DRAINAGE REPORT
FOR

REALIGNMENT OF THE SOUTH TALBOT DRAIN

TOWN OF TECUMSEH

DILLON CONSULTING

(FINAL REPORT)
17 MARCH 2021
MARK D. HERNANDEZ, P.ENG
FILE No. 18-9004
Tecumseh File No. E09SO(96)

Mayor and Council
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Drainage Report for the
REALIGNMENT OF THE SOUTH TALBOT DRAIN
Town of Tecumseh

Mayor and Council:

Instructions

The Town of Tecumseh received a request from the County of Essex for the repair and improvement of the South Talbot Drain that was filed at the Municipal Office on 20 August 2018. The request for the repair and improvement is a result of proposed roadway improvements to the South Talbot Road and County Road No. 11 (Walker Road) intersection. Council accepted the request under Section 78 of the Drainage Act and on 12 December 2018 appointed Dillon Consulting Limited to prepare a report.

The design of the proposed drainage works is being completed concurrently and in concert with the proposed road works. As the drainage works are required by and being assessed to the County of Essex, the County of Essex will be responsible for constructing and maintaining the work for a one year maintenance period following construction after which the drainage works will be turned over to the Town of Tecumseh.

Watershed Description

The South Talbot Drain is located entirely within the Town of Tecumseh. The upper end starts at a point approximately 59 metres (195 feet) south of the southerly limit of King's Highway No. 3 on the west side of Oldcastle Road. The drain proceeds southerly along the west side of Oldcastle Road to Walker Road where the drain turns west and crosses Walker Road. The drain then turns southerly to run on the westerly side of Walker Road to South Talbot Road. The drain then flows westerly along the north side of South Talbot Road to Holden Road where it then turns south to run on the easterly side of Holden Road and outlets into the Holden Outlet Drain on the west side of Holden Road.

The proposed length of drain to be realigned is 168 metres at the intersection of South Talbot Road and County Road No. 11 (Walker Road). A portion of the South Talbot Drain (approximately 18 metres) along the westerly limit of Oldcastle Road shall be abandoned to accommodate the proposed road improvements. This will also improve the flow in the drains by reducing the existing right angles in the drain crossing County Road No. 11 (Walker Road). The watershed area upstream of the realigned portion of the drain is approximately 77.8 acres (31.5 ha).

Drain History

The recent history of Engineers' reports for the South Talbot and Holden Outlet Drain follows:

- **11 March 2019 by Mark D. Hernandez, P. Eng.:** The report recommended the installation of a new farm access culvert as a result of a severance. The report also recommended incorporating a new access culvert for the Chrysler Greenway Trail System and the replacement of the road culvert at the intersection of South Talbot Road and Holden Road.
- **16 May 2007 by Tim Oliver, P. Eng.:** The report recommended the replacement and extension of Bridge No. 5 as a joint-use bridge under By-law No. 2009-40.
- **26 April 2006 by Tim Oliver, P. Eng.:** The recommended work included the brushing and cleaning of the South Talbot Drain from Walker Road to its outlet into the Holden Outlet Drain. The report also recommended the removal of an existing access culvert and the lowering and extension of an existing culvert.
- **3 November 1978 by Maurice Armstrong, P. Eng.:** The recommended work included the entire South Talbot Drain and the portion of the Holden Outlet Drain east of Howard Avenue and west of Holden Road being brushed and the drain bottom cleaned. Work also included the repair and improvement of a number of private access culverts on the drain.

On-Site Meeting

An on-site meeting was held on 22 January 2020. A record of the meeting is provided in Schedule 'A', which is appended hereto.

Survey

The survey was completed in 2018 by CIMA+ on behalf of the County of Essex as part of the detailed design assignment for intersection improvements.

Existing Conditions and Recommendations

The proposed intersection improvements at South Talbot Road and County Road No. 11 (Walker Road) include removal of the existing intersection and construction of a new roundabout. To accommodate this new design, we recommend that a portion of the drain be realigned and relocated on the northwest corner of the intersection. The new drain alignment will match into the existing drain alignment further downstream at Station 0+000A (0+186 2006 report). We also recommend the existing road culvert be replaced and realigned with a 31 m long, 900 mm diameter concrete pipe. The section of drain on the west side of Oldcastle Road between the existing 600 mm diameter C.S.P. and the proposed 900 mm diameter concrete pipe under County Road No. 11 (Walker Road) shall be filled in and abandoned. We also recommend the installation of a rock flow check dam and a refuge stilling pool as mitigation measures.

Design Considerations

The Design and Construction Guidelines published by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) recommends that open drainage systems and farm crossings serving farmlands be designed to effectively contain and convey the peak runoff generated from a storm event having a frequency of occurrence of 1 in 2 years. The road culvert has been designed for a storm event having a frequency of occurrence of 1 in 25 years. This will provide for a higher level of service for the roadway.

We believe that these design standards should provide a reasonable level of service, but it should be clearly understood that runoff generated from large storms or fast snow melts may sometimes exceed the capacity of the proposed systems and result in surface ponding for short periods of time.

Allowances

In accordance with Sections 29 and 30 of the Drainage Act, we do not anticipate any agricultural lands being damaged or taken as a result of the proposed drainage works. Any damage to existing grassed areas shall be restored to original conditions as part of the work. Private lands have been acquired to accommodate the intersection upgrades, therefore no Section 29 allowances for land taken will be paid.

In accordance with Section 30 of the Drainage Act, we have made a determination of the amount to be paid for damages to the lands and crops (if any) occasioned by the operation of equipment and the disposal of material excavated from the drain within the designated working corridor adjacent to properties along the north side of the South Talbot Drain.

Throughout the length of work, the excavated material is to be disposed of as set out in the Special Provisions in Schedule 'F' herein. The allowance for damages is calculated at a rate of $3,707 per hectare ($1,500 per acre). Schedule 'B' shows the distribution of these allowances for a corridor area designated to be 10.0 metres wide on the north side of the drain for placement and spreading of spoils.

Cost Estimate

Based on our review of the history, the information obtained during the site meeting and our examination and analysis of the survey data, we recommend that the South Talbot Drain be repaired and improved as described below:

Item	Description	Amount
	OPEN DRAIN WORK	
1.	Strip and place topsoil as follows:	
a)	Strip topsoil (minimum 150 mm depth) over proposed new open drain limits and stockpile. Upon completion of excavation and levelling, load, truck, place and level the stockpiled topsoil (minimum 50 mm depth) over the reshaped drain banks on realigned drain.	$2,800.00

Item	Description	Amount
b)	Along the existing drain alignment on South Talbot Road and County Road No. 11, strip topsoil from existing drain and stockpile. Upon completion of filling, grading and levelling, load, truck, place and level the stockpiled topsoil over the infilled drain.	$2,200.00
c)	Along the existing drain alignment on the west side of Oldcastle Road, strip topsoil from existing drain and stockpile. Upon completion of filling, grading and levelling, load, truck, place and level the stockpiled topsoil over the infilled drain.	$400.00
2.	Excavation, trucking, filling and compaction of excavated materials works, as follows:	
a)	Excavation of new open drain from Station 0+000A to Station 0+136A on north side of South Talbot Road with 3:1 (H:V) side slopes and 1.0 m bottom width.	$7,500.00
b)	Remove all vegetation, organic debris and topsoil from the existing drain slopes on north side of road prior to infilling. Fill existing drain with native soil materials including trucking, filling and compaction in 250 mm lifts. For the portion of drain to be filled within the new roadway, the backfill shall consist of Granular 'B' (approximately 2,415 tonnes) and Granular 'A' (minimum 300 mm thickness) above to finish road elevation (approximately 775 tonnes). Compaction to a minimum of 100% standard proctor density. Any excess materials to be trucked away off-site.	$82,000.00

Item	Description	Amount
c)	Remove all vegetation, organic debris and topsoil from the existing drain slopes on west side of Oldcastle Road prior to infilling. Fill existing drain with native soil materials including trucking, filling and compaction in 250 mm lifts. For the portion of drain to be filled within the new roadway, the backfill shall consist of Granular 'B' (approximately 275 tonnes) and Granular 'A' (minimum 300 mm thickness) above to finish road elevation (approximately 90 tonnes). Compaction to a minimum of 100% standard proctor density. Any excess materials to be trucked away off-site. Work shall also include removal of existing 750 mm diameter HDPE culvert.	$9,500.00
3.	Seeding of drain banks, buffer strips and filled in drains as follows:	
a)	Supply and placement of hydro-seed on new drain banks from Station 0+000A to Station 0+136A.	$4,800.00
b)	Supply and placement of hydro-seed on filled in drain from Station 0+000 of 2006 by-law (east end of existing 600 mm diameter CSP) to Station 0+168A.	$450.00
c)	Establish a 3.0 m wide grass buffer strip along the top of bank on the north side of the drain from Station 0+000A to Station 0+136A. Grass buffer to be hydro-seeded.	$1,700.00
d)	Lands situated between the new drain and the north shoulder of the road shall be hydro-seeded as per specifications.	$2,300.00
4.	Supply and install stone erosion protection (minimum 300 mm thickness) on drain banks complete with filter fabric underlay at the following locations:	
a)	From Station 0+005A to Station 0+072A (approximately 224 m^2)	$14,600.00
b)	From Station 0+124A to Station 0+136A (approximately 110 m^2).	$7,000.00
c)	Station 0+168A (approximately 25 m^2).	$1,700.00

Item	Description	Amount
5.	Rock flow check dam (temporary) (OPSD 219.2110) – Location to be determined by Drainage Superintendent. Supply and install stone erosion protection (SEP) (minimum 300 mm thickness) (approximately 30 m^2) including new filter fabric underlay beneath a small rock dam (minimum 600 mm height) constructed across the drain for silt and sediment control measure during construction.	$2,500.00
6.	Excavation of a 300 mm deep and 900 mm wide bottom, refuge stilling pool in the new channel below the design gradeline from Station 0+010A to Station 0+020A (10 metres). Also included is a 300 mm thick stone rip-rap lining complete with filter fabric underlay.	$2,000.00
7.	Removal of existing 600 mm diameter CSP crossing County Road No. 11 (Walker Road) at Station 0+136A including backfilling and install a new 900 mm diameter concrete pipe (A257.2 Class 100-D), 31 m long including stone erosion protection with filter fabric underlay and concrete headwall as per OPSD 804.030 complete with steel grate as per OPSD 804.050 for end treatment.	$41,450.00
8.	Connect existing tile ends (approx. 11 tiles) to new relocated drain and supply and install rodent gates.	$1,100.00
9.	Temporary Silt Control Measures During Construction	$650.00
	SUB-TOTAL –SECTION 26 COSTS	**$184,650.00**
10.	Allowances under Section 30	$500.00
11.	Survey, Report, Assessment and Final Inspection (cost portion)	$22,900.00
12.	Expenses and incidentals (cost portion)	$2,000.00
	TOTAL –SECTION 26 COSTS	**$210,050.00**

The estimate provided in this report was prepared according to current materials and installation prices as of the date of this report. In the event of delays from the time of filing of the report by the Engineer to the time of tendering the work, it is understood that the estimate of cost is subject to inflation. The rate of inflation shall be calculated using the Consumer Price Index applied to the cost of construction from the date of the report to the date of tendering.

