

**DRAINAGE REPORT  
FOR THE**

**REALIGNMENT OF THE  
LEPAIN DRAIN  
(SILVERLEAF SUBDIVISION)  
TOWN OF LASALLE**



FINAL  
21 JUNE 2022  
MARK D. HERNANDEZ, P. ENG.  
FILE No. 17-5772

File No. 17-5772

Members of Council  
Town of LaSalle  
5950 Malden Road  
LaSalle, Ontario  
N9H 1S4

**Drainage Report for the  
REALIGNMENT OF THE LEPAIN DRAIN  
(SILVERLEAF SUBDIVISION)  
In the Town of LaSalle**

Mayor and Members of Council:

**Instructions**

The Municipality received a request from the landowner of property Roll No. 260-05900 for the realignment of the LePain Drain for a proposed development on 22 April, 2022. Council accepted the request under Section 78(5) of the Drainage Act and on 24 May, 2022 appointed Dillon Consulting Limited to prepare a report.

This Section 78(5) Minor Improvement report is in advance of an on-going Section 78(1) report for the LePain Drain that was appointed to Dillon Consulting Limited on 12 May, 2017. The 2017 appointment relates to the broader proposed improvements within the Howard/Bouffard planning area. This work is on-going and a separate report concerning these works will be submitted at the appropriate time.

**Ontario Regulation 500/21**

We have assessed the applicability of Section 78(5) of the Drainage Act and find the proposed works satisfy the requirements for minor improvement work as described in Subsection 7(1) of O.Reg 500/21.

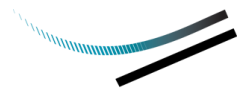
**Watershed Description**

The LePain Drain consists of an open drain with a length of 2,214 metres and a watershed area of approximately 293.2 hectares (724.3 acres). The head of the LePain Drain is located in Lot 2, Concession 5 just west of Heritage Drive. It flows westerly to Huron Church Line Road through Lot 1, Concession 3. The drain continues across Disputed Road flowing westerly near the line of Lot 30 and 31, Concession 2 to its outlet into the West Branch of the Cahill Drain. The surficial soils are predominately Berrien Sand which is defined as imperfectly drained.

The area east of Huron Church Line Road is a mix of residential, commercial and undeveloped lands serviced by storm sewer infrastructure which outlet into a storm water pond connected to the LePain Drain.



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## Drain History

The recent history of Engineers' reports for the LePain Drain follows:

- **31 July 1986 by E. O. Lafontaine, P.Eng.:** The recommended work included brushing, widening, reshaping, cleaning and improvement of the entire LePain Drain.
- **15 October 1945 by W. J. Fletcher, C. E.:** The recommended work included brushing, cleaning of the drain and just west of Huron Church Line Road, a 13 metre section of drain was realigned.

## Survey

Our survey and examination of the LePain Drain were carried out in December 2017 as part of a separate drainage appointment for the LePain Drain under Section 78(1). The survey comprised the recording of topographic data and examining the channel for available depth necessary to provide sufficient drainage. We commenced the survey at the outlet of the drain into the West Branch of Cahill Drain. We then proceeded upstream along the channel near the line between Lots 30 and 31, Concession 2 east towards Disputed Road then across Lot 1, Concession 3 to Huron Church Line Road to the head of the drain near the Heritage Drive, Concession 5. In addition, we surveyed the route for the proposed drain realignment.

Our survey revealed a minimal amount of overgrown brush and vegetation with frequent accumulations of debris, forming blockages within the channel. There is a uniform build up of sediment averaging 100 mm to 250 mm (4 to 10 inches) above the design bottom. The drain banks appear well grassed and stable.

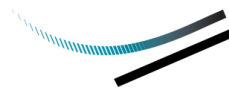
## Design Considerations

In accordance with requirements from the Essex Region Conservation Authority, the realignment of the LePain Drain through property Roll No. 260-05900 has been designed such that hydraulic grades lines both upstream and downstream of the realignment remain unaffected compared to the existing state of the drain. Considering that this realignment is in support of a residential development, flows from the 1:100 year design storm event are to remain within the banks of the realigned drain.

We have considered the controlled discharge proposed for the Silverleaf development including the proposed storm water detention pond and pumping station outlet to the relocated LePain Drain. The release rate of the pond is to be limited to 66 L/s. We have also considered the LePain Pond located on the upstream portion of the Drain, immediately east of Huron Church Line Road, and have confirmed the proposed realignment will have no adverse impacts to the surrounding lands both upstream and downstream of the development.

The following design criteria has been applied as noted below:

- An existing conditions model was completed using PCSWMM hydrologic modelling software to assess flow and hydraulic grade line conditions in the existing LePain Drain and associated drainage systems entering the drain. The downstream extents of the PCSWMM model is the Snake Lane crossing of the West Branch of the Cahill Drain. Associated drainage areas of downstream drains



were also included in the model. The 1 in 100 year design storm was used in the analysis based on a 24 hour duration, 108 mm total depth, Chicago storm distribution. The LePain Pond has been modelled with the restriction weir and pipe installed in 2019, which reduces the peak flows experienced in the drain. The existing conditions model showed that the LePain Drain through property Roll No. 260-05900 does not spill its banks during the 1 in 100 year design storm.

- The proposed conditions model was developed to simulate the hydraulic conditions of the relocated LePain Drain during the 1 in 100 year design storm to confirm that hydraulic grade line elevations were not adversely impacted either upstream or downstream of the proposed realignment compared to existing conditions.
- We have incorporated the 2:1 side slopes and set back requirements as required by the Essex Region Conservation Authority (ERCA).

A memorandum summarizing the results of the hydraulic and hydrologic analysis has been included herein as Schedule 'A.'

### **Allowances**

Throughout the length of the work, the excavated material is to be managed on-site as set out in the Special Provisions in Schedule 'F' herein. In accordance with Section 30 of the Drainage Act, we determined the amount of compensation to the owner for damages to lands and crops (if any) occasioned by the operation of equipment within the secondary working corridor to be located on the south side of the new drain. The allowance for damages is calculated at a rate of \$1,977 per hectare (\$800 per acre).

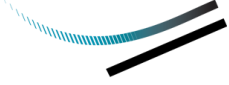
In accordance with Section 29 of the Drainage Act, we have determined allowances be given at a rate of \$123,553 per hectare (\$50,000 per acre) for the land used for establishing a 1 m wide grass buffer strip to be located on the south side of the drain only. No buffer is required on the north side of the drain as it will be maintained as boulevard area between the roadway and realigned drain. The abandoned section of open drain will be backfilled and the property owner will regain use of that land. Therefore, no allowances will be paid for land used for the footprint of the drain.

### **Recommendations and Cost Estimate**

Based on our review of the history, the information obtained from our examination and analysis of the survey data, we recommend that the LePain Drain be repaired and improved as described below:

<b>Item</b>	<b>Description</b>	<b>Amount</b>
	<b><u>EXISTING OPEN DRAIN IMPROVEMENTS</u></b>	
1.	Brushing of the drain from 1+110A to Station 1+239A including the disposal by burning on-site or removal off-site as required to accommodate the drainage works	\$650.00
2.	Excavation and trucking of excavated materials works, as follows:	
	a) Excavation and drain widening as follows:	





Item	Description	Amount
	i. Station 1+110A to Station 1+239A, totalling approximately 129 lineal metres of drain and approximately 200 m <sup>3</sup> of material.	\$2,050.00
	b) Trucking of all excavated materials to the temporary stock-pile specified, as follows:	
	i. Station 1+110A to Station 1+239A, totalling approximately 200 m <sup>3</sup> of material. <b>Drain spoils shall be deposited within the temporary stock-pile material area and kept separate from other drain excavation materials.</b>	\$1,700.00
3.	Placement of salvaged topsoil (50 mm minimum thickness), fine grading and hydraulic seeding, including the supply & installation of erosion control mats over new drain banks as shown on the Drawings and specified herein, as follows:	
	a) Station 0+435B to Station 0+467B - Placement of top soil, 50 mm minimum thickness (approx. 25 m <sup>3</sup> ), fine grading and seeding complete with erosion control mat (approx. 435 m <sup>2</sup> ), south bank only.	\$6,550.00
4.	Seeding of grass buffer strips, as follows:	
	a) Grading and seeding of 1 metre wide grass buffer strips (approx. 130 m <sup>2</sup> ) from Station 1+110A to Station 1+239A on the south side of the existing drain.	\$650.00
	<b><u>LEPAIN DRAIN RELOCATION WORK</u></b>	
5.	Strip topsoil to minimum 250 mm depth over the entire proposed drain cross section width prior to drain excavation (approx. 800 m <sup>3</sup> ). <b>All topsoil materials shall be deposited on the lands adjacent to the working corridor and kept separate from drain excavation materials.</b>	\$6,750.00
6.	Excavate new open drain along proposed alignment, approximately 360 lineal metres, Station 0+423B to Station 0+783B (approx. 3,090 m <sup>3</sup> ) including trucking and disposal. Material to be trucked and stock piled on-site as specified herein.	\$29,700.00
7.	Placement of salvaged topsoil (50 mm minimum thickness), fine grading and hydraulic seeding, including the supply & installation of erosion control mats over new drain banks as shown on the Drawings and specified herein, as follows:	
	b) Station 0+435B to Station 0+467B - Placement of top soil, 50 mm minimum thickness (approx. 10 m <sup>3</sup> ), fine grading and hydraulic seeding complete with erosion control mat (approx. 155 m <sup>2</sup> ), south bank only.	\$2,350.00

Item	Description	Amount
	c) Station 0+467B to Station 0+641.5B - Placement of top soil, 50 mm minimum thickness (approx. 115 m <sup>3</sup> ), fine grading and hydraulic seeding complete with erosion control mat (approx. 2300 m <sup>2</sup> ), both drain banks.	\$34,400.00
	d) Station 0+688.5B to Station 0+725B - Placement of top soil, 50 mm minimum thickness (approx. 20 m <sup>3</sup> ), fine grading and hydraulic seeding complete with erosion control mat (approx. 360 m <sup>2</sup> ) between Station 0+607B to Station 0+641.5B, both drain banks.	\$5,400.00
	e) Station 0+725B to Station 0+768B - Placement of top soil, 50 mm minimum thickness (approx. 10 m <sup>3</sup> ), fine grading and hydraulic seeding complete with erosion control mat (approx. 190 m <sup>2</sup> ), south bank only.	\$2,850.00
	f) Station 0+768B to Station 0+783B - Placement of top soil, 50 mm minimum thickness (approx. 5 m <sup>3</sup> ), fine grading and hydraulic seeding complete with erosion control mat (approx. 100 m <sup>2</sup> ), both drain banks.	\$1,500.00
8.	Stone Erosion protection works as follows:	
	a) Station 0+423B to Station 0+435B - Supply and install 130 m <sup>2</sup> (300 mm thick) of stone erosion protection (SEP) including new filter fabric underlay on new drain channel.	\$11,000.00
	b) Station 0+435B to Station 0+467B - Supply and install 200 m <sup>2</sup> (300 mm thick) of stone erosion protection (SEP) including new filter fabric underlay on north drain bank.	\$16,900.00
	c) Station 0+725B to Station 0+768B - Supply and install 230 m <sup>2</sup> (300 mm thick) of stone erosion protection (SEP) including new filter fabric underlay on north drain bank.	\$19,450.00
7.	Seeding of grass buffer strips, as follows:	
	b) Grading and seeding of 1 metre wide grass buffer strip (approx. 360 m <sup>2</sup> ) from Station 0+423B to Station 0+783B on the south side of the new drain.	\$1,800.00
8.	Clearing and grubbing of existing drain from Station 0+740A to Station 1+110A. Work includes the removal and disposal of all organic material prior to infilling.	\$2,000.00
9.	Hauling of subsoil and placement into the existing channel from Station 0+740A to Station 1+110A, including backfill, compaction, and reshaping of new banks (approx. 2,355 m <sup>3</sup> )	\$28,300.00

Item	Description	Amount
10.	Temporary silt control measures during construction. Including Rock Check Dam downstream of the proposed channel realignment (OPSD 219.211). Work to include subsequent removal of Rock Check Dam following construction completion.	\$650.00
<b><u>BRIDGE WORK</u></b>		
11.	<u>Bridge No. 2 – (Meo Road 0+655B)</u> - Supply and installation of a new 2730 mm span x 1830 mm rise precast concrete box culvert (CHBDC CAN/CSA S6-06), 35 m long with sloped stone end walls (approx. 240 m <sup>2</sup> ) including clear stone levelling base (approx. 55 tonnes), compacted Granular ‘B’ backfill up to road subgrade (approx. 350 tonnes) and Granular ‘A’ road base minimum 300 mm thickness (approx. 295 tonnes).	\$155,000.00
12.	<u>Temporary Access Bridge (0+825A)</u> - Supply and installation of a temporary 1000 mm diameter corrugated steel pipe culvert (minimum 2.0 mm thickness), 14 m long with sloped stone end walls (approx. 20 m <sup>2</sup> ) including clear stone levelling base (approx. 15 tonnes), compacted Granular ‘B’ backfill up to underside of driveway surface material (approx. 80 tonnes) and Granular ‘A’ driveway surface minimum 200 mm thickness (approx. 30 tonnes). Work includes the removal of the bridge and backfill upon completion of the drain works.	<u>\$10,100.00</u>
<b>SUB-TOTAL</b>		<b>\$339,750.00</b>
13.	Allowances under Sections 29 and 30	\$6,400.00
14.	Report and Final Inspection (cost portion)	\$25,000.00
15.	ERCA application review and permit fee	<u>\$800.00</u>
<b>TOTAL ESTIMATE – LEPAIN DRAIN</b>		<b>\$371,950.00</b>

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*).

