DRAINAGE REPORT
FOR THE

RUSH DRAIN RELOCATION AMENDMENTS

IN THE TOWN OF ESSEX

DILLON CONSULTING

2 MAY 2025

MARK D. HERNANDEZ, P.ENG.

FILE No. 19-1023

File No. 19-1023

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Drainage Report for the
RUSH DRAIN RELOCATION AMENDMENTS
In the Town of Essex

Mayor and Council:

Instructions

On 20 March 2023, Council appointed Dillon Consulting Limited under Section 78 of the Drainage Act to prepare a supplemental drainage report to address unforeseen circumstances encountered during construction of the drainage works recommended under the Drainage Report for the Relocation of the Rush Drain, dated 8 January 2021 (By-Law No. 1987). The drainage works recommended in the previous report remain incomplete and a new report is necessary to recommend drainage works to complete the Rush Drain.

Background

The original report dated 8 January 2021 was initiated upon a request for the relocation of the Rush Drain through Lots 284 & 285, Concession South Talbot Road (STR) by the owner of the lands referred to as the 'Essex Town Centre' (ETC) for the purposes of making the lands more open to proposed residential land development. In summary, the works included the following:

- Excavation of a new drain alignment situated around the south, east, and north boundary of the site with a cross-section of sufficient hydraulic capacity to convey the 100-year design storm event.
- Backfilling the existing Rush Drain alignment through the ETC lands and lands owned by Sturgeon Woods Trailer Park Ltd.
- Partial infilling and regrading of a private ditch serving the rear lots of industrial properties fronting Allen Avenue. The private ditch forms part of the Rush Drain and is referred to as the 'No-Name Drain'. Works included construction of rear yard catchbasins along the ditch connected to the Rush Drain.
- Construction of various culverts and drainage crossings.
- Drain clean-out of the 14th Concession East Drain.

Following passing of the by-law for the 8 January 2021 report and subsequent construction of the drainage works, the following items arose as part of the works that were not accounted for in the report:

- Three (3) additional rear yard catch basins were installed to pick up hidden private storm drain connections which discharged into the private ditch that was filled and replaced by the new Rush Drain alignment located behind existing industrial properties which front Allen Avenue. The catch basins were installed including piped outlets to the drain, complete with grates, flap gates and stone erosion protection. The original report had identified a total of five (5) similar catchbasin drains that were completed. The work has been completed as part of the Rush Drain construction however there are no means for the construction costs associated with the additional rear yard catchbasins to be assessed in the previous report.

- Existing guy wire anchors supporting a hydro pole located near Station 1+445 conflict with the drain relocation. This location is the upstream end of the drainage works proposed under the 2021 report and where the drain is proposed to turn easterly, instead of the existing southerly flow direction. Immediately upstream, the drain consists of a 2,060 mm x 1,520 mm corrugated steel pipe arch (CSPA) flowing from Allen Avenue and into the open portion of drain.

  It is impractical for the utility company to relocate the guy wires over the proposed drain bend considering the type and condition of the hydro pole. Dillon discussed an alternative approach with the utility company which included extension of the upstream CSPA drain enclosure to protect the integrity of the anchored pole. Connection cannot be made to start diverting upstream drainage flows from the Rush Drain until the remainder of the new downstream Rush Drain alignment is complete. There are no means to assess the costs associated with these additional works in the previous report.

- Soil contamination was discovered during excavation of the Rush Drain between Station 0+938 and Station 0+986 (referred to in this report hereon as the Soil Remediation Zone). Work on the drain halted and the portion of drain between said stations remains incomplete. A 300 mm diameter pipe was installed through the Soil Remediation Zone to provide drainage to industrial lots connected to the new constructed Rush Drain as a temporary measure. New recommendations to safely construct this portion of drain as well as handle and dispose of the associated contaminated soils are necessary. These works require a Qualified Person as described under the Excess Soils legislation (*On-Site and Excess Soil Management O.Reg 406/19*) to submit the procedure of handling and disposal of contaminated soils for their review and comment prior to construction. There are no means to assess the costs associated with these additional works in the previous report.

An application was made by the Town of Essex to the Agriculture, Food and Rural Affairs Appeal Tribunal (AFRAAT) under Section 58(4) of the Drainage Act to revise By-Law 1987.

The Tribunal rejected the request and recommended that one option to finish this project would be to appoint an engineer to prepare a new report under Section 78, which the Town accepted and appointed Dillon Consulting.

The purpose of this report is to address these items so the Rush Drain may be completed, and costs assessed accordingly. This report is considered supplemental to the 8 January 2021 report. The previous report is still considered the governing by-law for the sections of drain outside of this supplemental report.

Watershed Description

For the purpose of this report and accompanying drawings, the plan north direction is defined as being perpendicular to the King's Highway No. 3, with the said highway having an east-west alignment. The Rush Drain commences at the junction between Maidstone Avenue West and the Canadian Southern Railway and continues southerly as a closed drain across Allen Avenue to the southerly limit of the existing industrial properties. From there the Rush Drain continues as an open drain flowing in a southerly direction along the line between Lots 284 & 285 Concession STR to South Talbot Road allowance before turning east and then south again to align with and outlet into the 14th Concession East Drain.

For the purpose of future drainage assessments, we have divided the watershed area into block areas labelled Blocks 'A', 'B', 'C', and 'D' on the drawings appended to this report. Further details of the roll numbers are outlined in the 2021 report. The lands included within the Rush Drain watershed include a mix of existing residential and industrial land, denoted herein as Block 'A' having an area of approximately 45.12 hectares (111.5 acres).

The lower lands included within the Rush Drain watershed south of Block 'A' and lying west of the Cypher Systems Group Greenway corridor and to the north of South Talbot Road are slated for future residential and highway commercial development, being denoted herein as Block 'B' and Block 'C' respectively. Block 'B' has an area of approximately 33.55 hectares (82.9 acres). Block 'C' has an area of approximately 6.47 hectares (16.0 acres)

The King's Highway No. 3 and South Talbot Road allowance previously did not drain into the Rush Drain prior to its relocation. Said lands had direct outlet into the 14th Concession East Drain and its associated branch drain which runs westerly along the north side of highway. Since being relocated, the Rush Drain provides drainage for a portion of these roadways totalling approximately 5.41 hectares (13.4 acres).

The Rush Drain also provides outlet for the Cypher Systems Greenway lands and beyond to the east including Sadler's pond and the north-westerly portion of the Viscount Estates, as denoted herein as Block 'D'. Block 'D' has an area of approximately 8.71 hectares (21.5 acres).

The overall watershed area for the Rush Drain is approximately 102.2 hectares (252.6 acres) including Blocks 'A' to 'D'. Most of the land parcels within the Rush Drain watershed are systematically drained through urban storm sewer systems and roadside swales. There is little topographic relief. From the Ontario Soil Survey, the principle surficial soil in the study area is Brookston Clay and is characterized as a very slow draining soil type.

Drain History

The recent history of Engineers' reports for the Rush Drain prior to the 8 January 2021 report follows:

- **8 March 2006 by N.J. Peralta Engineering Ltd.:** The recommended work included the relocation of the open portion of the Rush Drain and the abandonment of the existing Rush Drain and Branch. The purpose of the drain relocation was to accommodate the request from the previous owner of the Essex Town Centre development (Block 'B') in 2006. The by-law for the report was passed, however only partial works were completed including the filling in of the Rush Drain Branch that was located along the northerly portion of the South Talbot Road allowance and extending from the Rush Drain easterly to the Cypher Systems Group Greenway corridor. Development plans were put on hold and the owner(s) of the said lands elected to sell the property thereafter. Subsequently, a private drainage ditch was constructed across the said development lands to pick up the drainage for part of the Greenway corridor that previously used the Rush Branch Drain as an outlet. Around the same time, maintenance work was performed to clean out the Rush Drain, 14th Concession East Drain Branch and a part of the 14th Concession East Drain to Pinkerton Road and beyond to the line between Lots 14 & 15, Concession 14.
- **29 November 1979 by LaFontaine, Cowie, Burratto and Associates Ltd.:** The report recommended enclosing the upper portion of the Rush Drain beginning from the Canadian Southern Railway along the south side of Maidstone Avenue West and extending through the Allen Avenue industrial subdivision, a total length of approximately 235 metres. The enclosed portion of drain consists of a 2060 mm span x 1520 mm rise arch pipe.
- **29 January 1965 by C.G.R. Armstrong, P.Eng.:** The recommended work included the repair and improvement of the Rush Drain and Branch, complete with brushing and cleaning. This report also included downstream cleanout works on the 14th Concession East Drain and 14th Concession East Drain Branch (previously known as the Munch Drain).

On-Site Meeting

An on-site meeting was held on May 10, 2023, at the Town Hall in Essex. The meeting was held to review the scope of the supplemental drainage report that would facilitate completion of the Rush Drain relocation project. A summary is provided below:

- Tim Oliver from Dillon Consulting Limited explained the need for a supplemental report due to the unforeseen items encountered during construction and that the new report is based on the recommended option provided by AFRAAT. Construction may not resume until a supplemental report is completed and must follow Section 78 of the Drainage Act.
- As required by the On-site and Excess Soil Management Regulation, the Town would hire an independent Qualified Person to address contaminated soils within the footprint of the Rush Drain. The Qualified Person would assist and provide guidance to Dillon in preparing recommendations which involve management of contaminated soils.

- The new report will include a cost estimate for the supplemental drainage works and a new assessment schedule for the distribution of costs. Tim Oliver noted the rationale in the previous report would be considered.
- Landowners may comment on the technical aspects at the meeting to consider and appeal assessments at the Court of Revision meeting.

Survey and Existing Conditions

Our original survey of the existing Rush Drain alignment and the surrounding lands it traverses (Blocks 'B' and 'C') was completed in March 2019 including the No-Name Drain which constitutes part of the Rush Drain.

Our additional survey of the areas of incomplete work and soil stockpiles was carried out in December 2024. A portion of the drain was surveyed both upstream and downstream of the proposed remediation area.