Assessment of Costs

The individual assessments are comprised of three (3) assessment components:

i. Benefit (*advantages relating to the betterment of lands, roads, buildings, or other structures resulting from the improvement to the drain).*
ii. Outlet Liability *(part of cost required to provide outlet for lands and roads).*
iii. Special Benefit *(additional work or feature that may not affect function of the drain).*

Typically, we assess the estimated costs against the affected lands and roads as listed in Schedule 'C' under "Value of Special Benefit," "Value of Benefit" and "Value of Outlet." Details of the Value of Special Benefit listed in Schedule 'C' are provided in Schedule 'D.'

Assessment Rationale

Special Benefit assessment shown in Schedule 'C' and detailed in Schedule 'D' were derived as follows:

1. As the proposed works are directly a result of the proposed intersection improvements, all associated costs for the repair and improvement of the realignment of the South Talbot Drain, shall be assessed 100% against the County of Essex under Section 26 of the Drainage Act as a non-pro-ratable assessment.

Utilities

It may become necessary to temporarily or permanently relocate utilities that may conflict with the construction recommended under this report. In accordance with Section 26 of the Drainage Act, we assess any relocation cost against the Public Utility having jurisdiction. Under Section 69 of the Drainage Act, the Public Utility is at liberty to do the work with its own forces, but if it should not exercise this option within a reasonable time, the Municipality will arrange to have this work completed and the costs will be charged to the appropriate Public Utility.

Future Maintenance

We recommend that future work of repair and maintenance of the realigned portion of the South Talbot Drain be carried out by the Town of Tecumseh and the costs assessed against the affected lands and roads in the South Talbot watershed in accordance with the provisions as described below.

Schedule 'E' is a Schedule of Assessment to be used for assessing drain maintenance costs. The schedule is based on assessments of 50% as a Benefit assessment and 50% as an Outlet assessment. Schedule 'E' has been developed on the basis of an arbitrary cost of $10,000.00. Future maintenance costs shall be levied pro rata on the affected lands and roads that are located upstream of the future maintenance works.

It is understood that the County of Essex has obtained the property required to facilitate the realignment of the South Talbot Drain and the associated drainage works.

We recommend that the costs of future works of repair and maintenance of the realigned portion of the South Talbot Drain be carried out as described below:

1. Tile inlet repairs and stone erosion protection shall be assessed 100% against the property on which the tile or surface water inlet serves.
2. Road crossings shall be maintained at the sole expense of the applicable Road Authority.

All tile and drain bank repairs associated with drainage from an abutting property shall be assessed 100% against the property on which the repair is located.

3. All other work shall be assessed against the lands and roads listed in Schedule 'E' in the same relative proportions as the amounts listed under "Value of Benefit" and "Value of Outlet."

These provisions for maintenance are subject to any other variations that may be made under the authority of the Drainage Act.

We further recommend that future works of repair and maintenance of the remaining drain downstream of the realigned drain be carried out by the Town of Tecumseh and in accordance with the technical specifications contained in the governing bylaw 2006 Dillon report for the South Talbot Drain. The assessment for future works and maintenance shall be levied in accordance with the governing bylaw for the 2006 Dillon report.

Drawings and Specifications

Attached to this report is "Schedule F", which contain specifications setting out the details of the recommended works, and "Schedule G", which represents the following drawings that are also attached to this report:

Page 1 of 5: **Overall Watershed Plan**
Page 2 of 5: **Plan 2**
Page 3 of 5: **Detail Plan**
Page 4 of 5: Profile
Page 5 of 5: Miscellaneous Details

Construction and Design Drawings

The work included in this report will be performed under the contract for the Detailed Design for the roundabout at the intersection of South Talbot Road and County Road No. 11 (Walker Road). Drawings and specifications will be prepared for the County Road No. 11 construction and they must adhere to the new drain grade, alignment, sizes, materials and location shown in this drainage report and shall be in general compliance with this report.

Approvals

The construction and/or improvement to a drainage works, including repair and maintenance activities, and all operations connected therewith are subject to the approval, inspection, by-laws and regulations of all Municipal, Provincial, Federal and other authorities having jurisdiction in respect to any matters embraced by the proposed works. Prior to any construction or maintenance works, the Municipality or proponent designated on the Municipality's behalf shall obtain all required approvals/permits and confirm any construction limitations including timing windows, mitigation/off-setting measures, standard practices or any other limitations related to in-stream works.

Grants

In accordance with the provisions of Sections 85, 86 and 87 of the Drainage Act, a grant in the amount of 33–1/3 percent of the assessment eligible for a grant may be made in respect to the assessment made under this report upon privately owned lands used for agricultural purposes. The assessments levied against privately owned agricultural land must also satisfy all other eligibility criteria set out in the Agricultural Drainage Infrastructure Program policies. Most of the privately owned lands are used for agricultural purposes and are eligible under the A.D.I.P. policies. We are not aware of any lateral drains involved in this work that would not be eligible for a grant.

We recommend that application be made to the Ontario Ministry of Agriculture, Food and Rural Affairs in accordance with Section 88 of the Drainage Act, for this grant, as well as for all other grants for which this work may be eligible.

Respectfully submitted,

DILLON CONSULTING LIMITED

Mark D. Hernandez, P.Eng.

MDH:wlb:sll:lld

File No. 18-9004

Schedule 'A'

Meeting Minutes

Subject: Realignment of the South Talbot Drain

Date: January 22, 2020

Location: Horwood Room Tecumseh Arena

Our File: 189004

Distribution: Landowners

Attendee

Mark Fishleigh	County of Essex
Kerry Hric	Landowner
Sam Paglia	Town of Tecumseh
Mark Hernandez	Dillon Consulting Limited
Kristine Wilkinson	Dillon Consulting Limited

Notes

Item	Discussion	Action by
1.	General information regarding the Drainage Act	
1.1.	Section 78 report for the realignment of the South Talbot Drain to accommodate proposed intersection improvements. The Municipality will engage the landowners in the watershed for a Public Information Centre Review of the draft report once ready.	
1.2.	There were no further questions regarding the Drainage Act process or next steps.	
2.	Presently there is work occurring at the location of the roundabout.	
2.1.	The County of Essex is presently locating utilities via hydrovac at the proposed roundabout location.	

Errors and/or Omissions

These minutes were prepared by *Kristine Wilkinson* who should be notified of any errors and/or omissions.

Meeting Minutes

Subject: South Tablot Drain

Date: March 5, 2021 1:30 p.m.

Location: Conference Call Via Zoom

Our File: 18-9004

Distribution: Landowners in the South Talbot Watershed

Attendees

Name	Role/Company
Sam Paglia	Town of Tecumseh
Mark Fishleigh	County of Essex
Mark Hernandez	Dillon Consulting Limited
Kristine Wilkinson	Dillon Consulting Limited

Notes

Item	Discussion	Action by
1.	The County has completed the construction of the roundabout including the relocated drain.	
2.	The Town noted that the farmer's tile at Roll #470-06600 was cut during the relocation of the gas main. To repair the tile, a new header was installed. The Town noted that some consideration should be given to the increased costs related to future maintenance of the tiles due to the works completed as a result of the conflict with the gas main. Dillon to review.	**Dillon**
3.	The Town noted that as a result of construction a furrow on the same property Roll # 470-06600 was cut off and had to be redirected easterly to County Road 11 (Walker Road). The Town generally noted that whatever drainage implements the farmer had in place need to be reinstated post construction.	

Errors and/or Omissions

These minutes were prepared by Kristine Wilkinson EIT, who should be notified of any errors and/or omissions.

"SCHEDULE B"

SCHEDULE OF ALLOWANCES

REALIGNMENT OF THE SOUTH TALBOT DRAIN

TOWN OF TECUMSEH

Roll No.	Con.	Description	Owner	Section 30 Damages	Section 29 Land	Total Allowances
470-00500	S.T.R.	Pt. Lot 302 RP12R15074 Pts. 1-4	1185610 Ontario Inc.	$500.00	$0.00	$500.00
TOTAL ALLOWANCES				**$500.00**	**$0.00**	**$500.00**

"SCHEDULE C"

SCHEDULE OF ASSESSMENT

REALIGNMENT OF SOUTH TALBOT DRAIN

TOWN OF TECUMSEH

SECTION 26 INCREASED COSTS-NON-PRORATABLE

Description	Owner	Special Benefit	Benefit	Outlet	Total Assessment
County Road No. 11 (Walker Road)	County of Essex	$210,050.00	$0.00	$0.00	$210,050.00
TOTAL ASSESSMENT		**$210,050.00**	**$0.00**	**$0.00**	**$210,050.00**

"SCHEDULE D"

DETAILS OF SPECIAL BENEFIT

REALIGNMENT OF THE SOUTH TALBOT DRAIN

TOWN OF TECUMSEH

SPECIAL BENEFIT ASSESSMENT
(MUNICIPAL LANDS)