We have assessed 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**

We have assessed the above estimated costs for the improvements to the LePain Drain against the affected lands and roads listed in Schedule 'C' under "Special Benefit", "Benefit" and "Outlet Liability".

Special Benefit assessment shown in Schedule 'C' and detailed in Schedule 'D' were derived as follows. As the realignment works are only required for the proposed residential development, we have assessed 100% of the costs to the benefiting lands having property Roll No. 260-05900.

### **Future Maintenance**

After completion, the realigned LePain Drain shall be maintained by the Town of LaSalle at the expense of the lands and road in the same relative proportions as set out in the previous 1986 LePain Drain report, subject of course, to any variations that may be made under the authority of the Drainage Act.

### **Drawings and Specifications**

Attached to this report is Schedule 'F', which are Specifications setting out the details of the recommended works and Schedule 'G' which represent the drawings that are attached to this report.

- Page 1 of 8 - Watershed Plan**
- Page 2 of 8 - Realignment Plan**
- Page 3 of 8 - Existing Drain Profile & Section**
- Page 4 of 8 - Realigned Drain Profile**
- Page 5 of 8 - Cross-Sections**
- Page 6 of 8 - Bridge No. 2 Details**
- Page 7 of 8 - Temporary Bridge Details**
- Page 8 of 8 - Miscellaneous Details**

### **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.

Respectfully submitted,

DILLON CONSULTING LIMITED

Mark D. Hernandez, P.Eng.  
MDH:oem



# Memo



To: Rocco Tullio, President/Owner, Rock Developments  
From: Aakash Bagchi, P.Eng., M.Eng., Dillon Consulting Limited  
Date: June 20, 2022  
Subject: Schedule A - Hydraulic Analysis of Lepain Drain Realignment  
Our File: 22-3264

Dillon Consulting Limited (Dillon) was retained by Silver Leaf Rock Developments Inc. to prepare a technical memorandum outlining the hydraulic assessment completed in support of the proposed Lepain Drain realignment. The proposed residential subdivision located at 4605 Huron Church Line in the Town of LaSalle is approximately 9.7 ha and is bounded on the north by the future Huron Acres and McKewan residential subdivisions, to the east by Huron Church Road, to the south by neighboring agricultural land, and to the west by Disputed Road. The Lepain Drain is proposed to be relocated from its current alignment to a proposed alignment along the southern boundary of the proposed residential development. Figure 1 shows the existing alignment of the Lepain Drain, and Figure 3 shows the future alignment of the Drain. The re-location of the Lepain Drain is proposed to be completed along with the initial phase of the proposed subdivision development.

The study area for this analysis will be the Lepain Drain alignment between the Huron Church Line and Disputed Road culvert crossings.

## **Updated Existing Conditions Hydraulic Assessment**

A hydraulic analysis of the Lepain Drain under existing conditions was completed as part of this study. An existing conditions PCSWMM model which included the Lepain Drain was prepared as part of the Howard-Bouffard Master Drainage Study (MDS) [In progress] (Dillon, 2018). This model has been used as the baseline for the hydraulic analysis of the Lepain Drain relocation. Improvements to the Lepain Pond and its outlet structure were completed in 2019 as per the Lepain Pond Expansion Stormwater Management Report (Dillon, 2018). Due to the timing of the Lepain Pond improvements (completed July 2019), and the creation of the Howard-Bouffard MDS PCSWMM model (2018-2019), the Lepain Pond improvements and new outlet structure were not incorporated in the original existing conditions model for the Howard-Bouffard Study. This resulted in higher flows being discharged from the Pond located upstream of the proposed Lepain Drain relocation.

As part of this study the Howard-Bouffard PCSWMM model has been updated to reflect the above noted Lepain Pond improvements; these updates included:

- Increasing the size of the Lepain Pond, and
- Decreasing the outlet from a 10 m wide overflow weir to a 1.20 m diameter outlet pipe.

The 1:100 year, 24 hour (Chicago distribution) design storm event was used to assess the flow conditions in the drain.

As a result of the proposed improvements, the peak flow through the Huron Church Line culvert decreased from approximately 8 m<sup>3</sup>/s (original weir condition to approximately 4 m<sup>3</sup>/s (updated 1.20 m outlet pipe). This significant decrease in flow rate causes the flows during the 1:100 year, 24 hour event simulation to be now maintained within the drain banks in the study area, between the Huron Church Line and Disputed Road culverts, under existing conditions.

#### **Proposed Conditions Hydraulic Assessment**

The following updates were made to the PCSWMM model to represent proposed conditions.

Drain Re-alignment - The proposed drain re-alignment includes:

- shifting the drain to the southern extent of the property;
- re-grading the drain to have a constant slope of approximately 0.25%;
- updating the cross section to be a trapezoidal channel with 1 m bottom width and 2:1 side slopes; and
- installing a 2.73 m x 1.83 m concrete box culvert crossing under the proposed Meo Boulevard roadway.

Silverleaf Development SWM Facility – A Stormwater Management (SWM) Facility is proposed for the Silverleaf development, located north of Lepain Drain. It includes a SWM Pond and a pump-station (PS) to restrict flows to an allowable release rate. A SWM study for the development was completed by Dillon recently. The SWM Pond is proposed to have a pumped discharge of 66 L/s to the Lepain Drain according to the Silverleaf SWM study. A constant inflow of 66 L/s was incorporated into the PCSWMM model used for this analysis to represent the pumped discharge.

Table 1 below presents the simulated peak flows and water levels in the Drain at the Huron Church Line and Disputed Road crossings, and at the confluence of Lepain Drain with the East Branch of Cahill Drain. The values in Table 1 compare the simulated peak flows and water surface elevations (WSEL) under existing and proposed conditions, for the 1:100 year, 24 hour design storm simulation.

**Table 1 - Comparison of Peak Flows and WSELs in Lepain Drain under Existing and Proposed Conditions (1:100 year, 24 hour design storm event simulation)**

Location	Existing Conditions		Proposed Conditions		Relative Difference		
	Peak Flow	WSEL	Peak Flow	WSEL	Peak Flow		WSEL
	(m <sup>3</sup> /s)	(m)	(m <sup>3</sup> /s)	(m)	(m <sup>3</sup> /s)	(%)	(m)
U/S of Huron Church Line culvert	4.046	180.55	4.184	180.44	+0.14	+3.4%	-0.11
D/S of Huron Church Line culvert	4.046	180.46	4.184	180.32	+0.14	+3.4%	-0.14
U/S of Disputed Road culvert	4.401	179.35	4.429	179.35	+0.03	+0.6%	0
D/S of Disputed Road culvert	4.401	179.27	4.429	179.27	+0.03	+0.6%	0
Confluence of Lepain Drain and East Brach of Cahill Drain	4.506	178.34	4.539	178.34	+0.03	+0.7%	0

Water levels in the Lepain Drain at the Disputed Road culvert and downstream reaches show no increase, compared to existing conditions. Water levels at the Huron Church Line culvert are however lower due to improved conveyance provided by the proposed wider drain cross section within the study area.

The flow rate through the Disputed Road culvert and downstream reaches under proposed conditions are slightly elevated when compared to the existing conditions as a result of the above described improved conveyance provided by the wider drain cross section through the study area. The increase in peak flow is approximately 0.03 m<sup>3</sup>/s, which translates to an increase of approximately 0.7% in flow, compared to existing conditions.

This amount of increase is considered negligible. Additionally, all flows under proposed conditions are contained within the drain cross section without the drain spilling its banks.

Overall, the proposed drain re-alignment is not expected to cause an adverse impact to the Lepain Drain system. Drain channel profiles representing a comparison of the water level within the drain under existing and proposed conditions is presented in Figures 2 and 4.

Under proposed conditions, there is approximately 0.35 m of depth available in the Drain before it spills its banks. The maximum discharge capacity of the proposed drain cross-section is approximately 7.0 m<sup>3</sup>/s, which is approximately 2.5 m<sup>3</sup>/s higher than the proposed 1:100 year flows in the Drain. This is

a considerable improvement over existing conditions in the Howard-Bouffard MDS model results, where the Drain was expected to readily spill its banks during the 1:100 year simulation.

### Conclusions

Dillon was retained by Silver Leaf Rock Developments Inc. to prepare a technical memorandum outlining the hydraulic assessment completed in support of the proposed Lepain Drain realignment. The existing conditions Howard-Bouffard MDS PCSWMM model was updated to reflect the Lepain Pond and outlet improvements.

A hydraulic analysis was completed for the proposed channel alignment, cross-sections and new culvert under Meo Boulevard, to determine impacts to upstream and downstream areas. The proposed changes to the Lepain Drain were found to have no adverse impacts to the drainage system under the design storms assessed.

If you have any questions regarding the analysis presented above, please feel free to contact the undersigned.

