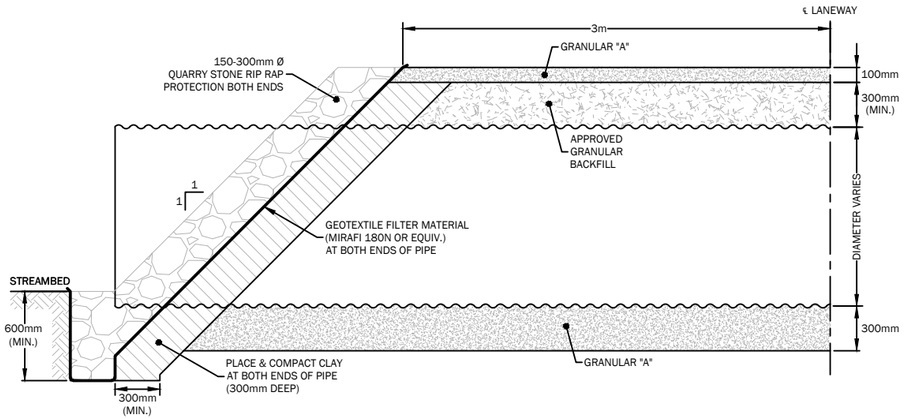
No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

Headway Engineering

DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	9 OF 11
DATE: 2025-12-18	REFERENCE No. WNFLT-001		



HALF ELEVATION **HALF SECTION**



HALF LONGITUDINAL SECTION

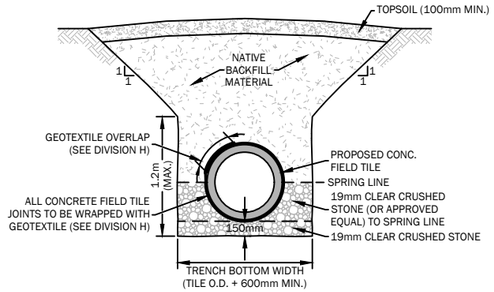
PROPOSED CULVERTS

STATION	DIAMETER	LENGTH	INVERT	STREAMBED	CORRUGATIONS	THICKNESS
0+114	1600mm	25m	U.S.E. = 174.14 D.S.E. = 174.12	U.S.E. = 174.38 D.S.E. = 174.36	125mm X 25mm	2.80mm
0+771	1600mm	12m	U.S.E. = 174.85 D.S.E. = 174.84	U.S.E. = 175.09 D.S.E. = 175.08	125mm X 25mm	2.80mm
0+996	1600mm	50m	U.S.E. = 175.10 D.S.E. = 175.05	U.S.E. = 175.34 D.S.E. = 175.29	125mm X 25mm	2.80mm

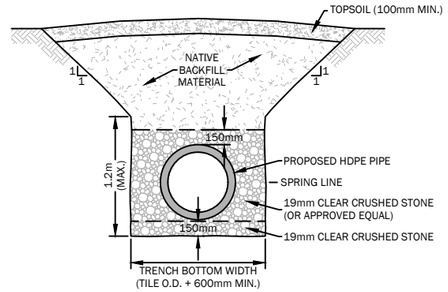
SUGGESTED CULVERTS

0+037	1600mm	12m	U.S.E. = 174.05 D.S.E. = 174.04	U.S.E. = 174.29 D.S.E. = 174.28	125mm X 25mm	2.80mm
0+945	1600mm	21m	U.S.E. = 175.04 D.S.E. = 175.02	U.S.E. = 175.28 D.S.E. = 175.26	125mm X 25mm	2.80mm

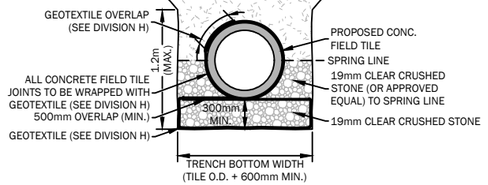
TYPICAL LANEWAY CULVERT DETAIL
N.T.S.



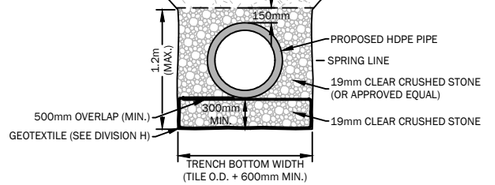
TYPICAL CONCRETE TILE INSTALLATION ON STONE BEDDING DETAIL
N.T.S.



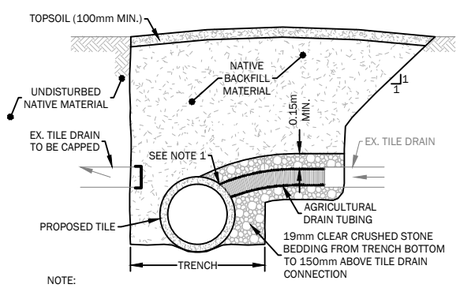
TYPICAL HDPE PIPE INSTALLATION ON STONE BEDDING DETAIL
N.T.S.



TYPICAL CONC. TILE INSTALLATION ON WRAPPED STONE BEDDING DETAIL (PROVISIONAL ITEM)
N.T.S.



TYPICAL HDPE PIPE INSTALLATION ON WRAPPED STONE BEDDING DETAIL (PROVISIONAL ITEM)
N.T.S.



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

TYPICAL TILE CONNECTION DETAIL
N.T.S.

The TOWNSHIP of WAINFLEET

COLLVER MUNICIPAL DRAIN

Details

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 **ELEV.=176.47**
TOP SOUTHWEST CORNER OF UTILITY PEDESTAL 3m EAST OF STA. 0+043 (COLLVER OPEN)

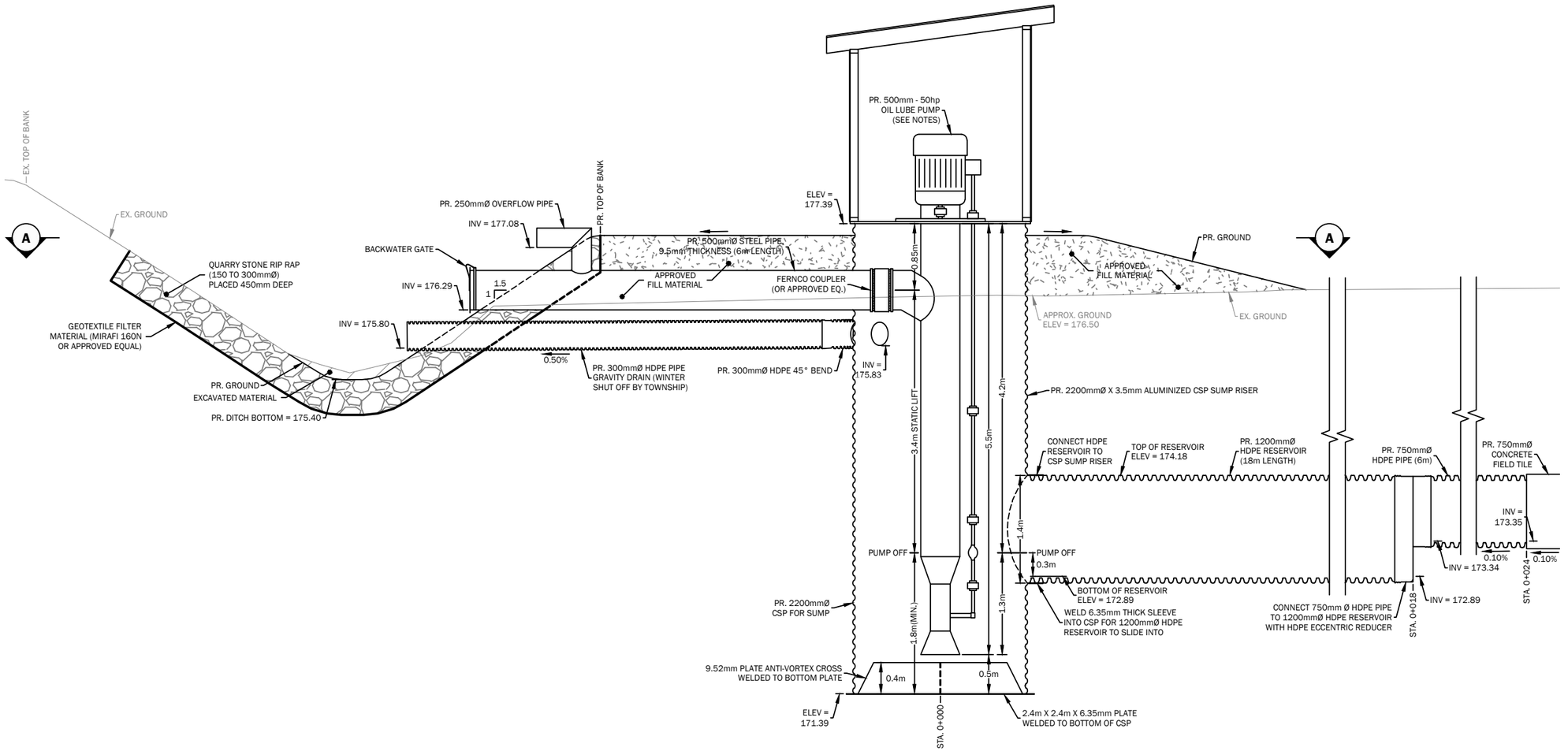
BENCHMARK No. 2 **ELEV.=177.02**
TOP CENTER OF CONCRETE RETAINING WALL ON DOWNSTREAM END OF 900mmØ CSP CULVERT 24m SOUTH OF STA. 0+840 (COLLVER CLOSED)

LICENSED PROFESSIONAL ENGINEER S.G.R. BRICKMAN 100150920 PROVINCE OF ONTARIO Dec. 17, 2025

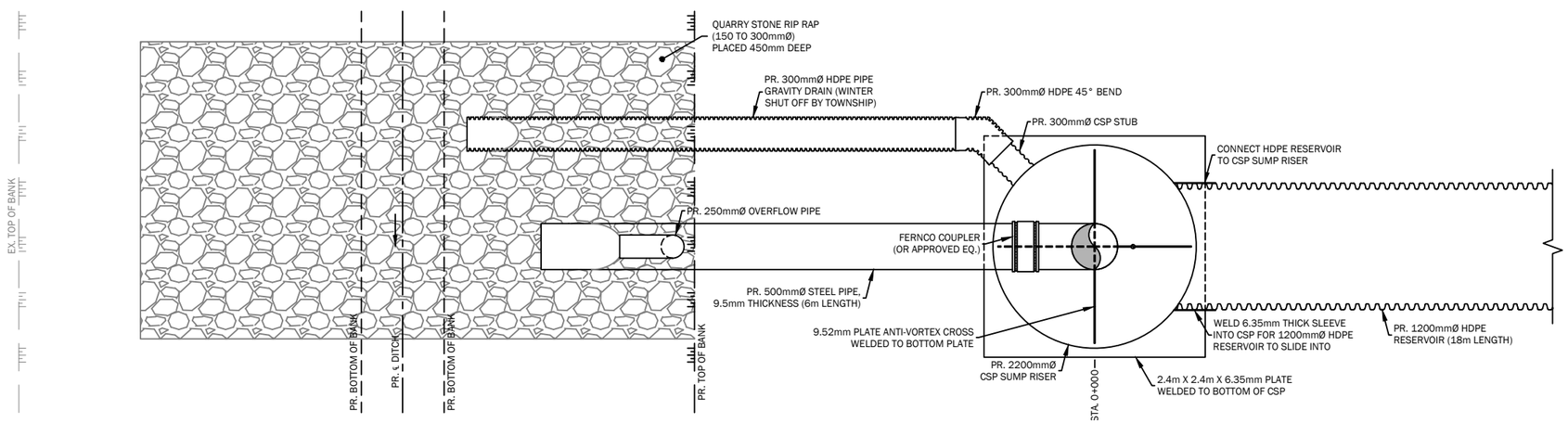
No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

Headway Engineering

DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	10 OF 11
DATE: 2025-12-18	REFERENCE No. WNFLT-001		



PUMP HOUSE OUTLET DETAIL
N.T.S.



SECTION A-A
N.T.S.

The TOWNSHIP of WAINFLEET

COLLVER MUNICIPAL DRAIN

Pump Details

PUMP STATION DETAILS:

HYDRAULIC REQUIREMENTS
- FLOW RATE : 9,750 gpm
- TOTAL DYNAMIC HEAD: 3.8m
- TYPE: AXIAL FLOW

MOTOR AND ELECTRICAL
- POWER: 50 hp
- SPEED: 900 rpm
- VOLTAGE: 575 v
- PHASE: 3 PHASE
- VARIABLE FREQUENCY DRIVE: YES
  - 3 PHASE INPUT AND OUTPUT
  - LINE LOAD REACTORS

SYSTEM INTEGRATION & COMPONENTS
- PUMP STATION: 2200mmØ X 6m VERTICAL CSP
- RESERVOIR: 1200mmØ X 18m LENGTH HDPE WITH END CAP
- DISCHARGE : 500mmØ X 9.5mm THICKNESS STEEL PIPE
- BACKWATER GATE: FLAP VALVE
- ACCESSORIES: FLOAT CONTROL SYSTEM, PUMP WELL TOP FRAME, PUMP HOUSE ENCLOSURE
- WIRING: PRE-INSTALLED

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 **ELEV.=176.47**
TOP SOUTHWEST CORNER OF UTILITY PEDESTAL 3m EAST OF STA. 0+043 (COLLVER OPEN)

BENCHMARK No. 2 **ELEV.=177.02**
TOP CENTER OF CONCRETE RETAINING WALL ON DOWNSTREAM END OF 900mmØ CSP CULVERT 24m SOUTH OF STA. 0+840 (COLLVER CLOSED)

No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

Headway Engineering

DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	11 OF 11
DATE: 2025-12-18	REFERENCE No. WNFLT-001		

APPENDIX “B”

This page has been intentionally left blank.

Shafley Municipal Drain

December 18, 2025

Prepared for:

The TOWNSHIP of WAINFLEET

Headway Engineering
23-500 Fairway Road South
Suite 308
Kitchener, Ontario N2C 1X3
226 243 6614
www.headwayeng.ca

23-500 Fairway Road South
Suite 308
Kitchener, Ontario N2C 1X3
226 243 6614
www.headwayeng.ca

Kitchener, Ontario

December 18, 2025

To the Mayor and Members of Council:

Re: Shafley Municipal Drain
Township of Wainfleet
Our Reference No. WNFLT-002

Headway Engineering is pleased to provide its report for the **Shafley Municipal Drain** in the Township of Wainfleet.

The preparation of this report was authorized by a resolution of the Council of the Township of Wainfleet on September 10, 2019, and July 13, 2021 per Section 78 of the Drainage Act.

The primary objective of this report is to improve the Shafley Municipal Drain by increasing depth for tile drainage where practical, replace existing access culverts and extending culverts where needed for road safety.

A summary of the assessments for this project are as follows:

Municipal Lands	$299,302
Privately Owned Non-Agricultural	$ 63,527
Privately Owned Agricultural	$263,771
Total Estimated Assessments	**$626,600**

Yours truly,

Stephen Brickman, P.Eng.
Project Engineer and Manager

Adam Hall
Project Coordinator
HEADWAY ENGINEERING

SB/

CONTENTS

SCHEDULES

SPECIFICATIONS FOR THE CONSTRUCTION OF MUNICIPAL DRAINAGE WORKS

23-500 Fairway Road South
Suite 308
Kitchener, Ontario N2C 1X3
226 243 6614
www.headwayeng.ca

1.0 INTRODUCTION AND LOCATION

The Council of the Township of Wainfleet has appointed Headway Engineering to investigate a request for improvements to the Shafley Municipal Drain.

The project services parts of Lots 35 and 36, Concessions 5, parts of Lots 34 to 38, Concession 6, and parts of Lot 36, Concession 7 in the Township of Wainfleet, Niagara Region.

The drainage area is approximately 276.7 hectares. Land use within the watershed is predominantly agricultural, with smaller portions consisting of woodlots, roads, and residential properties.

The attached Plans, Profiles, and Details; Drawing Numbers 1 to 7, and Specifications form part of this report. They show and describe in detail the location and extent of the work to be completed and the lands and roads which are affected.

2.0 AUTHORIZATION

Authority to prepare a report was first obtained by a resolution of the Township of Wainfleet Council at its September 10, 2019, meeting to appoint Dietrich Engineering Limited to prepare an Engineer's Report under Section 78 of the Drainage Act.

Authority to prepare this report was granted by a resolution of the Township of Wainfleet Council on July 13, 2021. At that meeting, Council transitioned its appointment of the Engineer to Headway Engineering in accordance with Section 8(2) of the Drainage Act

3.0 DRAINAGE HISTORY

The historical records for the Shafley Municipal Drain include two engineering reports. The latest report completed by J. R. Spriet, P. Eng, prepared in 1989, mentions the last reconstruction of the Shafley Drain prior to the 1989 report was completed by C. J. Clarke, P. Eng. in 1961. No records are available for the report authorizing the original construction of the Shafley Drain.

The table below summarizes all documented drainage reports.

Date	Report Author	Notes (Based on Available Records)
December 1961	C.J. Clarke, P. Eng.	The 1961 report provided for the reconstruction of the open drain.
April 1989	J. R. Spriet, P. Eng	The 1989 report references excavation of approximately 1,836m of the open drain, the construction of three closed tile drainage systems, Branch 'A', 'B' and 'C' and the installation of a pump station on Branch 'A'

Table 1 - Summary of Engineering Reports

4.0 MEETINGS AND PUBLIC ENGAGEMENTS

A series of technical, stakeholder, and statutory meetings have been held throughout the development of this report. These engagements involved landowners, municipal staff, regulatory authorities, and

railway representatives. The meetings occurred as design options were refined and new information became available. The key meetings are summarized in Table 2.