	Owner	Item Description	Estimated Cost	Cost of Report	Special Benefit
County Road No. 11 (Walker Road)	County of Essex	Realignment of the South Talbot Drain including excavation, fill, grading, 900 mm dia. concrete pipe, topsoil and seeding, stone erosion protection.	$185,150.00	$24,900.00	$210,050.00
Total Special Benefit Assessment (Municipal Lands)			$185,150.00	$24,900.00	$210,050.00
OVERALL TOTAL SPECIAL BENEFIT ASSESSMENT					**$210,050.00**

"SCHEDULE E"

SCHEDULE OF ASSESSMENT FOR FUTURE MAINTENANCE

REALIGNMENT OF THE SOUTH TALBOT DRAIN

TOWN OF TECUMSEH

MUNICIPAL LANDS:

Description	Area Affected (Acres)	(Ha.)	Owner	Special Benefit	Benefit	Outlet	Total Assessment
South Talbot Road	1.00	0.40	Town of Tecumseh	$0.00	$1,217.00	$188.00	$1,405.00
Oldcastle Road	1.60	0.65	Town of Tecumseh	$0.00	$153.00	$306.00	$459.00
County Road No. 11 (Walker Road)	8.00	3.24	County of Essex	$0.00	$901.00	$1,528.00	$2,429.00
Total on Municipal Lands				$0.00	$2,271.00	$2,022.00	$4,293.00

PRIVATELY-OWNED - NON-AGRICULTURAL LANDS:

Roll No.	Con.	Description	Area Affected (Acres)	(Ha.)	Owner	Special Benefit	Benefit	Outlet	Total Assessment
470-07200	S.T.R.	Pt. Lot 302 RP12R1335 Pt. 1	1.04	0.42	Simon T. & Tammy L. Wicks	$0.00	$39.00	$78.00	$117.00
470-07201	S.T.R.	N. Pt. Lot 302 RP12R4318 Pt. 1	0.73	0.30	George & Helen Dobrich	$0.00	$35.00	$71.00	$106.00
470-07202	S.T.R.	Pt. Lot 302 RP12R13926 Pt. 4	1.08	0.44	Vinko & Jelena Paulic	$0.00	$40.00	$80.00	$120.00
470-07203	S.T.R.	Pt. Lot 302 RP12R13962 Pt. Pt. 2&3	1.09	0.44	Paul & Danica Kalic	$0.00	$40.00	$80.00	$120.00
470-07300	S.T.R.	N. Pt. Lot 302 RP12R15725 Pts. 1&2	1.87	0.76	Ante Kalic	$0.00	$47.00	$94.00	$141.00
470-08400	S.T.R.	N. Pt. Lot 303	0.25	0.10	John M. Monaghan	$0.00	$14.00	$28.00	$42.00
470-08300	S.T.R.	N. Pt. Lot 303	0.30	0.12	Robert E. Harrison	$0.00	$17.00	$34.00	$51.00
470-08200	S.T.R.	N. Pt. Lot 303	0.30	0.12	Andre J. Masse	$0.00	$17.00	$34.00	$51.00
470-08100	S.T.R.	N. Pt. Lot 303	0.29	0.12	Donald F. & Cheryl McIninch	$0.00	$17.00	$34.00	$51.00

Roll No.	Con.	Description	Area Affected (Acres)	(Ha.)	Owner	Special Benefit	Benefit	Outlet	Total Assessment
470-08000	S.T.R.	N. Pt. Lot 303 RP12R16257 Pt. 2	0.29	0.12	Stephen Martin	$0.00	$17.00	$34.00	$51.00
470-07900	S.T.R.	N. Pt. Lot 303	0.29	0.12	Stephen Martin	$0.00	$17.00	$34.00	$51.00
470-07820	S.T.R.	Pt. Lot 303 RP12R22456 Pt. 2	0.31	0.13	Richard L. Raymond	$0.00	$18.00	$37.00	$55.00
470-07800	S.T.R.	Pt. Lot 303 RP12R22456 Pt. 1	0.28	0.11	Lorne Clarke & Christine M. Soanes	$0.00	$16.00	$31.00	$47.00
470-07600	S.T.R.	N. Pt. Lot 303	0.29	0.12	Kerry Hric	$0.00	$17.00	$34.00	$51.00
470-07500	S.T.R.	N. Pt. Lot 303	0.43	0.17	Mark S. Stephen	$0.00	$24.00	$48.00	$72.00
Total on Privately-Owned - Non-Agricultural Lands						$0.00	$375.00	$751.00	$1,126.00

PRIVATELY-OWNED - AGRICULTURAL LANDS (GRANTABLE)

Roll No.	Con.	Description	Area Affected (Acres)	Area Affected (Ha.)	Owner	Special Benefit	Benefit	Outlet	Total Assessment
470-08800	S.T.R.	N. Pt. Lot 302 RP12R16121 Pts. 6-11 Pt. Pt. 5	28.35	11.47	Kalminder & Inderjeet Singh	$0.00	$541.00	$1,082.00	$1,623.00
470-07400	S.T.R.	S. Pt. Lot 302	12.00	4.86	1185610 Ontario Inc.	$0.00	$229.00	$458.00	$687.00
470-00500	S.T.R.	Pt. Lot 302 RP12R15074 Pts. 1-4	18.00	7.28	1185610 Ontario Inc.	$0.00	$1,584.00	$687.00	$2,271.00
Total on Privately-Owned - Agricultural Lands (Grantable)						$0.00	$2,354.00	$2,227.00	$4,581.00
TOTAL ASSESSMENT						**$0.00**	**$5,000.00**	**$5,000.00**	**$10,000.00**

	(Acres)	**(Ha.)**
Total Area:	**77.79**	**31.49**

"SCHEDULE F"
REALIGNMENT OF THE SOUTH TALBOT DRAIN
Town of Tecumseh

SPECIAL PROVISIONS

1.0 GENERAL SPECIFICATIONS

The General Specifications attached hereto is part of "Schedule F". It also forms part of this specification and is to be read with it, but where there is a difference between the requirements of the General Specifications and those of the Special Provisions which follow, the Special Provisions will take precedence.

2.0 DESCRIPTION OF WORK

The work to be carried out under this Contract includes, but is not limited to, the supply of all **labour, equipment and materials** to complete the following items:

- Strip and place topsoil as follows:
  - Strip topsoil (minimum 150 mm depth) over proposed new open drain limits and stockpile. Upon completion of excavation and levelling, load, truck, place and level the stockpiled topsoil (minimum 50 mm depth) over the reshaped drain banks on realigned drain.
  - Along the existing drain alignment on South Talbot Road and County Road No. 11, strip topsoil from existing drain and stockpile. Upon completion of filling, grading and levelling, load, truck, place and level the stockpiled topsoil over the infilled drain.
  - Along the existing drain alignment on the west side of Oldcastle Road, strip topsoil from existing drain and stockpile. Upon completion of filling, grading and levelling, load, truck, place and level the stockpiled topsoil over the infilled drain.
- Excavation, trucking, filling and compaction of excavated materials works, as follows:
  - Excavation of new open drain from Station 0+000A to Station 0+136A on north side of South Talbot Road with 3:1 (H:V) side slopes and 1.0 metre bottom width.
  - Remove all vegetation, organic debris and topsoil from the existing drain slopes on north side of road prior to infilling. Fill existing drain with native soil materials including trucking, filling and compaction in 250 mm lifts.

For the portion of drain to be filled within the new roadway, the backfill shall consist of Granular 'B' (approximately 2,415 tonnes) and Granular 'A' (minimum 300 mm thickness) above to finish road elevation (approximately 775 tonnes). Compaction to a minimum of 100% standard proctor density. Any excess materials to be trucked away off-site.

- Remove all vegetation, organic debris and topsoil from the existing drain slopes on west side of Oldcastle Road prior to infilling. Fill existing drain with native soil materials including trucking, filling and compaction in 250 mm lifts. For the portion of drain to be filled within the new roadway, the backfill shall consist of Granular 'B' (approximately 275 tonnes) and Granular 'A' (minimum 300 mm thickness) above to finish road elevation (approximately 90 tonnes). Compaction to a minimum of 100% standard proctor density. Any excess materials to be trucked away off-site. Work shall also include removal of existing 750 mm diameter HDPE culvert.

- Seeding of drain banks, buffer strips and filled in drains as follows:
  - Supply and placement of hydro-seed on new drain banks from Station 0+000A to Station 0+136A.
  - Supply and placement of hydro-seed on filled in drain from Station 0+000 of 2006 by-law (east end of existing 600 mm diameter CSP) to Station 0+168A.
  - Establish a 3.0 m wide grass buffer strip along the top of bank on the north side of the drain from Station 0+000A to Station 0+136A. Grass buffer to be hydro-seeded.
  - Lands situated between the new drain and the north shoulder of the road shall be hydro-seeded as per specifications.
- Supply and install stone erosion protection (minimum 300 mm thickness) on drain banks complete with filter fabric underlay at the following locations:
  - From Station 0+005A to Station 0+072A (approximately 224 m2)
  - From Station 0+124A to Station 0+136A (approximately 110 m2).
  - Station 0+168A (approximately 25 m2).
- Rock flow check dam (temporary) (OPSD 219.2110) – Location to be determined by Drainage Superintendent. Supply and install stone erosion protection (SEP) (minimum 300 mm thickness) (approximately 30 m2) including new filter fabric underlay beneath a small rock dam (minimum 600

mm height) constructed across the drain for silt and sediment control measure during construction.

- Excavation of a 300 mm deep and 900 mm wide bottom, refuge stilling pool in the new channel below the design gradeline from Station 0+010A to Station 0+020A (10 metres). Also included is a 300 mm thick stone rip-rap lining complete with filter fabric underlay.
- Removal of existing 600 mm diameter CSP crossing County Road No. 11 (Walker Road) at Station 0+136A including backfilling and install a new 900 mm diameter concrete pipe (A257.2 Class 100-D), 31 m long including stone erosion protection with filter fabric underlay and concrete headwall as per OPSD 804.030 complete with steel grate as per OPSD 804.050 for end treatment.
- Connect existing tile ends (approx. 11 tiles) to new relocated drain and supply and install rodent gates.
- Temporary Silt Control Measures During Construction

3.0 ACCESS TO THE WORK

Access to the drain shall be from South Talbot Road and Walker Road (County Road No. 11). Through traffic must be maintained at all times along municipal roads with the required traffic control as per Section 13.0 in the General Specifications. The Contractor shall make his/her arrangements for any additional access for his/her convenience. Any damage resulting from the Contractor's access shall be rectified to pre-existing conditions at his expense.