DILLON CONSULTING LIMITED



Aakash Bagchi, P.Eng., M.Eng.  
Water Resources Engineer



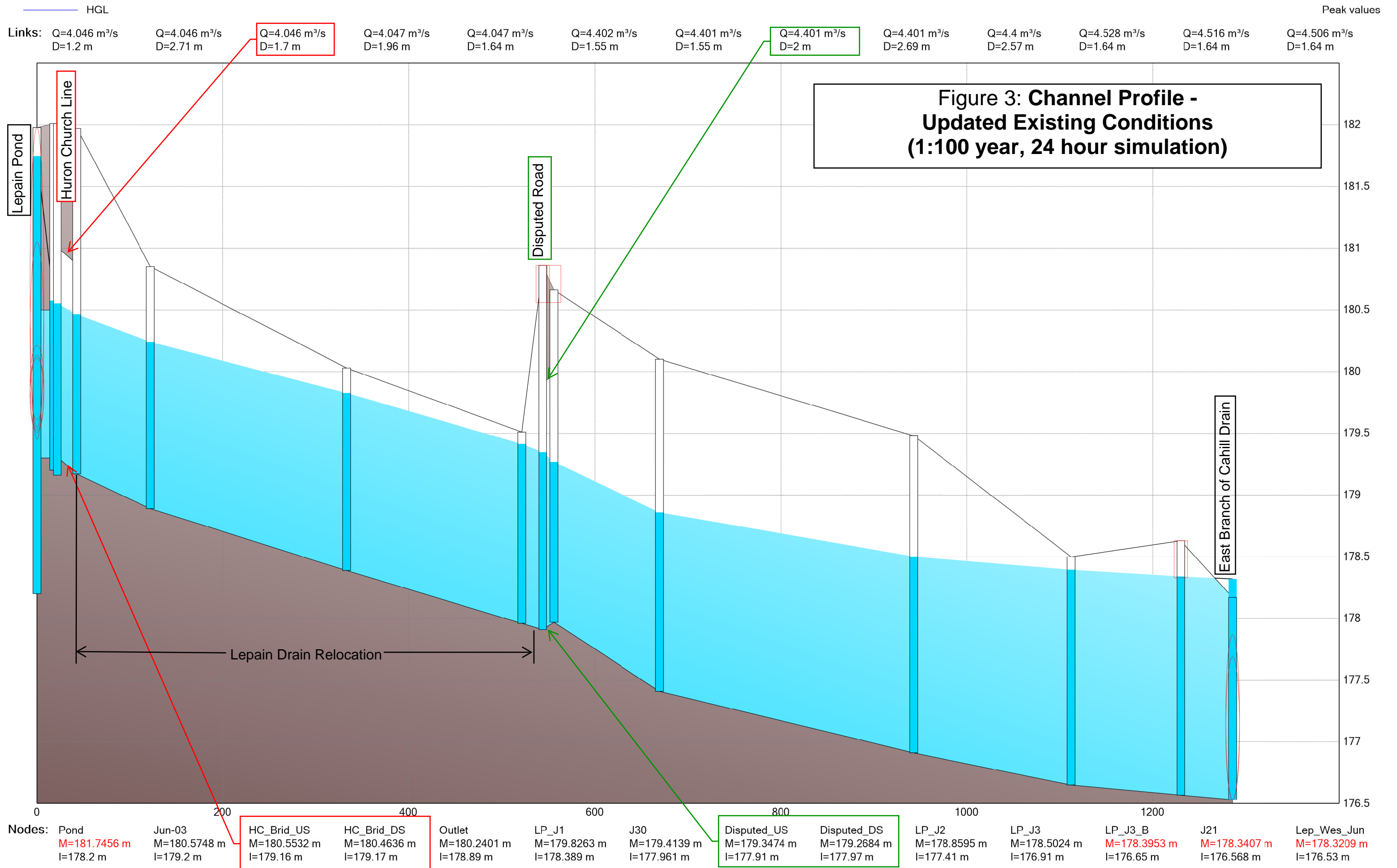


Figure 1: Model Schematic - Existing Conditions



50 m









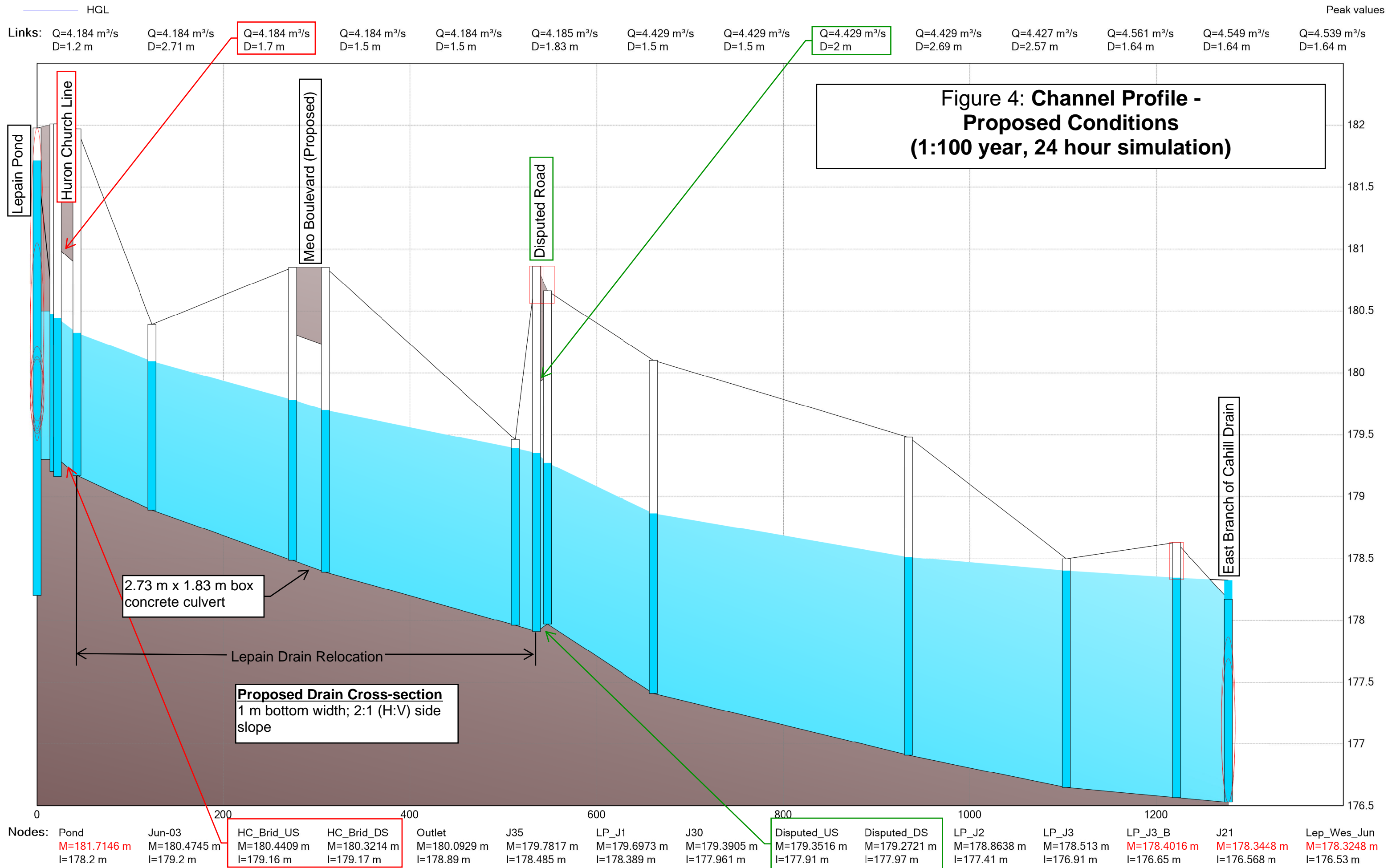
**Proposed Silverleaf Subdivision**

**Figure 3: Model Schematic - Proposed Conditions**



50 m





**Figure 4: Channel Profile - Proposed Conditions (1:100 year, 24 hour simulation)**

**Proposed Drain Cross-section**  
1 m bottom width; 2:1 (H:V) side slope

2.73 m x 1.83 m box concrete culvert

Lepain Drain Relocation

Lepain Pond

Huron Church Line

Meo Boulevard (Proposed)

Disputed Road

East Branch of Cahill Drain

Peak values

**"SCHEDULE B"**  
**SCHEDULE OF ALLOWANCES**  
**REALIGNMENT OF THE LEPAIN DRAIN (SILVERLEAF SUBDIVISION)**  
**TOWN OF LASALLE**

Roll No.	Con.	Description	Owner	Section 30 Damages	Section 29 Land	Total Allowances
260-05900	3.00	Pt. Lot 1	Silverleaf Rock Developments Inc.	\$400.00	\$6,000.00	\$6,400.00
<b>TOTAL ALLOWANCES</b>				<b>\$400.00</b>	<b>\$6,000.00</b>	<b>\$6,400.00</b>

**"SCHEDULE C"**  
**SCHEDULE OF ASSESSMENT**  
**REALIGNMENT OF THE LEPAIN DRAIN (SILVERLEAF SUBDIVISION)**  
**TOWN OF LASALLE**

**PRIVATELY-OWNED - AGRICULTURAL LANDS (NON-GRANTABLE)**

Roll No.	Con.	Description	Area Affected		Owner	Special Benefit	Benefit	Outlet	Total Assessment
			(Acres)	(Ha.)					
260-05900	3	Pt. Lot 1	23.15	9.37	Silverleaf Rock Developments Inc.	\$371,950.00	\$0.00	\$0.00	\$371,950.00
Total on Privately-Owned - Agricultural Lands.....						\$371,950.00	\$0.00	\$0.00	\$371,950.00
<b>TOTAL ASSESSMENT .....</b>						<b>\$371,950.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$371,950.00</b>
			(Acres)	(Ha.)					
<b>Total Area:</b>			<b>23.15</b>	<b>9.37</b>					

**"SCHEDULE D"**  
**DETAILS OF SPECIAL BENEFIT**  
**REALIGNMENT OF THE LEPAIN DRAIN (SILVERLEAF SUBDIVISION)**  
**TOWN OF LASALLE**

**SPECIAL BENEFIT ASSESSMENT**  
**(GENERAL DESCRIPTION OF SPECIAL BENEFIT)**

Roll No.	Owner	Item Description	Estimated Cost	Cost of Report	Special Benefit
260-05900	Silverleaf Rock Developments Inc.	Cost of the relocation of the LePain Drain through property Roll No. 260-05900 (100%)	\$346,150.00	\$25,800.00	\$371,950.00
<b>Total Special Benefit Assessment.....</b>			<b>\$346,150.00</b>	<b>\$25,800.00</b>	<b>\$371,950.00</b>
<b>OVERALL TOTAL SPECIAL BENEFIT ASSESSMENT .....</b>					<b>\$371,950.00</b>

”SCHEDULE F”  
DRAINAGE REPORT FOR THE  
**REALIGNMENT OF THE LEPAIN DRAIN**  
TOWN OF LASALLE  
IN THE COUNTY OF ESSEX

**SPECIAL PROVISIONS - GENERAL**

**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:

**LEPAIN DRAIN RELOCATION WORK**

- Brushing of the drain from 1+110A to Station 1+239A including the disposal by burning on-site or removal off-site as required to accommodate the drainage works
- Excavation and trucking of excavated materials works, as follows:
  - Excavation and drain widening as follows:
    - Station 1+110A to Station 1+239A, totalling approximately 129 lineal metres of drain and approximately 200 m<sup>3</sup> of material.
  - Trucking of all excavated materials to the temporary stock-pile specified, as follows:
    - Station 1+110A to Station 1+239A, totalling approximately 200 m<sup>3</sup> of material. **Drain spoils shall be deposited within the temporary stock-pile material area and kept separate from other drain excavation materials.**
- Placement of salvaged topsoil (50 mm minimum thickness), fine grading and hydraulic seeding, including the supply & installation of erosion control mats over new drain banks as shown on the Drawings and specified herein, as follows:
  - Station 0+435B to Station 0+467B - Placement of top soil, 50 mm minimum thickness (approx. 25 m<sup>3</sup>), fine grading and seeding complete with erosion control mat (approx. 435 m<sup>2</sup>), south bank only.
- Seeding of grass buffer strips, as follows:
  - Grading and seeding of 1 metre wide grass buffer strips (approx. 130 m<sup>2</sup>) from Station 1+110A to Station 1+239A on the south side of the existing drain.

**LEPAIN DRAIN RELOCATION WORK**

- Strip topsoil to minimum 250 mm depth over the entire proposed drain cross section width prior to drain excavation (approx. 800 m<sup>3</sup>). **All topsoil materials shall be deposited on the lands adjacent to the working corridor and kept separate from drain excavation materials.**



- Excavate new open drain along proposed alignment, approximately 360 lineal metres, Station 0+423B to Station 0+783B (approx. 3,090 m<sup>3</sup>) including trucking and disposal. Material to be trucked and stock piled on-site as specified herein.
- Placement of salvaged topsoil (50 mm minimum thickness), fine grading and hydraulic seeding, including the supply & installation of erosion control mats over new drain banks as shown on the Drawings and specified herein, as follows:
  - Station 0+435B to Station 0+467B - Placement of top soil, 50 mm minimum thickness (approx. 10 m<sup>3</sup>), fine grading and hydraulic seeding complete with erosion control mat (approx. 155 m<sup>2</sup>), south bank only.
  - Station 0+467B to Station 0+641.5B - Placement of top soil, 50 mm minimum thickness (approx. 115 m<sup>3</sup>), fine grading and hydraulic seeding complete with erosion control mat (approx. 2300 m<sup>2</sup>), both drain banks.
  - Station 0+688.5B to Station 0+725B - Placement of top soil, 50 mm minimum thickness (approx. 20 m<sup>3</sup>), fine grading and hydraulic seeding complete with erosion control mat (approx. 360 m<sup>2</sup>) between Station 0+607B to Station 0+641.5B, both drain banks.
  - Station 0+725B to Station 0+768B - Placement of top soil, 50 mm minimum thickness (approx. 10 m<sup>3</sup>), fine grading and hydraulic seeding complete with erosion control mat (approx. 190 m<sup>2</sup>), south bank only.
  - Station 0+768B to Station 0+783B - Placement of top soil, 50 mm minimum thickness (approx. 5 m<sup>3</sup>), fine grading and hydraulic seeding complete with erosion control mat (approx. 100 m<sup>2</sup>), both drain banks.
- Stone Erosion protection works as follows:
  - Station 0+423B to Station 0+435B - Supply and install 130 m<sup>2</sup> (300 mm thick) of stone erosion protection (SEP) including new filter fabric underlay on new drain channel.
  - Station 0+435B to Station 0+467B - Supply and install 200 m<sup>2</sup> (300 mm thick) of stone erosion protection (SEP) including new filter fabric underlay on north drain bank.
  - Station 0+725B to Station 0+768B - Supply and install 230 m<sup>2</sup> (300 mm thick) of stone erosion protection (SEP) including new filter fabric underlay on north drain bank.
- Seeding of grass buffer strips, as follows:
  - Grading and seeding of 1 metre wide grass buffer strip (approx. 360 m<sup>2</sup>) from Station 0+423B to Station 0+783B on the south side of the new drain.
- Clearing and grubbing of existing drain from Station 0+740A to Station 1+110A. Work includes the removal and disposal of all organic material prior to infilling.
- Hauling of subsoil and placement into the existing channel from Station 0+740A to Station 1+110A, including backfill, compaction, and reshaping of new banks (approx. 2,355 m<sup>3</sup>)
- Temporary silt control measures during construction. Including Rock Check Dam downstream of the proposed channel realignment (OPSD 219.211). Work to include subsequent removal of Rock Check Dam following construction completion.

## BRIDGE WORK

- Bridge No. 2 – (Meo Road 0+655B) - Supply and installation of a new 2730 mm span x 1830 mm rise precast concrete box culvert (CHBDC CAN/CSA S6-06), 35 m long with sloped stone end walls (approx. 240 m<sup>2</sup>) including clear stone levelling base (approx. 55 tonnes), compacted Granular ‘B’ backfill up to road subgrade (approx. 350 tonnes) and Granular ‘A’ road base minimum 300 mm thickness (approx. 295 tonnes).
- Temporary Access Bridge (0+825A) - Supply and installation of a temporary 1000 mm diameter corrugated steel pipe culvert (minimum 2.0 mm thickness), 14 m long with sloped stone end walls (approx. 20 m<sup>2</sup>) including clear stone levelling base (approx. 15 tonnes), compacted Granular ‘B’ backfill up to underside of driveway surface material (approx. 80 tonnes) and Granular ‘A’ driveway surface minimum 200 mm thickness (approx. 30 tonnes). Work includes the removal of the bridge and backfill upon completion of the drain works.

### **3.0 ACCESS TO THE WORK**

Access to the drain shall be from Disputed Road and Huron Church Line Road. The Contractor shall make his/her own arrangements for any additional access for his/her convenience. All road areas and grass lawn areas disturbed shall be restored to original conditions at the Contractor’s expense.