Meeting Date	Meeting Description	Summary
November 20, 2019	On-Site Meeting (Section 9(1) of the Drainage Act)	Preliminary plan circulated; meeting held to investigate the request for improvements.
October 19, 2022	Stakeholders Meeting 1	Review of options and alignments for the proposed drainage systems, including preliminary design considerations and associated cost distributions.
June 28, 2023	Canadian Pacific Railway	Meeting held to review the proposed design, the required rail crossings, and associated costs. Early coordination involved confirming whether CP or CN was the responsible authority; CP ultimately confirmed jurisdiction. CP claimed that they would not participate financially. The meeting concluded with CP's position noted and the process moved forward through later stakeholder discussions.
November 3, 2023	Stakeholders Meeting 2	The project status and possible next steps were reviewed. Pump options had been discussed previously, and at this meeting the proponent and Township confirmed that this was the direction to pursue.
January 9, 2025	Stakeholders Meeting 3	The meeting provided a review of options and alignments for Branch 'A' of the Shafley Drain. Headway Engineering presented the option to drain subsurface water to the Collver Drain.
July 9, 2025	Public Information Meeting	The meeting provided a review of the proposed design, estimated costs, and the proposed assessments, among other information. All meeting materials were posted online following the meeting, and all parties invited to attend the meeting were provided with access instructions to the meeting materials.
July 22, 2025	Stakeholder Meeting 4	Meeting held with several landowners and the Drainage Superintendent to review road safety concerns near the lower end of the Shafley Drain.
November 7, 2025	Department of Fisheries and Oceans (DFO)	Headway Engineering met with DFO to review the proposed works and discuss how the project complies with the Fisheries Act and the Species at Risk Act. The proposal was presented and explained.

Table 2 – Summary of Meetings and Engagements.

5.0 FINDINGS

Based on the information collected during field investigations, surveys, public engagements, and review of documentation, the following summarizes Headway Engineering's findings:

5.1 Watershed Condition (Hydrology):

- The watershed was established through the analysis of tile drainage maps, previous engineers' reports for the Shafley Drain and surrounding drainage systems, field

investigations, surveys and data analysis of the LiDAR derived digital data from Land Information Ontario. The drainage area comprises of approximately 276.7 hectares

- Approximate proportions of land uses within the watershed are as follows:
    - Agricultural: 74%
    - Woodlot: 19%
    - Roads: 5%
    - Residential: 2%
- The Ontario Ministry of Agriculture, Food and Agribusiness's (OMAFA's) Agricultural Information Atlas describes the soil types within the watershed and along the routes of the drains as loamy phase.

5.2 Existing Drainage System:

- The age of the original drainage system is unknown; however, it was last altered 1989.
- The existing drainage system consists of a main drain and three branch drains
    - The main drain is comprised of approximately 3,098 metres of open ditch.
    - Branch 'A' is a closed drainage system of approximately 1,400 metres in length with pipe diameters ranging from 300mm to 400mm.
    - Branch 'A' also includes a 300mm diameter, 7.5 horsepower pump.
    - Branch 'B' is a closed drainage system of approximately 288 metres in length and consists of 200mm diameter pipe.
    - Branch 'C' is a closed drainage system of approximately 75 metres in length and consists of 200mm diameter pipe.

5.3 Outlet:

- The outlet for the Shafley Municipal Drain is the Big Forks Drain on the west side of Smith Road, Lot 36, Concession 5.
- The Big Forks Drain is of adequate depth to provide sufficient outlet for the Shafley Municipal Drain. Likewise, no construction works are proposed in the Big Forks Drain under this report.

5.4 Other Noted Observations:

- The existing drainage system has very flat grades, increasing the need for frequent maintenance.
- The drain is not of sufficient depth to provide drainage at today's standards for lands within the watershed.
- Additional systematic tiling within the watershed is likely. For some lands, the capital cost of achieving a gravity outlet may make private pumping a more practical option.

- Portions of the Smith Road alongside the Shafley Drain, located downstream of Wilford Road have been reported to exhibit signs of instability.
- Some of the existing culverts are in poor states of repair and are of insufficient size and depth to convey runoff from upstream lands at today's standards of drainage.

5.5 Environmental Findings:

- The Department of Fisheries and Oceans (DFO) has classified Shafley Road Drain (Open) as "F Class", according to the OMAFA Agricultural Information Atlas, indicating an intermittently flowing watercourse with low fish habitat value.

6.0 DESIGN CONSIDERATIONS

6.1 Design Concepts Considered

Several design concepts were evaluated over the course of the design process. These options were developed in response to project needs, Landowner and Stakeholder direction, railway and Township input. The major alternatives considered are summarized below.

6.1.1 Maintain the Existing Configuration, with Upgrades

The initial concept retained the general configuration of the existing system. This option involved deepening the entire Shafley Municipal Drain, including replacement and deepening of the Canadian Pacific (CP) Rail culvert. Branch 'A' would also be deepened and upsized, which would require a new railway crossing and a larger pump installation at the lower end of Branch 'A'.

Railway requirements were reviewed at the June 28, 2023 meeting. The railway confirmed that the improved works could proceed provided safety and construction standards were met and the costs were borne by the drainage project (not the railway company). At the time, a province-wide legal dispute concerning railway cost responsibility was ongoing. Given the uncertainty, stakeholders discussed whether to wait for the outcome of the court case or proceed along an alternate path. At the Stakeholder Meeting No. 2 (November 3, 2023), the proponent and the Township indicated a preference to move forward and look at alternate concepts.

6.1.2 Deepening (Without CP Rail Culvert Replacement)

Recognizing that coordination with CP Rail for two rail crossings would be unpractical, a revised concept was developed that minimized work at the rail crossings. Under this option, the Shafley Drain would still be deepened, though to a lesser extent than in the initial concept. The Homan lands' subsurface waters north of the railway would be redirected east to drain into the Shafley Drain (rather than to the south through the rail corridor), requiring a pump installation adjacent to Smith Road.

6.1.3 Outlet to the Collver Drain (Preferred Option)

The third concept investigated involved directing sub-surface drainage from the Homan lands north of the CP Rail corridor westward to the proposed improvements on the Collver Drain. This eliminated the need for both a CP Rail culvert replacement and a pump along Smith Road. This option was determined to be the preferred approach.

6.2 Open Ditch Work:

The open ditch works have been designed to provide adequate depth for sufficient outlets to existing private tile drains, and improved tile drainage for workable areas adjacent to and upstream of the municipal drain. Where reasonable depth could be achieved, gravity drainage has been accommodated; however, given the local topography, some localized areas may not have enough elevation difference for a gravity outlet and may require private pumping.

Provisions have been made in the proposed works to allow for the repair of areas of ditch that have experienced bank failure, erosion or slumping.

6.3 Culverts:

Access crossing culverts have been designed using a minimum event standard of a 5-year rainfall event, while the road culverts were designed using a minimum event standard of a 10-year rainfall event.

6.4 Wetlands

The drainage system is designed to function collaboratively with the natural drainage features of the nearby wetlands. The design does not include any measures intended to alter or lower wetland water levels, and no changes have been introduced that increase this capability.

7.0 ENVIRONMENTAL CONSIDERATIONS

7.1 Department of Fisheries and Oceans (DFO)

The DFO has reviewed the Request for Review package sent to them on February 21, 2025, and considered in their review information presented during discussions and meetings that were held between Headway Engineering staff and DFO personnel on November 7, 2025.

7.2 Niagara Peninsula Region Conservation Authority (NPRCA)

The NPRCA has been included on the circulation list for this report and has been invited to all public engagements. Additionally, a permit application was submitted to the NPRCA on October 8, 2025.

7.3 Ministry of Natural Resources (MNR)

Headway Engineering completed a review of the Natural Heritage Information Centre mapping for Species at Risk in Ontario. NHIC mapping indicates the potential presence of Provincial Species at Risk within approximately one kilometer of the work area. Their occurrence within the project footprint is unlikely, as the preferred habitats for the identified species do not correspond with the conditions present at the work location and are instead associated with areas farther removed.

8.0 RECOMMENDATIONS

Headway Engineering recommends the following:

1. Approximately 2,995 metres be cleaned out and/or deepened to provide sufficient outlets for existing private farm tiling systems within the watershed,
2. The installation of three access culverts, two road culverts, and two culvert extensions.

3. Bank repair or bank reinforcement as required.
4. New maintenance schedules be provided for the Shafley Drain (Open) and the proposed culverts along the drain.
5. The existing length of Branch 'A' north of the railway and Branch 'C' of the Shafley Drain on the Dirk and Akke Homan (Roll No. 12-184) and Hihojo Ltd. property (Roll. No. 12-183-01) shall be abandoned.
6. The improved drainage system be known as the Shafley Municipal Drain.
7. Headway Engineering also recommends the watersheds of the surrounding municipal drainage systems be updated when those drainage works require improvement in the future.

9.0 SUMMARY OF PROPOSED WORKS

The proposed work consists of:

1. The cleanout and/or deepening of approximately 2,995 metres of open ditch on the Shafley Drain.
2. The installation of three access culverts.
3. The installation of two road culverts.
4. The installation of two culvert extensions.
5. Bank repair and reinforcement (provisional).

10.0 WORKING AREA AND ACCESS

Access to the working area shall be designated by the Landowners.

The working area shall be in accordance with the following average widths. The working width may be used for construction purposes including transporting excavated soil and supplying construction materials and equipment to the site.

Drain Segment and Station Range	Property Roll No.	Working side	Average Working Width for Construction	Average Working Width for Future Maintenance
0+020 to 1+048	12-179, 12-079-01, 12-178	West	12m	10m
1+062 to 1+495	12-177	East	12m	10m
1+523 to 1+730	12-176	East	12m	10m
1+730 to 1+922	Smith Road	West	6m	6m
1+937 to 2+162	12-179-15, 12-180-01	West	12m	10m
2+162 to 2+202	Smith Road	East	6m	6m

2+202 to 2+959	12-180	West	12m	10m
2+973 to 3+095	12-172	East	12m	10m

Table 3 - Summary of Working Area Descriptions

11.0 SCHEDULES

Four schedules are attached and form part of this report.

11.1 Schedule A – Schedule of Allowances

In accordance with Sections 29 and 30 of the Drainage Act, allowances are provided to affected Landowners for Right-of-Way, Damages to Lands and Crops and Loss of Access. Schedule A contains a table of the applicable allowances to Landowners.

11.2 Schedule B – Schedule of Estimated Construction Costs

An itemized cost estimate of the proposed construction work is included in detail in Schedule B.

11.3 Schedule C – Schedule of Assessment for Construction

Schedule C provides details of the distribution of the total estimated costs of the construction of the municipal drain.

11.4 Schedule D – Schedule of Assessment for Maintenance

Schedule D provides details of the distribution of future maintenance costs for the municipal drain. Maintenance assessments are expressed as a percentage of the total maintenance. Lands located upstream of the maintenance shall be determined by the Drainage Superintendent and assessed according to this schedule.

12.0 ALLOWANCES

In accordance with Sections 29 and 30 of the Drainage Act, Allowances payable to Landowners are calculated using the following methodology.

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

The Right-of-Way allowance compensates the lands for the right to enter onto the land at various times for the purpose of inspecting the drainage system and conducting maintenance activities.

The values used for calculating allowances for Right-of-Way are as follows:

Land Use	Land Value	Adjustment Factor for Drainage Act Right-of-Way	Adjusted Land Value for Drainage Act Right-of-Way Allowance
Agricultural Working Side of Ditch	$50,000/Ha	25%	$12,500/Ha
Agricultural Additional Top Width	$50,000/Ha	100%	$50,000/Ha

Woodlot Working Side of Ditch	$15,000/Ha	25%	$3,750/Ha
Woodlot Additional Top Width	$15,000/Ha	100%	$15,000/Ha

Table 4 - Land Values and Right-of-Way Allowances

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

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

Area values used for calculating allowances for Damages are as follows:

Land Use	Damage Value
Agricultural	$6,000/Ha
Woodlot	$3,000/Ha.

Table 5 - Standard Land Damage Values

Allowances payable to Landowners entitled thereto are as shown in Schedule A.

Total Allowances, under Sections 29, and 30 of the Drainage Act;

Shafley Municipal Drain: **$ 60,720**

13.0 ESTIMATED CONSTRUCTION COSTS

Headway Engineering has made an estimate of the cost of the proposed construction work. A detailed description of the estimated construction costs can be found in Schedule B of this report.

A) Shafley Drain	$ 388,240
B) Provisional Items	$ 25,000
Total Estimated Construction Costs	**$ 413,240**

14.0 SUMMARY OF ESTIMATED PROJECT COSTS

The total estimated project costs are as follows:

Allowances under Sections 29 and 30 of the Drainage Act (Refer to Schedule A)	$ 60,720
Total Estimated Construction Costs (Refer to Schedule B)	$ 413,240
Meetings, survey, design, preparation of preliminary cost estimates, preparation of final drainage report, consideration of report	$ 75,900
Consultation with Environmental Agencies and Permitting Fees	$ 2,500

Preparation of contract documents, contract administration, supervision, and inspection of construction	$ 36,700
Contingencies, Interest and net H.S.T.	$ 37,540
TOTAL ESTIMATED PROJECT COSTS – SHAFLEY MUNICIPAL DRAIN	**$626,600**

The estimated cost of the work in the Township of Wainfleet is $ 626,600.

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

The above cost estimate does not include costs associated with defending the drainage report should appeals be filed with the Court of Revision, Drainage Tribunal and/or Drainage Referee. Should additional costs be incurred, unless otherwise directed, the additional costs would be distributed in a pro-rata fashion over the assessments contained in Schedule C and as may be varied under the Drainage Act.

15.0 ASSESSMENT

Headway Engineering assesses the cost of this work against the Lands and Roads as shown in Schedule C - Assessment for Construction.

Assessments were determined using the principles included in the 'Drainage Assessment Revisited' paper prepared by E.P. Dries and H.H. Todgham. These principles of assessment are recognized to be fair and equitable for determining cost distributions among those affected.

15.1 Benefit (Section 22)

Benefit assessment is applied to those properties receiving a benefit as defined in Section 1 of the Drainage Act which is extracted below:

> ***Benefit*** *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 or sub-surface water, or any other advantages relating to the betterment of lands, roads, buildings or other structures.*

Typically, properties which have direct, or near direct access to the proposed drain receive Benefit as defined above.

15.2 Outlet Liability (Section 23)

Outlet Liability is distributed to all properties within the watershed area on an adjusted area basis. The areas are adjusted to accurately reflect equivalent run-off rates relative to other lands and roads within the watershed. Due to development, roads have been assessed higher Outlet Liability rates relative to agricultural lands.

15.3 Special Benefit (Section 24)

The Special Benefit instrument of assessment was used to separate the benefit portion of the new culvert crossings from the remaining costs of the new crossings.

15.4 Special Assessment (Section 26)

Special Assessments apply to public utilities and roads which directly cause increased costs to the construction of a drainage works due to the existence and operation of the public utility or road.

Construction costs which are required solely because of the existence of Smith Road are fully assessed to the road authority having jurisdiction over the road. The Special Assessment is calculated based on the actual costs of the proposed work, plus an allowance for administration, interest and Net HST as described below.

Road Name	Estimated Construction Costs	Plus, Estimated Administration Costs	Less Equivalent Drain Costs (Fixed)	Plus, Estimated Interest, and Net HST	Estimated Special Assessment
Smith Road 1+930	$29,500	$6,700	$800	$1,300	$36,700
Smith Road 2+967	$24,800	$6,410	$900	$1,190	$31,500

Table 6 - Estimated Special Assessment Calculations.

Whether or not the Township of Wainfleet elects to do the work along Smith Road they shall be assessed the actual increased costs to the drainage works due to the construction and operation of the above-mentioned sections of the Shafley Municipal Drain as a Special Assessment in addition to any benefit and outlet liability assessments.

If any additional work is required to construct or maintain the drainage works due to the existence of buried utilities, roads, railways, or if utilities require relocation or repair, then the extra costs incurred shall be borne by the utility, road or railway involved in accordance with the provisions of Section 26 of the Drainage Act.

16.0 GRANT ELIGIBILITY

The Province of Ontario provides grants towards assessments to eligible properties for drainage improvements which meet specified criteria. The provision of these grants for activities under the Drainage Act is called the Agriculture Drainage Infrastructure Program (ADIP).

A grant may be available for assessments to privately owned parcels of land which are used for agricultural purposes and eligible for Farm Property Class Tax rate. Section 88 of the Drainage Act directs the Municipality to make application for this grant upon certification of completion. The Municipality will then deduct the grant from the assessments.

Grant values provided by the Province of Ontario are for one-third (1/3) of the total assessment for eligible properties.

17.0 ABANDONMENT OF EXISTING MUNICIPAL DRAINS

In accordance with Section 19 of the Drainage Act, the existing municipal tile drainage system for Branch ‘A’ north of the railway and Branch ‘C’, constructed under the authority of a report prepared in 1989, shall be abandoned.

18.0 MAINTENANCE

After completion, this drain shall be maintained by the Township of Wainfleet at the expense of all the lands and roads assessed in the attached Schedule D - Assessment for Future Maintenance, and in the same relative proportions until such time as the assessment is changed under the Drainage Act, except for those portions of the drainage works crossing municipal or rail right-of-ways. These portions of the drain shall be maintained at the expense of the road authority having jurisdiction over said road.