4.0 WORKING AREA

On private lands north of South Talbot Road Station 0+000A to Station 0+136A, the working area shall include the area required to accommodate the proposed open channel, a 3 metre wide grass buffer strip on the north side of the new drain and a 10.0 m wide working corridor on north side of the realigned drain shall be provided for the temporary stockpiling of the topsoil stripped from the site and works on the drain. No excavated material shall be left on the working corridor.

The Contractor shal1 make his/her own arrangements for any additional access for his/her convenience.

The Contractor shall restrict his equipment to the working corridors as specified in this Section. Any damage resulting from non-compliance with this Section shall be borne by the Contractor.

5.0 DRAIN RELOCATION/OPEN CHANNEL WORKS

5.1 Setting Out

Benchmarks are provided on the attached drawings (drawing 1 of 5). From these benchmarks, the Contractor will do his own setting out. The setting out by the Contractor shall include but shall not be limited to the preparation of grade sheets, the installation of centreline stakes, grade stakes, offsets, and sight rails.

If, during the setting out, the contractor finds an error in the benchmarks provided by the Engineer in the attached drawings, or is uncertain as to the interpretation of the information provided or the work intended, he shall notify the Engineer immediately for additional verification or clarification before proceeding with construction.

The Contractor shall be responsible for the true and proper setting out of the works and for the correctness of the position, levels, dimensions and alignment of all parts of the work.

If, at any time during the progress of the works, an error shall appear or arise in the position, levels, dimensions or alignment of any part of the works, the Contractor shall, at his own expense, rectify such error to the satisfaction of the Engineer, unless such error is based on incorrect data supplied in writing by the Engineer.

5.2 Profile and Excavation of New Drain

Excavation shall be carried out in accordance with the profile shown on the drawings for the drain relocation. In all cases, the Contractor shall use the benchmarks to establish the proposed grade. However, for convenience, the drawings provide the approximate depth from the surface of the ground and from the existing drain bottom to the proposed grades. **The Contractor shall not excavate deeper than the gradelines shown on the drawings.**

Should over excavation of the drain bank occur, the Contractor will not be permitted to repair with native material packed into place by the excavator and re-shaped. Should over excavation occur, the Contractor will be required to have a bank repair detail engineered by a Professional Engineer (hired by the Contractor), to ensure long term stability of the bank is maintained. Such repairs shall be subject to approval by the Engineer and will be at no extra cost to the item.

The contractor shall complete the excavation of the new course of the drain from Station 0+000A to Station 0+168A.

The subsoil is to be excavated from the new course, and placed directly in the existing drain as long as it is spread in uniform full width layers of not more than 250 mm depths to ensure proper compaction practices as described below.

All excavation work shall be done in such a manner as to not harm any vegetation or trees, not identified in this report or by the Drainage Superintendent for clearing. Any damages to trees or vegetation caused by the Contractors work shall be rectified to the satisfaction of the Drainage Superintendent.

The Contractor shall exercise caution around existing tile inlets and shall confirm with the property owners that all tiles have been located and tile ends repaired as specified.

5.3 Alignment and Dimensions

Alignment of the new open channel for the South Talbot Drain from Station 0+000A to Station 0+168A shall be according to design drawings prepared by Cima+.

The drain banks shall be constructed at a slope of 1 vertical to 3 horizontal from the ground surface to the grade specified on the appropriate profile drawing. At the proper grade, a 1.0 metre wide drain bottom shall be constructed.

Layout of the working limits shall be determined by the area required to accommodate the specified dimensioning along with the specifications of the working corridor in Section 4.0 'Working Area.'

5.4 Obstructions

All brush, timber, logs, stumps, stones or other obstructions that interfere with the construction of the drain, encountered along the course of the drain are to be removed by the Contractor. Timber, logs and stumps are to be dealt with in the same manner as specified for brush and trees. Large stones and other similar material are to be piled near the limit of the working corridor and the disposal of this material will be the responsibility of the landowner.

Where the new drain alignment encounters private open drains it may be necessary to remove pipes which have been installed as erosion protection in the mouth of the open private drain. These pipes are to be removed with reasonable care and deposited on the adjacent land at the edge of the working corridor. The landowner shall remain responsible to replace the pipe in the private drain or dispose of it as they prefer.

5.5 Topsoil Strip and Replace

Topsoil shall be stripped for a minimum depth of 150 mm from the proposed open drain alignment including all trenches excavated across lawn areas. The topsoil shall be temporarily stockpiled north of the proposed open channel in a 10.0 m wide corridor. Later, the topsoil will be spread on the existing abandoned drain alignment, the banks of the new drain and the disturbed lawn areas.

A minimum depth of topsoil over the old course of the drain is 150 mm. A 50 mm layer of topsoil shall be placed and graded on the banks of the new drain. Disturbed lawn areas shall be top dressed with a minimum 100 mm of topsoil.

Excess topsoil shall not be removed from the site. Excess topsoil shall be used to repair settlements and increase the topsoil thickness over the filled alignment. It is anticipated that the amount of topsoil stripped from proposed open channel alignments will be greater than the amount required to dress the entire surface of the filled alignment however, if needed, the Contractor shall import screened topsoil to complete the work at their expense.

5.6 Filling and Levelling of Existing Drain

Native soil materials removed from new alignment of the South Talbot Drain shall be used to fill the existing open drain. Excess excavated materials shall require trucking and hauling off-site and disposed of at the Contractor's expense. Prior to the infilling of the open drain, the contractor shall remove all vegetation, organic debris and topsoil from the existing drain slopes and haul off-site and dispose of at the Contractor's expense . The native materials used to fill the drain shall be placed in maximum 300 mm loose lifts, with the exception of within accesses and tile drain extensions as described herein, and compacted with sheepsfoot type compaction equipment capable of achieving 95% of the maximum standard proctor density or better. The granular materials used to fill the drain shall be placed in maximum 250 mm loose lifts, with the exception of within accesses and tile drain extensions as described herein, and compacted with mechanical type compaction equipment capable of achieving 100% of the maximum standard proctor density or better. The contractor shall use benching when filling in the drain as per OPSD 208.010 with bench lifts not exceeding 0.6 metres. Fill shall be placed in the existing drain to the surface to match existing grade.

Furthermore, the contractor shall confirm with the Drainage Superintendent that all existing lateral and main tile outlets have been found and marked prior to infilling the drain.

Each layer shall be compacted to a Standard Proctor Dry Density of 100% by repetitive passes over the fill area with standard levelling equipment or compaction equipment if necessary. Then, the excess excavated subsoil is to be placed and graded in the area of the existing drain and the areas where topsoil was stripped on both sides of the existing drain. These areas are to be levelled and graded to provide a uniform contour and slope.

Then, the stockpiled topsoil removed from this area is to be replaced and spread over the entire area surrounding the road. The grading and re-levelling of this area is to be carried out to the satisfaction of the Drainage Superintendent in charge. The finished work shall allow for drainage of surface runoff without ponding.

Alternative methods or procedures for completing the earthworks may be proposed by the Contractor for approval of the engineer prior to construction. All work must be acceptable to the Drainage Superintendent in charge.

It may be required to relocate excavated material on-site for use in other locations to reach the desired grade elevation and contours for the area where the existing drain is backfilled. On-site relocation shall be completed at the expense of the Contractor. Materials in excess of that required to fill the drain shall be hauled off-site to an approved dumping location. Topsoil shall not be removed from the site but is to be used as the top layer of backfill for the abandoned open drain.

5.7 Outlet Pipes

Outlet drains shall be terminated at the new south drain bank using 320 kPa smooth wall high density polyethylene pipe (HDPE). Each outlet pipe shall be a minimum 3 metre length of non-perforated pipe complete with rodent grate per Section 9.0 'Tile Outlet Repairs.'

6.0 STONE EROSION PROTECTION (SEP)

The Contractor shall supply and install the required quantities of graded stone rip-rap erosion protection materials where specified. All stone to be used for erosion protection shall be 125 - 250 mm clear **quarried rock** or OPSS 1001 placed over a non-woven filter fabric Terrafix 270R or approved equivalent. **Concrete rip-rap will not be permitted.**

The minimum thickness requirement of the erosion stone layer is 300 mm with no portion of the filter fabric to be exposed.

7.0 ROCK CHECK DAM

Rock check dam shall be installed at the downstream end of the proposed works prior to commencing construction. The location and exact dimensions of the rock check dam will be confirmed with the Drainage Superintendent prior to their installation. Installation shall be in accordance with OPSD 219.211 with the modifications to size as discussed with the Drainage Superintendent.

The rock check dam will not be removed until vegetation is established in the new channel or as directed by the Drainage Superintendent.

8.0 REFUGE STILLING POOL

The Contractor shall construct a refuge stilling pool in the bottom of the new open drain from Station 0+010A to Station 0+020A. The contractor shall excavate the pool in the drain bottom to enhance fish habitat. The pool shall have a length of 10 metres, a bottom width of 1.0 metres with 1:1 side slopes and a depth below design grade of 300 mm. A stone rip-rap lining, countersunk and 300 mm thick with filter fabric underlay, shall be placed in the bottom. The pool shall be centred on the finished bottom width of the drain as specified herein. Material excavated from the pool shall be disposed of in the same manner as all other material excavated from the channel bottom.

9.0 TILE OUTLET REPAIRS

For tile outlets along the north drain bank of the relocated drain, the Contractor shall excavate a sufficient distance into the north drain bank of the new open channel to accommodate the proposed inlet pipe replacements and/or relocations from the north side of the drain. New high density polyethylene (HDPE) pipes shall have a smooth interior wall, a minimum 320 kPa pipe stiffness and conform to ASTM D3350, CAN/CSA B182.6-M92 and OPSS 1840.

New plastic drainage tubing if required shall be black (UV resistant) corrugated, high density, polyethylene tubing, made with high density polyethylene resin, meeting or exceeding Type III, Category 4 or 5, Grade P33 or P34, Class C per ASTM D1248 and shall have a minimum pipe stiffness of 170 kPa and 210 kPa at 5% deflection, when tested in accordance with ASTM D2412.