### **4.0 WORKING AREA (CONSTRUCTION)**

For the excavation of the new alignment for the LePain Drain, the working area shall include the area between the new relocated drain and the existing drain to be subsequently filled in which may be used for the stockpiling of salvaged topsoil to be reused for lining the new banks. The working corridor shall also include a 25 metre corridor measured off the existing north top of bank of the LePain Drain, and is to be used for stock piling of excavated materials from the new drain and for stockpiling of excess topsoil.

For the cleanout of the upstream portion of the existing drain from Huron Church Line Road to the realigned drain, access shall be on the north side.

The Contractor shall restrict his/her 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. The working corridor shall be measured from the top of the drain bank and shall be as follows:

<b>FROM STA.</b>	<b>TO STA.</b>	<b>PRIMARY (See Note 1)</b>	<b>SECONDARY (See Note 2)</b>
		<b><u>Existing Drain</u></b>	
0+740A	1+110A	25.0 m wide on north side from the top of existing drain bank	
1+110A	1+236A	9.0 m wide on north side from the top of existing drain bank	

<b>FROM STA.</b>	<b>TO STA.</b>	<b>PRIMARY (See Note 1)</b>	<b>SECONDARY (See Note 2)</b>
		<b><u>Realigned Drain</u></b>	
0+423B	0+783B	Area situated between realigned drain and existing drain	6.0 m wide on south side from the top of new drain bank
1+110A	1+236A	9.0 m wide on north side from the top of existing drain bank	6.0 m wide on south side from the top of new drain bank

Note 1: *Primary working corridor* indicates the access corridor along the side of the drain where excavation is recommended (unless noted otherwise below and/or in the Specifications, as well as all purposes listed for Secondary Working Corridors).

Note 2: *Secondary working corridor* indicates the access corridor alongside the drain where construction equipment may travel for the purpose of trucking, bank protection works, drain bank repairs, tile inlet repairs, surface water inlet repairs, grass buffer strips and other miscellaneous works. **No disposal of fill or levelling of materials shall be permitted within a secondary working corridor. As further specified, use of this secondary working corridor may be further restricted due to site condition. Read all Specifications, Drawings and/or notes before completing works.**

## 5.0 WORKING AREA (FUTURE MAINTENANCE)

The designated working corridor for future maintenance of the LePain Drain from Station 0+423B to Station 0+743B shall be a 9.0 metre corridor on the south side of the drain. The designated working corridor from Station 1+070A to Station 1+236A shall be a 9.0 metre corridor on the south side of the drain.

The Contractor shall restrict his/her 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. The working corridor shall be measured from the top of the drain bank and shall be as follows:

<b>FROM STA.</b>	<b>TO STA.</b>	<b>PRIMARY (See Note 1)</b>	<b>SECONDARY (See Note 2)</b>
0+000B	0+783B	9.0 m wide on south side from top of existing drain bank	Sandwich West Parkway Right-Of-Way
1+110A	1+236A	9.0 m wide on south side from top of existing drain bank	6.0 m wide on north side from top of existing drain bank

Note 1: *Primary working corridor* indicates the access corridor along the side of the drain where excavation is recommended (unless noted otherwise below and/or in the Specifications, as well as all purposes listed for Secondary Working Corridors).

Note 2: *Secondary working corridor* indicates the access corridor alongside the drain where construction equipment may travel for the purpose of trucking, bank protection works, drain

bank repairs, tile inlet repairs, surface water inlet repairs, grass buffer strips and other miscellaneous works. **No disposal of fill or levelling of materials shall be permitted within a secondary working corridor. As further specified, use of this secondary working corridor may be further restricted due to site condition. Read all Specifications, Drawings and/or notes before completing works.**

*\*Note: In the event that a landowner owns the property on both sides of the drain, the landowner can choose which side of the drain to place the spoil. The landowner should advise the Drainage Superintendent of their preference of spoil placement before improvements to the drain are made so that the Drainage Superintendent can notify the Contractor in advance.*

## SPECIAL PROVISIONS – OPEN DRAIN

### 6.0 BRUSHING

Brushing shall be carried out on the entire drain within the above identified sections of the drain where required and as specified herein. **All** brush and trees located within the drain side slopes shall be cut parallel to the side slopes, as close to the ground as practicable. Tree branches that overhang the drain shall be trimmed. Small branches and limbs are to be disposed of by the Contractor along with the other brush. Tree stumps, where removed to facilitate the drain excavation and reshaping of the drain banks, may be burned by the Contractor where permitted; otherwise, they shall be disposed of, off the site. The Contractor shall make every effort to preserve mature trees which are beyond the drain side slopes, and the working corridors. If requested to do so by the Drainage Superintendent, the Contractor shall preserve certain mature trees within the designated working corridors (see Section 4.0).

Except as specified herein, all brush and trees shall be stockpiled adjacent to the drain within the working corridors. Stockpiles shall not be less than 100 m apart and shall be a minimum of 2.0 m from the edge of the drain bank. All brush, timber, logs, stumps, large stones or other obstructions and deleterious materials that interfere with the construction of the drain, as encountered along the course of the drain are to be removed from the drain by the Contractor. Large stones and other similar material shall be disposed of by the Contractor off the site.

Following completion of the work, the Contractor is to trim up any broken or damaged limbs on trees which remain standing, disposing of the branches cut off along with other brush and leaving the trees in a neat and tidy condition. Brush and trees removed from the working area are to be put into piles by the Contractor, in locations where they can be safely burned, and to be burned by the Contractor after obtaining the necessary permits, as required. If, in the opinion of the Drainage Superintendent, any of the piles are too wet or green to be burned, he shall so advise the Contractor to haul away the unburned materials to an approved dump site. Prior to, and during the course of burning operations, the Contractor shall comply with the current guidelines prepared by the Air Quality Branch of the Ontario Ministry of Environment and shall ensure that the Environmental Protection Act is not violated. Since the trees and brush that are cut off flush with the earth surface may sprout new growth later, it is strongly recommended that the Municipality make arrangements for spraying this new growth at the appropriate time so as to kill the trees and brush.

As part of this work, the Contractor shall remove any loose timber, logs, stumps, large stones or other debris from the drain bottom and from the side slopes. **Timber, logs, stumps, large stones or other debris shall be disposed of off-site.**

### 7.0 EXCAVATION

#### 7.1 Excavation of Existing Drain Channel

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 reshaped. 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.

All excavated material from the LePain Drain between Station 1+110A and Station 1+239A shall be temporary stored within the stockpile area specified on the drawings and are to be handled in accordance with Section 7.2. These excavated drain spoils are to be kept separate from excavated

material from the realigned LePain Drain. Excavated material shall not be placed on dykes, in ditches, tiles or depressions intended to conduct water into the drain.

Seeding of the disturbed drain banks shall be completed immediately following drain construction and as specified in Section 11.0.

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.

## **7.2 Trucking and Stockpiling of Excavated Materials**

Excavated materials are to remain on site for the use of the residential development. The Contractor's attention is drawn to

The Contractor shall be solely responsible for acquiring any and all permits and approvals required prior to hauling and disposal of materials off-site. The Contractor shall restore any such areas which are damaged by his/her operations, to original or better condition. The Contractor will be held liable for damages to roads, sodded areas and gardens, resulting from his/her non-compliance with these Specifications.

## **8.0 NEW OPEN DRAIN CONSTRUCTION**

### **8.1 Setting Out**

Benchmarks are provided on the attached drawings (Page No. 1). From these benchmarks, the Contractor will do his/her 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 a discrepancy 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. The Contractor shall take every precaution and to ensure that the property limit is clearly and regularly marked and to have its accuracy confirmed by a professional land surveyor prior to constructing any part of the new drain.

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.

### **8.2 Profile and Excavation of New Drain Construction**

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.

### **8.3 Topsoil Stripping, Salvaging and Re-use on New Drain Banks and Buffer Strip**

Prior to any drain excavation from Station 0+423B to Station 0+783B, the topsoil shall be stripped across a minimum 10 m width over the proposed new drain location (360 m length) and temporarily stockpiled within the area specified. Topsoil shall be kept separate from excavated materials from the realigned drain. The salvaged topsoil shall be spread and levelled to a minimum 50 mm thickness on the banks of the newly constructed drain alignment from Station 0+423B to Station 0+783B, as well as on 1 m adjacent to the drain for the establishment of the grass buffer strip. It is anticipated that the amount of topsoil stripped will be greater than the amount required to fully dress the banks of the new drain alignment, however if needed, the Contractor may elect to import screened topsoil to complete the work at their expense. Excess topsoil shall not be removed from the site. Excess top soil is to remain stockpiled in the designated area for the future use of the proposed development.

### **8.4 Construction of Relocated Drain Portion Offline**

The Contractor shall construct the relocated LePain Drain offline from its outlet at the Disputed Road culvert (Station 0+423B) continuing upstream to Station 0+783B and stopping short of and without connecting into the abandoned LePain Drain at Station 1+110A. The purpose of the off line drain construction is to allow for the completion of the specified bank stabilization work to minimize erosion and sediment transport once the off line drain is subsequently connected to the upstream portion of the LePain Drain. Over this time period, the abandoned LePain Drain shall remain open and drainage maintained through the original alignment.

Prior to constructing the off line drain, the rock flow check dam shall be installed between Station 0+740 and 0+748 across the bottom of the drain in accordance with specification OPSD 219.211.

The Contractor shall complete the excavation of the new course of the drain from Station 0+423B to Station 0+783B. The subsoil is to be excavated from the new course, and is to be stockpiled within the area specified along the north bank of existing drain. Openings to be provided within the stockpiled windrow where necessary to ensure surface drainage is maintained for the lands north of the LePain Drain.

Excess soils are to remain within the stockpile area specified for the future use of the proposed development. 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.

### **8.5 Drain Bank Protection**

Protection of the newly formed drain banks shall be completed prior to infilling of the abandoned portion of the LePain Drain by hydraulic seeding as specified in Section 11.0, and installation of erosion control mats following drain construction and spreading of topsoil and as specified in Section 8.3.

A straw blanket shall be placed on the drain banks to protect against erosion where sloping stone erosion protection not specified. The blanket shall be “snake friendly” SBN 150 Erosion Control – 100% Straw, coconut mesh erosion blanket by North American Green (or approved equal). Blankets shall be supplied and installed in accordance with the manufacturer’s installation instructions. **Installation shall be in accordance with installation on shorelines, and shall be securely fastened to the drain banks using the required number of staples and staple pattern as per the manufacturer’s specifications.**

### **8.6 Filling and Levelling of Abandoned LePain Drain**

Native soil materials excavated from the new LePain Drain alignment shall be used to fill the abandoned LePain Drain original alignment. The work may proceed once the banks of the new

LePain Drain have been protected with erosion control mats as specified in Section 8.5. Prior to the infilling of the open drain, the Contractor shall remove all vegetation, organic debris and topsoil from the existing drain. **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.**

The native materials used to fill the drain shall be placed in maximum 250 mm loose lifts and compacted with a sheepsfoot type compaction equipment capable of achieving 95% of the maximum standard proctor density or better. For any existing lateral and main tile outlets that may exist within abandoned LePain Drain, the Contractor shall mark them for future relocation. The relocation of lateral drain tiles are the responsibility of the landowner.

## **9.0 STONE EROSION PROTECTION**

Erosion protection, as specified in the locations on the drawings, shall be constructed of quarry stone rip-rap consisting of 150 - 250 mm sized clear quarry angular limestone materials placed over a non-woven filter fabric Terrafix 270R or approved equivalent.

The maximum drain slope shall be 2:1 horizontal to vertical. The minimum thickness requirement of the erosion stone layer is 300 mm with no portion of the filter fabric to be exposed.

## **10.0 GRASS BUFFER STRIPS**

A 1 metre wide grass buffers shall be established and preserved immediately adjacent to south bank of the open channel from Station 0+423B to Station 0+783B and continue from Station 1+110A to 1+236A. 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 11.0 and top soil placement as described in Section 8.3.

## **11.0 HYDRAULIC SEEDING OF DRAIN BANKS & GRASS BUFFER STRIP ALONG NEW DRAIN CHANNEL**

All newly established drain banks and existing grassed areas disturbed by construction or as identified as new or existing grass buffers shall be seeded as specified herein. The existing ground surface to be seeded shall be loosened to a depth of 25 mm and shall be rendered uniformly loose for that 25 mm depth. 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. If mulching is required, it shall be carried out by the contractor as part of the item's tendered price.

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:

<i>Creeping Red Fescue</i>	20%
<i>Meadow Fescue</i>	30%
<i>Tall Fescue</i>	30%
<i>Timothy</i>	10%
<i>White Clover</i>	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 m<sup>2</sup>.

Fertilizer shall be 8-32-16 applied at 350 kg per 10,000 m<sup>2</sup>. It shall be in granular form, dry, free from lumps and in bags bearing the label of the manufacturer, indicating mass and analysis.

**The 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 TEMPORARY ACCESS BRIDGE CONSTRUCTION

### 12.1 Location of Temporary Access Bridge

The bridge shall be located and installed as shown on the drawings attached hereto.