Design Considerations

To complete the construction of the Rush Drain expeditiously, a culvert enclosure is recommended to extend from the existing closed portion of drain where the upstream end of the realigned drain connects to the existing alignment. This closed drain extension is necessary to direct flows past the existing hydro pole and its guy wires without compromising the pole.

The required design criteria for the relocation of the Rush Drain were set out by the Town of Essex and Essex Region Conservation Authority. The relocated portion of drain was designed to convey the 100-year design storm event such that calculated 100-year water levels in the drain upstream and downstream of the relocation in the existing condition are maintained or lowered. This design criteria have been applied to the proposed closed drain section to by-pass the existing hydro pole and guy wires that are in conflict.

Regarding the contaminated soils, the Town of Essex retained RWDI Air Inc. as a Qualified Person defined under *O.Reg. 153/04: Records of Site Condition* of the *Environmental Protection Act* to prepare a Remedial Action Plan (RAP) to address environmental impacts associated with the completion of the Rush Drain through Stations 0+938 and Station 0+986. A revised final report dated May 2, 2025, was submitted to the Town based on site observations and soil analysis provided by Dillon Consulting Ltd. which were completed in 2021. The report is included in Schedule 'A' attached herein.

Recommendations

The following recommendations are provided to allow for the completion of the Rush Drain relocation works, and to assess costs not previously accounted for. Remaining drainage works specified under the 8 January 2021 report unchanged by this report shall be completed in accordance with the 2021 report.

Soil Remediation Zone

We recommend the Rush Drain be constructed through the Soil Remediation Zone in accordance with the RAP prepared by RWDI Air Inc. which has been appended hereto under Schedule 'A'.

Gabion stone erosion protection has been recommended on the drain banks through the entire remediated section of drain, and in the vicinity of existing hydro poles that are close to the drain bank within a 0.5 metre horizontal clearance. The remainder of the drain outside of the zone must be full vegetated before the Rush Drain may be connected to existing Rush Drain.

Enclosed Drain Portion

Following completion of the open portion of the drain, the portion of drain between Station 1+424 and Station 1+452 be enclosed with a 2,060 mm x 1,520 mm corrugated steel pipe arch complete with bends necessary to meet the new alignment of the Rush Drain. The alignment of this bend traverses north of the hydro pole and guy wire anchors instead of south, avoiding conflict. Two drainage pipes find outlet into the current Rush Drain alignment in the vicinity of the proposed closed drain extension. These outlets are proposed to tie directly into the new closed drain at a location where a prefabricated tee catchbasin will provide a point of inspection.

Upon completion of the amended works, the existing alignment of the Rush Drain shall be filled in, in accordance with the 8 January 2021 report.

No-Name Drain

The No-Name Drain is an existing drain that was partially filled and regraded between Station 0+000B and Station 0+377B, which lies west of Bell Ave, and constitutes part of the Rush Drain. The portion east of Bell Avenue (Station 0+397B to Station 0+540B) and one rear yard catchbasin (Mun No. 280 Allen Ave.) were not constructed as it was determined to not to be necessary during construction considering ground elevations are higher than the minimum top of bank elevation. We recommend these drainage works be abandoned under Section 19 of the Drainage Act. This abandonment excludes the 4.5 metre wide working corridor which shall remain.

We recommend that the three new rear yard catchbasins installed at Stations 0+025B, 0+056B, and 0+259B all be incorporated as part of the drainage works. Drawings and specifications are included herein for their future maintenance.

Existing Rush Drain

The existing Rush Drain shall be filled in upon completion of the Rush Drain where the new drain banks have vegetation fully established in accordance with the 8 January 2021 report. Excavated material from the construction of the Rush Drain relocation has been stockpiled along the east bank of the existing Rush Drain and along the newly excavated relocated drain in the vicinity of Bell Avenue. Stockpiled material shall be used to infill the existing Rush Drain.

The owner of property Roll No. 210-00506 (Sturgeon Woods Trailer Park Ltd.) is undergoing development of land where the Rush Drain is to be filled in. The downstream most 10 metres of open drain shall be abandoned, however shall remain open for the use of the owner. The open ditch shall be maintained by the owner of land which the ditch resides.

Allowances

In accordance with Sections 29 and 30 of the Drainage Act, the 8 January 2021 report determined the amount to be paid to the owners for damages to lands and crops (if any) occasioned by the operation of equipment and the disposal of material excavated from the drain. For affected lands which are presently occupied by the abandoned Rush Drain, we have not provided a damage allowance since the said lands occupied by the abandoned drain when filled in become re-usable and are no longer encumbered.

For non-agricultural lands which may be disturbed during the drain excavation works, we have recommended the restoration to original or better than original conditions in lieu of providing a damage allowance. Allowances for damages for installation of rear yard catch basins on properties on the No-Name Drain were paid under the previous report. Therefore, 'Schedule B' for Allowances has not been included in this report.

Cost Estimate of Supplemental Drainage Works

We have estimated the costs of the recommended drainage improvements so the Rush Drain Relocation may be completed, as outlined below:

Item	Description	Amount
	RUSH DRAIN	
1.	Construction of the Rush Drain through the Soil Remediation Zone in accordance with the RAP prepared by RWDI Air Inc., as follows:	
	a) Decommission three (3) monitoring wells (5.2 m deep) adjacent to drainage channel prior to excavation, completed by a licensed well driller.	$5,000.00
	b) Excavation of the Soil Remediation Zone from Station 0+938 to Station 0+986 to a depth of approximately 3.0 mbgs, totalling approximately 48 lineal metres of drain and approximately 1,560 m^3. Excavation shall be conducted as specified on the Drawings and the RWDI report attached herein. Work includes removal and disposal of the temporary 300 mm diameter pipe. Note: Excavation may only proceed following approval from the Qualified Person which shall be based on soil tests. Stockpiling of contaminated material on-site is **not** permitted.	$78,000.00

Item	Description	Amount
	c) **Provisional:** Excavation of the Soil Remediation Zone from Station 0+938 to Station 0+986 from a depth of approximately 3.0 mbgs to 4.6 mbgs, totalling approximately 48 lineal metres of drain and approximately 1,180 m^3. Excavation shall be conducted as specified on the Drawings and the RWDI report attached herein. Note: Excavation may only proceed following approval from the Qualified Person which shall be based on soil tests. Stockpiling of contaminated material on-site is **not** permitted.	$59,000.00
	d) Trucking and disposal of contaminated material at a MECP-licenced waste disposal facility (approximately 1,560 m^3). Work shall comply to requirements under *O.Reg 406/19* including all documentation requirements.	$329,200.00
	e) **Provisional:** Trucking and disposal of contaminated material at a MECP-licenced waste disposal facility (approximately 1,180 m^3). Work shall comply to requirements under *O.Reg 406/19* including all documentation requirements.	$249,000.00
	f) Removal and disposal off-site of accumulated groundwater within the work area, considered to be liquid waste (approximately 10,000 Litres with Ontario Waste Class 221L Oily Water) in accordance with the Ontario Water Resources Act, O. Reg 387/04 and the Environmental Protection Act, O. Reg. 63/16. *Note: Groundwater is not acceptable quality for discharge as surface water*	$25,000.00
	g) Supply & installation of 10 mil polypropelene (PP) sheeting over walls of excavated zone for an approximate area of 605 m^2.	$2,500.00
	h) Backfill of Soil Remediation Zone as specified on the Drawings and the RWDI report attached herein with clean clay material, compacted to 95% S.P.D. (maximum 300 mm thick lifts) (approximately 990 m^3). Imported material shall adhere to Table 3.1 or better of the Excess Soil Quality Standards (ESQS) from the Rules for Soil Management and Excess Soil Quality Standards (MECP, 2022)	$53,600.00

Item	Description	Amount
	i) **Provisional:** Backfill of Soil Remediation Zone as specified on the Drawings and the RWDI report attached herein with clean clay material, compacted to 95% S.P.D. (maximum 300 mm thick lifts) (approximately 1,180 m^3). Imported material shall adhere to Table 3.1 or better of the Excess Soil Quality Standards (ESQS) from the Rules for Soil Management and Excess Soil Quality Standards (MECP, 2022)	$64,100.00
	j) Supply & installation of the stone erosion protection, as follows:	
	i. Station 0+938 to Station 0+986 - Supply and installation of stone erosion protection (SEP) (min. 300 mm thickness) including new filter fabric underlay across full channel (approximately 520 m^2).	$55,000.00
	ii. Station 0+987 – Supply and installation of stone erosion protection (SEP) (min. 300 mm thickness) including new filter fabric underlay at hydro pole location on drain bank (approx. 10 m^2).	$1,000.00
	k) Co-ordination with Hydro One for working in close proximity to hydro lines and poles, including but not limited to two (2) pole hold requests and line cover-up.	$18,000.00
	l) Supply and place temporary steel plates to protect future road subgrade for Bell Avenue starting from Allen Avenue southward to south side of Rush Drain (box culvert) approx. 90 m length for truck haul route.	$30,000.00
	m) Stormwater Runoff Management Plan.	$5,000.00
	n) Temporary flow diversion during construction.	$10,000.00
	o) Temporary fencing during construction.	$5,000.00

Item	Description	Amount
2.	Drain Enclosure - Station 1+424 to Station 1+452 - Remove and dispose of existing bagged concrete headwall off-site. Supply and install 2010 mm x 1530 mm corrugated steel pipe arch, 27.6 m long complete with prefabricated pipe sections including 22 degree bend, 45 degree bend, and pre-fabricated 600 mm diameter and 150 mm diameter 'Tees'. Coupled to existing 2010 mm x 1530 mm corrugated steel pipe arch and stone erosion end protection (min. 300 mm thickness) (approximately 155 m^2). 19 mm clearstone bedding and backfill up to pipe springline (approx. 90 tonnes), and native material above (approx. 80 m^3). Minimum 100 mm of topsoil, fine graded and seeded to be placed over disturbed areas. Work includes rerouting two (2) existing 100 mm diameter Big 'O' pipes, including appurtenances. The Contractor shall be responsible for costs of, and coordination with Hydro One related to temporary utility pole supports where required. **Note: This work shall be completed following completion of the open drain within the Soil Remediation Zone.**	$80,000.00
5.	Temporary Silt Control Measures During Construction	$1,500.00
	SUB-TOTAL – EXCLUDING NET HST	**$1,070,900.00**
6.	Survey, Report, Assessment, Meetings and Final Inspection (cost portion)	$62,000.00
7.	Construction observation & contract administration	$66,500.00
8.	Expenses and incidentals (cost portion)	$1,000.00
9.	ERCA review permit fee	$800.00
10.	RWDI Air Inc. – Remedial Action Plan Report	$28,292.00
11.	RWDI Air Inc. – Environmental assistance during construction including construction observation, waste characterization, soil verification sampling, and excess soil documentation reviews (if required).	$49,100.00
	TOTAL – EXCLUDING NET HST	**$1,278,592.00**

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.