Culvert sizes for the private crossings not being replaced under this report have been included in the drawing set for reference. Landowners and railway agencies are recommended to use these details when undertaking future replacements.

Schedule A

Schedule of Allowances

Schedule of Allowances
Shafley Municipal Drain

	Property Details				Draiange Act Allowances		
	Part Lot	Con.	Landowner	Roll Number	Right of Way (Sec. 29)	Damages (Sec. 30)	Total Allowances
Shafley Municipal Drain	Pt. 35	5	R. & L. Marr	12-177	$ 7,580	$ 3,120	$ 10,700
	Pt. 36	5	Vision Farms Ltd.	12-079	$ 7,830	$ 4,220	$ 12,050
	Pt. 36	5	D. & A. Homan	12-079-01	$ 3,410	$ 2,170	$ 5,580
	Pt. 36	5	J. & J. Homan	12-178	$ 110	$ 500	$ 610
	Pt. 35	6	D. & M. Vander Meer	12-176	$ 2,590	$ 2,490	$ 5,080
	Pt. 35	6	Vander Meer Farms Ltd.	12-172	$ 2,140	$ 880	$ 3,020
	Pt. 35	6	A. Amanali & N. Merchant	12-174	$ -	$ 1,010	$ 1,010
	Pt. 35	6	K. & T. Vis	12-175	$ -	$ 870	$ 870
	Pt. 35	6	J. & E. Vanamerongen	12-173-50	$ -	$ 670	$ 670
	Pt. 36	6	Hihojo Ltd.	12-179-15	$ 2,240	$ 920	$ 3,160
	Pt. 36	6	K. Perron	12-180-01	$ 2,180	$ 1,990	$ 4,170
	Pt. 36	6	Y. Hessels	12-180	$ 9,230	$ 4,570	$ 13,800
	Total Allowances Shafley Municipal Drain				**$ 37,310**	**$ 23,410**	**$ 60,720**

Schedule B

Schedule of Estimated Construction Costs

Schedule of Estimated Construction Costs

An estimate of the cost of the proposed work has been completed, which is outlined in detail as follows:

Part A - Shafley Municipal Drain

	Description	Estimated Quantity		$/Unit	Total
1)	Clearing, brushing and mulching	l.s.			$ 40,000.00
2)	Open ditch excavation (approx. 4,600m3)	2995	m	$ 20.00	$ 59,900.00
3)	Hydro seed disturbed side slopes	7500	m2	$ 4.00	$ 30,000.00
4)	Supply 1-1600mm diameter, corrugated steel pipe laneway culvert (Homan Crossing), 2.8mm thickness, 125x25mm corrugations, aluminized Type II coating	45	m	$ 1,000.00	$ 45,000.00
	Installation of 1600mm diameter culvert at Sta. 0+606 complete with quarry stone rip-rap protection and geotextile material (25m2) including remove and dispose of existing culvert offsite and connection of 375mm road pipe.	l.s.			$ 22,500.00
5)	Supply 1-900mm diameter, corrugated steel pipe laneway culvert (Perron Crossing), 2.0mm thickness, 68x13mm corrugations, aluminized Type II coating	12	m	$ 450.00	$ 5,400.00
	Installation of 900mm diameter culvert at Sta. 2+189 complete with quarry stone rip-rap protection and geotextile material (20m2) including remove and dispose of existing culvert offsite	l.s.			$ 7,000.00
6)	Supply 1-900mm diameter, corrugated steel pipe laneway culvert (Hessels Crossing), 2.0mm thickness, 68x13mm corrugations, aluminized Type II coating	12	m	$ 450.00	$ 5,400.00
	Installation of 900mm diameter culvert at Sta. 2+460 complete with quarry stone rip-rap protection and geotextile material (20m2) including remove and dispose of existing culvert offsite	l.s.			$ 7,000.00
7)	Erosion and sediment control	l.s.			$ 5,000.00

	Description	Estimated Quantity		$/Unit	Total
8)	Supply 1-1200mm diameter, corrugated steel pipe culvert, 2.8mm thickness, 125x25mm corrugations, aluminized Type II coating	71	m	$ 800.00	$ 56,800.00
	Installation of 1200mm diameter culvert including connections to existing culverts Sta. 0+020 to Sta. 0+046 and Sta. 0+100 to Sta.0+145 complete with quarry stone rip-rap protection and geotextile material (25m2)	l.s.			$ 35,000.00
9)	Traffic Control	l.s.			$ 14,940.00
	Sub-Total - Work on the Township of Wainfleet Road Allowance (Non-Special Assessment)				**$ 333,940.00**
10)	Work on the Township of Wainfleet Road Allowance (Smith Road Crossing), (Sta. 1+922 to Sta. 1+937)				
a)	Supply 1-1200mm diameter, corrugated steel pipe road culvert, 2.8mm thickness, 125x25mm corrugations, aluminized Type II coating	16	m	$ 800.00	$ 12,800.00
	Installation of 1200mm diameter culvert at Sta. 2+966 complete with quarry stone rip-rap protection and geotextile material (xxm2) including remove and dispose of existing culvert offsite	l.s.			$ 10,000.00
b)	Road Restoration including:				
	Supply and Place 150mm thickness of Granular 'A' (50m2 x 0.15m thickness)	20	t	$ 60.00	$ 1,200.00
	HL8 and 50mm HL4) asphalt (40m2 x 0.1m thickness)	10	t	$ 500.00	$ 5,000.00
c)	Traffic Control	l.s.			$ 500.00
	Sub-Total - Work on the Township of Wainfleet Road Allowance (Smith Road - Special Assessment)				**$ 29,500.00**

Description	Estimated Quantity		$/Unit		Total
10) Work on the Township of Wainfleet Road Allowance (Smith Road Crossing), (Sta. 2+960 to Sta. 2+974)					
a) Supply 1-900mm diameter, corrugated steel pipe road culvert, 2.0mm thickness, 68x13mm corrugations, aluminized Type II coating	18	m	$ 450.00	$	8,100.00
Installation of 900mm diameter culvert at Sta. 2+967 complete with quarry stone rip-rap protection and geotextile material (xxm2) including remove and dispose of existing culvert offsite	l.s.			$	10,000.00
b) Road Restoration including:					
Supply and Place 150mm thickness of Granular 'A' (50m2 x 0.15m thickness)	20	t	$ 60.00	$	1,200.00
Supply and place 100mm thickness (50mm HL8 and 50mm HL4) asphalt (40m2 x 0.1m thickness)	10	t	$ 500.00	$	5,000.00
c) Traffic Control	l.s.			$	500.00
Sub-Total - Work on the Township of Wainfleet Road Allowance (Smith Road - Special Assessment)				$	24,800.00

Total Estimated Construction Costs
Part A - Shafley Municipal Drain

$ 388,240.00

Part B - Provisional Items

A Provisional Item is an item that may or may not be required as a part of the Contract. The decision as to whether a Provisional Item will form part of the Contract will be at the discretion of the engineer at time of construction. Payment for Provisional Items will only be made for work authorized in writing by the Engineer. Payment for work performed under a Provisional Item shall be based on the Unit Price bid in the Scope of Work below.

1) Quarry stone rip-rap including geotextile filter material	250	t	$ 100.00	$	25,000.00

Total Estimated Construction Costs
Part B - Provisional Items

$ 25,000.00

Summary of Estimated Construction Costs

Part A - Shafley Municipal Drain	$	388,240.00
Part B - Provisional Items	$	25,000.00
Total Estimated Construction Costs	**$**	**413,240.00**
Total Estimated Materials	$	133,500.00
Total Estimated Labour and Equipment	$	279,740.00
Total Estimated Construction Costs SHAFLEY MUNICIPAL DRAIN	**$**	**413,240.00**

Schedule C

Schedule of Assessment for Construction

Schedule of Assessment for Construction
Shafley Municipal Drain

Shafley Municipal Drain

Property Details					Drainage Act Instruments of Assessment					For Information		
Part Lot	Concession	Landowner	Roll Number	Approx. Ha. Affected	Benefit (Sec. 22)	Outlet Liability (Sec. 23)	Special Benefit (Sec. 24)	Special Assessment (Sec. 26)	Total Assessment	Less Gov't Grant	Less Allowances	Net Estimated Expense
Pt. 34	5	S. Scheel & K. Comfort	12-167	0.7	$ -	$ 32			$ 32	*	$ -	$ 32
Pt .34	5	R. & L. Marr	12-167-02	2.5	$ -	$ 121			$ 121	*	$ -	$ 121
Pt. 35	5	Hihojo Ltd.	12-077	0.3	$ -	$ 57			$ 57	$ 19	$ -	$ 38
Pt. 35	5	2027479 Ontario Ltd.	12-077-01	8.7	$ -	$ 1,366			$ 1,366	$ 455	$ -	$ 911
Pt. 35	5	L. & L. Dumlao	12-078	0.9	$ -	$ 355			$ 355.00	*	$ -	$ 355
Pt. 35	5	R. & L. Marr	12-177	17.7	$ 24,731	$ 3,673			$ 28,404	*	$ 10,700	$ 17,704
Pt. 36	5	Vision Farms Ltd.	12-079	5.0	$ 25,162	$ 504	$ 4,580		$ 30,246	$ 10,082	$ 12,050	$ 8,114
Pt. 36	5	D. & A. Homan	12-079-01	8.1	$ 6,641	$ 251	$ 13,740		$ 20,632	$ 6,877	$ 5,580	$ 8,175
Pt. 36	5	J. & J. Homan	12-178	27.9	$ 7,793	$ 11,677			$ 19,470	$ 6,490	$ 610	$ 12,370
Pt. 37	5	J. Homan	12-178-01	0.8	$ -	$ 269			$ 269	$ 90	$ -	$ 179
Pt. 37	5	Hihojo Ltd.	12-183	8.4	$ -	$ 2,435			$ 2,435	$ 812	$ -	$ 1,623
Pt. 34	6	A. & C. Otten	12-168	20.6	$ -	$ 9,975			$ 9,975	$ 3,325	$ -	$ 6,650
Pt. 34	6	L. Ireland	12-168-01	5.9	$ -	$ 1,250			$ 1,250	*	$ -	$ 1,250
Pt. 34	6	N. & E. Gill	12-169	3.7	$ -	$ 933			$ 933	$ 311	$ -	$ 622
Pt. 35	6	D. & M. Vander Meer	12-176	10.3	$ 22,733	$ 5,494			$ 28,227	$ 9,409	$ 5,080	$ 13,738
Pt. 35	6	Vander Meer Farms Ltd.	12-172	30.0	$ 23,895	$ 26,947			$ 50,842	$ 16,947	$ 3,020	$ 30,875
Pt. 35	6	R. Anderson	12-171	20.5	$ -	$ 16,785			$ 16,785	$ 5,595	$ -	$ 11,190
Pt. 35	6	A. Amanali & N. Merchant	12-174	0.7	$ 949	$ 704			$ 1,653	*	$ 1,010	$ 643
Pt. 35	6	K. & T. Vis	12-175	0.3	$ 641	$ 401			$ 1,042	*	$ 870	$ 172
Pt. 35	6	J. & E. Vanamerongen	12-173-50	1.3	$ 296	$ 1,028			$ 1,324	*	$ 670	$ 654
Pt. 35	6	R. Vangeel	12-172-02	0.4	$ -	$ 542			$ 542	*	$ -	$ 542
Pt. 36	6	N. Masi & A. Stephanie	12-179-05	1.4	$ -	$ 907			$ 907	*	$ -	$ 907
Pt. 36	6	Hihojo Ltd.	12-179-15	19.1	$ 8,957	$ 4,717			$ 13,674	$ 4,558	$ 3,160	$ 5,956
Pt. 36	6	R. & L. Gerryts	12-179	0.7	$ -	$ 635			$ 635	*	$ -	$ 635
Pt. 36	6	K. Perron	12-180-01	1.9	$ 422	$ 858	$ 10,500		$ 11,780	*	$ 4,170	$ 7,610
Pt. 36	6	T. & Y. Hessels	12-181	15.8	$ 8,488	$ 7,319			$ 15,807	$ 5,269	$ -	$ 10,538
Pt. 36	6	Y. Hessels	12-180	12.3	$ 30,237	$ 8,023	$ 10,500		$ 48,760	$ 16,253	$ 13,800	$ 18,707
Pt. 37	6	D. & A. Homan	12-184	20.2	$ -	$ 1,553			$ 1,553	$ 518	$ -	$ 1,035
Pt. 37	6	Hihojo Ltd.	12-183-01	10.4	$ -	$ 865			$ 865.00	$ 288.00	$ -	$ 577.00
Pt. 37	6	W. Dobrucki	12-182	8.5	$ -	$ 907			$ 907	$ 302	$ -	$ 605
Pt. 36	7	D. & L. Mann	12-229	1.0	$ -	$ 968			$ 968	$ 323	$ -	$ 645
Total Assessments on Lands					**$ 160,945**	**$ 111,551**	**$ 39,320**	**$ -**	**$ 311,816**	**$ 87,923**	**$ 60,720**	**$ 163,173**

Shafley Municipal Drain

Property Details				Drainage Act Instruments of Assessment					For Information		
Road Name	Road Authority	Roll Number	Approx. Ha. Affected	Benefit (Sec. 22)	Outlet Liability (Sec. 23)	Special Benefit (Sec. 24)	Special Assessment (Sec. 26)	Total Assessment	Less Gov't Grant	Less Allowances	Net Estimated Expense
Zion Road	Township of Wainfleet		0.8	$ -	$ 1,331			$ 1,331			$ 1,331
Smith Road	Township of Wainfleet		5.2	$ 34,203	$ 13,106	$ 160,860	$ 68,200	$ 276,369			$ 276,369
Marr Road	Township of Wainfleet		1.0	$ -	$ 4,032			$ 4,032			$ 4,032
Gracey Road	Township of Wainfleet		0.1	$ -	$ 252			$ 252			$ 252
Willford Road	Township of Wainfleet		1.3	$ 6,487	$ 3,460			$ 9,947			$ 9,947
Canada Southern Railway Company		13-998	4.2	$ 4,897	$ 10,585			$ 15,482			$ 15,482
Concession 6 Road	Township of Wainfleet		0.8	$ 838	$ 6,533			$ 7,371			$ 7,371
Total Assessments on Roads				**$ 46,425**	**$ 39,299**	**$ 160,860**	**$ 68,200**	**$ 314,784**			**$ 314,784**
Total Assessments Shafley Municipal Drain				**$ 207,370**	**$ 150,850**	**$ 200,180**	**$ 68,200**	**$ 626,600**	**$ 87,923**	**$ 60,720**	**$ 477,957**

Notes:
1 '*' Denotes Lands not eligible for ADIP Grants.
2 The Special Benefit Assessment (Sec. 24) has been used to separate the benefit portion of culvert crossings from the normal benefit assessment.
3 The Special Assessments (Sec. 26) shall be a non-proratable assessment. All other assessments are proratable.
4 The Net Estimated Expense is the Total Assessment less gov't grants and allowances (if applicable).

Schedule D

Schedule of Assessment for Future Maintenance

Schedule of Assessment for Future Maintenance
Shafley Municipal Drain

Shafley Municipal Drain	Property Details					Proportion of Maintenance Assessment			
						Open Ditch	Municipal Drain Crossings		
	Part Lot	Con.	Landowner	Roll Number		Shafley Drain (Open)	Sta. 0+606	Sta. 2+189	Sta. 2+460
	Pt. 34	5	S. Scheel & K. Comfort	12-167	*	0.02%	0.003%		
	Pt .34	5	R. & L. Marr	12-167-02	*	0.08%	0.01%		
	Pt. 35	5	Hihojo Ltd.	12-077		0.04%	0.01%		
	Pt. 35	5	2027479 Ontario Ltd.	12-077-01		0.91%	0.06%		
	Pt. 35	5	L. & L. Dumlao	12-078		0.24%	0.05%		
	Pt. 35	5	R. & L. Marr	12-177	*	2.43%	0.50%		
	Pt. 36	5	Vision Farms Ltd.	12-079		0.33%	5.56%		
	Pt. 36	5	D. & A. Homan	12-079-01		0.17%	16.73%		
	Pt. 36	5	J. & J. Homan	12-178		7.74%	1.69%		
	Pt. 37	5	J. Homan	12-178-01		0.18%	0.04%		
	Pt. 37	5	Hihojo Ltd.	12-183		1.61%	0.35%		
	Pt. 34	6	A. & C. Otten	12-168		6.61%	1.04%		
	Pt. 34	6	L. Ireland	12-168-01	*	0.83%	0.29%		
	Pt. 34	6	N. & E. Gill	12-169		0.62%	1.08%		
	Pt. 35	6	D. & M. Vander Meer	12-176		3.64%	0.52%		
	Pt. 35	6	Vander Meer Farms Ltd.	12-172		17.86%	1.79%	11.30%	12.42%
	Pt. 35	6	R. Anderson	12-171		11.13%	0.94%	5.94%	8.65%
	Pt. 35	6	A. Amanali & N. Merchant	12-174	*	0.47%	0.06%		
	Pt. 35	6	K. & T. Vis	12-175	*	0.27%	0.03%		

Shafley Municipal Drain

Property Details					Proportion of Maintenance Assessment			
					Open Ditch	Municipal Drain Crossings		
Part Lot	Con.	Landowner	Roll Number		Shafley Drain (Open)	Sta. 0+606	Sta. 2+189	Sta. 2+460
Pt. 35	6	J. & E. Vanamerongen	12-173-50	*	0.68%	0.08%		
Pt. 35	6	R. Vangeel	12-172-02	*	0.36%	0.03%	0.17%	0.23%
Pt. 36	6	N. Masi & A. Stephanie	12-179-05	*	0.60%	0.09%		
Pt. 36	6	Hihojo Ltd.	12-179-15		3.13%	0.59%		
Pt. 36	6	R. & L. Gerryts	12-179	*	0.42%	0.05%		
Pt. 36	6	K. Perron	12-180-01	*	0.57%	0.06%	70.00%	
Pt. 36	6	T. & Y. Hessels	12-181		4.85%	0.47%	4.80%	
Pt. 36	6	Y. Hessels	12-180		5.32%	0.45%	2.86%	75.09%
Pt. 37	6	D. & A. Homan	12-184		1.03%	0.38%		
Pt. 37	6	Hihojo Ltd.	12-183-01		0.57%	0.25%		
Pt. 37	6	W. Dobrucki	12-182		0.60%	0.12%		
Pt. 36	7	D. & L. Mann	12-229		0.64%	0.05%	0.29%	0.40%
Total Assessments on Lands					73.95%	33.39%	95.37%	96.80%
Zion Road		Township of Wainfleet			0.88%	0.19%		
Smith Road		Township of Wainfleet			8.69%	64.20%	2.58%	0.41%
Marr Road		Township of Wainfleet			2.67%	0.38%		
Gracey Road		Township of Wainfleet			0.17%	0.01%	0.08%	0.10%
Willford Road		Township of Wainfleet			2.29%	0.50%		
Canada Southern Railway Company					7.02%	1.01%		
Concession 6 Road		Township of Wainfleet			4.33%	0.31%	1.97%	2.68%
Total Assessments on Roads					26.05%	66.61%	4.63%	3.20%
Total Assessments Shafley Municipal Drain					100.00%	100.00%	100.00%	100.00%

Specifications for the Construction of Municipal Drainage Works

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

DIVISION A

General Conditions

CONTENTS

DIVISION A – GENERAL CONDITIONS

A.1. Scope

The work to be done under this contract consists of supplying all labour, equipment and materials to construct the drainage work as outlined in the Scope of Work, Drawings, General Conditions and other Specifications.