### 12.2 Materials for Temporary Access Bridge

Materials shall be as follows:

<i>Culvert</i>	<b>Temporary Access Bridge – Station 0+835A:</b> 14.0 m long, 1000 mm diameter corrugated steel pipe culvert (CSP), wall thickness of 2.0 mm and 68x13 corrugations with rerolled ends.
<i>Pipe Bedding Below Pipe</i>	20-25 mm clear stone conforming to OPSS Division 10.
<i>Backfill to pipe springline</i>	Granular 'B' conforming to OPSS Division 10.
<i>Backfill up to underside of driveway surface</i>	Granular 'B' conforming to OPSS Division 10.
<i>Driveway Surface</i>	Granular 'A' conforming to OPSS Division 10, minimum 200 mm thickness.
<i>Erosion Stone</i>	All stone to be used for erosion protection shall be 125 – 250 mm clear quarried rock or OPSS 1004, minimum 300 mm thickness.
<i>Filter Fabric</i>	“Non-Woven” geotextile filter fabric with a minimum strength equal or greater than Terrafix 270R, Amoco 4546, Mirafi 140NC, or approved equivalent.

### 12.3 Lateral Tile Drains

The Contractor shall re-route any outlet tile drains, in consultation with the Drainage Superintendent, as required to accommodate the new culverts. Tile drain outlets through the wall of the new culvert will not be permitted. All costs associated with re-routing lateral tile drains (if any) shall be at the Contractor's expense.

### 12.4 Bridge Installation

Suitable dykes shall be constructed in the drain so that the installation of the pipe or 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; native materials shall be compacted to 95% of their maximum dry density.

### 12.5 Sloping Stone End Walls

Sloping stone end walls shall be constructed of quarry stone rip-rap, as shown on the drawings and 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. The minimum thickness requirement of the erosion stone layer is 300 mm, with no portion of the filter fabric to be exposed.

### 12.6 Native Materials

Native materials suitable for use as backfill, shall be salvaged from the bridge site as required to complete the work as shown on the drawings and/or from the drain excavation. Where there is an

insufficient amount of native fill materials for backfilling the culvert, the Contractor may elect to import additional dry native materials or alternatively use Granular 'B' at his/her own expense.

### **13.0 ROAD BRIDGE CONSTRUCTION**

#### **13.1 Location of New Bridge**

The bridge shall be located and installed as shown on the drawings attached hereto.

#### **13.2 Materials for New Road Bridge**

Materials shall be as follows:

<i>Culvert</i>	<b>Bridge No. 2 – Meo Road Station 0+665B:</b> <i>New 35.0 m long, 2730 mm span x 1830 mm rise precast concrete box culvert as per CHBDC CAN/CSA S06-06, as manufactured by Coldstream Concrete, or approved equivalent.</i>
<i>Pipe Bedding Below Pipe</i>	<i>20-25 mm clear stone conforming to OPSS Division 10.</i>
<i>Backfill to 300 mm above culvert</i>	<i>Granular 'B' conforming to OPSS Division 10.</i>
<i>Backfill up to driveway surface (within roadway)</i>	<i>Granular 'A' conforming to OPSS Division 10.</i>
<i>Backfill up to topsoil surface (outside of roadway)</i>	<i>Dry native material free of topsoil, organic matter, broken concrete, steel, wood and deleterious substances.</i>
<i>Erosion Stone</i>	<i>All stone to be used for erosion protection shall be 125 – 250 mm clear quarried rock or OPSS 1004, minimum 300 mm thickness.</i>
<i>Filter Fabric</i>	<i>“Non-Woven” geotextile filter fabric with a minimum strength equal or greater than Terrafix 270R, Amoco 4546, Mirafi 140NC, or approved equivalent.</i>

#### **13.3 Lateral Tile Drains**

The Contractor shall re-route any outlet tile drains, in consultation with the Drainage Superintendent, as required to accommodate the new culverts. Tile drain outlets through the wall of the new culvert will not be permitted. All costs associated with re-routing lateral tile drains (if any) shall be at the Contractor's expense.

#### **13.4 Sloping Stone End Walls**

Sloping stone end walls shall be constructed of quarry stone rip-rap, as shown on the drawings and 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. The minimum thickness requirement of the erosion stone layer is 300 mm, with no portion of the filter fabric to be exposed.

#### **13.5 Native Materials**

Native materials suitable for use as backfill, as defined under Section 13.2, shall be salvaged from the bridge site as required to complete the work as shown on the drawings and/or from the drain excavation. Where there is an insufficient amount of native fill materials for backfilling the culvert,

the Contractor may elect to import additional dry native materials or alternatively use Granular 'B' at his/her own expense.

#### **14.0 WORKING IN VICINITY OF PLAINS MIDSTREAM CANADA PIPELINE**

An agreement between the Town of LaSalle and Plains Midstream Canada shall be executed prior to the commencement of the work. The Contractor is required to follow all requirements set out in the agreement.

## **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. To access the electronic standards on the Web go to <http://www.mto.gov.on.ca/english/transrd/>. Under the title Technical Manuals is a link to the Ontario Provincial Standards. Users require Adobe Acrobat to view all pdf files.

## **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. To access the electronic standards on the Web go to <http://www.mto.gov.on.ca/english/transrd/>, click on "Library Catalogue," under the "Title," enter "Ontario Traffic Manual" as the search. Open the applicable "Manual(s)" by choosing the "Access Key," once open look for the "Attachment," click the pdf file. Users require Adobe Acrobat to view all pdf files.

**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.





PLAN NORTH

**LEGEND**

- MUNICIPAL BOUNDARY
- LEPAIN DRAIN DRAINAGE AREA BOUNDARY
- LEPAIN DRAIN
- OTHER DRAINS
- EXISTING BRIDGE
- NEW BRIDGE
- ⊕ TEMPORARY BRIDGE FOR CONSTRUCTION
- ⊕ LOCAL BENCHMARKS



**WATERSHED PLAN**  
SCALE=1:7,500

**SITE BENCHMARKS**

**BM1**—TOP OF SOUTHWEST CORNER OF CONCRETE CULVERT CROSSING DISPUTED ROAD AT STATION 0+728A  
ELEVATION=180.26m

**BM2**—TOP OF SOUTHWEST CORNER OF CONCRETE CULVERT CROSSING HURON CHURCH LINE ROAD AT STATION 1+240A  
ELEVATION=181.19m

**NOTE: CONTRACTOR TO VERIFY BENCHMARKS PRIOR TO CONSTRUCTION.**

**NOTE: CONTRACTOR IS RESPONSIBLE TO ARRANGE UTILITY LOCATES PRIOR TO CONSTRUCTION**

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1	CLIENT REVIEW	JUNE 8/22	MDH

DESIGN	REVIEWED BY
OEM	MDH
DRAWN	CHECKED BY
OEM	TRO
DATE	June 21, 2022
SCALE	AS SHOWN

PROJECT NO. 17-5772

DRAWING SCALES BASED ON A 11" X 17" SHEET

**'SCHEDULE G'**

Drainage Report for the  
**REALIGNMENT OF THE LEPAIN DRAIN (SILVERLEAF SUBDIVISION)**  
Town of LaSalle

SHEET TITLE: **WATERSHED PLAN**

PAGE NO.: 1 of 8

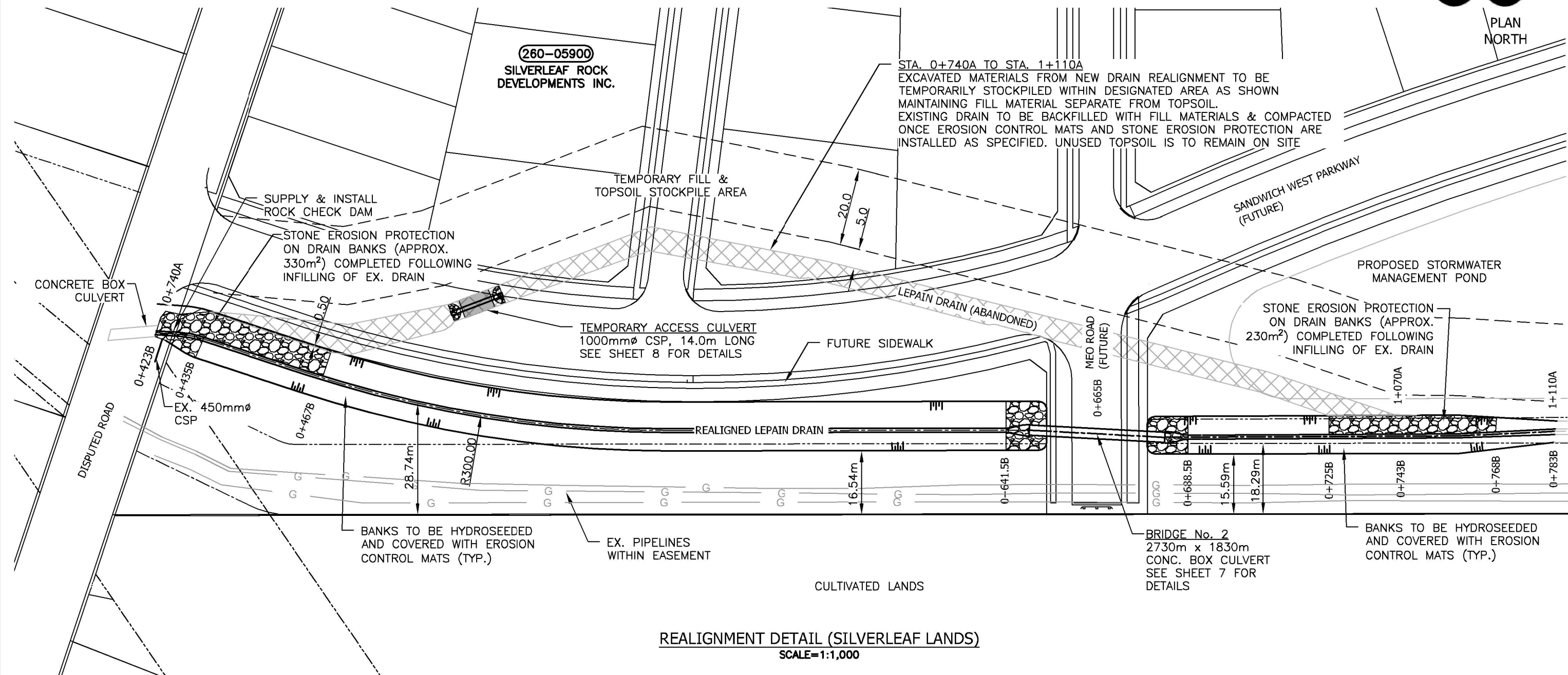




PLAN NORTH

260-05900  
SILVERLEAF ROCK DEVELOPMENTS INC.

STA. 0+740A TO STA. 1+110A  
EXCAVATED MATERIALS FROM NEW DRAIN REALIGNMENT TO BE TEMPORARILY STOCKPILED WITHIN DESIGNATED AREA AS SHOWN MAINTAINING FILL MATERIAL SEPARATE FROM TOPSOIL. EXISTING DRAIN TO BE BACKFILLED WITH FILL MATERIALS & COMPACTED ONCE EROSION CONTROL MATS AND STONE EROSION PROTECTION ARE INSTALLED AS SPECIFIED. UNUSED TOPSOIL IS TO REMAIN ON SITE



REALIGNMENT DETAIL (SILVERLEAF LANDS)  
SCALE=1:1,000

NOTE: NORTH LIMIT OF REALIGNED LEPAIN DRAIN SHALL MAINTAIN A 0.50m MINIMUM CLEARANCE FROM FUTURE SANDWICH SOUTH PARKWAY ROAD ALLOWANCE.