Actual Costs of Unassessed Additional Works

The costs of the additional works associated with the Rush Drain construction which are not otherwise assessable under By-Law No. 1987 are detailed below. Costs shown reflect actual amounts and exclude municipal administration costs and HST.

Item	Description	Amount
1.	Supply and install additional 450 mm diameter HDPE rear yard catchbasin (RYCB) including 6 m long, 300 mm diameter outlet pipe and flap gate at the following locations:	
	• Station 0+025B	$3,650.00
	• Station 0+056B	$3,650.00
	• Station 0+259B	$3,650.00
2.	Supply and install a 60 m long, 300 mm diameter HDPE by-pass pipe through the contaminated area in alignment with the drain centreline for the purposes of draining standing water from the upstream Rush Drain.	$4,000.00
3.	Additional works involving test pit excavation (30 test pits) performed on September 29th providing assistance including survey to layout the test pit locations for soil sampling taken within the contaminated area of the Rush Drain.	$4,000.00
4.	Construction observation, contract administration and assistance with soil contamination.	$25,295.00
5.	Soil sampling & laboratory fees	$8,491.00
	SUB-TOTAL – EXCLUDING NET HST	**$52,736.00**
6.	Preparation of the supplemental report and assessments (cost portion).	$8,000.00
	TOTAL – EXCLUDING NET HST	**$60,736.00**

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 special feature that may not affect function of the drain) or increased costs to the drainage works due to presence of a public utility or road authority).*

Assessment Rationale (Supplemental Drainage Works)

We have assessed the estimated costs against the affected lands and roads listed in Schedule 'C-1' under 'Special Benefit", "Benefit", and "Outlet". Details of Special Benefit listed in Schedule 'D-1' were derived as follows:

1. The increased costs associated with construction of the Rush Drain through the Soil Remediation Zone, including engineering cost apportionment (or otherwise stated) shall be assessed as outlined below:

    i. Costs associated with working in proximity of power utilities shall be assessed against Hydro One Networks Inc. as a non-prorateable assessment in accordance with Section 26 of the Drainage Act.

    ii. We recommend $23,711.00 be assessed in the same proportions listed in Schedule 'C-1' of the report for the Relocation of the Rush Drain dated 8 January 2021 as a non-prorateable assessment. This portion of costs represents the tendered value of drainage works (excluding applicable taxes) that are supplanted by the soil remediation works. The tendered value is the costs of construction that would have been assessed against the watershed in the original 2021 report. Engineering fee apportionment for this special benefit item is omitted because the assessed lands and roads already have a report fee assessment in the 8 January 2021 Report and by-law.

    iii. The remaining costs are assessed against Block 'B' Lands (Essex Town Centre Ltd.). The proposed drain alignment is necessary for the development considering the proposed land development plan and the storm pond constructed adjacent to the drain requiring soil remediation. Block 'B' Lands therefore derive the greatest benefit from completing the drain in its proposed location.

    In our considered opinion, lands and roads within the watershed not associated with the ETC development have already been assessed a fair portion of the construction and engineering costs for the Rush Drain through the 2021 report for the increased level of service provided by the upgraded drain design. The increased level of service is independent from the alignment of the drain and is not further increased by addressing the soil remediation.

2. The cost of enclosing the drain between Station 1+424 to Station 1+452 to avoid the existing hydro pole and guy wire support anchors including the rerouting of the existing tiles, engineering cost apportionment and application to the Essex Region Conservation Authority, shall be assessed as outlined below:

    i. We recommend $10,500.00 of the costs are assessed in the same proportions in accordance with Schedule 'C-1' of the report for the Relocation of the Rush Drain dated 8 January 2021 as a non-prorateable assessment. This portion of costs represents the tendered value of drainage works (excluding applicable taxes) that are supplanted by the enclosure that was assessed among the watershed in the original report. Engineering fee apportionment for this special benefit item is omitted because the assessed lands and roads already have a report fee assessment in the 8 January 2021 Report and by-law.

ii. We recommend $28,500.00 (plus engineering fee apportionment) of the costs be assessed against Hydro One Networks Inc. as an increased cost due to the presence of the utility in accordance with Section 26 as a non-prorateable assessment. This assessment was derived based on the increased cost should the alignment of the open drain deflect southerly to avoid the conflicting guy wires. The increased cost accounts for a longer open section of drain that would have been necessary to construct, including additional stone erosion protection necessary to avoid the pole and guy wires.

iii. The remaining costs shall be assessed against Block 'B' Lands (Essex Town Centre Ltd.) as the purpose of the enclosure is to allow the drain's construction to be completed in an alignment that suits the development and would otherwise interfere with proposed future lots and/or roadways. The installation of an enclosed drain therefore provides the greatest benefit to the owner of the land development.

In our considered opinion, lands and roads within the watershed not associated with the ETC development have already been assessed a fair portion of the construction and engineering costs for the Rush Drain through the 2021 report for the increased level of service provided by the upgraded drain design. The increased level of service is independent from the alignment of the drain and is not further increased by addressing the soil remediation.

Assessment Rationale (Unassessed Additional Works)

We have assessed the costs associated with the additional works against the affected lands and roads listed in Schedule 'C-2' under 'Special Benefit", "Benefit", and "Outlet". Details of Special Benefit listed in Schedule 'D-2' were derived as follows:

1. The costs associated with the rear yard catchbasins are assessed in accordance with Schedule 'C-1' of the report for the Relocation of the Rush Drain dated 8 January 2021.
2. Costs associated with the contaminated soils, being installation of the 300 mm diameter by-pass pipe, assistance with soil test pits, laboratory fees and associated engineering fees are assessed 100% against Block 'B' lands. The rationale again being that Block 'B' Lands derive the greatest benefit from completing the drain in its proposed location.

Future Maintenance (Rush Drain)

We recommend that future work of repair and maintenance of the Rush Drain and the additional catchbasins be carried out by the Town of Essex and the costs assessed against the affected lands and roads as outlined in the 2021 report. Future work of repair and maintenance of the enclosed portion of the Rush Drain (Station 1+424 to Station 1+452) shall be assessed 50% against Block 'B' and 50% against upstream lands in the same proportions as shown Schedule C-1 of By-Law 1987.

Drawings and Specifications

Attached to this report is "Schedule F," which contains 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 8:	**Watershed Plan**
Page 2 of 8:	**Plan (Sta. 0+925 to Sta. 1+452)**
Page 3 of 8:	**Rush Drain Profile**
Page 4 of 8:	**No Name Drain Profile**
Page 5 of 8:	**Soil Remediation Zone Detail**
Page 6 of 8:	**Soil Remediation Zone Section**
Page 7 of 8:	**Drain Connection (Sta. 1+452)**
Page 8 of 8:	**Miscellaneous Details**

Approvals

The MECP was notified and engaged throughout preparation of the RAP. The final design was submitted to the MECP for review.

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, legislation, 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:wlb:lld

SCHEDULE 'A'

REPORT

RUSH DRAIN REALIGNMENT

TOWN OF ESSEX, ONTARIO

REMEDIAL ACTION PLAN
RWDI # 2307044
May 2, 2025

SUBMITTED TO

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TABLE OF CONTENTS

LIST OF FIGURES

VERSION HISTORY

Index	Date	Pages	Author
Draft	April 19, 2024	All	SP/BJL
Final	May 9, 2024	All	SP/PEJ
Final – Rev 1	July 2, 2024	All	SP/PEJ
Final – Rev 2	April 8, 2025	3 - 6	SP/BL
Final – Rev 3	May 2, 2025	1	SP/BL

1 INTRODUCTION

RWDI was retained by the Corporation of the Town of Essex (the Town) to prepare this Remedial Action Plan (RAP) for a portion of the Rush Drain realignment. The remedial measures described below are provided to address environmental impacts encountered during the realignment of the drainage system as part of the Essex Town Centre (ETC) future residential subdivision development.

Work to restore the natural environment within the impacted section of the Rush Drain realignment will be undertaken to facilitate timely completion of the drain construction, thereby allowing development of surrounding lands. This RAP pertains to the immediate area of the Rush Drain realignment illustrated in **FIGURES 1** and **2** (the Site) where remedial efforts will extend 1 metre to the east and 1.5 metres to the west of the limits of the drainage channel footprint. A further remediation plan would be required to address subsurface impacts in areas beyond the Rush Drain realignment (plus the 1 m to the east and 1.5 m to the west).

This RAP has also been prepared with the understanding that the depth of contaminated soil beneath the impacted section of the Rush Drain realignment has not been fully delineated. The proposed vertical extent for excavation presented herein is based on information provided by Dillon Consulting Ltd. (Dillon) with respect to their field observations and laboratory soil analytical testing data completed in 2021. It should also be noted that field and/or soil quality subsurface conditions since the 2021 investigation may be different and thus, some components of this RAP may require field adjustment during the actual remedial efforts.

2 BACKGROUND

The Town is completing construction of the Rush Drain realignment for the ETC development located south of Maidstone Avenue West, in Essex. In 2021, soil exhibiting hydrocarbon odour was encountered during excavation activities near the southeast corner of the Rush Drain realignment. Upon discovery of the impacted soil, the Town notified the Ministry of the Environment, Conservation and Parks (MECP) of the existing conditions and initiated the environmental assessment work described below.