A.2. Tenders

Tenders are to be submitted on a lump sum basis for the complete works or a portion thereof, as instructed by the Municipality. The Scope of Work must be completed and submitted with the Form of Tender and Agreement. A certified cheque is required as Tender Security, payable to the Treasurer of the Municipality.

All certified cheques, except that of the bidder to whom the work is awarded will be returned within ten (10) days after the tender closing. The certified cheque of the bidder to whom the work is awarded will be retained as Contract Security and returned when the Municipality receives a Completion Certificate for the work.

A certified cheque is not required if the Contractor provides an alternate form of Contract Security such as a Performance Bond for 100% of the amount of the Tender or other satisfactory security, if required/permitted by the Municipality. A Performance Bond may also be required to insure maintenance of the work for a period of one (1) year after the date of the Completion Certificate.

A.3. Examinations of Site, Drawings, and Specifications

The Tenderer must examine the premises and site to compare them with the Drawings and Specifications in order to satisfy himself of the existing conditions and extent of the work to be done before submission of his Tender. No allowance shall subsequently be made on behalf of the Contractor by reason of any error on his part. Any estimates of quantities shown or indicated on the Drawings, or elsewhere are provided for the convenience of the Tenderer. Any use made of these quantities by the Tenderer in calculating his Tender shall be done at his own risk. The Tenderer for his own protection should check these quantities for accuracy.

The standard specifications (Divisions B through G) shall be considered complementary and where a project is controlled under one of the Divisions, the remaining Divisions will apply for miscellaneous works.

In case of any inconsistency or conflict between the Drawings and Specifications, the following order of precedence shall apply:

- Direction of the Engineer
- Special Provisions (Division H)
- Scope of Work
- Contract Drawings
- Standard Specifications (Divisions B through G)
- General Conditions (Division A)

A.4. Payment

Progress payments equal to 87±% of the value of work completed and materials incorporated in the work will be made to the Contractor monthly. An additional ten per cent (10±%) will be paid 60 days after the final acceptance by the Engineer, and three per cent (3±%) of the Contract price may be reserved by the Municipality as a maintenance holdback for a one (1) year period from the date of the Completion Certificate. A greater percentage of the Contract price may be reserved by the Municipality for the same one (1) year period if in the opinion of the Engineer, particular conditions of the Contract requires such greater holdback.

After the completion of the work, any part of this reserve may be used to correct defects developed within that time from faulty workmanship and materials, provided that notice shall first be given to the Contractor and that he may promptly make good such defects.

A.5. Contractor's Liability Insurance

Prior to commencement of any work, the Contractor shall file with the Municipality evidence of compliance with all Municipality insurance requirements (Liability Insurance, WSIB, etc.) for no less than the minimum amounts as stated in the Purchasing Procedures of the Municipality. All insurance coverage shall remain in force for the entire contract period including the warranty period which expires one year after the date of the Completion Certificate.

The following are to be named as co-insured:

- Successful Contractor
- Sub-Contractor
- Municipality
- Headway Engineering

A.6. Losses Due to Acts of Nature, Etc.

All damage, loss, expense and delay incurred or experienced by the Contractor in the performance of the work, by reason of unanticipated difficulties, bad weather, strikes, acts of nature, or other mischances shall be borne by the Contractor and shall not be the subject of a claim for additional compensation.

A.7. Commencement and Completion of Work

The work must commence as specified in the Form of Tender and Agreement. If conditions are unsuitable due to poor weather, the Contractor may be required, at the discretion of the Engineer to postpone or halt work until conditions become acceptable and shall not be subject of a claim for additional compensation.

The Contractor shall give the Engineer a minimum of 48 hours notice before commencement of work. The Contractor shall then arrange a meeting to be held on the site with Contractor, Engineer, and affected Landowners to review in detail the construction scheduling and other details of the work.

If the Contractor leaves the job site for a period of time after initiation of work, he shall give the Engineer and the Municipality a minimum of 24 hours notice prior to returning to the project. If any work is commenced without notice to the Engineer, the Contractor shall be fully responsible for all such work undertaken prior to such notification.

The work must proceed in such a manner as to ensure its completion at the earliest possible date and within the time limit set out in the Form of Tender and Agreement.

A.8. Working Area and Access

Where any part of the drain is on a road allowance, the road allowance shall be the working area. For all other areas, the working area available to the Contractor to construct the drain is specified in the Special Provisions (Division H).

Should the specified widths become inadequate due to unusual conditions, the Contractor shall notify the Engineer immediately. Where the Contractor exceeds the specified working widths without authorization, he shall be held responsible for the costs of all additional damages.

If access off an adjacent road allowance is not possible, each Landowner on whose property the drainage works is to be constructed, shall designate access to and from the working area. The Contractor shall not enter any other lands without permission of the Landowner and he shall compensate the Landowner for damage caused by such entry.

A.9. Sub-Contractors

The Contractor shall not sublet the whole or part of this Contract without the approval of the Engineer.

A.10. Permits, Notices, Laws and Rules

The Contractor shall obtain and pay for all necessary permits or licenses required for the execution of the work (but this shall not include MTO encroachment permits, County Road permits permanent easement or rights of servitude). The Contractor shall give all necessary notices and pay for all fees required by law and comply with all laws, ordinances, rules and regulations relating to the work and to the preservation of the public's health and safety.

A.11. Railways, Highways, and Utilities

A minimum of 72 hours' notice to the Railway or Highways, exclusive of Saturdays, Sundays, and Statutory Holidays, is required by the Contractor prior to any work activities on or affecting the applicable property. In the case of affected Utilities, a minimum of 48 hours' notice to the utility owner is required.

A.12. Errors and Unusual Conditions

The Contractor shall notify the Engineer immediately of any error or unusual conditions which may be found. Any attempt by the Contractor to correct the error on his own shall be done at his own risk. Any additional cost incurred by the Contractor to remedy the wrong decision on his part shall be borne by the Contractor. The Engineer shall make the alterations necessary to correct errors or to adjust for unusual conditions during which time it will be the Contractor's responsibility to keep his men and equipment gainfully employed elsewhere on the project.

The Contract amount shall be adjusted in accordance with a fair evaluation of the work added or deleted.

A.13. Alterations and Additions

The Engineer shall have the power to make alterations in the work shown or described in the Drawings and Specifications and the Contractor shall proceed to make such changes without causing delay. In

every such case, the price agreed to be paid for the work under the Contract shall be increased or decreased as the case may require according to a fair and reasonable evaluation of the work added or deleted. The valuation shall be determined as a result of negotiations between the Contractor and the Engineer, but in all cases the Engineer shall maintain the final responsibility for the decision. Such alterations and variations shall in no way render the Contract void. No claims for a variation or alteration in the increased or decreased price shall be valid unless done in pursuance of an order from the Engineer and notice of such claims made in writing before commencement of such work. In no such case shall the Contractor commence work which he considers to be extra before receiving the Engineer's approval.

A.14. Supervision

The Contractor shall give the work his constant supervision and shall keep a competent foreman in charge at the site.

A.15. Field Meetings

At the discretion of the Engineer, a field meeting with the Contractor or his representative, the Engineer and with those others that the Engineer deems to be affected, shall be held at the location and time specified by the Engineer.

A.16. Periodic and Final Inspections

Periodic inspections by the Engineer will be made during the performance of the work. If ordered by the Engineer, the Contractor shall expose the drain as needed to facilitate inspection by the Engineer.

Final inspection by the Engineer will be made within twenty (20) days after he has received notice from the Contractor that the work is complete.

A.17. Acceptance By the Municipality

Before any work shall be accepted by the Municipality, the Contractor shall correct all deficiencies identified by the Engineer and the Contractor shall leave the site neat and presentable.

A.18. Warranty

The Contractor shall repair and make good any damages or faults in the drain that may appear within one (1) year after its completion (as dated on the Completion Certificate) as the result of the imperfect or defective work done or materials furnished if certified by the Engineer as being due to one or both of these causes; but nothing herein contained shall be construed as in any way restricting or limiting the liability of the Contractor under the laws of the Country, Province or Locality in which the work is being done. Neither the Completion Certificate nor any payment there under, nor any provision in the Contract Documents shall relieve the Contractor from his responsibility.

A.19. Termination of Contract By The Municipality

If the Contractor should be adjudged bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should refuse or fail to supply enough properly skilled workmen or proper materials after having received seven (7) days notice in writing from the Engineer to supply additional workmen or materials to commence or complete the works, or if he should fail to make prompt payment to Sub-Contractors, or for material, or labour, or persistently disregards laws, ordinances, or the instruction of the Engineer,

or otherwise be guilty of a substantial violation of the provisions of the Contract, then the Municipality, upon the certificate of the Engineer that sufficient cause exists to justify such action, may without prejudice to any other right or remedy, by giving the Contractor written notice, terminate the employment of the Contractor and take possession of the premises, and of all materials, tools and appliances thereon, and may finish the work by whatever method the Engineer may deem expedient but without delay or expense. In such a case, the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Contract price will exceed the expense of finishing the work including compensation to the Engineer for his additional services and including the other damages of every name and nature, such excess shall be paid by the Contractor. If such expense will exceed such unpaid balance, the Contractor shall pay the difference to the Municipality. The expense incurred by the Municipality, as herein provided, shall be certified by the Engineer.

If the Contract is terminated by the Municipality due to the Contractor's failure to properly commence the works, the Contractor shall forfeit the certified cheque bid deposit and furthermore shall pay to the Municipality an amount to cover the increased costs, if any, associated with a new Tender for the Contract being terminated.

If any unpaid balance and the certified cheque do not match the monies owed by the Contractor upon termination of the Contract, the Municipality may also charge such expense against any money which may thereafter be due to the Contractor from the Municipality.

A.20. Tests

The cost for the testing of materials supplied to the job by the Contractor shall be borne by the Contractor. The Engineer reserves the right to subject any lengths of any tile or pipe to a competent testing laboratory to ensure the adequacy of the tile or pipe. If any tile supplied by the Contractor is determined to be inadequate to meet the applicable A.S.T.M. standards, the Contractor shall bear full responsibility to remove and/or replace all such inadequate tile in the Contract with tile capable of meeting the A.S.T.M. Standards.

A.21. Pollution

The Contractor shall keep their equipment in good repair. The Contractor shall refuel or repair equipment away from open water.

If polluted material from construction materials or equipment is caused to flow into the drain, the Contractor shall immediately notify the Ministry of the Environment, and proceed with the Ministry's protocols in place to address the situation.

A.22. Species and Risk

If a Contractor encounters a known Species at Risk as designated by the MNR or DFO, the Contractor shall notify the Engineer immediately and follow the Ministry's guidelines to deal with the species.

A.23. Road Crossings

This specification applies to all road crossings (Municipality, County, Regional, or Highway) where no specific detail is provided on the drawings or in the standard specifications. This specification in no way limits the Road Authority's regulations governing the construction of drains on their Road Allowance.

A.23.1. Road Occupancy Permit

Where applicable, the Contractor must submit an application for a road occupancy permit to the Road Authority and allow a minimum of five (5) working days for its review and issuance.

A.23.2. Road Closure Request and Construction Notification

The Contractor shall submit written notification of construction and request for road closure (if applicable) to the Road Authority and the Engineer for review and approval a minimum of five (5) working days prior to proceeding with any work on the road allowance. The Contractor shall be responsible for notifying all applicable emergency services, schools, etc. of the road closure or construction taking place.

A.23.3. Traffic Control

The Contractor shall supply flagmen, and warning signs and ensure that detour routes are adequately signed in accordance with no less than the minimum standards as set out in the Ontario Traffic Manual's Book 7.

A.23.4. Weather

No construction shall take place during inclement weather or periods of poor visibility.

A.23.5. Equipment

No construction material and/or equipment is to be left within three (3) metres of the travelled portion of the road overnight or during periods of inclement weather.

If not stated on the drawings, the road crossing shall be constructed by open cut method. Backfill from the top of the cover material over the subsurface pipe or culvert to the under side of the road base shall be Granular "B". The backfill shall be placed in lifts not exceeding 300mm in thickness and each lift shall be thoroughly compacted to 98% Standard Proctor. Granular "B" road base for County Roads and Highways shall be placed to a 450mm thickness and Granular "A" shall be placed to a thickness of 200mm. Granular road base materials shall be thoroughly compacted to 100% Standard Proctor.

Where the road surface is paved, the Contractor shall be responsible for placing HL-8 Hot Mix Asphalt patch at a thickness of 50mm or of the same thickness as the existing pavement structure. The asphalt patch shall be flush with the existing roadway on each side and without overlap.

Excavated material from the trench beyond 1.25 metres from the travelled portion or beyond the outside edge of the gravel shoulder may be used as backfill in the trench in the case of covered drains. The material shall be compacted in lifts not exceeding 300mm.

A.24. Laneways

All pipes crossing laneways shall be backfilled with material that is clean, free of foreign material or frozen particles and readily tamped or compacted in place unless otherwise specified. Laneway culverts on open ditch projects shall be backfilled with material that is not easily erodible. All backfill material shall be thoroughly compacted as directed by the Engineer.

Culverts shall be bedded with a minimum of 300mm of granular material. Granular material shall be placed simultaneously on each side of the culvert in lifts not exceeding 150mm in thickness and compacted to 95% Standard Proctor Density. Culverts shall be installed a minimum of 10% of the

culvert diameter below design grade with a minimum of 450mm of cover over the pipe unless otherwise noted on the Drawings.

The backfill over culverts and subsurface pipes at all existing laneways that have granular surfaces on open ditch and closed drainage projects shall be surfaced with a minimum of 300mm of Granular "B" material and 150mm of Granular "A" material. All backfill shall be thoroughly compacted as directed by the Engineer. All granular material shall be placed to the full width of the travelled portion.

Any settling of backfilled material shall be repaired by or at the expense of the Contractor during the warranty period of the project and as soon as required.

A.25. Fences

No earth is to be placed against fences and all fences removed by the Contractor shall be replaced by him in as good a condition as found. Where practical the Contractor shall take down existing fences in good condition at the nearest anchor post and roll it back rather than cutting the fence and attempting to patch it. The replacement of the fences shall be done to the satisfaction of the Engineer. Any fences found in such poor condition where the fence is not salvageable, shall be noted and verified with the Engineer prior to commencement of work.

Fences damaged beyond repair by the Contractor's negligence shall be replaced with new materials, similar to those materials of the existing fence, at the Contractor's expense. The replacement of the fences shall be done to the satisfaction of the Landowner and the Engineer.

Any fences paralleling an open ditch that are not line fences that hinder the proper working of the excavating machinery, shall be removed and rebuilt by the Landowner at his own expense.

The Contractor shall not leave fences open when he is not at work in the immediate vicinity.

A.26. Livestock

The Contractor shall provide each landowner with 48 hours notice prior to removing any fences along fields which could possibly contain livestock. Thereafter, the Landowner shall be responsible to keep all livestock clear of the construction areas until further notified. The Contractor shall be held responsible for loss or injury to livestock or damage caused by livestock where the Contractor failed to notify the Landowner, or through negligence or carelessness on the part of the Contractor.

A.27. Standing Crops

The Contractor shall be responsible for damages to standing crops which are ready to be harvested or salvaged along the course of the drain and access routes if the Contractor has failed to notify the Landowners 48 hours prior to commencement of the work on that portion of the drain.

A.28. Surplus Gravel

If as a result of any work, gravel or crushed stone is required and not all the gravel or crushed stone is used, the Contractor shall haul away such surplus material.