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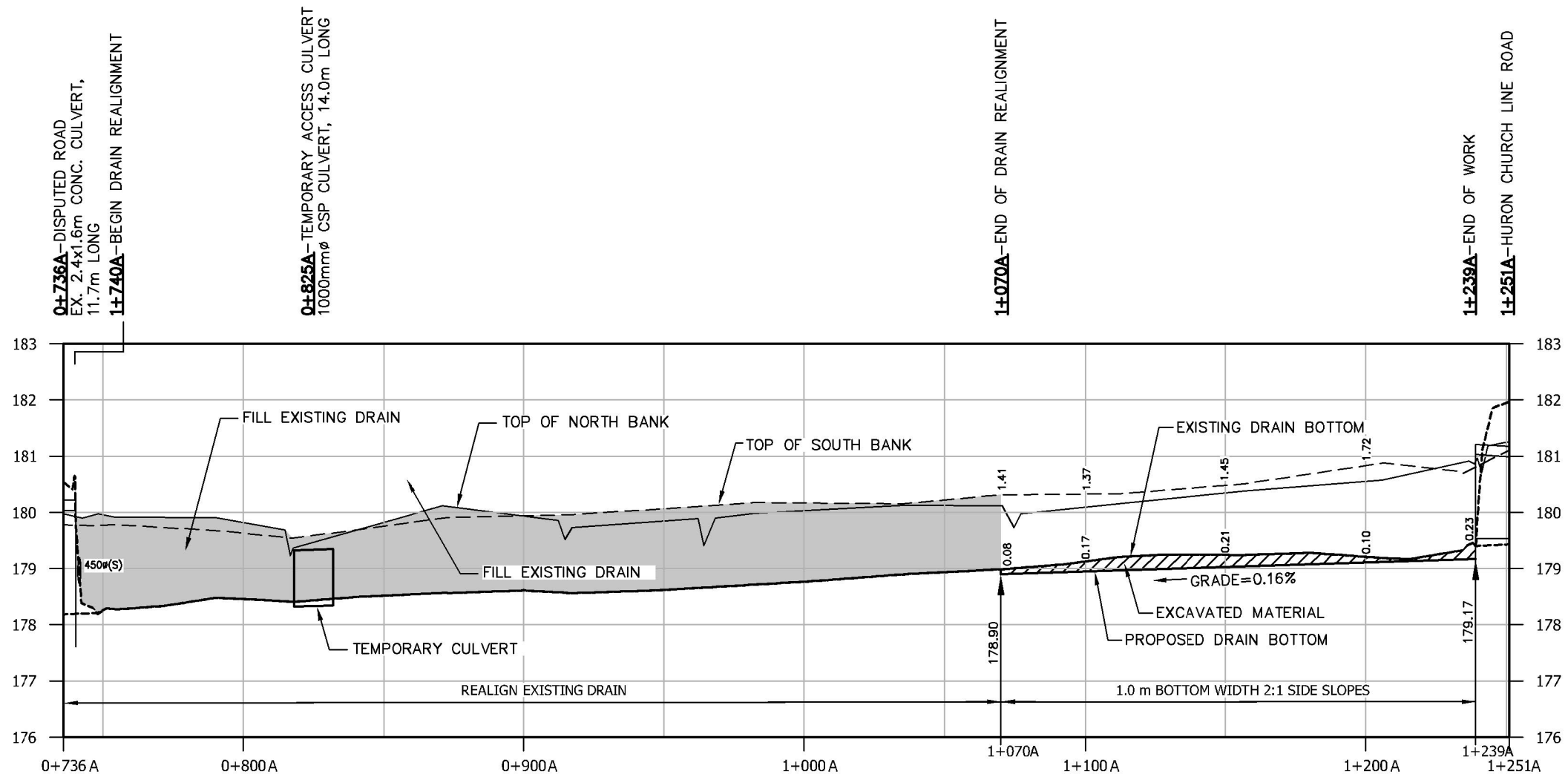
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OEM	MDH
DRAWN	CHECKED BY
OEM	TRO
DATE	June 21, 2022
SCALE	AS SHOWN

	PROJECT NO.	17-5772
	DRAWING SCALES BASED ON A 11" X 17" SHEET	

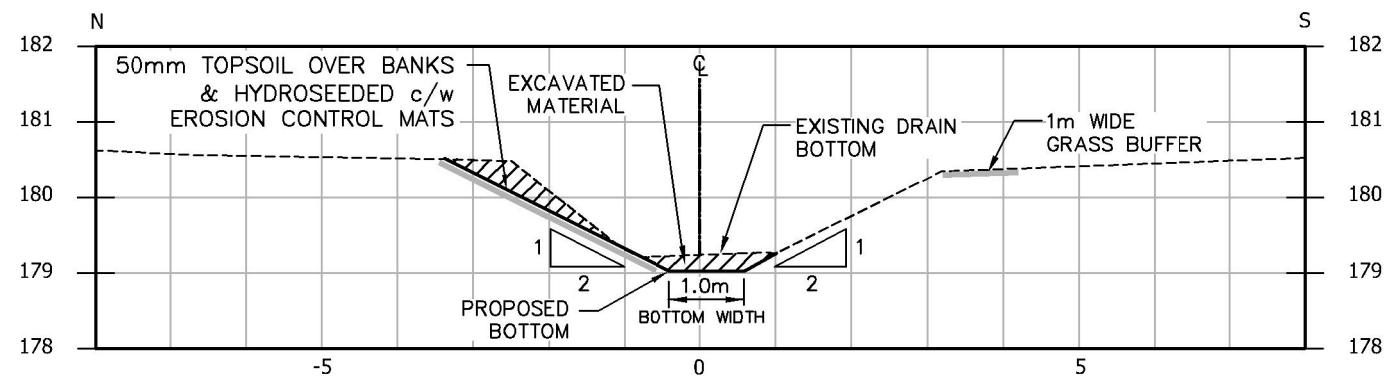
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Drainage Report for the REALIGNMENT OF THE LEPAIN DRAIN (SILVERLEAF SUBDIVISION) Town of LaSalle	
SHEET TITLE	REALIGNMENT DETAIL
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**PROFILE STA. 0+736A - STA. 1+239A**  
 SCALE--HORIZ.=1:2000  
 VERT.=1:100



**CROSS SECTION STA. 1+150A**  
 SCALE-1:100



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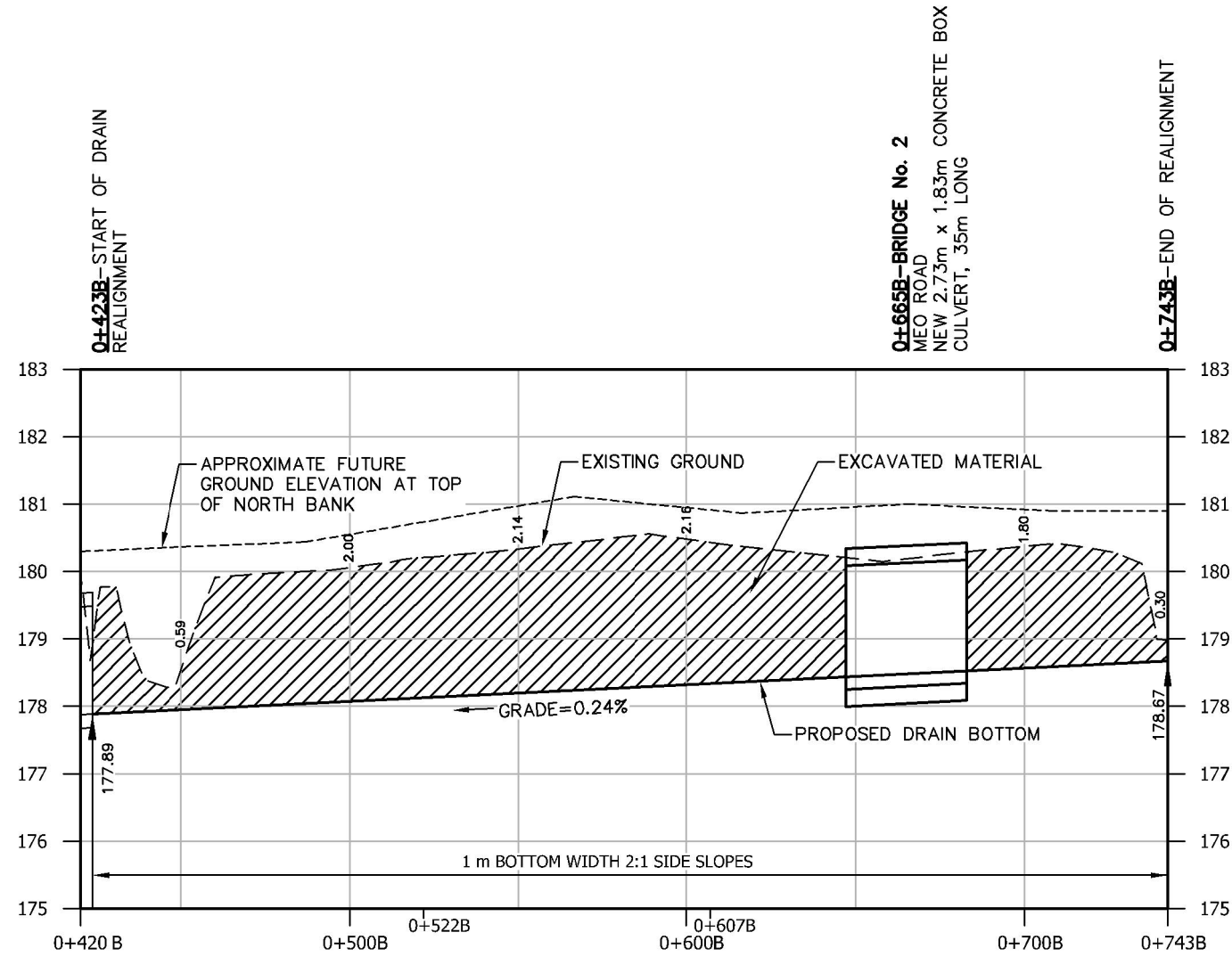
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DATE	June 21, 2022		
SCALE	AS SHOWN		

  
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 PROJECT NO. 17-5772  
 DRAWING SCALES BASED ON A 11" X 17" SHEET

**'SCHEDULE G'**  
 Drainage Report for the  
**REALIGNMENT OF THE LEPAIN DRAIN**  
 (SILVERLEAF SUBDIVISION)  
 Town of LaSalle  
 SHEET TITLE **EXISTING DRAIN PROFILE & SECTION**  
 PAGE NO. **3 of 8**

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PROFILE STA. 0+423B - STA. 0+743B  
 SCALE-HORIZ.=1:2000  
 VERT.=1:100



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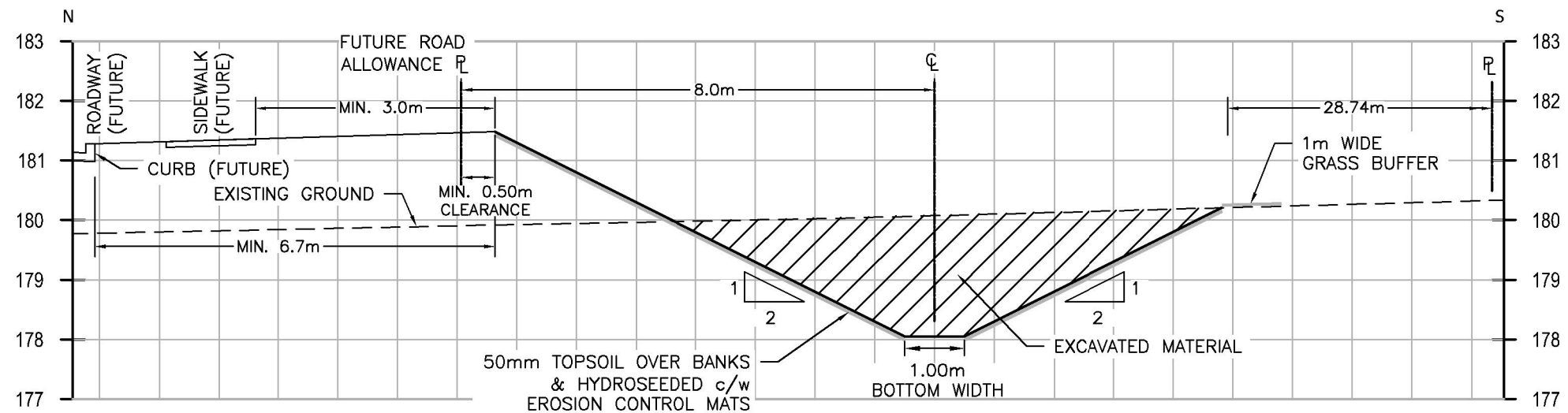
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PROJECT NO. 17-5772  
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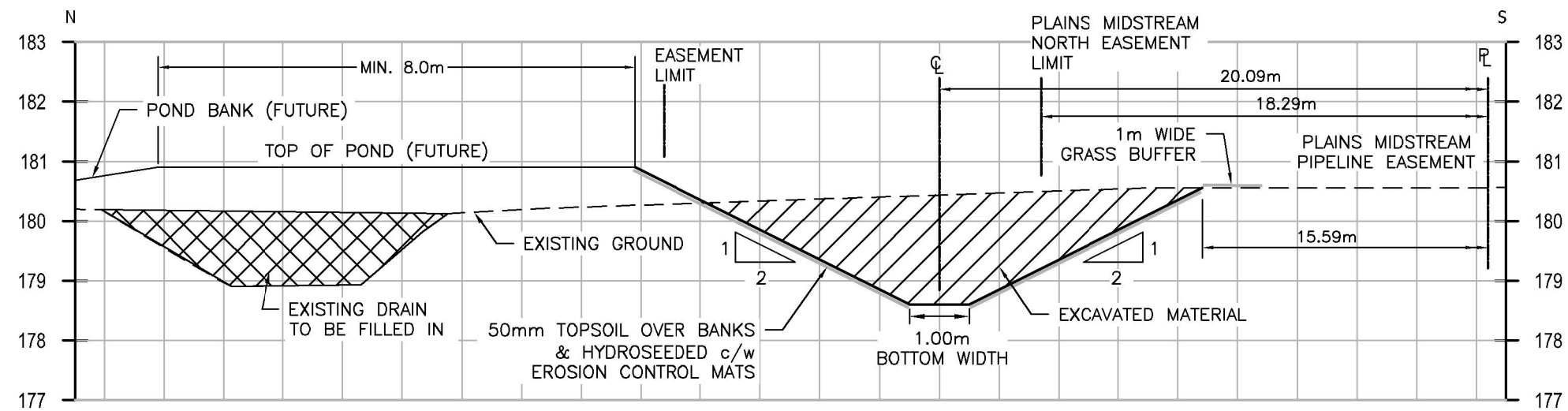
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 (SILVERLEAF SUBDIVISION)  
 Town of LaSalle