2.1 Impacted Soil Investigation

Dillon Consulting Limited (Dillon) completed subsurface contaminant delineation assessments for both the Rush Drain and the ETC development lands adjacent thereto west of the drain that included advancing shallow test pits and selectively collecting soil samples from test pit excavations for laboratory analytical testing. The laboratory data identified elevated concentrations of petroleum hydrocarbons (PHCs), volatile organic compounds (VOCs) including benzene, toluene, ethylbenzene, and xylene (BTEX), as well as polycyclic aromatic hydrocarbons (PAHs) at select locations adjacent to the Rush Drain realignment within the ETC development. The impacts were such that the soil was identified as being contaminated at the test pits shown in **FIGURE 3**, as red dots or squares.

The interpretive extent of subsurface contamination was identified by Dillon to consist of an approximately 50 metre (m) long section within the northwest-southeast trending leg of the Rush Drain realignment. The identification of impacted soil was confirmed through field observations and field soil vapour measurements. The odorous soil horizons ranged in depth from 1.0 to 2.0 m below ground surface (mbgs) within the Rush Drain realignment. Many sample locations exhibited odourous soil up the terminal depth of 2.0 mbgs. The southern extent of the impacted area was interpreted to be located approximately 12 m northwest of the southeast bend within the realignment. Soil characteristics from horizons deeper than 2.0 mbgs within the Rush Drain realignment were not investigated and thus, full vertical delineation of subsurface impacts are not currently defined.

Subsurface soil delineation efforts completed by Dillon included advancing test pits within the future ETC development adjacent to the west of the Rush Drain realignment. Chemical analytical testing was included within this portion of the delineation investigation, which confirmed PHC and/or PAH contaminated soils at depths ranging from 2.0 to 4.0 mbgs. The interpreted topographic bottom of the Rush Drain is approximately 1.6 m below surrounding grade. Thus, if odourous soils were vertically delineated at approximately 4.0 mbgs within the adjacent land to the west, an interpretation can be made that odourous soils could be present up to approximately 2.4 m below the bottom elevation of the Rush Drain. Dillon did not identify the presence of non-aqueous phase liquid (NAPL) in their documentation.

The impacted soil delineation area defined by Dillon is depicted in **Figure 3**. The delineated area of impacted soil shows that the contaminant plume extends southward, beyond the Rush Drain realignment and toward the existing stormwater management pond (SMP). Moreover, the eastern-most embankment of the SMP that was constructed to manage runoff from the future residential subdivision, overlaps the identified impacted soil area.

2.2 Follow-Up Investigations

The ETC developer engaged the services of Soil & Materials Engineering Inc. (SME) to provide geotechnical and environmental engineering consulting services toward the ETC's proposed development. A subsurface investigation was completed in August 2022 on behalf of ETC to verify groundwater and soil conditions located within the lands between the SMP and the Rush Drain. The investigation focused on determining groundwater movement patterns, as well as soil environmental quality. The findings of the investigation as interpreted by SME is summarized below.

- Groundwater flow direction was interpreted to be toward the southwest.
- Soil quality, as compared to the MECP's Soil Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (MECP Standards), indicated unacceptable concentrations of one or more PAHs, VOCs, and PHCs at three sample locations, which aligned with Dillon's 2021 interpretation of subsurface contaminants.
- A toxicity characteristic leachate procedure (TCLP) analysis was completed for 2 field-identified impacted soil samples (i.e., based on elevated field vapour measurements, odours, visual discolouration, etc.). The contaminated soil was deemed a non-hazardous waste.

SME also provided a Letter of Opinion to the ETC as it relates to the 'influx potential' for subsurface impacts to reach the SMP and whether the pump station should be commissioned, with the following general conclusions.

- The characterization of the contaminant plume is not fully defined beneath the Rush Drain realignment.

- Contaminant migration is anticipated to reach the stormwater management pond within a 'few years', without the implementation of mitigative measures. Further subsurface soil characterization was recommended to ascertain the actual migration rate of contaminants.

SME recommended that the pumping station shown in **FIGURE 2** be commissioned, at least for the time being, since contaminated groundwater has not yet reached/been detected in the SMP, nor is it expected to reach the SMP for 'at least a few more years'.

2.3 Evaluation of Remediation Options

The Town was presented with remediation options that included:

a) Partial excavation within the contaminated zone followed by installation of an impermeable concrete liner over the remaining impacted soil to minimize the potential for impact to surface water within the drain.
b) Full depth excavation within the contaminated zone.

Based on follow up discussions with the Town, full depth excavation of the impacted soil within the drainage channel was selected as the preferred remedial approach. This approach was selected to allow for timely completion of the Rush Drain realignment such that surface water flow can occur within the drain without becoming unacceptably impacted by the contaminated soil currently within the Rush Drain realignment footprint.

3 REMEDIAL OBJECTIVE

The scope of work associated with this RAP is limited to the area of the Rush Drain realignment such that construction of the drainage system can be completed expeditiously, and in a manner that protects human health and the environment. Areas of impact beyond the drainage channel are anticipated to be addressed at a later date.

As outlined under Part IX, Sections 34 through 43.1 of Ontario Regulation (O. Reg.) 153/04 – Records of Site Condition, the selection of appropriate Site Condition Standards (SCS) is based on the Qualified Person's (QPs) evaluation of applicable selection criteria. RWDI's evaluation of the SCS selection criteria, based on a review of existing documentation including previous subsurface investigations is presented in **TABLE 1** below.

Table 1. Site Condition Standard Selection Criteria and Evaluation

Selection Criteria	Site Condition
Property Use	The Site is a municipal drain that is otherwise undeveloped.
Potable or Non-potable use of Groundwater	Potable water is supplied by water treatment plants located along the shore of Lake Erie.
Distance to a Surface Water Body	The Rush Drain is a "Class F" municipal drain with intermittent flow and therefore, is not a water body as defined by O. Reg. 153/04. There are no water bodies within 30 metres of the Site.
Distance to Areas of Natural Significance or Environmentally Sensitive Area	The property is not located within an Area of Natural and Scientific Interest (ANSI).

Selection Criteria	Site Condition
Depth to Bedrock	Previous investigations demonstrate that the overburden thickness is greater than two (2) metres throughout the Site.
Soil pH	Previous investigations demonstrate that the soil pH is in the typical range
Soil Texture	Soil in the area is comprised of a low-permeability clay unit identified as the Brookston Clay. Hydraulic conductivity in the area of the Site is estimated to be 1 x 10^{-6} to 1x10^{-9} cm/s (from Dillon remedial options documentation). The soil is inferred to be fine-textured material, and this will be verified by future assessment work.

Based on the above evaluation, the remediation should proceed with reference to the Site Condition Standards (SCS) provided in Table 3: Generic Site Condition Standards for Use in a Non-Potable Groundwater Condition for residential/parkland/institutional (RPI) property use. This objective will be achieved through targeted remedial excavation and soil management activities, followed by a soil quality assessment. Although the Town is not filing a Record of Site Condition (RSC) for the property, the soil quality assessment work will be carried out in general accordance with O. Reg. 153/04.

4 SOIL REMEDIATION

4.1 Preparation

Approval for disposal of the impacted soil requires an evaluation of the material quality such that it be characterized as a solid non-hazardous waste per Ontario Regulation 558 for ultimate management to an appropriately licensed waste disposal facility per Ontario Regulation 347. Waste characterization data requirements typically include bulk analysis for VOCs, PHCs, PAHs, metals and inorganic parameters, as well as toxicity leachate characteristic procedure (TCLP) analysis for VOCs, PAHs, and metals. Existing soil quality data will be used to facilitate the waste characterization, and this will be supplemented by additional soil quality data as needed. Soil texture analysis will also be completed.

To maintain surface water flow within the Rush Drain, a 300-millimetre (mm) diameter pipe, 60 m in length, has been placed in alignment and at the same depth of the future Rush Drain realignment. The pipe placement was intended to direct surface water flows across the identified contaminated soil unimpeded and served to protect surface quality from potential adverse effects from subsurface contaminants. It is understood that watertight pipe and joint materials were used for each section of pipe and that the pipe was placed within a bedding of unimpacted native clayey soil originating from the ETC development lands. The pipe and associated bedding material is proposed to remain in place to convey water during remedial activities as remedial activities will take place from downstream to upstream. The soil over the current pipe will be graded such that runoff flows downstream. The temporary pipe will be progressively removed (i.e., in sections) during remedial activities. The contractor will need to prepare a stormwater runoff management plan as part of their excavation and remedial program submission.

A hydro-pole is located within, and another adjacent to, the contaminated soil region and within the area of the planned excavation at the location shown in **Figure 4**. The utility service provider is to be contacted to coordinate a pole hold request application so that the poles are adequately supported during soil removal.

4.2 Excavation of Impacted Soil

The volume of impacted soil, based on Dillon's proposed excavation plan, which requires removal from within the footprint of the Rush Drain realignment is estimated to be 1,400 m^3. As the vertical extent of contaminated soil is not currently delineated beneath the impacted section of the Rush Drain realignment, the estimated volume of soil requiring removal is not expected to be less than 1,400 m^3.

The soil excavation and backfilling activities should progress in the sequence illustrated in **Figure 5**, which was prepared by Dillon. As shown, the contaminated soil is to be excavated in four (4) designated 12-metre-long zones ranging in width from 1.2 metres to 2 metres, conforming to the plan's specifications for a total length of approximately 48 metres and total width of approximately 11.2 metres. The excavation is to maintain a clearance of at least 1.5 metres around the existing hydro poles with the remaining material wrapped in heavy-duty (minimum of 10 mil or 0.25 mm thick) polypropylene sheeting before backfilling. Excavated impacted soil, following receipt of proper authorization to proceed, is anticipated to be transported to a MECP-licensed waste disposal facility.