All connections to the existing tile shall be in a silt-tight manner, as approved by the Drainage Superintendent. When connecting two (2) pieces of plastic drainage tubing, the Contractor shall use factory manufactured snap, insert or split couplers that are silt-tight.

The area of the bank disturbed by the repairs and/or relocation shall be backfilled with compacted native material and shaped to match the contour of the adjacent drain bank. The Contractor shall minimize disturbance of the very sensitive banks. As specified below, disturbed areas shall then be covered with filter fabric and 300 mm of graded rip-rap stone (125 - 250 mm clear quarried rock or OPSS 1001, with quantity of stone shown below). When cutting back the existing plastic drainage tubing exposes white tubing (non-UV resistant), the Contractor shall replace the last 3.0 m of drainage tubing, as specified above with black (UV resistant) tubing.

10.0 GRASS BUFFER STRIPS

One - 3 metre wide grass buffer shall be established and preserved immediately adjacent to north bank of the new open channel. Grass buffer strips are to be established as indicated in Section 2.0 'Description of Work'. Establishment of grass buffer strips shall be executed using the same seeding methods as described in Section 18.0 of the General Specifications.

11.0 HYDRAULIC SEEDING OF DRAIN BANKS ON NEW DRAIN CHANNEL & GRASS BUFFER STRIP ALONG NEW DRAIN CHANNEL & FILLED OLD DRAIN ALIGNMENT

The newly established drain banks and all existing grassed areas disturbed by construction shall be hydraulic mulch seeded as specified herein. The surface shall be predominantly fine and free from weeds and other unwanted vegetation. All other loose surface litter shall be removed and disposed of.

Bonded Fibre Matrix shall consist of thermally refined wood fibers and 10% cross-linked hydro-colloidal tackifiers. It should be 100% biodegradable. The curing period shall be not more than 48 hours. Bonded Fibre Matrix shall be hydraulically applied and after application be capable of adhering to the soil. In a dry state, shall be comprised of not less than 70% by weight of long, stranded wood fibres held together by organic or mineral bonding agents or both.

Bonded Fibre Matrix shall be applied at a minimum rate of 3,700 kg of dry product per 10,000 m^2. It shall be thoroughly mixed with water in a hydraulic seeder and mulcher at a rate of 20-30 kg of dry product to 500-600 litres of water to form a homogeneous slurry. Refer to OPSS.PROV 804 for specifications.

Seeding and mulching shall be a one step process in which the seed, fertilizer and hydraulic mulch are applied simultaneously in a water slurry via the hydraulic seeder/mulcher.

The materials shall be added to the supply tank while it is being loaded with water. The materials shall be thoroughly mixed into a homogeneous water slurry and shall be distributed uniform, cohesive mat over the prepared surface.

The materials shall be measured by mass or by a mass-calibrated volume measurement, acceptable to the Drainage Superintendent.

The hydraulic seeder/mulcher shall be equipped with mechanical agitation equipment capable of mixing the materials into a homogenous state until applied. The discharge pumps and gun nozzles shall be capable of applying the material uniformly.

Grass seed shall be Canada No. 1 grass seed mixture meeting the requirements of a Waterway Slough Mixture as supplied by Growmark or approved equal, as follows:

Creeping Red Fescue	20%
Meadow Fescue	30%
Tall Fescue	30%
Timothy	10%
White Clover	10%

Bags shall bear the label of the supplier indicating the content by species, grade and mass. Seed shall be applied at a rate of 200 kg per 10,000 m².

Fertilizer shall be 8-32-16 applied at 350 kg per 10,000 m². It shall be in granular form, dry, free from lumps and in bags bearing the label of the manufacturer, indicating mass and analysis.

The hydraulic seeding shall be deemed "Completed by the Contractor" when the seed has established in all areas to the satisfaction of the Engineer. Re-seeding and/or other methods required to establish the grass will be given consideration to achieve the end result and the costs shall be incidental to the works.

12.0 ROAD BRIDGE CONSTRUCTION

12.1 Location of New Road Bridge

The new bridge structure shall be installed as shown on the drawing attached hereto.

12.2 Materials for New Road Bridge

Materials shall be as follows:

Culvert	**Road Bridge**-New 31.0 m long, 900 mm diameter CSA A-257.2 Class 100-D reinforced circular concrete pipe.
Pipe Bedding Below Culvert	20-25 mm clear stone conforming to OPSS Division 10.
Backfill	Granular 'A' conforming to OPSS Division 10.
Erosion Stone	All stone to be used for erosion protection shall be 125 - 250 mm clear quarried rock or OPSS 1004, minimum 300 mm thickness.
Filter Fabric	"Non-Woven" geotextile filter fabric with a minimum strength equal to or greater than Terrafix 270R, Amoco 4546, Mirafi 140NC or approved equivalent.

12.3 Culvert Installation

Suitable dykes shall be constructed in the drain so that the installation of the culvert can be accomplished in the dry. The drain bottom shall be cleaned, prepared, shaped and compacted to suit the new culvert configuration, as shown on the drawings. Granular materials shall be compacted to 100% of their maximum dry density; imported clean native materials shall be supplied, placed and compacted to 95% of their maximum dry density.

12.4 Sloping Stone End Walls

End walls shall be constructed of quarry stone rip-rap, as specified herein. Each end wall shall extend from the invert of the new culvert to the top of the proposed lane. The end walls shall be sloped 1 vertical to 1.5 horizontal with a filter fabric underlay surrounding the pipe and spanning across the entire width of the drain and wrapping around the drain banks to align with the ends of the new pipe culvert. The minimum thickness requirement of the erosion stone layer is 300 mm with no portion of the filter fabric to be exposed to sunlight.

12.5 Site Clean-up and Restoration

As part of the work and upon completion, the Contractor shall remove and dispose of, off-site any loose timber, logs, stumps, large stones, rubber tires, cinder blocks or other debris from the drain bottom and from the side slopes. Where the construction works cross a lawn, the Contractor shall take extreme care to avoid damaging the lawn, shrubs and trees encountered. Upon completion of the work, the Contractor shall completely restore the area by the placement and fine grading of topsoil and seeding or sodding the area as specified by the Engineer or Drainage Superintendent.

GENERAL SPECIFICATIONS

1.0 AGREEMENT AND GENERAL CONDITIONS

The part of the Specifications headed "Special Provisions" which is attached hereto forms part of this Specification and is to be read with it. Where there is any difference between the requirements of this General Specification and those of the Special Provisions, the Special Provisions shall govern.

Where the word "Drainage Superintendent" is used in this specification, it shall mean the person or persons appointed by the Council of the Municipality having jurisdiction to superintend the work.

Tenders will be received and contracts awarded only in the form of a lump sum contract for the completion of the whole work or of specified sections thereof. The Tenderer agrees to enter into a formal contract with the Municipality upon acceptance of the tender. The General Conditions of the contract and Form of Agreement shall be those of the Stipulated Price Contract CCDC2-Engineers, 1994 or the most recent revision of this document.

2.0 EXAMINATION OF SITE, PLANS AND SPECIFICATIONS

Each tenderer must visit the site and review the plans and specifications before submitting his/her tender and must satisfy himself/herself as to the extent of the work and local conditions to be met during the construction. Claims made at any time after submission of his/her tender that there was any misunderstanding of the terms and conditions of the contract relating to site conditions, will not be allowed. The Contractor will be at liberty, before bidding to examine any data in the possession of the Municipality or of the Engineer.

The quantities shown or indicated on the drawings or in the report are estimates only and are for the sole purpose of indicating to the tenderers the general magnitude of the work. The tenderer is responsible for checking the quantities for accuracy prior to submitting his/her tender.

3.0 MAINTENANCE PERIOD

The successful Tenderer shall guarantee the work for a period of one (1) year from the date of acceptance thereof from deficiencies that, in the opinion of the Engineer, were caused by faulty workmanship or materials. The successful Tenderer shall, at his/her own expense, make good and repair deficiencies and every part thereof, all to the satisfaction of the Engineer.

Should the successful Tenderer for any cause, fail to do so, then the Municipality may do so and employ such other person or persons as the Engineer may deem proper to make such repairs or do such work, and the whole costs, charges and expense so incurred may be deducted from any amount due to the Tenderer or may be collected otherwise by the Municipality from the Tenderer.

4.0 GENERAL CO-ORDINATION

The Contractor shall be responsible for the coordination between the working forces of other organizations and utility companies in connection with this work. The Contractor shall have no cause of action against the Municipality or the Engineer for delays based on the allegation that the site of the work was not made available to him by the Municipality or the Engineer by reason of the acts, omissions, misfeasance or non-feasance of other organizations or utility companies engaged in other work.

5.0 RESPONSIBILITY FOR DAMAGES TO UTILITIES

The Contractor shall note that overhead and underground utilities such as hydro, gas, telephone and water are not necessarily shown on the drawings. It is the Contractor's responsibility to contact utility companies for information regarding utilities, to exercise the necessary care in construction operations and to take other precautions to safeguard the utilities from damage. All work on or adjacent to any utility, pipeline, railway, etc., is to be carried out in accordance with the requirements of the utility, pipeline, railway, or other, as the case may be, and its specifications for such work are to be followed as if they were part of this specification. The Contractor will be liable for any damage to utilities.

6.0 CONTRACTOR'S LIABILITY

The Contractor, his/her agents and all workmen or persons under his/her control including sub-contractors, shall use due care that no person or property is injured and that no rights are infringed in the prosecution of the work. The Contractor shall be solely responsible for all damages, by whomsoever claimable, in respect to any injury to persons or property of whatever description and in respect of any infringement of any right, privilege or easement whatever, occasioned in the carrying on of the work, or by any neglect on the Contractor's part.

The Contractor, shall indemnify and hold harmless the Municipality and the Engineer, their agents and employees from and against claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of or attributable to the Contractor's performance of the contract.

7.0 PROPERTY BARS AND SURVEY MONUMENTS

The Contractor shall be responsible for marking and protecting all property bars and survey monuments during construction. All missing, disturbed or damaged property bars and survey monuments shall be replaced at the Contractor's expense, by an Ontario Land Surveyor.