A.29. Iron Bars

The Contractor is responsible for the cost of an Ontario Land Surveyor to replace any iron bars that are altered or destroyed during the course of the construction.

A.30. Rip-Rap

Rip-rap shall be quarry stone rip-rap material and shall be the sizes specified in the Special Provisions. Broken concrete shall not be used as rip-rap unless otherwise specified.

A.31. Clearing, Grubbing and Brushing

This specification applies to all brushing where no specific detail is provided on the drawings or in the Special Provisions.

The Contractor shall clear, brush and stump trees from within the working area that interfere with the installation of the drainage system.

All trees, limbs and brush less than 150mm in diameter shall be mulched. Trees greater than 150mm in diameter shall be cut and neatly stacked in piles designated by the Landowners.

A.32. Restoration of Lawns

This specification applies to all lawn restoration where no specific detail is provided on the drawings or in the Special Provisions and no allowance for damages has been provided under Section 30 of the Drainage Act RSO 1990 to the affected property.

The Contractor shall supply “high quality grass seed” and the seed shall be broadcast by means of an approved mechanical spreader. All areas on which seed is to be placed shall be loose at the time of broadcast to a depth of 25mm. Seed and fertilizer shall be spread in accordance with the supplier’s recommendations unless otherwise directed by the Engineer. Thereafter it will be the responsibility of the Landowner to maintain the area in a manner so as to promote growth

END OF DIVISION

DIVISION B

Specifications for Open Drains

CONTENTS

DIVISION B – SPECIFICATIONS FOR OPEN DRAINS

B.1. Alignment

The drain shall be constructed in a straight line and shall follow the course of the present drain or water run unless noted on the drawings. Where there are unnecessary bends or irregularities on the existing course of the drain, the Contractor shall contact the Engineer before commencing work to verify the manner in which such irregularities or bends may be removed from the drain. All curves shall be made with a minimum radius of fifteen (15) metres from the centre line of the drain.

B.2. Profile

The Profile Drawing shows the depth of cuts from the top of the bank to the final invert of the ditch in metres and decimals of a metre, and also the approximate depth of excavated material from the bottom of the existing ditch to the final invert of the ditch. These cuts are established for the convenience of the Contractor; however, bench marks (established along the course of the drain) will govern the final elevation of the drain. The location and elevation of the bench marks are given on the Profile Drawing. Accurate grade control must be maintained by the Contractor during ditch excavation.

B.3. Excavation

The bottom width and the side slopes of the ditch shall be those shown on the drawings. If the channel cross-section is not specified it shall be a one metre bottom width with 1.5(h):1(v) side slopes. At locations along the drain where the cross section dimensions change, there shall be a transitional length of not less than 10:1 (five metre length to 0.5 metre width differential). Where the width of the bottom of the existing ditch is sufficient to construct the design width, then construction shall proceed without disturbing the existing banks.

Where existing side slopes become unstable, the Contractor shall immediately notify the Engineer. Alternative methods of construction and/or methods of protection will then be determined prior to continuing work.

Where an existing drain is being relocated or where a new drain is being constructed, the Contractor shall strip the topsoil for the full width of the drain, including the location of the spoil pile. Upon completion of levelling, the topsoil shall be spread to an even depth across the full width of the spoil.

An approved hydraulic excavator shall be used to carry out the excavation of the open ditch unless otherwise directed by the Engineer.

B.4. Excavated Material

Excavated material shall be placed on the low side of the drain or opposite trees and fences. The Contractor shall contact all Landowners before proceeding with the work to verify the location to place and level the excavated material.

No excavated material shall be placed in tributary drains, depressions, or low areas which direct water behind the spoil bank. The excavated material shall be placed and levelled to a maximum depth of 200 mm, unless instructed otherwise and commence a minimum of one (1) metre from the top of the bank. The edge of the spoil bank away from the ditch shall be feathered down to the existing ground; the edge of the spoil bank nearest the ditch shall have a maximum slope of 2(h):1(v). The material shall be levelled such that it may be cultivated with ordinary farm equipment without causing undue

hardship to the farm machinery and farm personnel. No excavated material shall cover any logs, brush, etc. of any kind.

Any stones or boulders which exceed 300mm in diameter shall be removed and disposed of in a location specified by the Landowner.

Where it is necessary to straighten any unnecessary bends or irregularities in the alignment of the ditch or to relocate any portion or all of an existing ditch, the excavated material from the new cut shall be used for backfilling the original ditch. Regardless of the distance between the new ditch and the old ditch, no extra compensation will be allowed for this work and must be included in the Contractor's lump sum price for the open work.

B.5. Excavation at Existing Bridge and Culvert Sites

The Contractor shall excavate the drain to the full specified depth under all bridges and to the full width of the structure. Temporary bridges may be carefully removed and left on the bank of the drain but shall be replaced by the Contractor when the excavation is complete. Permanent bridges must, if at all possible, be left intact. All necessary care and precautions shall be taken to protect the structure. The Contractor shall notify the Landowner if excavation will expose the footings or otherwise compromise the structural integrity of the structure.

The Contractor shall clean through all pipe culverts to the grade and width specified on the profile.

B.6. Pipe Culverts

All pipe culverts shall be installed in accordance with the standard detail drawings. If couplers are required, five corrugation couplers shall be used for up to and including 1200mm diameter pipes and 10 corrugation couplers for greater than 1200mm diameter pipes.

When an existing crossing is being replaced, the Contractor may backfill the new culvert with the existing native material that is free of large rocks and stones. The Contractor is responsible for any damage to a culvert pipe that is a result of rocks or stones in the backfill.

B.7. Rip-Rap Protection For Culverts

Quarry stone rip-rap shall be used as end treatment for new culverts and placed on geotextile filter material (Mirafi 160N or approved equal). The rip-rap shall be adequately keyed in along the bottom of the slope, and shall extend to the top of the pipe or as directed on the drawings. The maximum slope for rip-rap shall be 1(h):1(v) or as directed by the Engineer.

The Contractor shall be responsible for any defects or damages that may develop in the rip-rap or the earth behind the rip-rap that the Engineer deems to have been fully or partially caused by faulty workmanship or materials.

B.8. Clearing, Grubbing and Mulching

Prior to excavation, all trees, scrub, fallen timber and debris shall be removed from the side slopes of the ditch and for such a distance on the working side so as to eliminate any interference with the construction of the drain or the spreading of the spoil. The side slopes shall be neatly cut and cleared flush with the slope whether or not they are affected directly by the excavation. With the exception of large stumps causing damage to the drain, the side slopes shall not be grubbed. All other cleared areas shall be grubbed and the stumps put into piles for disposal by the Landowner.

All trees or limbs 150mm or larger, that is necessary to remove, shall be cut, trimmed and neatly stacked in the working width for the use or disposal by the Landowner. Brush and limbs less than 150mm in diameter shall be mulched. Clearing, grubbing and mulching shall be carried out as a separate operation from the excavation of the ditch, and shall not be completed simultaneously at the same location.

B.9. Tributary Tile Outlets

All tile outlets in existing ditches shall be marked by the Landowner prior to excavation. The Contractor shall guard against damaging the outlets of tributary drains. Any tile drain outlets that were marked or noted on the drawings and are subsequently damaged by the Contractor shall be repaired by the Contractor at his expense. The Landowner shall be responsible for repairs to damaged tile outlets that were not marked.

B.10. Seeding

The side slopes where disturbed shall be seeded using an approved grass seed mixture. The grass seed shall be applied the same day as the excavation of the open ditch.

Grass seed shall be fresh, clean and new crop seed, meeting the requirements of the MTO and composed of the following varieties mixed in the proportion by weight as follows:

- 55% Creeping Red Fescue
- 40% Perennial Rye Grass
- 5% White Clover

Grass seed shall be applied at the rate of 100 kg/ha.

B.11. Hydro Seeding

The areas specified in the contract document shall be hydro seeded and mulched upon completion of construction in accordance with O.P.S.S. 572.

B.12. Hand Seeding

Placement of the seed shall be of means of an approved mechanical spreader.

B.13. Completion

At the time of completion and final inspection, all work in the Contract shall have the full dimensions and cross-sections specified without any allowance for caving of banks or sediment in the ditch bottom.

END OF DIVISION

SPECIAL PROVISIONS

Shafley Municipal Drain

CONTENTS

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

1.0 GENERAL

The Contractor shall notify the Landowner, the Drainage Superintendent, and the Engineer 48 hours prior to construction.

The Contractor shall arrange a pre-construction meeting and shall invite the Landowners on whose property work will take place, and the Engineer, and the Drainage Superintendent.

The Contractor shall verify the location of the new drainage system with the Engineer and Landowner prior to construction.

The Contractor shall check and verify all dimensions and elevations and report any discrepancies to the Engineer prior to proceeding with the work.

The Contractor shall be responsible for settlement within the warranty period.

2.0 UTILITIES

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

The locations and elevations of all utilities shown on the drawings are approximate locations. Actual locations and elevations of all utilities must be verified by the Contractor prior to construction.

The Contractor shall arrange to have a representative of the utility owner on site during construction if it is a requirement by the utility owner.

3.0 WORKING AREA AND ACCESS

Access to the working area shall be designated by the Landowner.

The working area shall be in accordance with the following average widths.

Drain Segment and Station Range	Property Roll No.	Working side	Average Working Width for Construction	Average Working Width for Future Maintenance
0+020 to 1+048	12-179, 12-079-01, 12-178	West	12m	10m
1+062 to 1+495	12-177	East	12m	10m
1+523 to 1+730	12-176	East	12m	10m
1+730 to 1+922	Smith Road	West	6m	6m
1+937 to 2+162	12-179-15, 12-180-01	West	12m	10m

2+162 to 2+202	Smith Road	East	6m	6m
2+202 to 2+959	12-180	West	12m	10m
2+973 to 3+095	12-172	East	12m	10m

4.0 CLEARING BRUSHING AND MULCHING

The Contractor shall clear, brush and mulch trees from within the working area that interfere with the construction of the drainage system. The Contractor shall not clear all trees within the working area unless the full working width in a specific section is required for the installation of the drain and unless the Engineer has authorized the full clearing of the trees.

All trees, limbs, and brush less than 150mm in diameter shall be mulched/chipped. Clearing and brushing shall be done prior to the construction of the drain. Trees and branches greater than 150mm in diameter shall be cut into lengths no greater than four metres and placed in nearby stacks designated by the Landowner. Trees removed from road right-of-ways shall be mulched or disposed of offsite by the Contractor.

5.0 OPEN DITCH EXCAVATION

An approved hydraulic excavator shall be used to carry out the excavation of the open ditch. The open ditch shall have a 900mm bottom width and shall be parabolic in shape. The side slopes shall be a 1.5H:1V or flatter.

6.0 EXCAVATED MATERIAL

The excavated material from the ditch cleanout shall be hauled and used for the construction of the ditch enclosure on the Collver Municipal Drain.

7.0 SEEDING

The Contractor shall supply and hydroseed an approved seed mixture (OPS 803 – Lowland Mix), complete with a bonded fibre matrix mulch over the disturbed areas.

All seed shall be applies using the manufacturer's application recommendations.

8.0 CULVERT INSTALLATIONS

The Contractor shall install the culverts in accordance with the attached details.

9.0 BANK REPAIR

In areas where high levels of erosion have occurred, the Contractor shall reshape the banks to match typical bank side slopes. The Contractor shall then place geo-textile filter material and stone riprap for long term bank stabilization.

10.0 ROAD CROSSINGS

10.1 Notice

The Contractor shall notify the Engineer and the Township of Wainfleet a minimum of 48 hours prior to the scheduled road crossing.

The Contractor shall notify all emergency services and local district school boards of the road enclosure.

Detour routes and plans shall be provided to all relevant local authorities in accordance with their respective notification protocols.

10.2 Traffic Control

The Contractor shall be responsible to arrange all traffic control signals, signs and devices that are required for safe and proper traffic management during the installation of the drainage system. The Contractor shall contact Huron County for specific local procedures, guidelines, and timelines. Traffic control shall meet the standards of Book 7 of the Ontario Traffic Manual.

10.3 Road Restoration

The Contractor shall remove and dispose of offsite, all excavated material unsuitable for use as backfill.

The Contractor shall grade the road ditches to the ditch. Any areas disturbed within the Road Right-of-Way shall be topsoiled and hydroseeded with an approved grass seed mixture (OPS 803 – Standard Roadside Mix).

11.0 RIP-RAP

All stone rip-rap material shall be quarry stone 150mm to 300mm diameter and placed to a depth of 300mm, unless otherwise noted. All rip-rap material shall be placed on geo-textile filter material.

12.0 EROSION AND SEDIMENT CONTROL

The Contractor shall provide adequate erosion and sediment control for the duration of construction including monitoring and maintenance of the control measures put in place. The Contractor shall inspect the erosion and sediment control measures regularly, and specifically before predicted rainfall events, and after rainfall events.

The TOWNSHIP of WAINFLEET

SHAFLEY MUNICIPAL DRAIN

Watershed Plan

NOTES:

1. THIS MAP WAS CREATED USING NIAGARA REGION GEOGRAPHIC INFORMATION SYSTEM DIGITAL DATA. THIS MAP IS A SECONDARY PRODUCT WHICH HAS NOT BEEN VERIFIED BY NIAGARA REGION.
2. THE CONTOURS WERE CREATED USING IMAGERY DERIVED DIGITAL DATA (2015) FROM LAND INFORMATION ONTARIO.

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 **ELEV.=175.38**
TOP CENTER UPSTREAM END OF CSPA CULVERT 8m EAST OF STA. 0+000 (MAIN)

BENCHMARK No. 2 **ELEV.=175.93**
TOP CENTER UPSTREAM END OF 1200mmØ CSP CULVERT AT STA. 0+615 (MAIN)

BENCHMARK No. 3 **ELEV.=177.96**
NAIL IN WEST FACE OF 1200mmØ TREE 15m EAST OF STA. 0+832 (MAIN)

BENCHMARK No. 4 **ELEV.=176.33**
TOP CENTER DOWNSTREAM END OF 1200mmØ CSP CULVERT AT STA. 1+497 (MAIN)

BENCHMARK No. 5 **ELEV.=176.26**
TOP CENTER UPSTREAM END OF 1200mmØ CSP CULVERT AT STA. 1+518 (MAIN)

BENCHMARK No. 6 **ELEV.=176.65**
TOP CENTER UPSTREAM END OF 750mmØ CSP CULVERT AT STA. 2+194 (MAIN)

SCHEDULE OF OWNERSHIP

ST. No.	OWNERSHIP	ROLL NO.	WATERSHED AREA
SMITH ROAD			
63687	RACHEL VANGEEL	12-172-02	0.4 HA.
63645	JAMES & ENGEKINA VANAMERONGEN	12-173-50	1.3 HA.
63644	RICHARD & LAURA GERRYTS	12-179	0.7 HA.
63643	KEVIN & TACEY VIS	12-175	0.3 HA.
63641	AKBAR AMANALI & NADIA MERCHANT	12-174	0.7 HA.
63634	NICHOLAS MASI & ANN STEPHANIE	12-179-05	1.4 HA.