RWDI will attend the Site during excavation to further assess the soil quality as the excavation progresses. Field screening of soil samples collected from the excavation will be conducted using a photo-ionization detector (PID) or hydrocarbon surveyor to measure soil vapour concentrations in the remaining soil. The final limits of excavation within the work area will be determined based on the findings of the soil vapour monitoring activities, visual/olfactory observations, laboratory analytical data associated with verification soil samples (discussed below) and the arial limitations of the excavation plan.

4.3 Verification Sampling

Soil verification samples will be collected from the final walls and base of the completed excavation once it is determined that sufficient volumes of impacted soil has been excavated. The samples will be submitted to a Canadian Association for Laboratory Accreditation (CALA) laboratory for analysis of PHCs, VOCs, and PAHs. The sampling frequency will consider the stipulations of *Table 3: Minimum Confirmation Sampling Requirements for Excavation* as outlined in Schedule E of O. Reg. 153/04. Excavated areas should not be backfilled until laboratory data has confirmed that the excavation base along the Rush Drain realignment has achieved the soil quality remedial objective for the property. Laboratory analysis will be expedited to facilitate timely progress of the excavation activities. It is expected that for most of the remedial work area the excavation sidewalls will not be of suitable quality, however, that is understood to remain in place with the protective plastic barrier sheeting being placed over this material to protect newly placed soil from immediate contamination.

For quality assurance purposes, duplicate soil verification samples will be collected for similar testing as the original samples. The number of duplicate samples will be equal to or greater than 10% of the number of verification soil samples.

4.4 Backfilling & Restoration

Following completion of each stage of soil removal, a precluding, temporary barrier comprised of a minimum 10-mil polypropylene sheeting will be installed along the base and walls along the entire perimeter of the excavation, in continuous or over-lapping segments. Where overlapping occurs, plastic sheeting should be placed in a shingle manner with the upstream piece overlaying the downstream piece. Overlap length is to be no less than 0.6 m. This installation is a measure designed to separate the remediated areas from surrounding impacted soil. Following placement of the polypropylene sheeting, the excavation segments within each of the four zones are to be backfilled using clean clay materials, following the sequence shown in **Figure 5**. The excavation and backfilling sequencing prepared by Dillon is being considered for this RAP.

Backfilling should not commence without instruction from the QP and should not occur until analytical data is received indicating that concentrations for contaminants of concern meet the remediation objective at the verification sample locations. The clay is to be compacted to a minimum 95% standard proctor density using a sheepsfoot roller. The drainage channel is to be re-excavated and re-compacted providing appropriate, long-term drainage in accordance with the drainage plan.

4.4.1 Soil Importation Considerations

If soil used to backfill the excavation is sourced from Project Areas other than the ETC development lands, the reuse activity will require to be managed per O. Reg. 406/19 – Excess Soil Regulation. Prior to the importation of any excess soil, the soil quality documentation will be reviewed by RWDI on behalf of the Town.

For this remedial effort, imported soil quality requires to adhere to Table 3.1 or better of the Excess Soil Quality Standards (ESQS) taken from the *Rules for Soil Management and Excess Soil Quality Standards* (MECP, 2022).

4.5 Transportation Management

Entry to the Site is expected to be from Bell Avenue and the gated, temporary access road northeast of the excavation. Egress from the Site is also expected to be via the gate at Bell Avenue. The existing temporary access road to the adjacent stormwater management pond's (SMP) pumping station provides sufficient truck access to the work area. Vehicle queuing on Bell Avenue is not permitted. The road sub-grade in an approximately 100 m section of Bell Avenue, from Allen Avenue southwestward to the west side of the Rush Drain box culvert will require protection from potential subsidence and rutting by heavy equipment during the project. Protective steel plates are an option to protect the road sub-grade in this area prior to soil transportation. This protection will need to be outlined in the contractor's excavation and remedial program.

Drivers are required to produce hauling records and load documentation for each load transferred from the Site to the waste disposal facility. It is noted that although the contaminated soil is designated as waste, it requires tracking of for its movement per Ontario Regulation 406 but is not required to be tracked to the online excess soil registry managed by the Resource Productivity and Recovery Authority (RPRA). The hauling records are to include the following information:

a) The location of the Site or Project Area.

b) The date and time the excess soil was loaded for transportation.
c) The quantity of excess soil in the load.
d) The name of an individual who may be contacted to respond to inquiries regarding the load, including inquiries regarding soil quality.
e) The name of the corporation, partnership or firm transporting the excess soil, the name of the driver of the vehicle and the number plates issued for the vehicle under the Highway Traffic Act.
f) The waste disposal site is to be identified as the location at which the excess soil is to be deposited.

Upon arriving at the waste disposal, the driver shall ensure that the hauling record includes the following information:

a) Date and time the load of soil is deposited.
b) The name and phone number of the individual at the waste disposal site who acknowledges that the soil has been deposited on the specified date and time.
c) Declaration by the individual at the waste disposal site, acknowledging the deposit of the excess soil.

Copies of the Hauling Record will be left with the waste disposal site and provided to the QP who will reconcile the records with scale tickets and load documentation produced by waste disposal site.

4.6 Dust Control

The General Contractor will minimize excavation and soil management operations during an Environment Canada Wind Warning or within 24 hours of receiving significant precipitation, typically greater than 10 millimetres (mm) in a 24-hour period.

In the event that there is an excessive amount of dust created due to work occurring at the Site (to the point of nuisance for either the haulers, workers, or surrounding properties), water will be applied to the ground surface as needed to suppress dust.

4.7 Erosion Control

Contaminated soil from the drain excavation is to be directly loaded (without any stockpiling) into vehicles for disposal. If stockpiling of clean, clay material is required prior to backfilling, the soil is to be stored in a designated area that will be established by the remediation team.

The Site will implement standard erosion controls, as needed, which may include, but not necessarily be limited to, silt fencing, straw bale check dams, for the duration of construction activities.

Erosion and sedimentation controls are to be inspected daily during remediation and maintained such that a minimum amount of erosion occurs and that sedimentation facilities control any erosion that does occur.

4.8 Air Quality & Odour Control

The identified contaminants of concern in subsurface soil include benzene and other VOCs. Benzene is a chemical agent that is prescribed as a designated substance under O. Reg. 490/09 - Designated Substances. For the protection of workers involved in the project, a site-specific Health and Safety Plan will be prepared and implemented prior to excavation.

Adverse air quality is not anticipated beyond the immediate vicinity of the excavation however, as a precautionary measure, air monitoring is proposed to be conducted daily during soil removal. The monitoring is proposed to consist of using specialized instrumentation (i.e., a photo-ionization detector (PID)) that can detect and measure concentrations of contaminants of concern (i.e., benzene and other air-borne VOCs). Monitoring stations are proposed to be established downwind of the excavation and, if warranted, at property boundaries that are closest to nearby residents.

During soil removal, exposed sections of contaminated soil within the excavation (i.e., in times when there may be small delays while waiting for soil laboratory chemical data) will be covered after working hours with polypropylene sheeting to minimize volatilization and potential for adverse air quality. If measurable VOC concentrations are confirmed to have been generated by excavation activities (i.e., based on detections downwind from the active excavation area) and are detected in ambient air during excavation at the property boundaries, the excavation activities will immediately cease, and the exposed excavation will be covered with polypropylene sheeting or clean soil to prevent further release of the contaminants. Additional monitoring will be conducted to determine the appropriate conditions for further excavation.

4.9 Documentation & Record Keeping

Following completion of the remediation work and upon receipt of analytical data which indicates that remedial objectives have been achieved, a report describing the soil excavation, sampling methodology and findings will be prepared for the Town. This report will form the basis for remediation planning that will be prepared and implemented to address any remaining environmental impacts outside of the drainage channel.

Contracts relating to the remediation and management of soil, including transportation and disposal are to be retained by both the Town and the Operator at the Site for a period of at least seven (7) years after the date the contract was entered into. The QP will retain all documents or record prepared by them or those acting under their supervision for a period of at least seven (7) years after the date that the document or record is prepared. The documents will be stored at the corporate office and made available to any public body responsible for the management of excess soil.

All persons transporting soil from the Site will retain hauling records (described above) for a period of at least two (2) years after the day that the soil was loaded for transportation.

5 STATEMENT OF LIMITATION

This Remedial Action Plan (the "**Report**") for the area of the Rush Drain defined within **SECTION 1** of the Report (the "**Site**") was prepared by RWDI AIR Inc., ("RWDI") for The Corporation of the Town of Essex ("**Client**"). The findings and recommendations presented in this Report have been prepared for the Client for the Intended Purpose described in **SECTION 1** of the Report in relation to the specific portions of the Site identified herein and subject to the limitations of RWDI's Scope of Services.

The investigations, assessments and studies performed and summarized in this Report have been conducted in accordance with generally accepted engineering and environmental consulting in the Province of Ontario as of the date of this Report (the "**Standard of Care**"). No other warranty, expressed or implied, is intended or made and this Report is not to be construed as legal advice.

The information contained in this Report are based on information: (1) supplied by the Client (including its representatives, employees, independent contractors and other consultants engaged by the Client) in relation to the Site at the time the Report was prepared ("**Client Supplied Information**"); and (2) information made available by governmental authorities and other authoritative sources (including without limitation, the authors of professional reports provided to RWDI for its performance of the Scope of Services and/or manufacturers of products, tools, and/or supplies used by RWDI to perform the Scope of Services ("**Third Party Information**"). RWDI assumes that the Client Supplied Information and Third-Party Information is accurate and reliable and does not accept responsibility for any deficiency, misstatement or inaccuracy contained in this Report as a result of errors, omissions, misrepresentations, or inaccuracies in the Client Supplied Information or Third-Party Information. Investigations to determine the truth or accuracy of the Client Supplied Information or Third-Party Information are outside of RWDI's Scope of Services. In the event that additional information becomes available which differs significantly from our understanding of conditions presented in this Report, RWDI is not obligated to update the conclusions in this Report and shall not do so unless engaged by the Client for that purpose.