8.0 MAINTENANCE OF FLOW

The Contractor shall, at his/her own cost and expense, permanently provide for and maintain the flow of all drains, ditches and water courses that may be encountered during the progress of the work.

9.0 ONTARIO PROVINCIAL STANDARDS

Ontario Provincial Standard Specifications (OPSS) and Ontario Provincial Standard Drawings (OPSD) shall apply and govern at all times unless otherwise amended or extended in these Specifications or on the Drawing. Access to the electronic version of the Ontario Provincial Standards is available online through the MTO website, free of charge to all users.

10.0 APPROVALS, PERMITS AND NOTICES

The construction of the works and all operations connected therewith are subject to the approval, inspection, by-laws and regulations of all Municipal, Provincial, Federal and other authorities having jurisdiction in respect to any matters embraced in this Contract. The Contractor shall obtain all approvals and permits and notify the affected authorities when carrying out work in the vicinity of any public utility, power, underground cables, railways, etc.

11.0 SUBLETTING

The Contractor shall keep the work under his/her personal control, and shall not assign, transfer, or sublet any portion without first obtaining the written consent of the Municipality.

12.0 TIME OF COMPLETION

The Contractor shall complete all work on or before the date fixed at the time of tendering. The Contractor will be held liable for any damages or expenses occasioned by his/her failure to complete the work on time and for any expenses of inspection, superintending, re-tendering or re-surveying, due to their neglect or failure to carry out the work in a timely manner.

13.0 TRAFFIC CONTROL

The Contractor will be required to control vehicular and pedestrian traffic along roads at all times and shall, at his/her own expense, provide for placing and maintaining such barricades, signs, flags, lights and flag persons as may be required to ensure public safety. The Contractor will be solely responsible for controlling traffic and shall appoint a representative to maintain the signs and warning lights at night, on weekends and holidays and at all other times that work is not in progress.

All traffic control during construction shall be strictly in accordance with the **Occupational Health and Safety Act** and the current version of the **Ontario Traffic Manuals**. Access to the electronic version of the **Ontario Traffic Manual** is available online through the MTO website, free of charge to all users.

Contractors are reminded of the requirements of the Occupational Health and Safety Act pertaining to Traffic Protection Plans for workers and Traffic Control Plan for Public Safety.

14.0 SITE CLEANUP AND RESTORATION

As part of the work and upon completion, the Contractor shall remove and dispose of, off-site any loose timber, logs, stumps, large stones, rubber tires, cinder blocks or other debris from the drain bottom and from the side slopes. Where the construction works cross a lawn, the Contractor shall take extreme care to avoid damaging the lawn, shrubs and trees encountered. Upon completion of the work, the Contractor shall completely restore the area by the placement and fine grading of topsoil and seeding or sodding the area as specified by the Engineer or Drainage Superintendent.

15.0 UTILITY RELOCATION WORKS

In accordance with Section 26 of the Drainage Act, if utilities are encountered during the installation of the drainage works that conflict with the placement of the new culvert, the operating utility company shall relocate the utility at their own costs. The Contractor however will be responsible to co-ordinate these required relocations (if any) and their co-ordination work shall be considered incidental to the drainage works.

16.0 FINAL INSPECTION

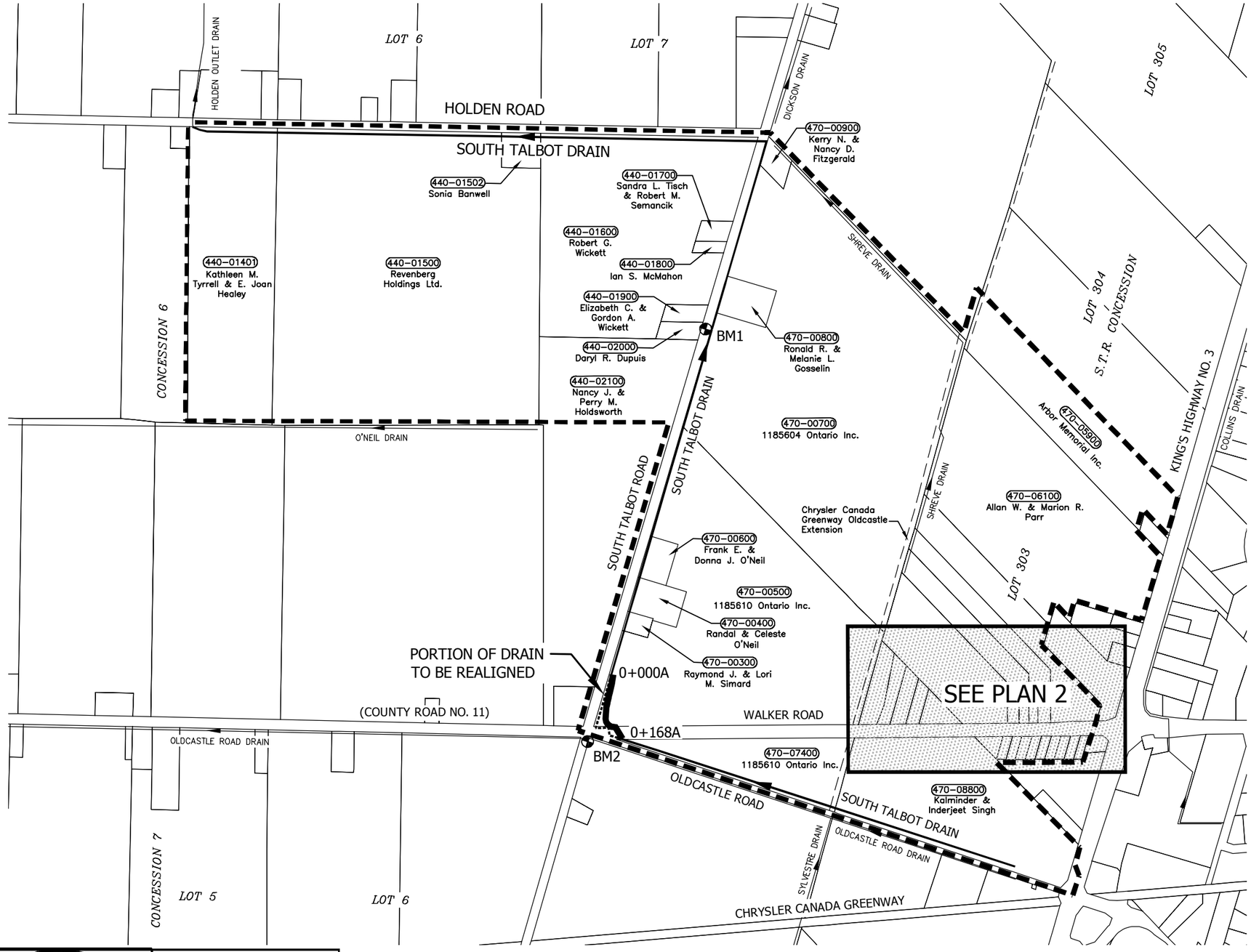
All work shall be carried out to the satisfaction of the Drainage Superintendent for the Municipality, in compliance with the specifications, drawings and the Drainage Act. Upon completion of the project, the work will be inspected by the Engineer and the Drainage Superintendent.

Any deficiencies noted during the final inspection shall be immediately rectified by the Contractor.

Final inspection will be made by the Engineer within 20 days after the Drainage Superintendent has received notice in writing from the Contractor that the work is completed, or as soon thereafter as weather conditions permit.

17.0 FISHERIES CONCERNS

Standard practices to be followed to minimize disruption to fish habitat include embedment of the culvert a minimum 10% below grade, constructing the work 'in the dry' and cutting only trees necessary to do the work (no clear-cutting). No in-water work is to occur during the timing window unless otherwise approved by the appropriate authorities.



OVERALL WATERSHED PLAN

SCALE=1:10,000

SITE BENCHMARKS

BM1– BRASS CAP, 23cm BELOW GRADE ON NORTH SHOULDER OF SOUTH TALBOT ROAD APPROXIMATELY 60m SOUTHEAST OF OF BRIDGE NO. 5 ACCESS FOR MUN. NO. 1400.

ELEVATION=188.05m

BM2– TOP OF NORTHWEST CORNER OF CONC. HEADWALL ON NORTHEAST CORNER OF WALKER ROAD & SOUTH TALBOT ROAD INTERSECTION.

ELEVATION=190.07m

NOTE: CONTRACTOR TO VERIFY BENCHMARKS PRIOR TO CONSTRUCTION.

LEGEND

- SOUTH TALBOT DRAIN WATERSHED BOUNDARY
- SOUTH TALBOT DRAIN
- OTHER DRAINS

LICENSED PROFESSIONAL ENGINEER
M. D. HERNANDEZ
100078099
March 17/21
PROVINCE OF ONTARIO

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.