LEGEND

- LOT/CONCESSION LINE
- PROPERTY LINE
- MAJOR WATERSHED BOUNDARY
- MINOR WATERSHED BOUNDARY
- WETLAND LIMIT
- BENCHMARK LOCATION (B.M. 1 / 123.45) — BENCHMARK No. / BENCHMARK ELEVATION
- JOHN & JANE SMITH 12-345 (12.3 Ha.) — LANDOWNER NAME(S) / ASSESSMENT ROLL No. (ABBREVIATED) / AREA WITHIN WATERSHED

EXISTING FEATURES:
- DRAIN NAME — OPEN DRAIN WITH CROSSING AND FLOW DIRECTION
- DRAIN NAME (CB, MH) — CLOSED DRAIN WITH CATCH BASIN, MANHOLE AND FLOW DIRECTION
- OVERLAND FLOW PATH

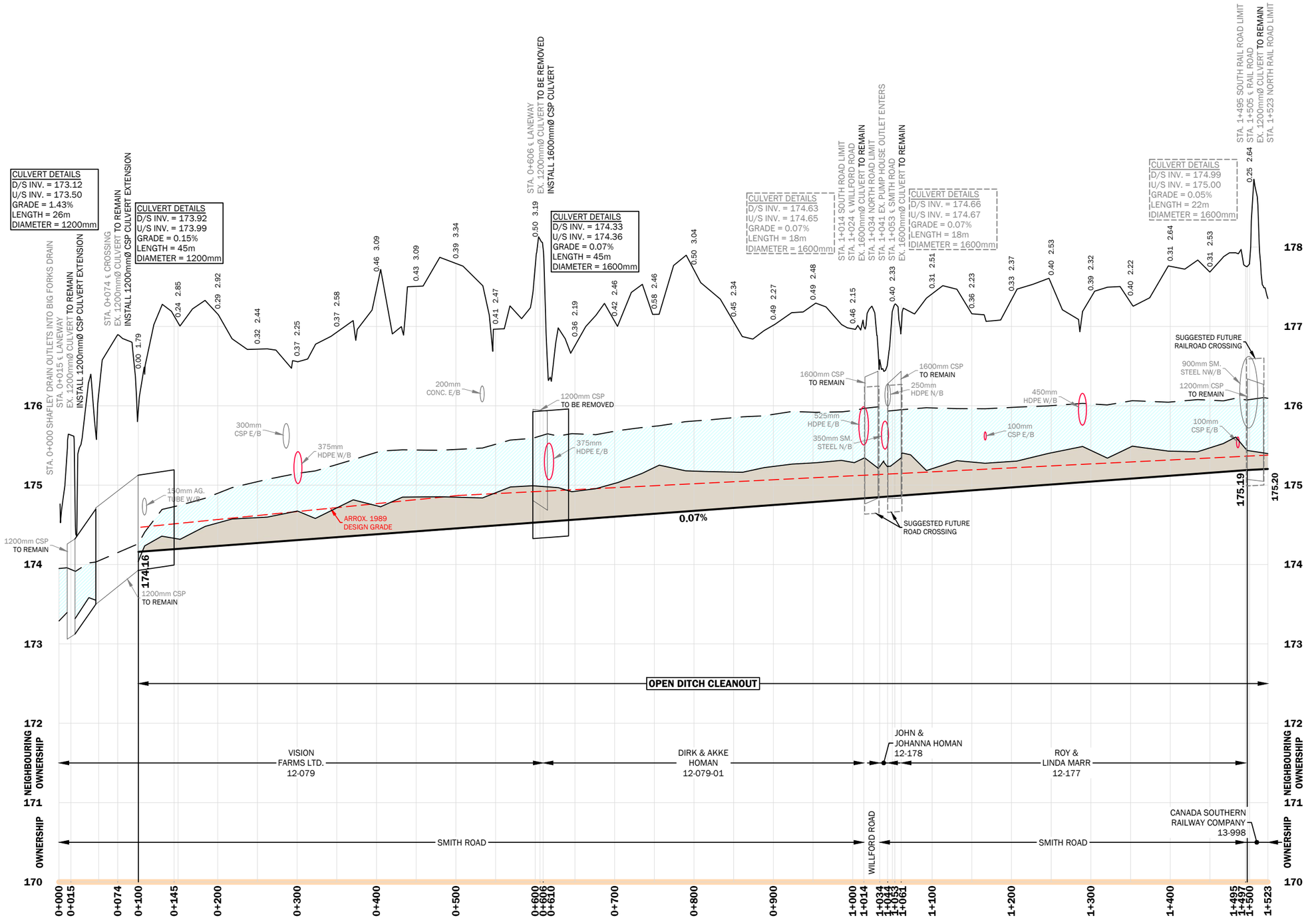
PROPOSED FEATURES:
- DRAIN NAME — OPEN DRAIN WITH CROSSING AND FLOW DIRECTION

No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

LICENSED PROFESSIONAL ENGINEER — Dec. 18, 2025 — S.G.R. BRICKMAN — 100150920 — PROVINCE OF ONTARIO

Headway Engineering

DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	1 OF 7
DATE: 2025-12-18	REFERENCE No. WNFLT-002		



PROFILE SCALES

HORZ. 0 100 200 300

VERT. 0 1 2 3

The TOWNSHIP of WAINFLEET

SHAFLEY MUNICIPAL DRAIN

Main Drain (Open) Profile (Sta. 0+000 to Sta. 1+523)

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 — **ELEV.=175.38**
TOP CENTER UPSTREAM END OF CSPA CULVERT 8m EAST OF STA. 0+000 (MAIN)

BENCHMARK No. 2 — **ELEV.=175.93**
TOP CENTER UPSTREAM END OF 1200mmØ CSP CULVERT AT STA. 0+615 (MAIN)

BENCHMARK No. 3 — **ELEV.=177.96**
NAIL IN WEST FACE OF 1200mmØ TREE 15m EAST OF STA. 0+832 (MAIN)

BENCHMARK No. 4 — **ELEV.=176.33**
TOP CENTER DOWNSTREAM END OF 1200mmØ CSP CULVERT AT STA. 1+497 (MAIN)

BENCHMARK No. 5 — **ELEV.=176.26**
TOP CENTER UPSTREAM END OF 1200mmØ CSP CULVERT AT STA. 1+518 (MAIN)

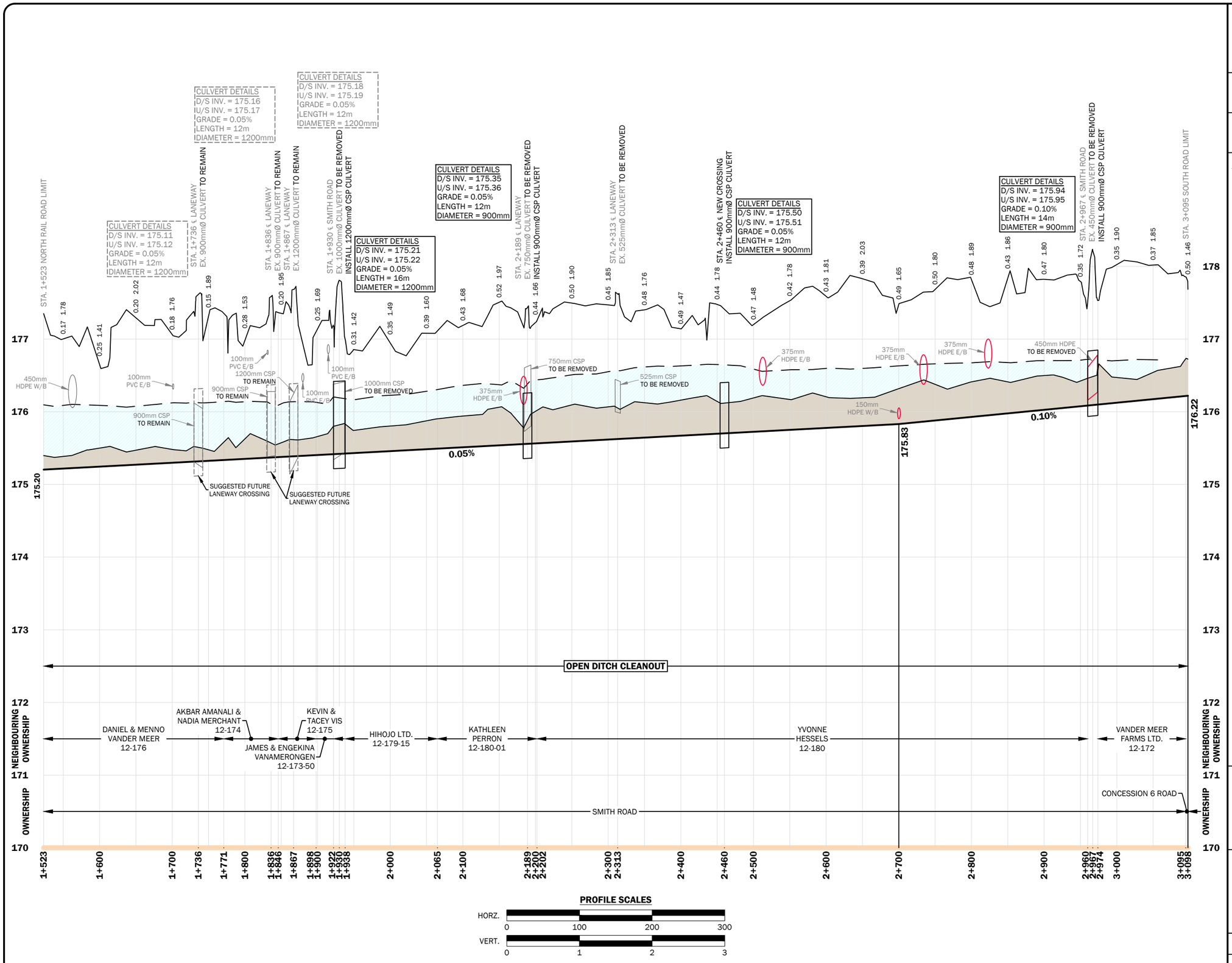
BENCHMARK No. 6 — **ELEV.=176.65**
TOP CENTER UPSTREAM END OF 750mmØ CSP CULVERT AT STA. 2+194 (MAIN)

LICENSED PROFESSIONAL ENGINEER Dec. 18, 2025 S.G.R. BRIDGMAN 100150920 PROVINCE OF ONTARIO

No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

Headway Engineering

DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	2 OF 7
DATE: 2025-12-18	REFERENCE No. WNFLT-002		



PROFILE SCALES

HORZ. 0 100 200 300

VERT. 0 1 2 3

The TOWNSHIP of WAINFLEET

SHAFLEY MUNICIPAL DRAIN

Main Drain (Open) Profile (Sta. 1+523 to Sta. 3+098)

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 — **ELEV.=175.38**
TOP CENTER UPSTREAM END OF CSPA CULVERT 8m EAST OF STA. 0+000 (MAIN)

BENCHMARK No. 2 — **ELEV.=175.93**
TOP CENTER UPSTREAM END OF 1200mmØ CSP CULVERT AT STA. 0+615 (MAIN)

BENCHMARK No. 3 — **ELEV.=177.96**
NAIL IN WEST FACE OF 1200mmØ TREE 15m EAST OF STA. 0+832 (MAIN)

BENCHMARK No. 4 — **ELEV.=176.33**
TOP CENTER DOWNSTREAM END OF 1200mmØ CSP CULVERT AT STA. 1+497 (MAIN)

BENCHMARK No. 5 — **ELEV.=176.26**
TOP CENTER UPSTREAM END OF 1200mmØ CSP CULVERT AT STA. 1+518 (MAIN)

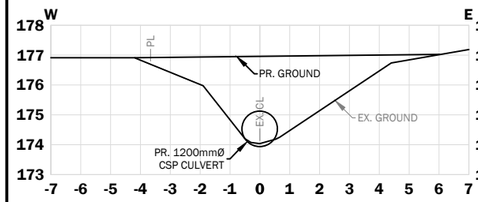
BENCHMARK No. 6 — **ELEV.=176.65**
TOP CENTER UPSTREAM END OF 750mmØ CSP CULVERT AT STA. 2+194 (MAIN)

LICENSED PROFESSIONAL ENGINEER S.G.R. BRICKMAN 100150820 PROVINCE OF ONTARIO Dec 17,2025

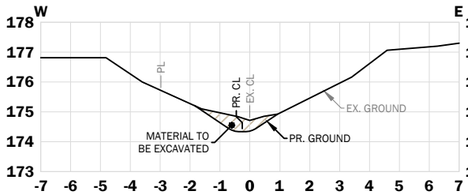
No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

Headway Engineering

DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	3 OF 7
DATE: 2025-12-18	REFERENCE No. WNFLT-002		

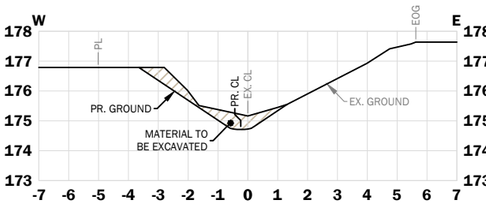


STA. 0+100

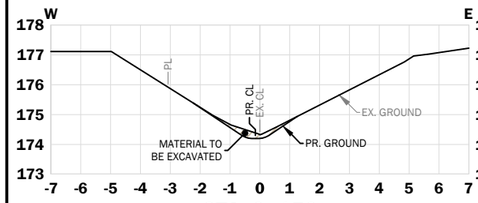


STA. 0+350

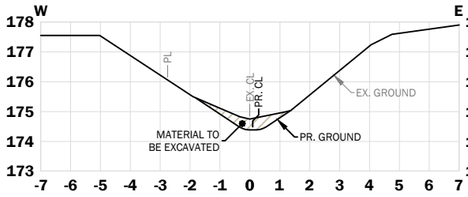
STA. 0+600



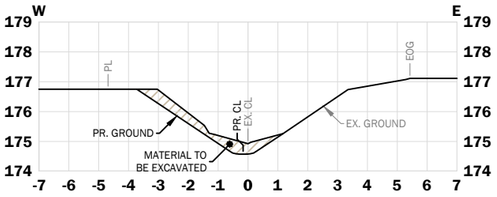
STA. 0+850



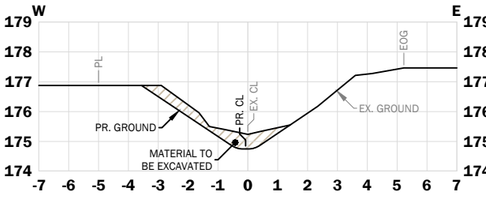
STA. 0+150



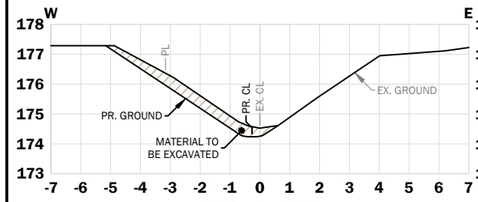
STA. 0+400



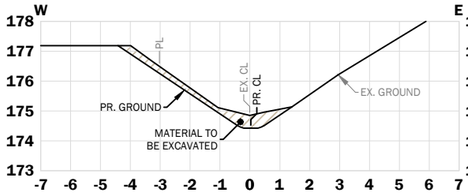
STA. 0+650



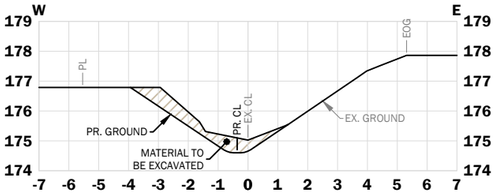
STA. 0+900



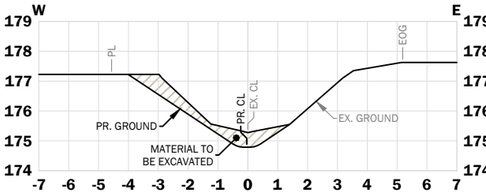
STA. 0+200



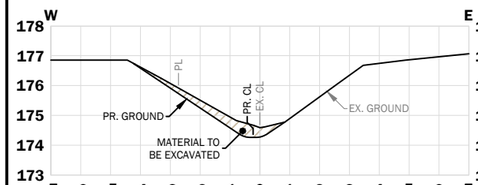
STA. 0+450



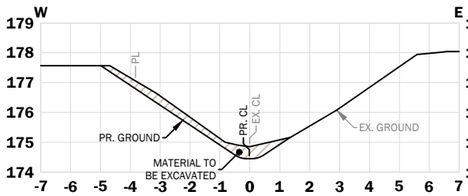
STA. 0+700



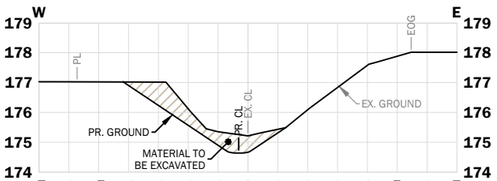
STA. 0+950



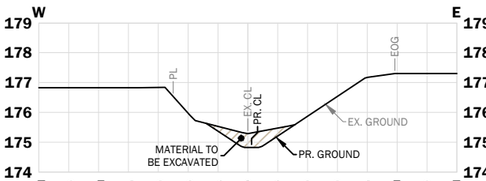
STA. 0+250



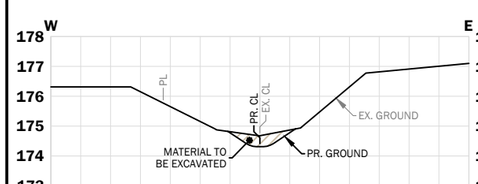
STA. 0+500



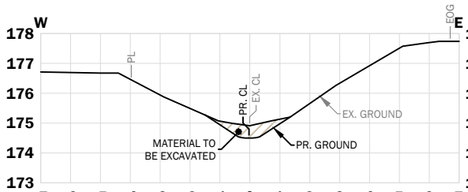
STA. 0+750



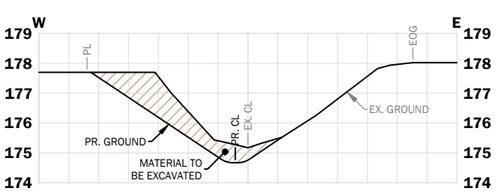
STA. 1+000



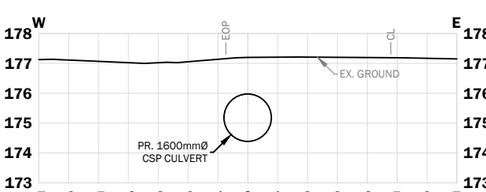
STA. 0+300



STA. 0+550



STA. 0+800



STA. 1+050

SECTION SCALE

0 4 8 12

The TOWNSHIP of WAINFLEET

SHAFLEY MUNICIPAL DRAIN

Sections - Main Drain (Open)
(Sta. 0+100 to Sta. 1+050)

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 **ELEV.=175.38**
TOP CENTER UPSTREAM END OF CSPA CULVERT 8m EAST OF STA. 0+000 (MAIN)

BENCHMARK No. 2 **ELEV.=175.93**
TOP CENTER UPSTREAM END OF 1200mmØ CSP CULVERT AT STA. 0+615 (MAIN)

BENCHMARK No. 3 **ELEV.=177.96**
NAIL IN WEST FACE OF 1200mmØ TREE 15m EAST OF STA. 0+832 (MAIN)

BENCHMARK No. 4 **ELEV.=176.33**
TOP CENTER DOWNSTREAM END OF 1200mmØ CSP CULVERT AT STA. 1+497 (MAIN)

BENCHMARK No. 5 **ELEV.=176.26**
TOP CENTER UPSTREAM END OF 1200mmØ CSP CULVERT AT STA. 1+518 (MAIN)

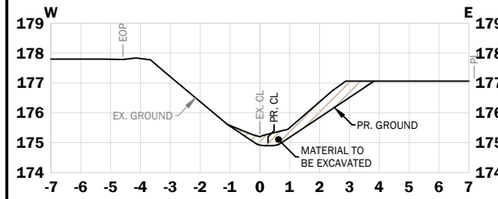
BENCHMARK No. 6 **ELEV.=176.65**
TOP CENTER UPSTREAM END OF 750mmØ CSP CULVERT AT STA. 2+194 (MAIN)