The applicability and reliability of any of the conclusions, recommendations, or opinions expressed in this Report, are only in relation to the Intended Purpose, and only to the extent that there has been no material alteration to or variation to: (1) the physical conditions on the portions of the Site analyzed by RWDI: (2) any of the stated assumptions described in the Report; (3) the Client Supplied Information or Third Party Information; or (4) changes to applicable laws and/or standards after the date of this Report governing the matters that are the subject of this Report. RWDI assumes no responsibility for any deficiency or inaccuracy in Client Supplied Information or Third-Party Information.

The investigations and evaluations of the Site conditions, soils, groundwater, sediments, contaminants and their quantities have been performed in accordance with the Standard of Care and utilizing scientific principles and professional judgment and estimations. Nevertheless, there is still an inherent risk that some conditions will not be detected.

Furthermore, the investigations and evaluations of the Site may be subject to factors beyond RWDI's control including but not limited to restrictions caused by physical obstructions, precipitation or other adverse or anomalous weather conditions, denied access, inaccessible areas, time constraints, limitations in the Scope of Services and, readily available documentation. It is therefore RWDI's intent that the conclusions and recommendations contained in this Report be utilized as guidance in relation to the Intended Purpose and not as instructions for a firm course of action, unless explicitly stated otherwise in the Report.

This Remedial Action Plan for the Site was prepared by Scott Pitsch, P.Geo. Ltd., QP_{ESA}, Phil Janisse, P.Geo., QP_{ESA}, and Brent J. Langille, B.Sc., P.Geo., QP_{ESA} who are Qualified Persons (QP) as defined under Section 5 of Ontario Regulation 153/04 for the completion of Environmental Site Assessments in Ontario (QP_{ESA}). Therefore, the findings and conclusions within this Report have been supervised and/or reviewed by the undersigned Qualified Persons.

RWDI has assumed that the Client has provided our Qualified Person's or RWDI personnel supervised by our QP ESAs with all necessary information and authorized the above RWDI personnel to make any inquiries of the Client's employees and agents, for the purpose of assisting the QPs in preparing or overseeing the preparation of this documentation.

It is noted that regulatory guidelines, standards and related documents as referenced in this report are subject to interpretation and may change over time.

It is important that the reader of this Report, recognize that subsurface, environmental and/or geotechnical conditions may vary geographically and temporally. This is a natural phenomenon, which is not fully accommodated in the limited testing conducted by RWDI. In addition, the analysis of the collected data, by necessity, incorporates simplifying assumptions of site conditions and analytical solutions that assume uniformity in site conditions. The opinions, conclusions, and recommendations contained within the Report therefore represent RWDI's professional judgment in-light of these limitations.

This Report is for the sole use of the Client for the Intended Purpose. As such, the Report shall not be relied upon by third parties, unless otherwise agreed to in writing between RWDI and the Client or where required by law; or RWDI accepts no responsibility, and denies any liability whatsoever for: (1) any use of this Report by any third party who may come in possession of this Report; and/or (2) to the Client for any use of this Report for any purpose other than the Intended Purpose. Nevertheless, any reliance upon, or decisions or actions based on the Report or any of its contents, are at the sole risk of the Client and any third party that comes into possession of this Report. RWDI shall not be responsible or liable for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

This statement of Qualifications and Limitations is attached to, and forms part of the Report and any use of the Report is subject to the terms thereof.

6 CLOSURE

We trust the information provided in this Remedial Action Plan is satisfactory for your requirements. Please contact us should you have any questions.

Yours truly,

RWDI AIR Inc.

Scott Pitsch, P.Geo. Ltd., QP_{ESA}
Technical Director | Geosciences

Brent J. Langille, B.Sc., P.Geo., QP_{ESA}
Senior Technical Director | Principal

SP//BJL/kta

Attach.

7 REFERENCES

1. Dillon Consulting Limited 2021. *Environmental Review, Essex Town Center Development - Maidstone Avenue West*. Letter Report, May 6, 2021.

2. Dillon Consulting Limited 2021. *Soil Characterization*, Essex Town Center Development - Maidstone Avenue West. Letter Report, May 6, 2021.

3. Dillon Consulting Limited. Soil Remediation for Contaminated Soils, Rush Drain, Letter Report,

   October 28, 2021

4. Soil & Materials Engineering Inc. 2022. *Interim Report for the Limited Soil Investigation for 0 Bell Ave. Essex Subdivision/Rush Drain Soil Contamination, Essex, Ontario*. Report, October 20, 2022.

5. Soil & Materials Engineering Inc. 2022. *Contamination Influx Potential to the Storm Water Pond, Essex Town Center Subdivision, Essex Ontario*. Letter Report, November 21, 2022.

6. Dillon Consulting Limited 2023. *Rush Drain Realignment*. Environmental Information Package, May 2023

7. County of Essex Interactive Mapping. https://maps.countyofessex.ca

FIGURES

Site Location

Rush Drain Realignment

Map Projection: NAD 1983 UTM Zone 17N

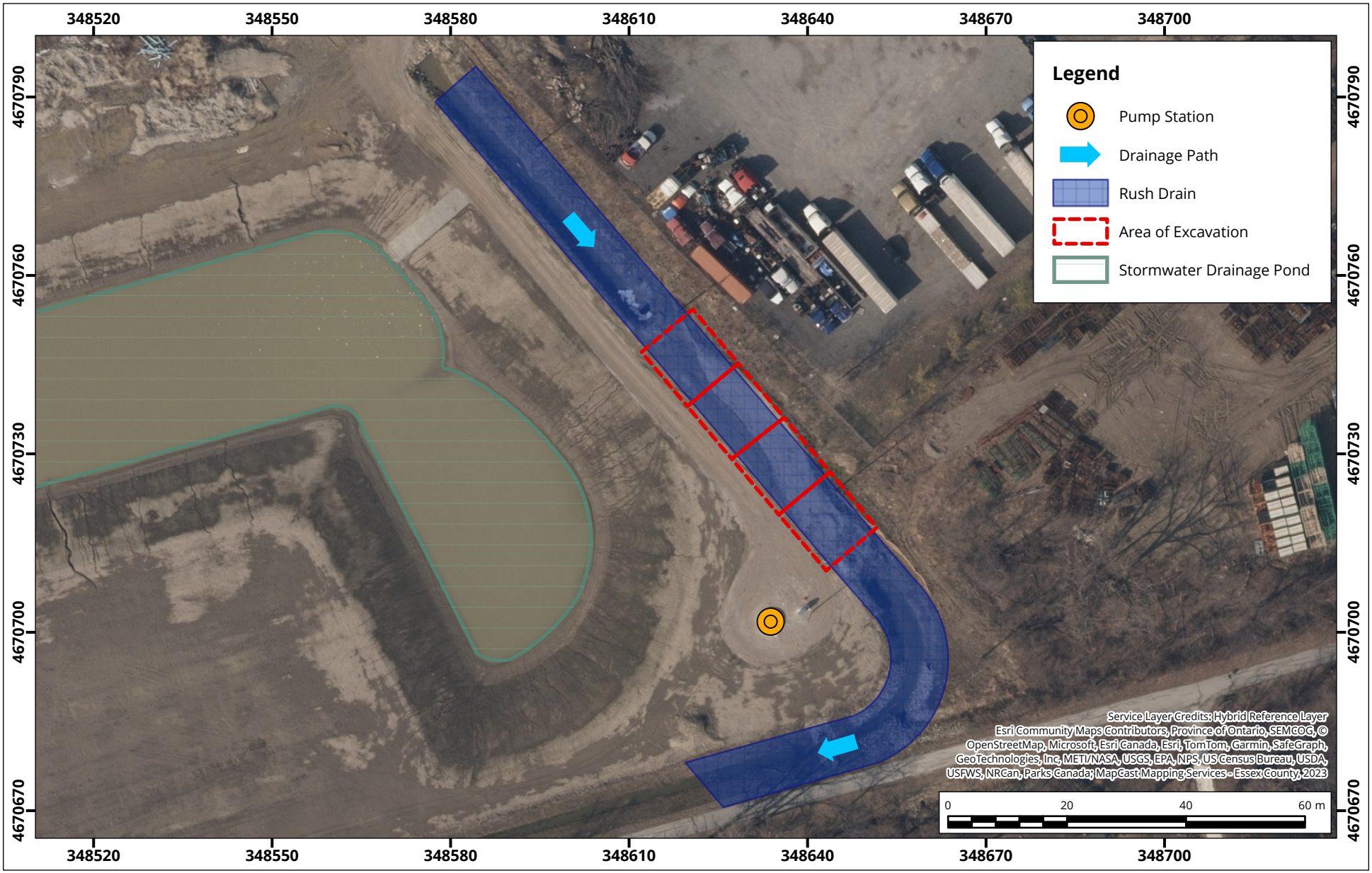
Essex Town Centre Development - Essex, ON