No.	ISSUED FOR	DATE	BY
3	FINAL REPORT SUBMISSION	MAR. 17/2021	MDH
2	PUBLIC INFORMATION CENTRE	FEB. 17/2021	MDH
1	CLIENT REVIEW	Nov. 3/2020	MDH

DESIGN: MDH	REVIEWED BY: CDP
DRAWN: WLB	CHECKED BY: TRO
DATE: March 17, 2021	
SCALE: AS SHOWN	

DILLON CONSULTING

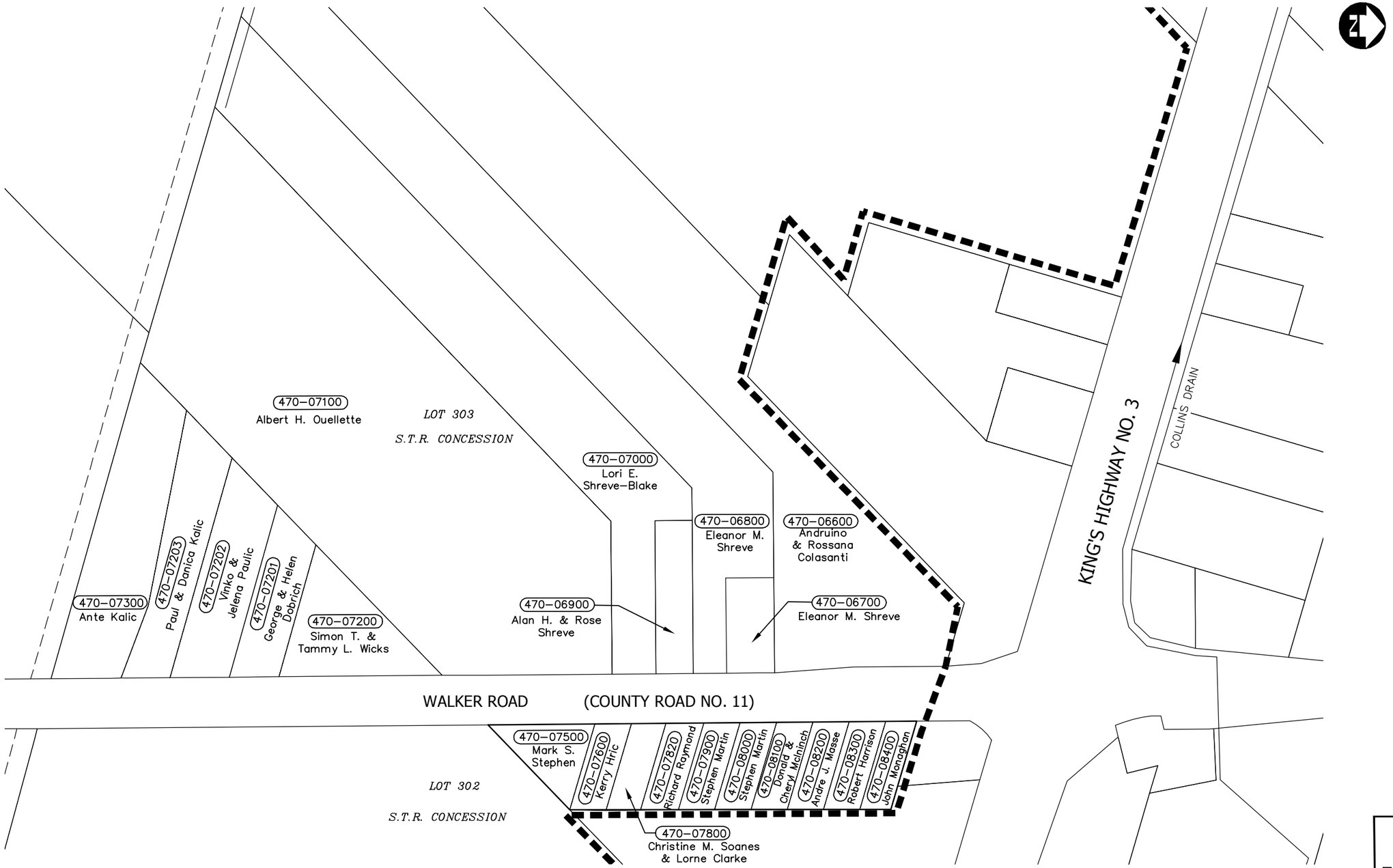
PROJECT NO. 18-9004

DRAWING SCALES BASED ON A 11" X 17" SHEET

'SCHEDULE G'

Drainage Report for the
REALIGNMENT OF THE SOUTH TALBOT DRAIN
Town of Tecumseh

SHEET TITLE: OVERALL WATERSHED PLAN



PLAN 2
SCALE=1:2500

'SCHEDULE G'

LICENSED PROFESSIONAL ENGINEER
M. D. HERNANDEZ
100078099
March 17/21
PROVINCE OF ONTARIO

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1	CLIENT REVIEW	NOV. 3/2020	MDH

DESIGN MDH	REVIEWED BY CDP
DRAWN WLB	CHECKED BY TRO
DATE March 17, 2021	
SCALE AS SHOWN	

DILLON CONSULTING

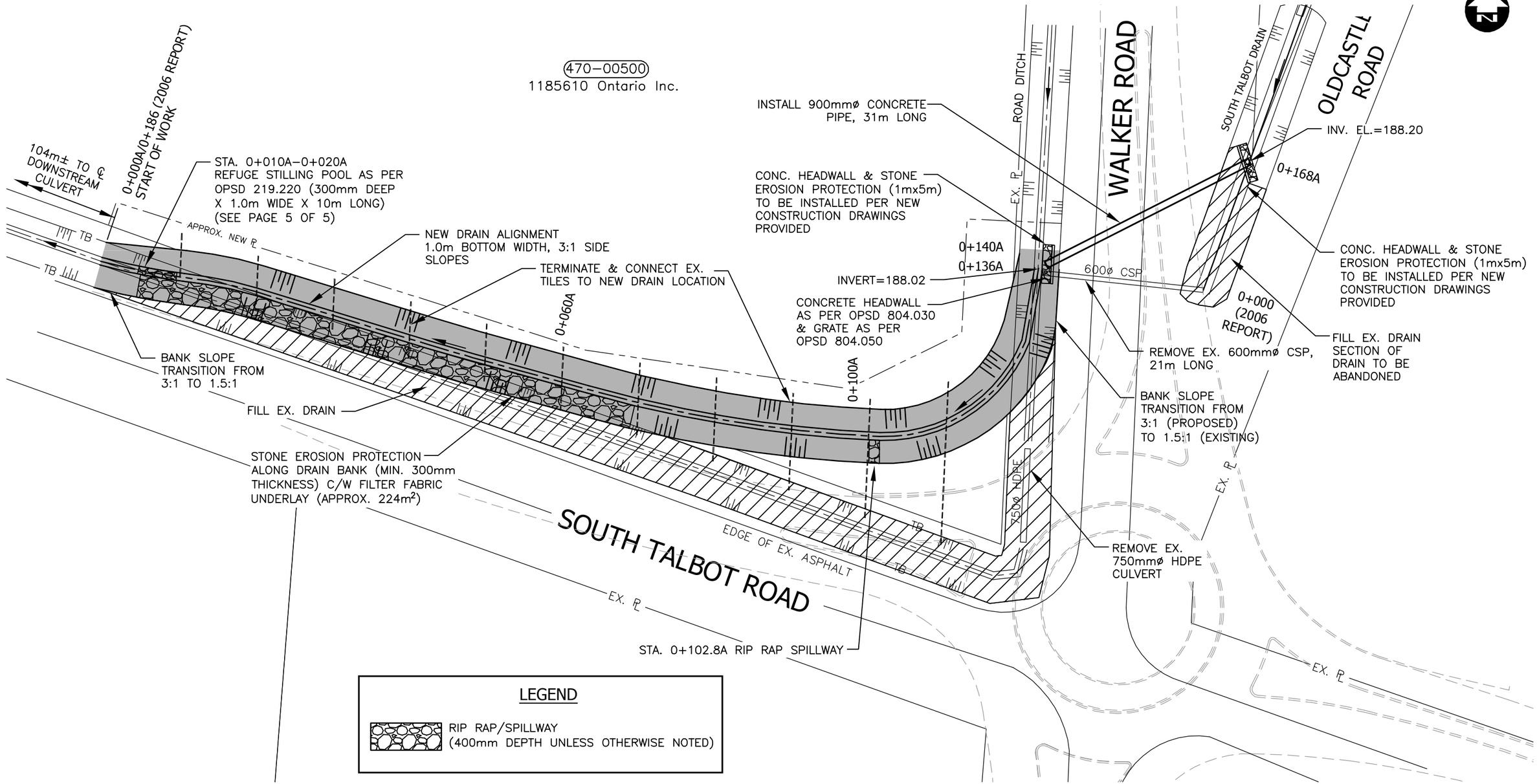
PROJECT NO. 18-9004

DRAWING SCALES BASED ON A 11" X 17" SHEET

Drainage Report for the
REALIGNMENT OF THE SOUTH TALBOT DRAIN
Town of Tecumseh

SHEET TITLE PLAN 2

Mar 17, 2021 – 5:25pm C:\pw working directory\projects 2018\33wlb\dms66148\189004-DRN-CON FINAL.dwg



DETAIL PLAN
SCALE=1:2500

'SCHEDULE G'

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No.	ISSUED FOR	DATE	BY
3	FINAL REPORT SUBMISSION	MAR. 17/2021	MDH
2	PUBLIC INFORMATION CENTRE	FEB. 17/2021	MDH
1	CLIENT REVIEW	NOV. 3/2020	MDH

DESIGN MDH	REVIEWED BY CDP
DRAWN WLB	CHECKED BY TRO
DATE March 17, 2021	
SCALE AS SHOWN	

DILLON CONSULTING

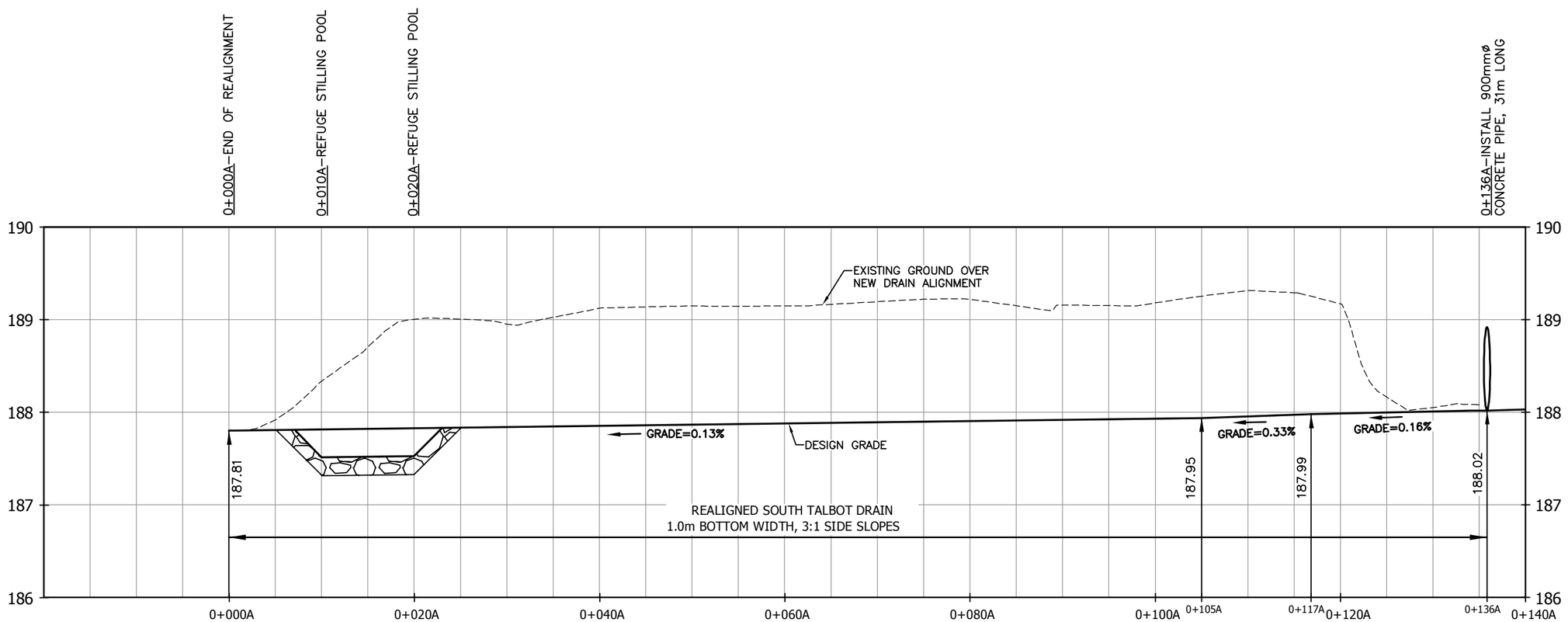
Drainage Report for the
REALIGNMENT OF THE SOUTH TALBOT DRAIN
Town of Tecumseh