SHEET TITLE **REALIGNED DRAIN PROFILE**  
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**CROSS SECTION STA. 0+492B (LOOKING UPSTREAM)**  
SCALE-1:100



**CROSS SECTION STA. 0+718B (LOOKING UPSTREAM)**  
SCALE-1:100



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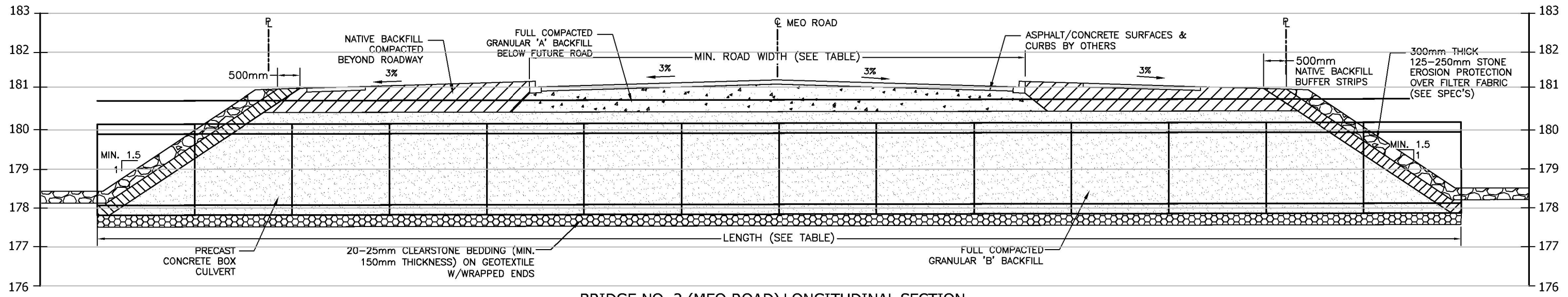
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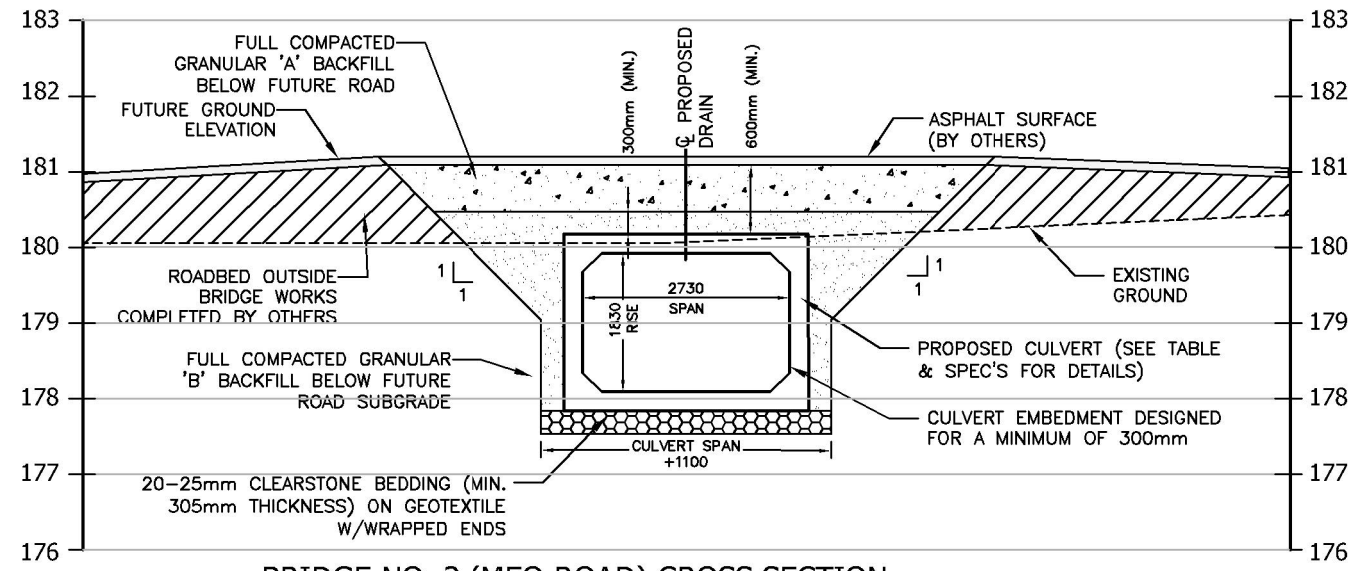
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Drainage Report for the <b>REALIGNMENT OF THE LEPAIN DRAIN</b> (SILVERLEAF SUBDIVISION) Town of LaSalle	
SHEET TITLE	<b>CROSS-SECTIONS</b>
PAGE NO.	5 of 8





**BRIDGE NO. 2 (MEO ROAD) LONGITUDINAL SECTION**

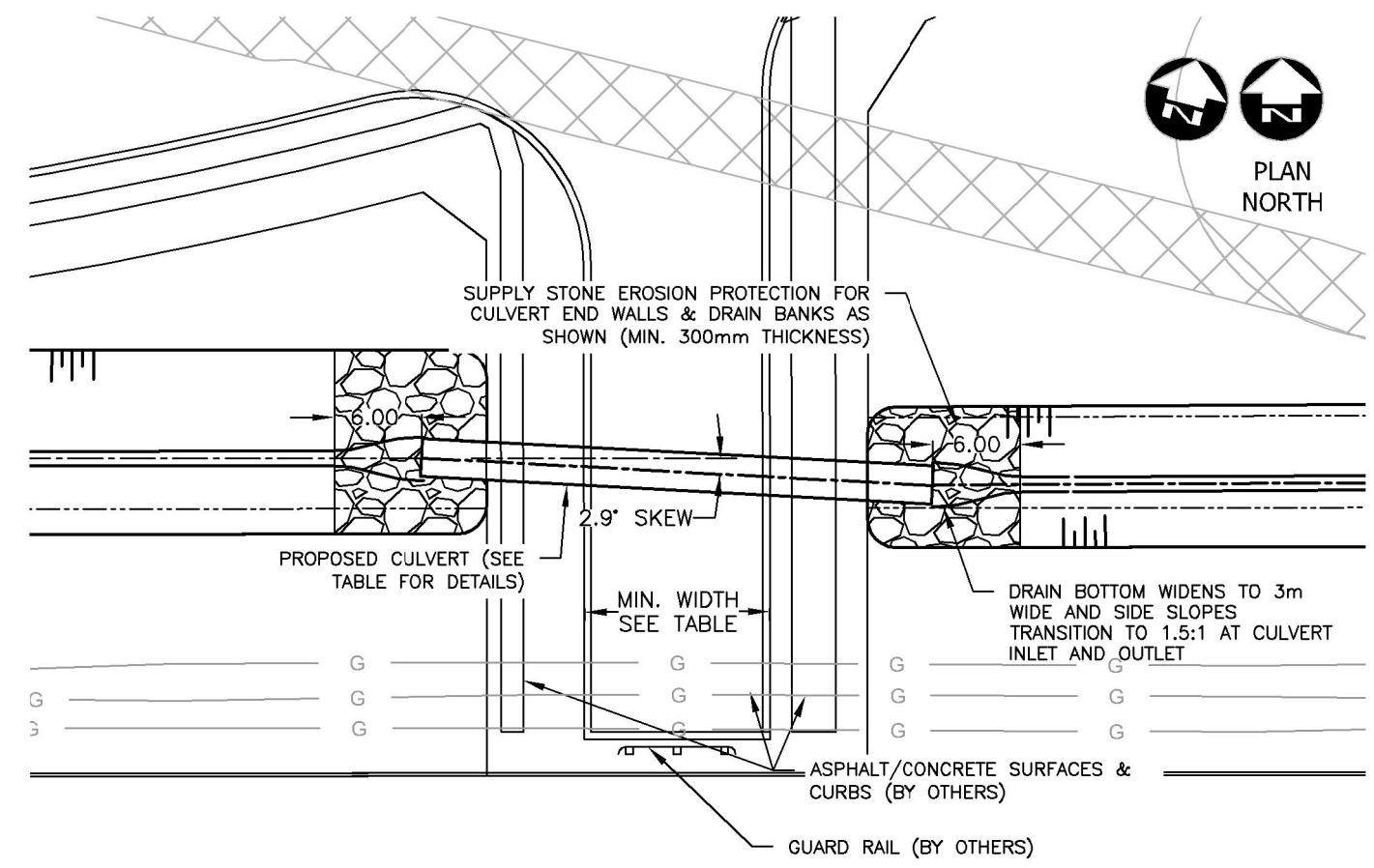
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**BRIDGE NO. 2 (MEO ROAD) CROSS SECTION**

SCALE=1:100

TABLE 1 - BRIDGE NO. 2 DESIGN INFORMATION	
CULVERT $\phi$ LOCATION (STA.)	0+665B
PIPE INVERT ELEV. U/S SIDE(m)	178.12
PIPE INVERT ELEV. D/S SIDE(m)	178.06
TOP OF $\phi$ DRIVEWAY SURFACE ELEV. (m)	181.19
DRAIN BOTTOM (m) (DESIGN) (AT CENTRELINE OF CULVERT)	178.47
MIN. ROAD WIDTH (INCL. CURBS) (m)	12.7
MIN. CULVERT GRADE (%)	0.10
CULVERT TYPE	BOX
CULVERT MATERIAL	CONC.
CULVERT LENGTH (m)	35.0
CULVERT SIZE (mm)	2730x1830
CULVERT ENDWALL TYPE	SLOPING STONE



**BRIDGE NO. 2 (MEO ROAD) DETAIL**

SCALE=1:500

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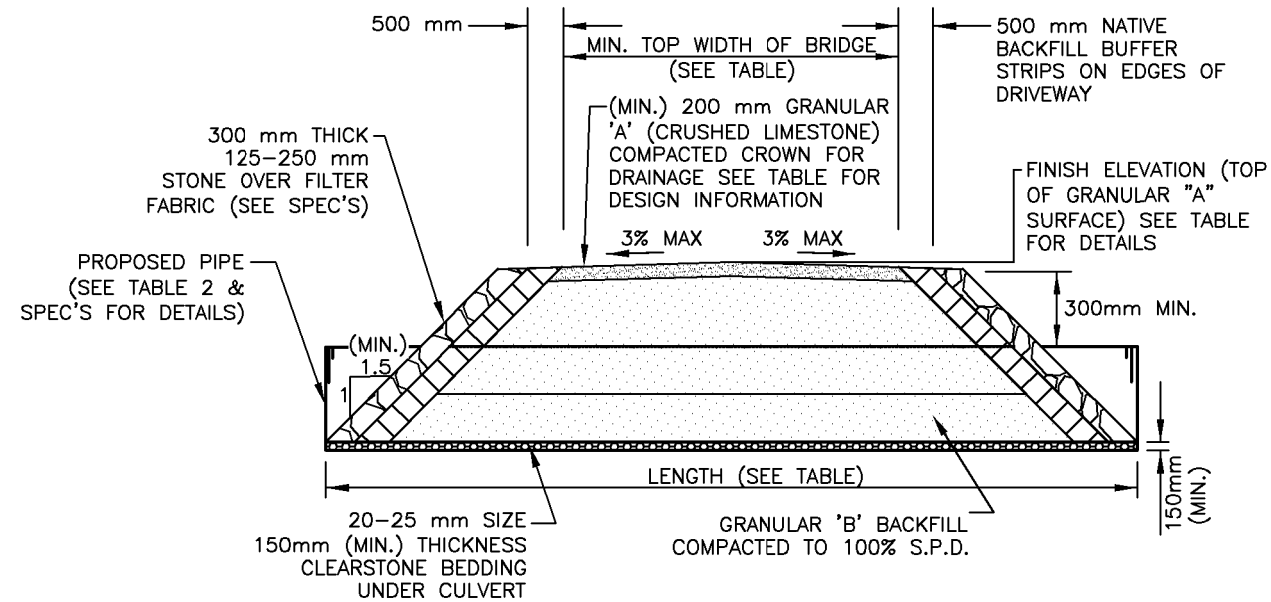
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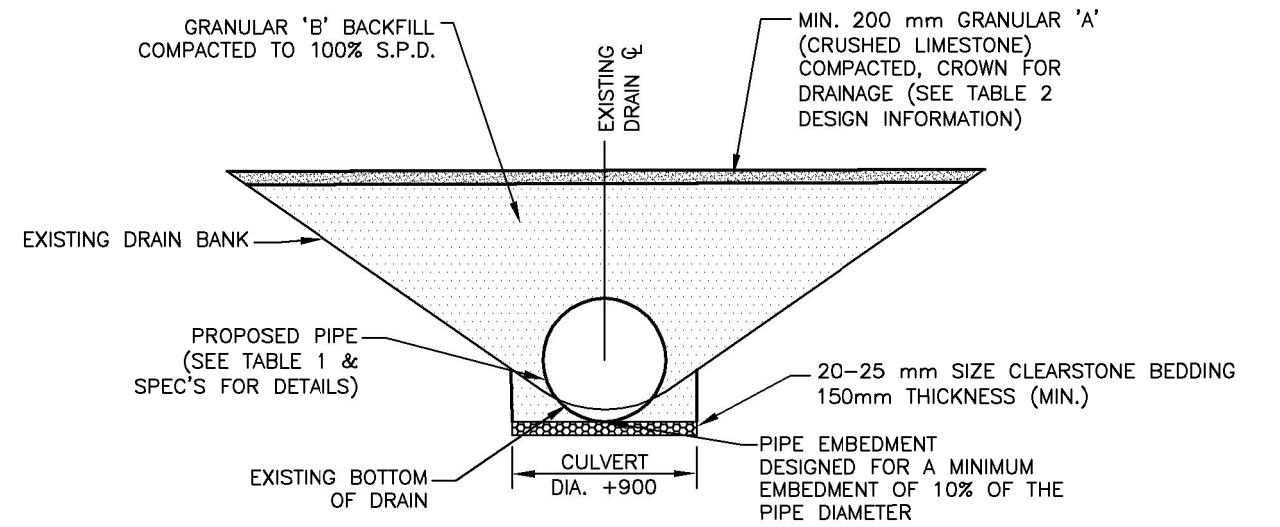
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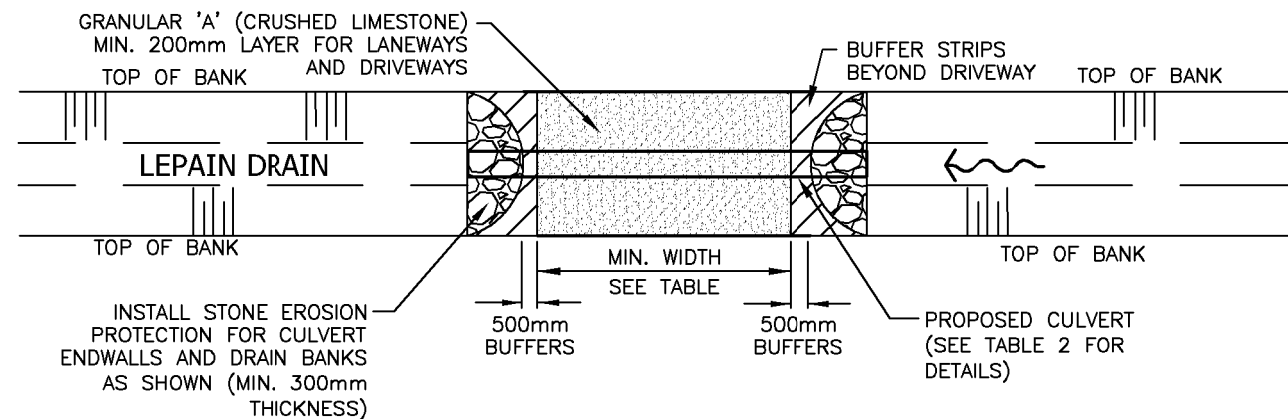
**'SCHEDULE G'**  
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**REALIGNMENT OF THE LEPAIN DRAIN (SILVERLEAF SUBDIVISION)**  
 Town of LaSalle  
 SHEET TITLE: **BRIDGE NO. 2 DETAILS**  
 PAGE NO.: **6 of 8**