True North

Project #: 2307044

Drawn by: RCL		Figure:	1
Approx. Scale:	1:10,000		
Date Revised:	Apr 1, 2024		

Map Document: C:\GIS\2307044_RushDrain\P2307044_RushDrain.aprx



Site Layout

Rush Drain Realignment

Map Projection: NAD 1983 UTM Zone 17N

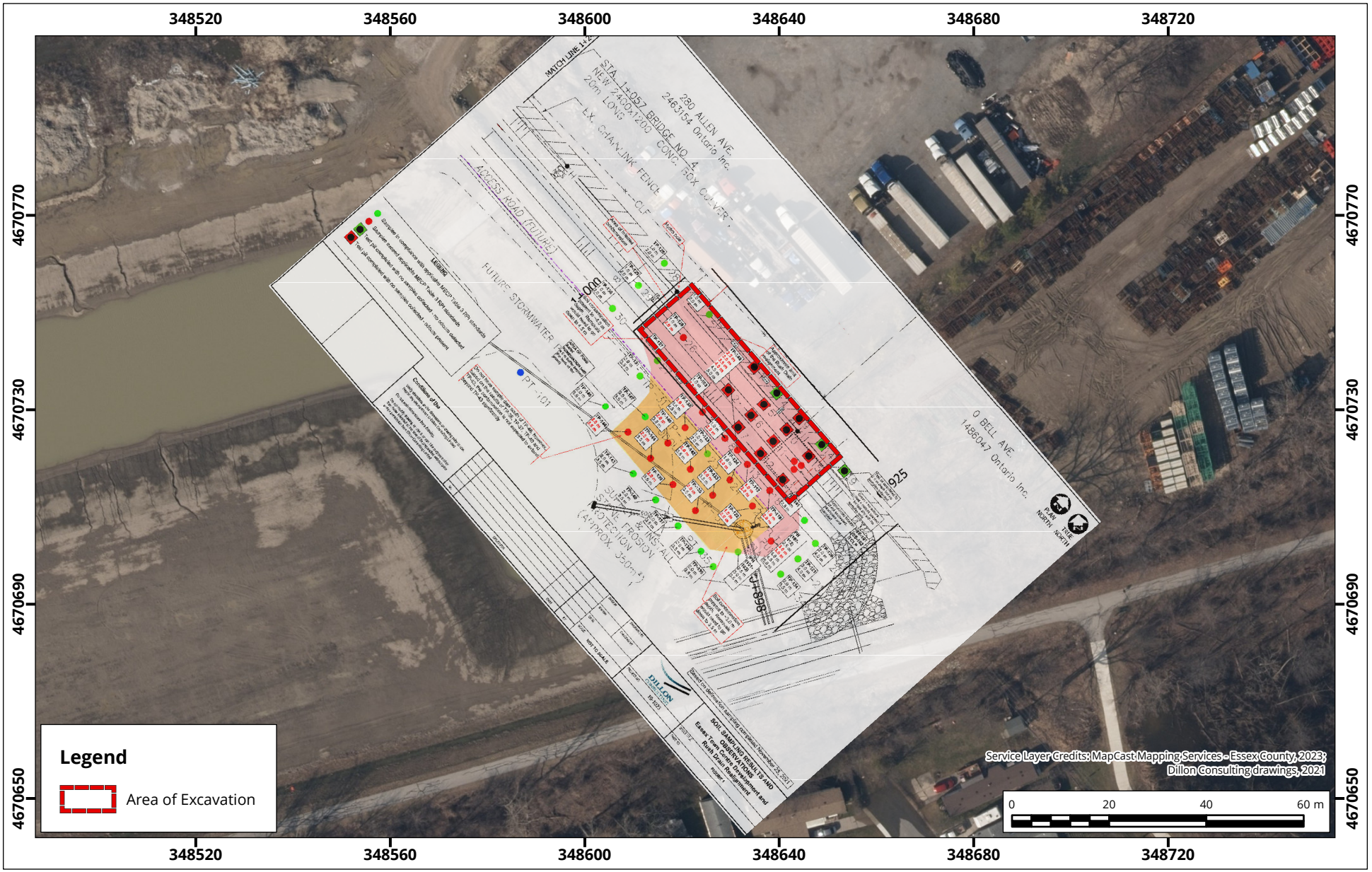
Essex Town Centre Development - Essex, ON

True North

Project #: 2307044

Drawn by: RCL	Figure:	2
Approx. Scale:	1:900	
Date Revised:	Apr 2, 2024	

Map Document: C:\GIS\2307044_RushDrain\P2307044_RushDrain.aprx



Test Pit Locations
Rush Drain Realignment

Map Projection: NAD 1983 UTM Zone 17N

Essex Town Centre Development - Essex, ON

Note:
Figure adapted from Dillon Consulting reference No. 19-1023 Soil Remediation for Contaminated Soils, Rush Drain, dated October 28, 2021

True North

Project #: 2307044

Drawn by: RCL	Figure:	3
Approx. Scale:		1:1,100
Date Revised:		Apr 2, 2024

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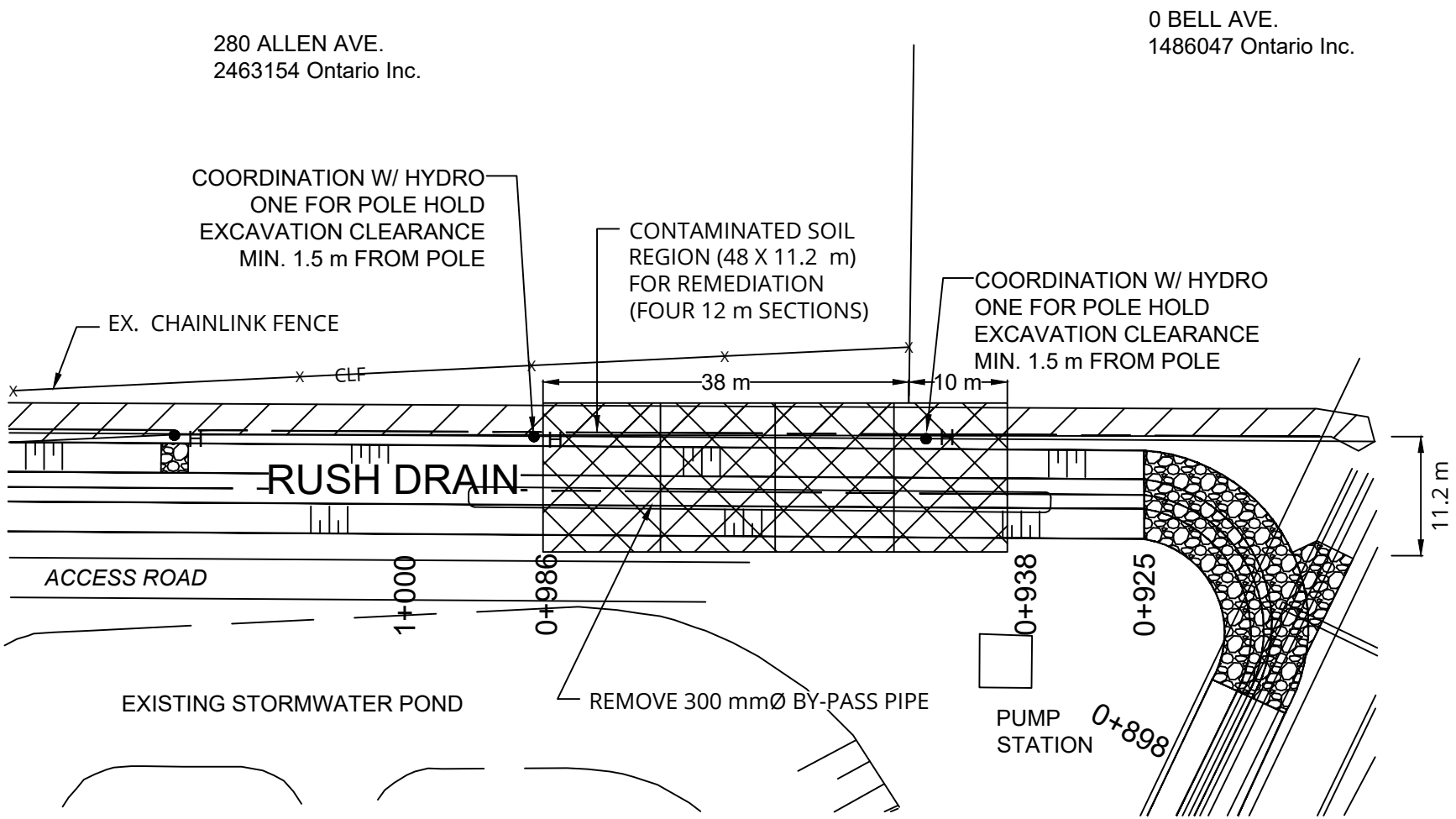


Notes:

1. Upstream drainage flow to be rerouted to the original Rush Drain alignment as part of the Flow Management Plan.
2. Figure adapted from Dillon Consulting reference No. 19-1023 Soil Remediation for Contaminated Soils, Rush Drain, dated October 28, 2021.

Soil Remediation Plan View
Rush Drain Realignment
Remediation Plan

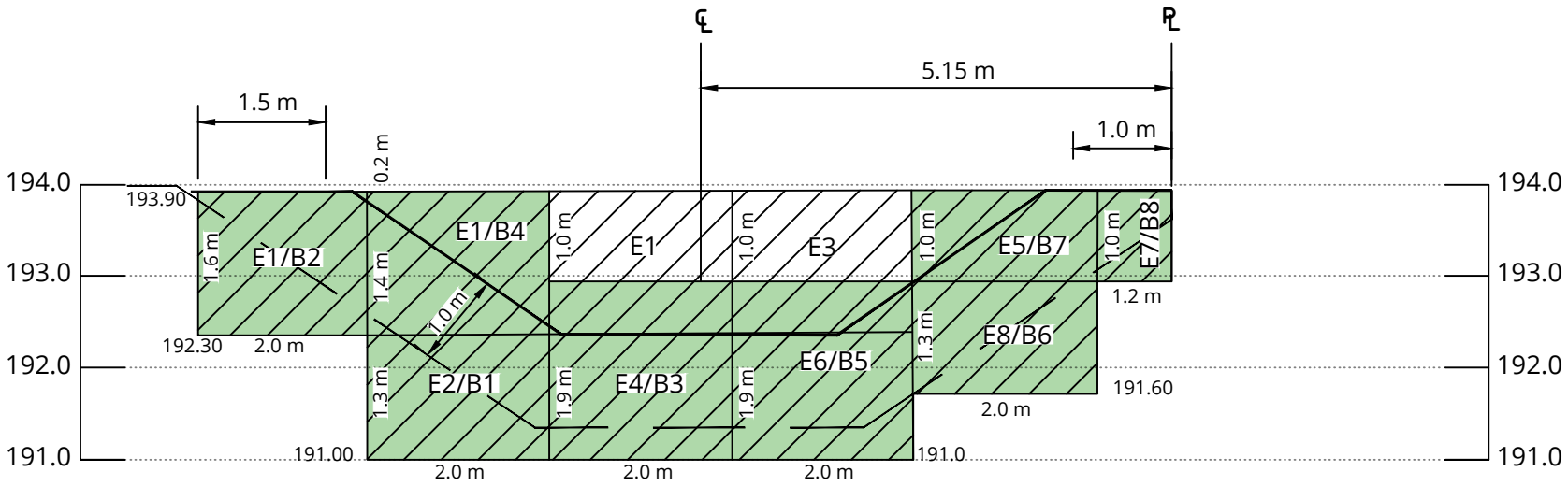
Essex Town Centre Development - Essex, ON