LICENCED PROFESSIONAL ENGINEER
Dec. 17, 2025
S.G.R. BRICKMAN
100150820
PROVINCE OF ONTARIO

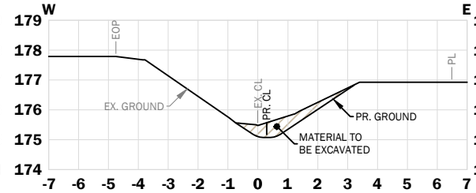
No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

Headway Engineering

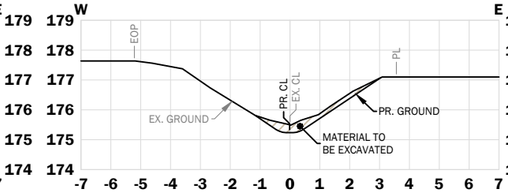
DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	4 OF 7
DATE: 2025-12-18	REFERENCE No. WNFLT-002		



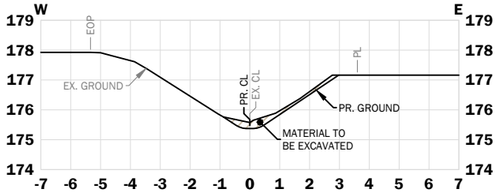
STA. 1+100



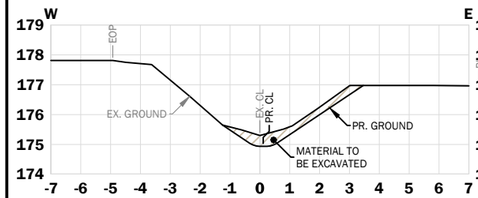
STA. 1+350



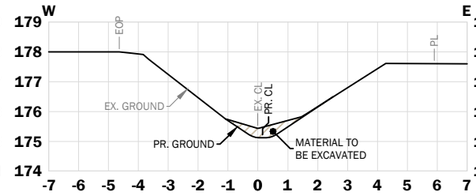
STA. 1+600



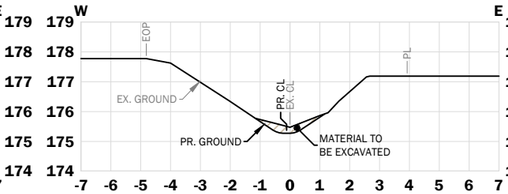
STA. 1+850



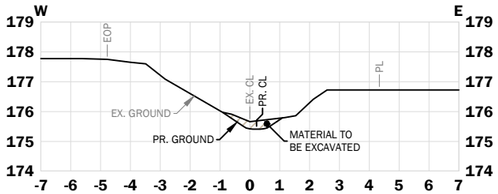
STA. 1+150



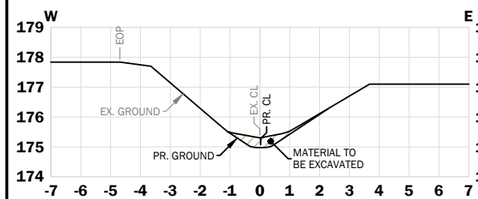
STA. 1+400



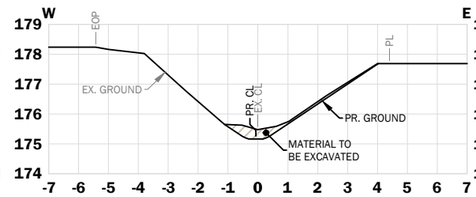
STA. 1+650



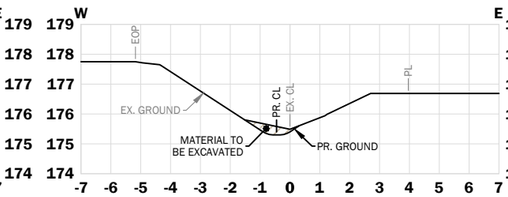
STA. 1+900



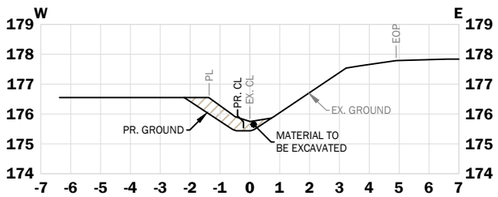
STA. 1+200



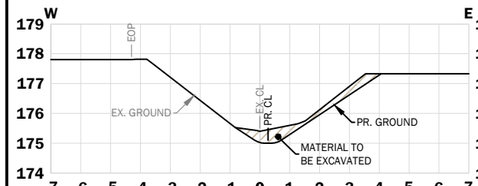
STA. 1+450



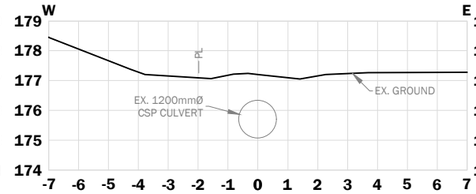
STA. 1+700



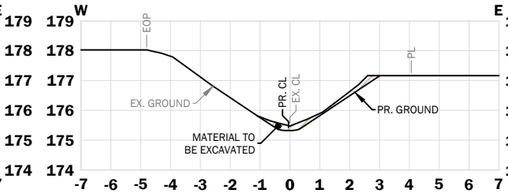
STA. 1+950



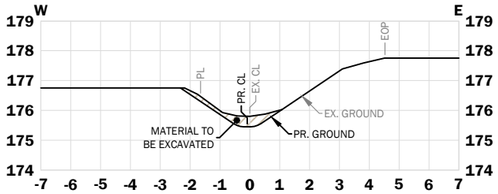
STA. 1+250



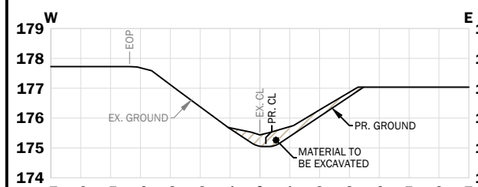
STA. 1+500



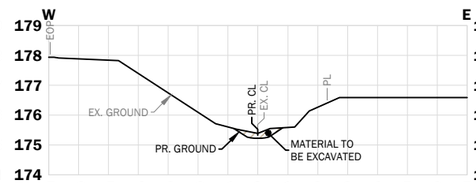
STA. 1+750



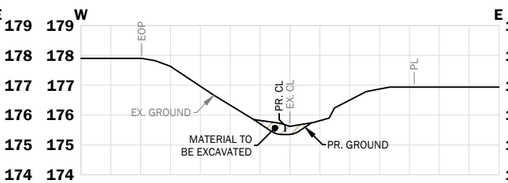
STA. 2+000



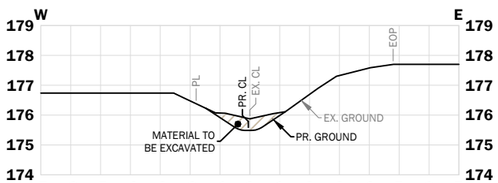
STA. 1+300



STA. 1+550

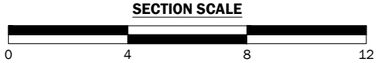


STA. 1+800



STA. 2+050

SECTION SCALE



The TOWNSHIP of WAINFLEET

SHAFLEY MUNICIPAL DRAIN

Sections - Main Drain (Open) (Sta. 1+100 to Sta. 2+050)

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 **ELEV.=175.38**
TOP CENTER UPSTREAM END OF CSPA CULVERT 8m EAST OF STA. 0+000 (MAIN)

BENCHMARK No. 2 **ELEV.=175.93**
TOP CENTER UPSTREAM END OF 1200mmØ CSP CULVERT AT STA. 0+615 (MAIN)

BENCHMARK No. 3 **ELEV.=177.96**
NAIL IN WEST FACE OF 1200mmØ TREE 15m EAST OF STA. 0+832 (MAIN)

BENCHMARK No. 4 **ELEV.=176.33**
TOP CENTER DOWNSTREAM END OF 1200mmØ CSP CULVERT AT STA. 1+497 (MAIN)

BENCHMARK No. 5 **ELEV.=176.26**
TOP CENTER UPSTREAM END OF 1200mmØ CSP CULVERT AT STA. 1+518 (MAIN)

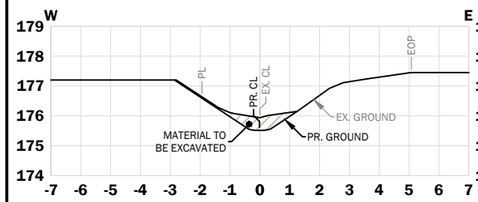
BENCHMARK No. 6 **ELEV.=176.65**
TOP CENTER UPSTREAM END OF 750mmØ CSP CULVERT AT STA. 2+194 (MAIN)

LICENCED PROFESSIONAL ENGINEER S.G.R. BRICKMAN 100150820 PROVINCE OF ONTARIO Dec. 17, 2025

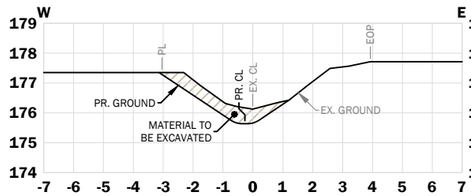
No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

Headway Engineering

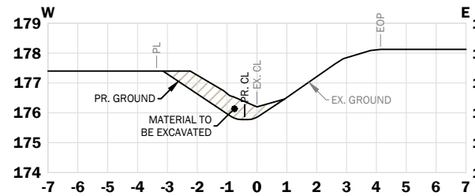
DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	5 OF 7
DATE: 2025-12-18	REFERENCE No. WNFLT-002		



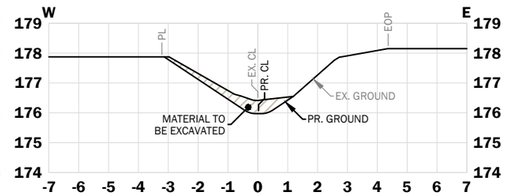
STA. 2+100



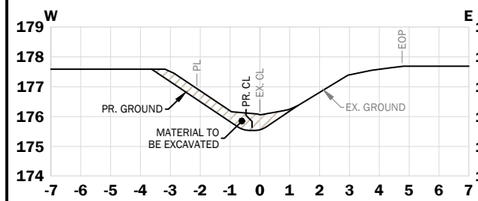
STA. 2+350



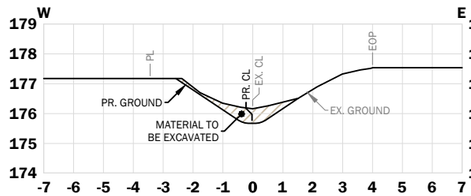
STA. 2+600



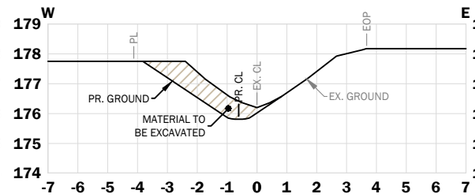
STA. 2+850



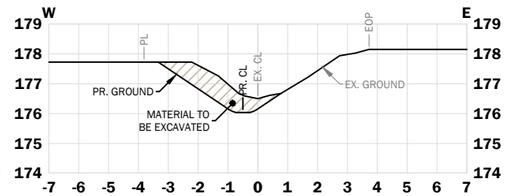
STA. 2+150



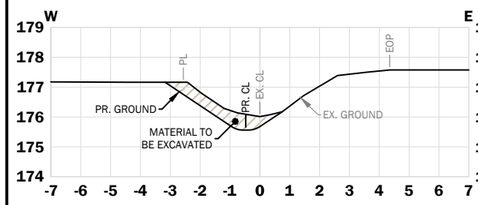
STA. 2+400



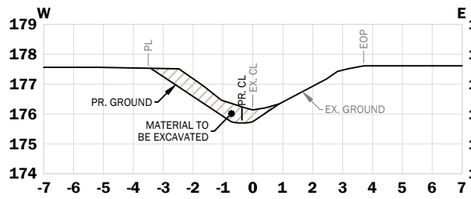
STA. 2+650



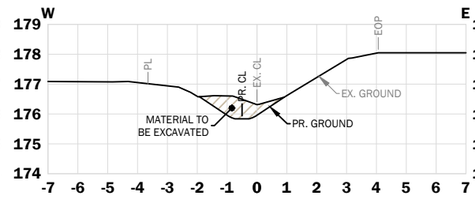
STA. 2+900



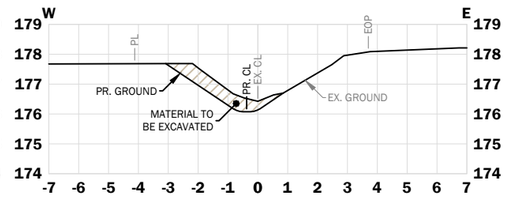
STA. 2+200



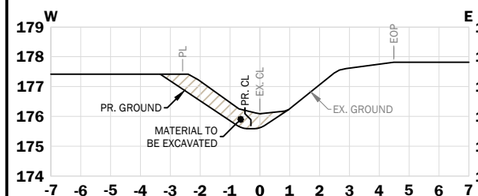
STA. 2+450



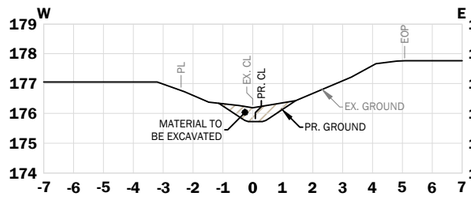
STA. 2+700



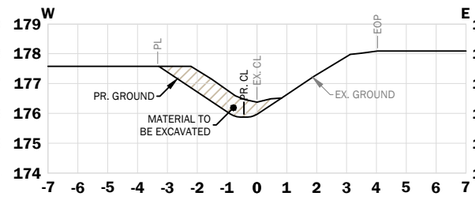
STA. 2+950



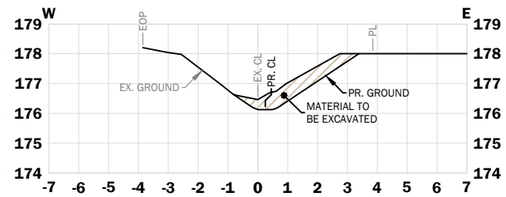
STA. 2+250



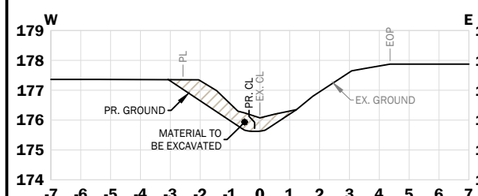
STA. 2+500



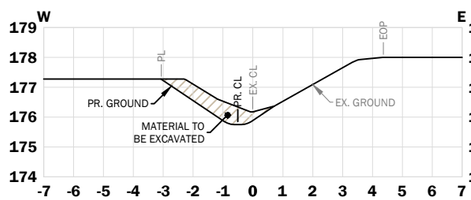
STA. 2+750



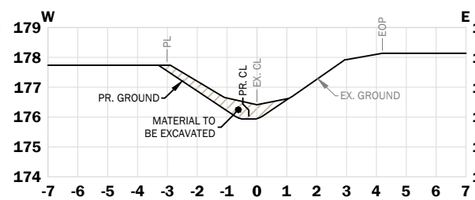
STA. 3+000



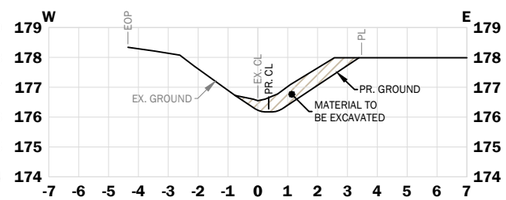
STA. 2+300



STA. 2+550

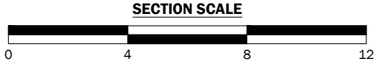


STA. 2+800



STA. 3+050

SECTION SCALE



The TOWNSHIP of WAINFLEET

SHAFLEY MUNICIPAL DRAIN

Sections - Main Drain (Open)
(Sta. 2+100 to Sta. 3+050)

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 **ELEV.=175.38**
TOP CENTER UPSTREAM END OF CSPA CULVERT 8m EAST OF STA. 0+000 (MAIN)

BENCHMARK No. 2 **ELEV.=175.93**
TOP CENTER UPSTREAM END OF 1200mmØ CSP CULVERT AT STA. 0+615 (MAIN)

BENCHMARK No. 3 **ELEV.=177.96**
NAIL IN WEST FACE OF 1200mmØ TREE 15m EAST OF STA. 0+832 (MAIN)

BENCHMARK No. 4 **ELEV.=176.33**
TOP CENTER DOWNSTREAM END OF 1200mmØ CSP CULVERT AT STA. 1+497 (MAIN)

BENCHMARK No. 5 **ELEV.=176.26**
TOP CENTER UPSTREAM END OF 1200mmØ CSP CULVERT AT STA. 1+518 (MAIN)

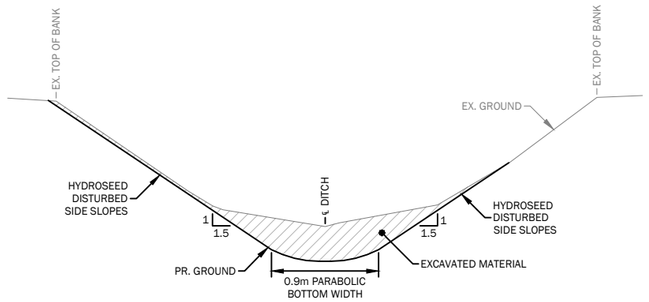
BENCHMARK No. 6 **ELEV.=176.65**
TOP CENTER UPSTREAM END OF 750mmØ CSP CULVERT AT STA. 2+194 (MAIN)