**TEMPORARY BRIDGE LONGITUDINAL SECTION**  
SCALE=N.T.S.



**TEMPORARY BRIDGE CROSS SECTION**  
SCALE=N.T.S.



**TEMPORARY BRIDGE DETAIL**  
SCALE=N.T.S.

TABLE 2 – TEMPORARY BRIDGE DESIGN INFORMATION	
CULVERT $\phi$ LOCATION (STA.)	0+825A
PIPE INVERT ELEV. U/S SIDE(m)	178.35
PIPE INVERT ELEV. D/S SIDE(m)	178.32
TOP OF $\phi$ DRIVEWAY SURFACE ELEV. (m)	179.67
DRAIN BOTTOM (m) (DESIGN) (AT CENTRELINE OF CULVERT)	178.43
MIN. ROAD WIDTH (INCL. CURBS) (m)	7.3
MIN. CULVERT GRADE (%)	0.10
CULVERT TYPE	CSP
CULVERT MATERIAL	GALV.
CULVERT LENGTH (m)	14.0
PIPE SIZE (mm)	1000
CULVERT ENDWALL TYPE	SLOPING STONE

**NOTE:**  
 • LOCATION OF TEMPORARY ACCESS CULVERT MAY BE DETERMINED DURING CONSTRUCTION WITH APPROVAL OF DRAINAGE SUPERINTENDENT

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**DILLON CONSULTING**

PROJECT NO. 17-5772

DRAWING SCALES BASED ON A 11" X 17" SHEET

**'SCHEDULE G'**

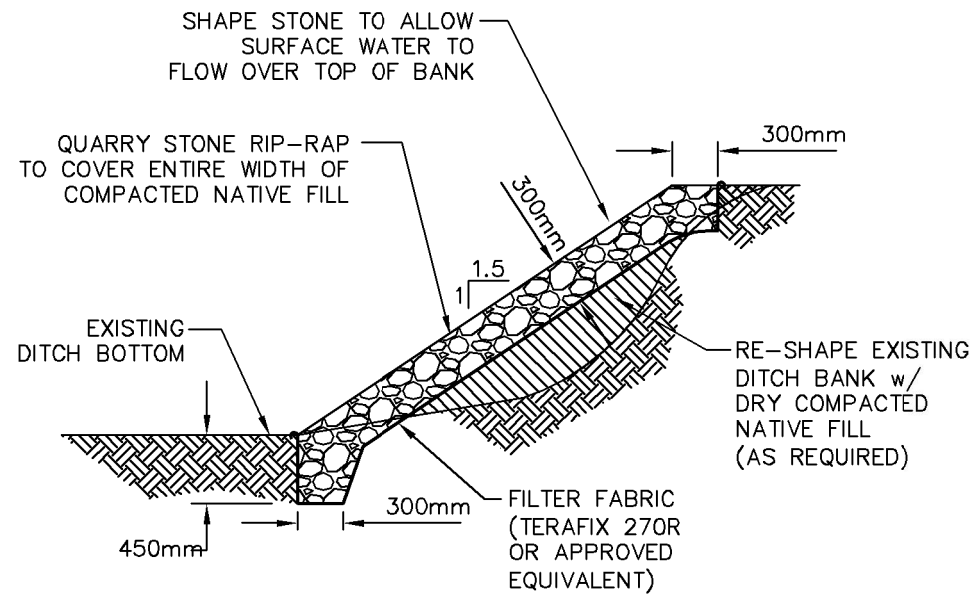
Drainage Report for the  
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 (SILVERLEAF SUBDIVISION)  
 Town of LaSalle

SHEET TITLE **TEMPORARY BRIDGE DETAILS**

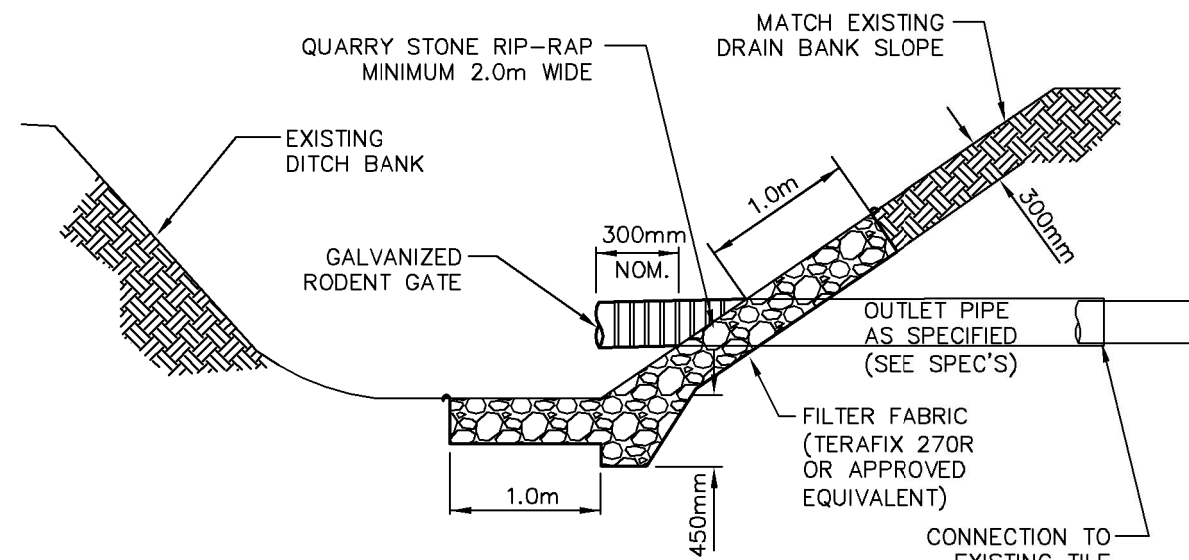
PAGE NO. **7 of 8**



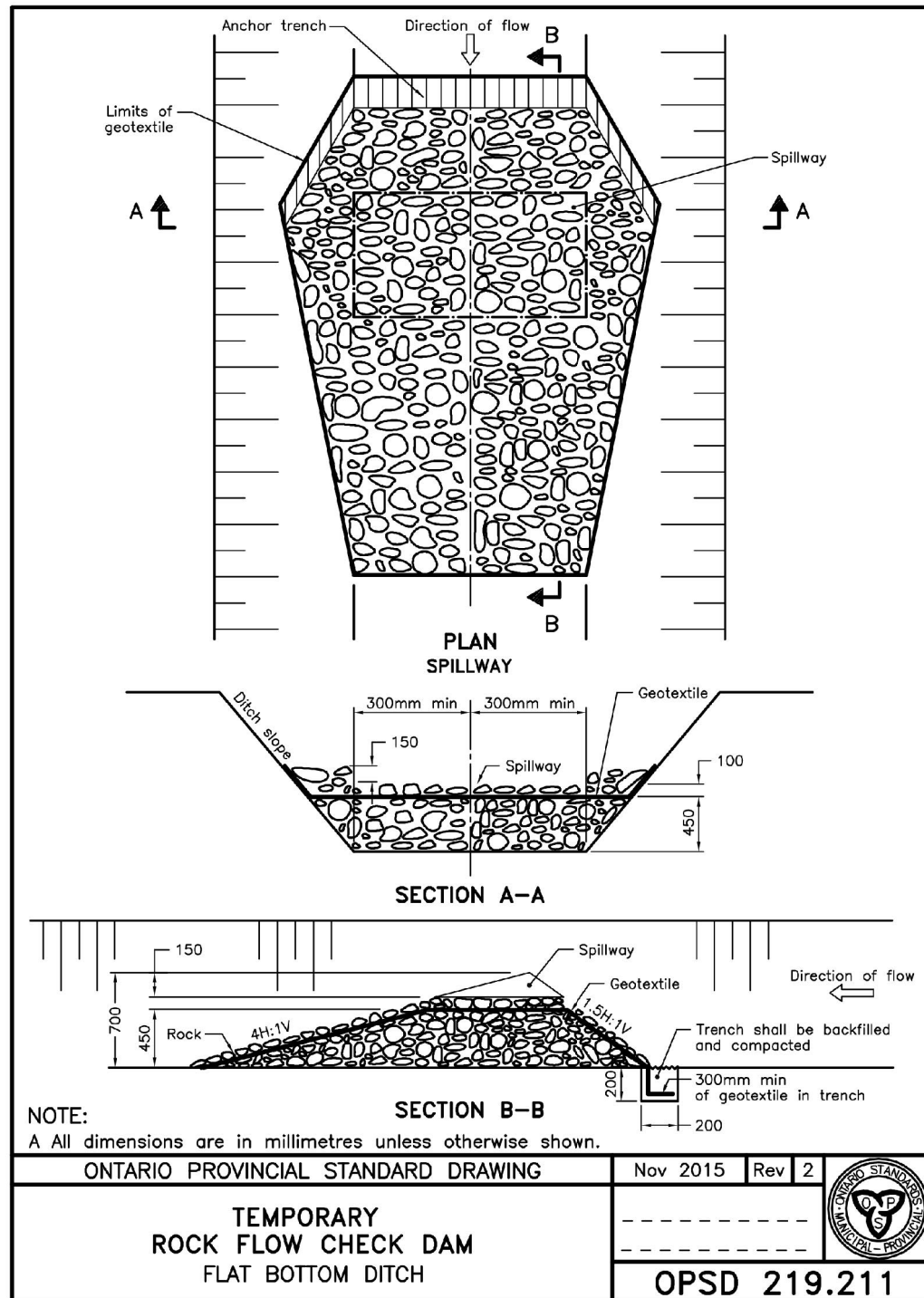
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**TYPICAL DITCH BANK WASHOUT  
DETAIL W/ BACKFILLING & RIP RAP  
NOT TO SCALE**



**TYPICAL TILE INLET REPLACEMENT DETAIL  
NOT TO SCALE**



ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2015	Rev 2	
<b>TEMPORARY ROCK FLOW CHECK DAM FLAT BOTTOM DITCH</b>		<b>OPSD 219.211</b>		



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**'SCHEDULE G'**

Drainage Report for the  
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Town of LaSalle

SHEET TITLE: **MISCELLANEOUS DETAILS**

PAGE NO. **8 of 8**