PROJECT NO. 18-9004

SHEET TITLE DETAIL PLAN

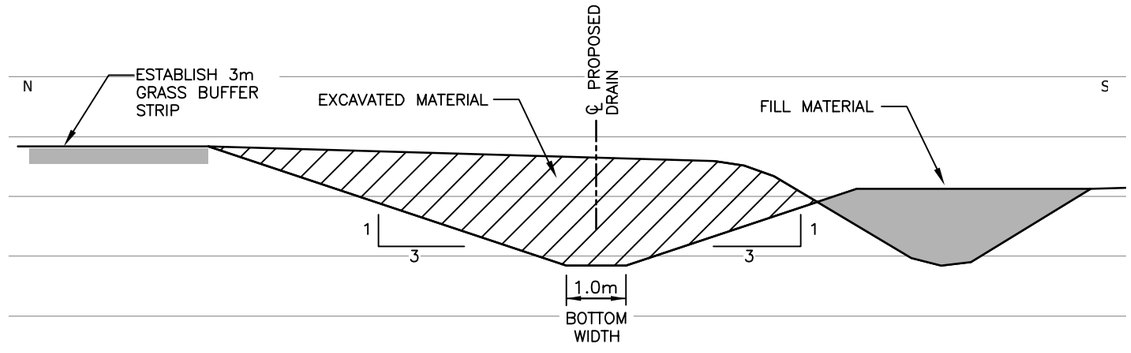
DRAWING SCALES BASED ON A 11" X 17" SHEET

PAGE NO. 3 of 5



PROFILE

SCALE: HORIZ.=1:500
VERT.=1:50



CROSS SECTION 0+060A (LOOKING UPSTREAM)

NOT TO SCALE

'SCHEDULE G'

LICENSED PROFESSIONAL ENGINEER
M. D. HERNANDEZ
100078099
March 17/21
PROVINCE OF ONTARIO

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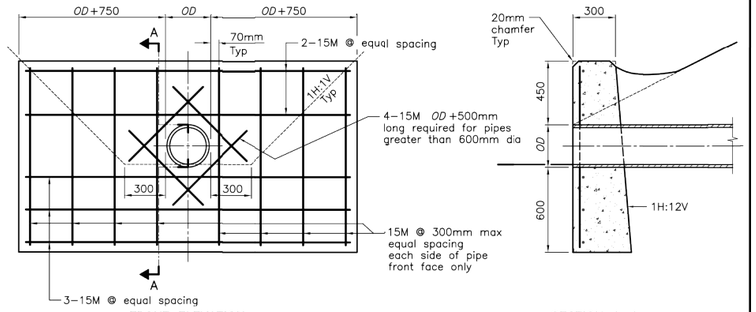
DRAWING SCALES BASED ON A 11" X 17" SHEET

Drainage Report for the
REALIGNMENT OF THE SOUTH TALBOT DRAIN
Town of Tecumseh

SHEET TITLE PROFILE



FRONT ELEVATION

SECTION A–A

LEGEND:

OD – Outside diameter of pipe

NOTES:

A This OPSD to be read in conjunction with OPSD 3940.150.

B If a steel grate is required, refer to OPSD 804.05.

C Class of concrete: 30MPa.

D Cover to reinforcing bars 75mm ± 20mm.

E All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2006	Rev	1
CONCRETE HEADWALL FOR PIPE LESS THAN 900mm DIAMETER			
	OPSD 804.030		

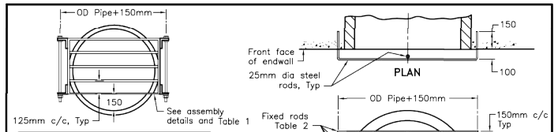
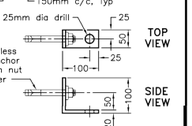


TABLE 1 – NUMBER OF RODS IN FRAME	
PIPE DIA	No of RODS
450	1
525	1
600	2
675	3
750	3
825	4
900	4
975	5
1050	6
1200	7

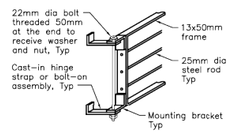
PIPE DIA up to 1200mm

TABLE 2 – NUMBER OF RODS IN FIXED UPPER FRAME	
PIPE DIA	No of RODS
1350	1
1500	2
1650	3
1800	4
1950	5
2100	6
2250	7
2400	8

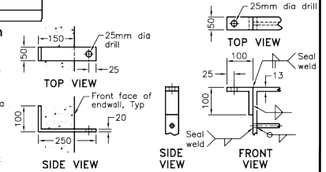
PIPE DIA 1350 to 2400mm



BOLT–ON ASSEMBLY DETAIL



ASSEMBLY



CAST–IN HINGE STRAP ASSEMBLY DETAILS

NOTES:

1 Grates shall be secured by either a bolt and nut or a locking device as specified.

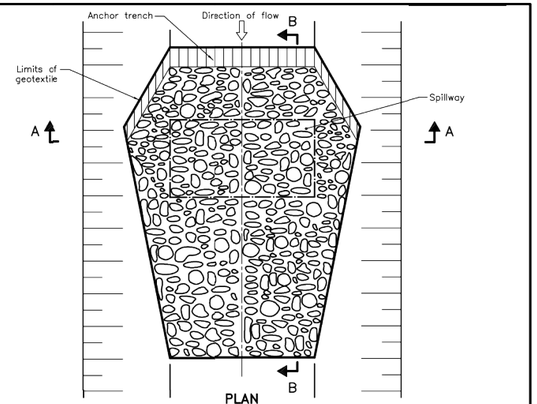
A Metal surfaces shall be either painted with 2 coats of self priming abrasion resistant immersion grade epoxy or hot dip galvanized as specified.

B Frame, hinge strap, mounting bracket, and steel rods shall be medium grade steel.

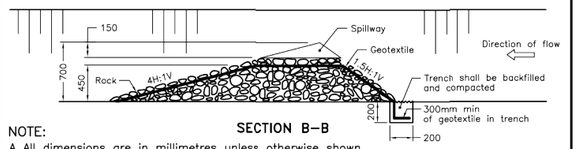
C All welding shall be according to CSA W59.

D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2008	Rev	0
GRATING FOR CONCRETE ENDWALL			
	OPSD 804.050		



SECTION A–A

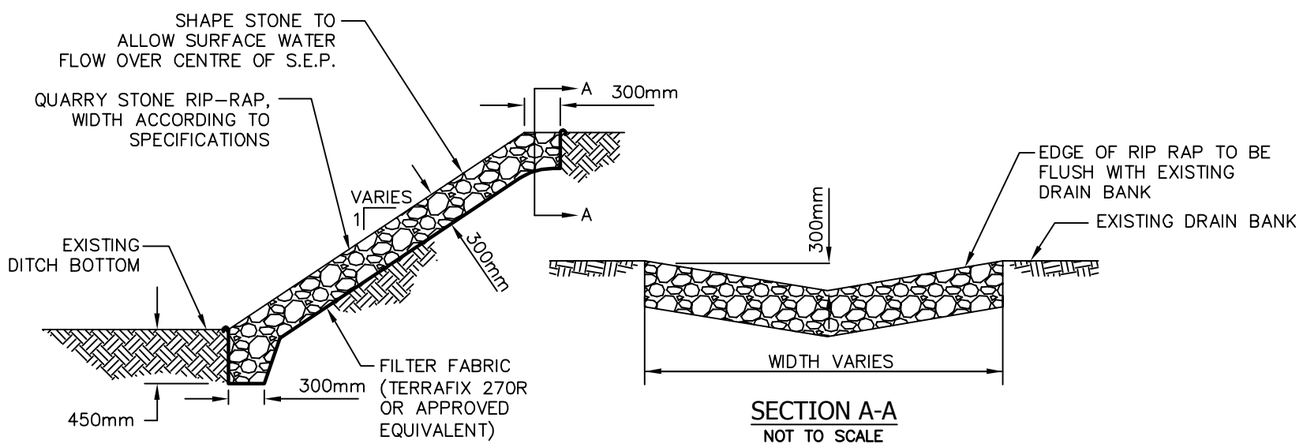


SECTION B–B

NOTE:

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	2
TEMPORARY **ROCK FLOW CHECK DAM** FLAT BOTTOM DITCH			
	OPSD 219.211		



TYPICAL DITCH BANK SPILLWAY
DETAIL w/ RIP RAP
NOT TO SCALE

SECTION A-A
NOT TO SCALE

'SCHEDULE G'

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SHEET TITLE: MISCELLANEOUS DETALS

PAGE NO.: 5 of 5