LICENSED PROFESSIONAL ENGINEER
Dec. 18, 2025
S.G.R. BRICKMAN
100150920
PROVINCE OF ONTARIO

No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

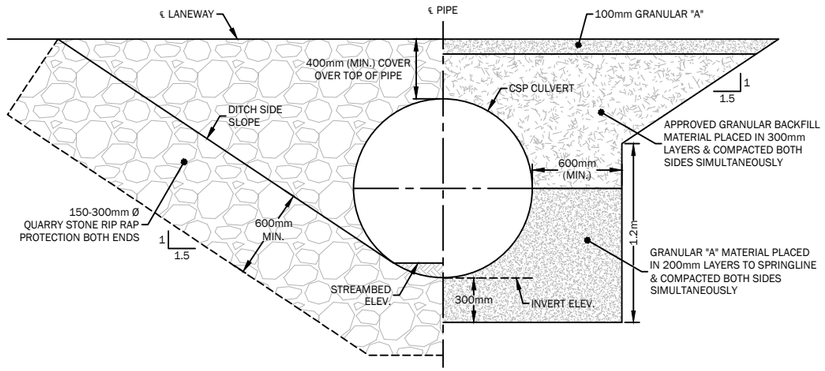
Headway Engineering

DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	6 OF 7
DATE: 2025-12-18	REFERENCE No. WNFLT-002		

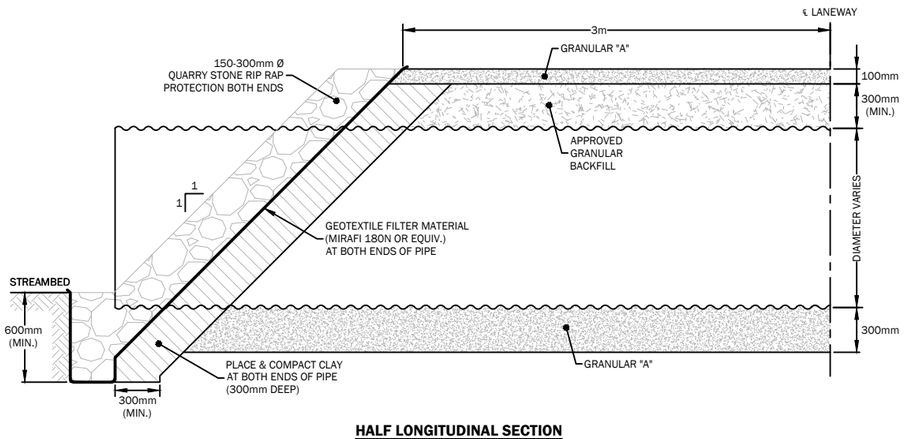


TYPICAL DITCH CROSS SECTION

N.T.S.



HALF ELEVATION **HALF SECTION**



HALF LONGITUDINAL SECTION

PROPOSED CULVERTS

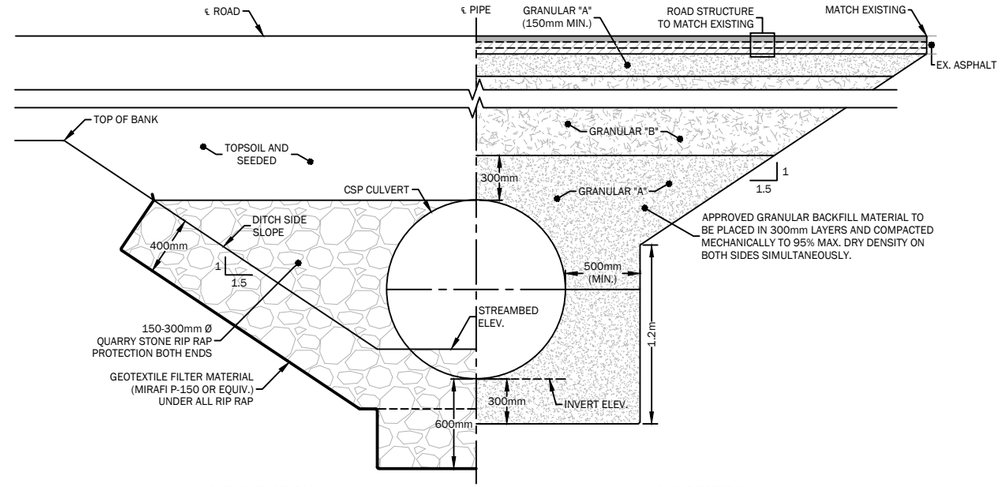
STATION	DIAMETER	LENGTH	INVERT	STREAMBED	CORRUGATIONS	THICKNESS
0+015	1200mm	26m	U.S.E. = 173.50 D.S.E. = 173.12	U.S.E. = 174.70 D.S.E. = 174.32	125mm X 25mm	2.80mm
0+074	1200mm	45m	U.S.E. = 173.99 D.S.E. = 173.92	U.S.E. = 174.19 D.S.E. = 174.16	125mm X 25mm	2.80mm
0+606	1600mm	45m	U.S.E. = 174.36 D.S.E. = 174.33	U.S.E. = 174.56 D.S.E. = 174.53	125mm X 25mm	2.80mm
2+189	900mm	12m	U.S.E. = 175.36 D.S.E. = 175.35	U.S.E. = 175.56 D.S.E. = 175.55	68mm X 13mm	2.00mm
2+460	900mm	12m	U.S.E. = 175.51 D.S.E. = 175.50	U.S.E. = 175.71 D.S.E. = 175.70	68mm X 13mm	2.00mm

SUGGESTED FUTURE CULVERTS

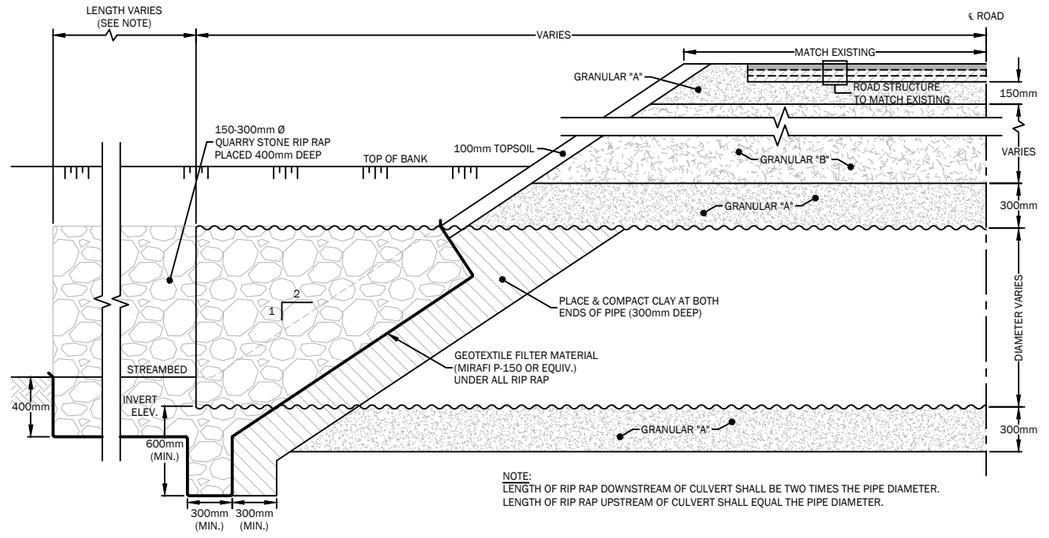
1+736	1200mm	12m	U.S.E. = 175.12 D.S.E. = 175.11	U.S.E. = 175.32 D.S.E. = 175.31	125mm X 25mm	2.80mm
1+836	1200mm	12m	U.S.E. = 175.17 D.S.E. = 175.16	U.S.E. = 175.37 D.S.E. = 175.36	125mm X 25mm	2.80mm
1+867	1200mm	12m	U.S.E. = 175.19 D.S.E. = 175.18	U.S.E. = 175.39 D.S.E. = 175.38	125mm X 25mm	2.80mm

TYPICAL LANEWAY CULVERT DETAIL

N.T.S.



HALF ELEVATION **HALF SECTION**



NOTE:
LENGTH OF RIP RAP DOWNSTREAM OF CULVERT SHALL BE TWO TIMES THE PIPE DIAMETER.
LENGTH OF RIP RAP UPSTREAM OF CULVERT SHALL EQUAL THE PIPE DIAMETER.

HALF LONGITUDINAL SECTION

PROPOSED CULVERTS

STATION	DIAMETER	LENGTH	INVERT	STREAMBED	CORRUGATIONS	THICKNESS
1+930	1200mm	16m	U.S.E. = 175.22 D.S.E. = 175.21	U.S.E. = 175.42 D.S.E. = 175.41	125mm X 25mm	2.80mm
2+967	900mm	14m	U.S.E. = 175.95 D.S.E. = 175.94	U.S.E. = 176.10 D.S.E. = 176.09	68mm X 13mm	2.00mm

SUGGESTED FUTURE CULVERTS

1+024	1600mm	18m	U.S.E. = 174.65 D.S.E. = 174.63	U.S.E. = 174.85 D.S.E. = 174.83	125mm X 25mm	2.80mm
1+053	1600mm	18m	U.S.E. = 174.67 D.S.E. = 174.66	U.S.E. = 174.87 D.S.E. = 174.86	125mm X 25mm	2.80mm
1+505	1600mm	22m	U.S.E. = 175.00 D.S.E. = 174.99	U.S.E. = 175.20 D.S.E. = 175.19	125mm X 25mm	2.80mm

TYPICAL ASPHALT ROAD CULVERT DETAIL

N.T.S.

The TOWNSHIP of WAINFLEET

SHAFLEY MUNICIPAL DRAIN

Details

BENCHMARK DESCRIPTIONS

BENCHMARK No. 1 **ELEV.=175.38**
TOP CENTER UPSTREAM END OF CSPA CULVERT 8m EAST OF STA. 0+000 (MAIN)

BENCHMARK No. 2 **ELEV.=175.93**
TOP CENTER UPSTREAM END OF 1200mmØ CSP CULVERT AT STA. 0+615 (MAIN)

BENCHMARK No. 3 **ELEV.=177.96**
NAIL IN WEST FACE OF 1200mmØ TREE 15m EAST OF STA. 0+832 (MAIN)

BENCHMARK No. 4 **ELEV.=176.33**
TOP CENTER DOWNSTREAM END OF 1200mmØ CSP CULVERT AT STA. 1+497 (MAIN)

BENCHMARK No. 5 **ELEV.=176.26**
TOP CENTER UPSTREAM END OF 1200mmØ CSP CULVERT AT STA. 1+518 (MAIN)

BENCHMARK No. 6 **ELEV.=176.65**
TOP CENTER UPSTREAM END OF 750mmØ CSP CULVERT AT STA. 2+194 (MAIN)

LICENSED PROFESSIONAL ENGINEER Dec. 17, 2025 S.G.R. BRICKMAN 100150820 PROVINCE OF ONTARIO

No.	REVISION	DATE (YY-MM-DD)
6	REPORT SUBMISSION	25-12-18
5	PUBLIC INFORMATION MEETING	25-07-09
4	PETITIONER MEETING	25-01-09
3	CP RAILWAY SUBMISSION	23-05-31
2	PETITIONER MEETING	22-10-19
1	ON-SITE MEETING	19-11-20

Headway Engineering

DRAWN BY:	DESIGNED BY:	CHECKED BY:	DRAWING
R.U.	A.H.	S.B.	7 OF 7
DATE: 2025-12-18	REFERENCE No. WNFLT-002		

THE CORPORATION OF THE TOWNSHIP OF WAINFLEET

BY-LAW NO. 007-2026

Being a by-law to provide for drainage works in the Township of Wainfleet in the Region of Niagara.

WHEREAS the Council of the Township of Wainfleet has procured a report under Section 78 of the Drainage Act for the improvement of the Shafley Road Drain;

AND WHEREAS the report dated December 18, 2025, has been authored by Stephen Brickman, P. Eng. Headway Engineering and the attached report forms part of this by-law;

AND WHEREAS the estimated total cost of the drainage works is $626,600.00;

AND WHEREAS $299,302.00 is the amount to be contributed by the Township of Wainfleet for the drainage works;

AND WHEREAS the Council is of the opinion that drainage of the area is desirable;

NOW THEREFORE the Council of the Corporation of the Township of Wainfleet pursuant to the Drainage Act **HEREBY ENACTS AS FOLLOWS**:

1. The attached report is adopted and the drainage works is authorized and shall be completed as specified in the report.

2. The Corporation of the Township of Wainfleet may borrow on the credit of the corporation the amount of $626,600.00, being the amount necessary for the improvement of the drainage works. This project will not be debentured.

3. This By-law comes into force on the passing thereof and may be cited at the "Shafley Road Drain Improvement By-law".

BY-LAW READ A FIRST TIME THIS 12TH DAY OF FEBRUARY, 2026.

BY-LAW READ A SECOND TIME THIS 12TH DAY OF FEBRUARY, 2026.

PROVISIONALLY ADOPTED THIS 12TH DAY OF FEBRUARY, 2026.

_____

B. Grant, MAYOR

_____

A. Chrastina, CLERK

BY-LAW READ A THIRD TIME AND FINALLY ENACTED THIS _____DAY OF

_____.

_____

Brian Grant, MAYOR

_____

A. Chrastina, CLERK

I, Amber Chrastina, Clerk of the Corporation of the Township of Wainfleet certify that the above By-law was duly passed by the Council of the Corporation and is a true copy thereof.

_____

A. Chrastina, CLERK

THE CORPORATION OF THE TOWNSHIP OF WAINFLEET

BY-LAW NO. 008-2026

Being a by-law to provide for drainage works in the Township of Wainfleet in the Region of Niagara.

WHEREAS the Council of the Township of Wainfleet has procured a report under Section 78 of the Drainage Act for the improvement of the Collver Drain;

AND WHEREAS the report dated December 18, 2025, has been authored by Stephen Brickman, P. Eng. Headway Engineering and the attached report forms part of this by-law;

AND WHEREAS the estimated total cost of the drainage works is $1,714,000.00;

AND WHEREAS $84,138.00 is the amount to be contributed by the Township of Wainfleet for the drainage works;

AND WHEREAS the Council is of the opinion that drainage of the area is desirable;

NOW THEREFORE the Council of the Corporation of the Township of Wainfleet pursuant to the Drainage Act **HEREBY ENACTS AS FOLLOWS**:

1. The attached report is adopted and the drainage works is authorized and shall be completed as specified in the report.

2. The Corporation of the Township of Wainfleet may borrow on the credit of the corporation the amount of $1,714,000.00, being the amount necessary for the improvement of the drainage works. This project will not be debentured.

3. This By-law comes into force on the passing thereof and may be cited at the "Collver Drain Improvement By-law".

BY-LAW READ A FIRST TIME THIS 12TH DAY OF FEBRUARY, 2026.

BY-LAW READ A SECOND TIME THIS 12TH DAY OF FEBRUARY, 2026.

PROVISIONALLY ADOPTED THIS 12TH DAY OF FEBRUARY, 2026.

_____

B. Grant, MAYOR

_____

A. Chrastina, CLERK

BY-LAW READ A THIRD TIME AND FINALLY ENACTED THIS _____DAY OF

_____.

_____

Brian Grant, MAYOR

_____

A. Chrastina, CLERK

I, Amber Chrastina, Clerk of the Corporation of the Township of Wainfleet certify that the above By-law was duly passed by the Council of the Corporation and is a true copy thereof.

_____

A. Chrastina, CLERK

THE CORPORATION OF THE TOWNSHIP OF WAINFLEET

BY-LAW NO. 009-2026

Being a by-law to adopt, ratify and confirm the proceedings of the Council of the Corporation of the Township of Wainfleet at its Special Meeting of Council held February 12, 2026

WHEREAS Subsection 5 (1) of the *Municipal Act*, *2001*, S.O. 2001, Chapter M.25, as amended, provides that the powers of a municipal corporation are to be exercised by its Council;

AND WHEREAS section 5 (3) of the *Municipal Act 2001,* S.O. 2001, Chapter M.25, as amended, provides that, except if otherwise authorized, the powers of Council shall be exercised by by-law;

AND WHEREAS it is deemed desirable and expedient that the actions of the Council as herein set forth be adopted, ratified and confirmed by by-law;

NOW THEREFORE the Council of the Corporation of the Township of Wainfleet **HEREBY ENACTS AS FOLLOWS:**

1. (a) The actions of the Council at its Special Meeting of Council held February 12, 2026, including all resolutions or motions approved, are hereby adopted, ratified and confirmed as if they were expressly embodied in this by-law.

   (b) The above-mentioned actions shall not include:

   (i) any actions required by law to be taken by resolution, or

   (ii) any actions for which prior Ontario Municipal Board approval is required, until such approval is obtained.

2. The Mayor and proper officials of the Corporation of the Township of Wainfleet are hereby authorized and directed to do all things necessary to give effect to the above-mentioned actions and to obtain approvals where required.

3. Unless otherwise provided, the Mayor and Clerk are hereby authorized and directed to execute and the Clerk to affix the seal of the corporation of the Township of Wainfleet to all documents necessary to give effect to the above-mentioned actions.

4. This by-law shall come into force on the day upon which it is passed.

BY-LAW READ AND PASSED THIS 12TH DAY OF FEBRUARY, 2026

B. Grant, MAYOR

A. Chrastina, CLERK