True North

Project #2307044

Drawn by: TFB	Figure: 4	
Approx. Scale:	NTS	
Date Revised:	May 9, 2024	

RUSH DRAIN (STA, 0+938 to STA, 0+986



ORDER OF EXCAVATION & BACKFILL (MAX 2 m WIDE TRENCHES)

E1, E2, B1, B2, E3, E4, B3, B4, E5, E6, B5, E7, E8, B6, B7, B8

CONSTRUCTION NOTES:

- CLEAN CLAY MATERIAL TO BE PLACED IN UNIFORM 300 mm LAYERS & COMPACTED w/ SHEEPSFOOT ROLLER
- LENGTH OF OPEN DRAIN EXCAVATION SHALL BE LIMITED TO 12 m & FULLY BACKFILLED UPON VERIFICATION OF ACCEPTABLE SOIL QUALITY ON THE EXCAVATION FLOOR (TOTAL LENGTH OF DRAIN THROUGH CONTAMINATED SOIL REGION IS APPROXIMATELY 48 m)
- THE PERIMETER OF THE DELINEATED CONTAMINATED SOIL REGION TO BE SURROUNDED W/SAFETY FENCE AT END OF EACH DAY
- CONTRACTOR SHALL BE RESPONSIBLE TO TAKE ALL HEALTH & SAFETY PRECAUTIONS NECESSARY INCLUDING USE OF AIR MONITORING EQUIPMENT, APPLICATION OF RESPIRATORS, FACE SHIELDS FOR ALL EQUIPMENT OPERATORS. CONTRACTOR SHALL HAVE H&S PLAN PREPARED & SUBMITTED TO TOWN OF ESSEX & RWDI AIR Inc. PRIOR TO STARTUP

CONTAMINATED SOIL TO BE EXCAVATED

BACKFILL & COMPACT CLAY IN MAX 300 mm LIFTS (1 m THICK CLAY LINER)

E1 EXCAVATION ZONE No.

B1 BACKFILL/COMPACTION ZONE No.

Note:
Figure adapted from Dillon Consulting reference No. 19-1023 Soil Remediation for Contaminated Soils, Rush Drain, dated November 1, 2021.

Soil Remediation Cross Section
Rush Drain Realignment
Remediation Plan

Essex Town Centre Development - Essex, ON

Project #2307044

Drawn by: TFB | Figure: 5
Approx. Scale: NTS
Date Revised: Apr. 5, 2024

"SCHEDULE C-1"
SCHEDULE OF ASSESSMENT (SUPPLEMENTAL DRAINAGE WORKS)
RUSH DRAIN RELOCATION AMENDMENTS
TOWN OF ESSEX

NON-AGRICULTURAL LANDS:

Roll No. / Description	Area Affected (Acres)	(Ha.)		Owner	Special Benefit	Benefit	Outlet	Total Assessment
Block 'B' Lands				Essex Town Centre Ltd.	$1,192,481.00	$0.00	$0.00	$1,192,481.00
Schedule C-1 of By-Law No. 1987			*	Various	$34,211.00	$0.00	$0.00	$34,211.00
Total on Non-Agricultural Lands……					$1,226,692.00	$0.00	$0.00	$1,226,692.00

SECTION 26:

Roll No. / Description	Area Affected (Acres)	(Ha.)	Owner	Special Benefit	Benefit	Outlet	Total Assessment
Public Utility			Hydro One Networks Inc.	$51,900.00	$0.00	$0.00	$51,900.00
Total on Non-Agricultural Lands……				$51,900.00	$0.00	$0.00	$51,900.00
TOTAL ASSESSMENT				**$1,278,592.00**	**$0.00**	**$0.00**	**$1,278,592.00**

	(Acres)	(Ha.)
Total Area:	**0.00**	**0.00**

* TO BE DISTRIBUTED BASED ON SUM OF 'BENEFIT' & 'OUTLET' OUTLINED IN SCHEDULE C-1 OF REPORT DATED 8 JANUARY 2021 (BY-LAW NO. 1987)

"SCHEDULE C-2"
SCHEDULE OF ASSESSMENT (UNASSESSED ADDITIONAL WORKS)
RUSH DRAIN RELOCATION AMENDMENTS
TOWN OF ESSEX

NON-AGRICULTURAL LANDS:

Roll No. / Description	Area Affected (Acres)	(Ha.)		Owner	Special Benefit	Benefit	Outlet	Total Assessment
Block 'B' Lands				Essex Town Centre Ltd.	$10,950.00	$0.00	$0.00	$10,950.00
Schedule C-1 of By-Law No. 1987			*	Various	$49,786.00	$0.00	$0.00	$49,786.00
Total on Non-Agricultural Lands……					$60,736.00	$0.00	$0.00	$60,736.00
TOTAL ASSESSMENT					**$60,736.00**	**$0.00**	**$0.00**	**$60,736.00**

	(Acres)	(Ha.)
Total Area:	**0.00**	**0.00**

* TO BE DISTRIBUTED BASED ON SUM OF 'BENEFIT' & 'OUTLET' OUTLINED IN SCHEDULE C-1 OF REPORT DATED 8 JANUARY 2021 (BY-LAW NO. 1987)

"SCHEDULE D-1"
DETAILS OF SPECIAL BENEFIT (SUPPLEMENTAL DRAINAGE WORKS)
RUSH DRAIN RELOCATION AMENDMENTS
TOWN OF ESSEX

SECTION 24 PRORATEABLE

Roll No.	Owner	Item Description	Estimated Cost	Cost of Report	Special Benefit
Block 'B' Lands	Essex Town Centre Ltd.	Supply & install culvert extension to avoid hydro pole, including ERCA review fee (100% of prorateable assessment portion)	$41,800.00	$4,860.00	$46,660.00
		Costs associated with completion of the Rush Drain through the Soil Remediation Zone, including RAP, environmental assistance during construction, and temporary sediment & erosion control (100% of prorateable assessment portion)	$1,026,581.00	$119,240.00	$1,145,821.00
Total Special Benefit Assessment (Section 24 Prorateable)			$1,068,381.00	$124,100.00	$1,192,481.00

SECTION 24 NON-PRORATEABLE

Roll No.	Owner	Item Description	Estimated Cost	Cost of Report	Special Benefit
Schedule C-1 of By-Law No. 1987	Various	Supply & install culvert extension to avoid hydro pole, including ERCA review fee (cost portion)	$10,500.00	$0.00	$10,500.00
	Various	Costs associated with completion of the Rush Drain through the Soil Remediation Zone, including environmental monitoring and reporting fees, and temporary sediment & erosion control (cost portion)	$23,711.00	$0.00	$23,711.00
Total Special Benefit Assessment (Section 24 Non-Prorateable)			$34,211.00	$0.00	$34,211.00

SECTION 26 NON-PRORATEABLE

Roll No.	Owner	Item Description	Estimated Cost	Cost of Report	Special Benefit
Public Utility	Hydro One Networks Inc.	Supply & install culvert extension to avoid hydro pole, including ERCA review fee (cost portion)	$28,500.00	$3,310.00	$31,810.00
		Coordination with Hydro-One for working safely around existing utilities, including pole holds & power line cover-up (100%)	$18,000.00	$2,090.00	$20,090.00
Total Special Benefit Assessment (Section 26 Non-Prorateable)			$46,500.00	$5,400.00	$51,900.00

OVERALL TOTAL SPECIAL BENEFIT ASSESSMENT $1,278,592.00

"SCHEDULE D-2"
DETAILS OF SPECIAL BENEFIT FOR UNASSESSED ADDITIONAL WORKS
RUSH DRAIN RELOCATION AMENDMENTS
TOWN OF ESSEX

SECTION 24 - NON-PRORATEABLE

Roll No.	Owner	Item Description	Estimated Cost	Cost of Report	Special Benefit
Schedule C-1 of By-Law No. 1987	Various	Costs associated with the installation of three (3) additional rear yard catchbasins and appurtenances (100%)	$10,950.00	$0.00	$10,950.00
Block 'B' Lands	Essex Town Centre Ltd.	Costs associated with additional interim works required during construction related to contaminated soils including pipe installation, testing and engineering fees (100%)	$41,786.00	$8,000.00	$49,786.00
Total Special Benefit Assessment (Section 24 Non Pro-Ratable)			$52,736.00	$8,000.00	$60,736.00

OVERALL TOTAL SPECIAL BENEFIT ASSESSMENT $60,736.00

"SCHEDULE F"
DRAINAGE REPORT FOR THE
RELOCATION OF THE RUSH DRAIN
TOWN 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:

- Construction of the Rush Drain through the Soil Remediation Zone in accordance with the RAP prepared by RWDI Air Inc., as follows:
  - Decommission three (3) monitoring wells (5.2 m deep) adjacent to drainage channel prior to excavation, completed by a licensed well driller.
  - Excavation of the Soil Remediation Zone from Station 0+938 to Station 0+986 to a depth of approximately 3.0 mbgs, totalling approximately 48 lineal metres of drain and approximately 1,560 m^3. Excavation shall be conducted as specified on the Drawings and the RWDI report attached herein. Work includes removal and disposal of the temporary 300 mm diameter pipe.

    Note: Excavation may only proceed following approval from the Qualified Person which shall be based on soil tests. Stockpiling of contaminated material on-site is **not** permitted.
  - **Provisional:** Excavation of the Soil Remediation Zone from Station 0+938 to Station 0+986 from a depth of approximately 3.0 mbgs to 4.6 mbgs, totalling approximately 48 lineal metres of drain and approximately 1,180 m^3. Excavation shall be conducted as specified on the Drawings and the RWDI report attached herein.

    Note: Excavation may only proceed following approval from the Qualified Person which shall be based on soil tests. Stockpiling of contaminated material on-site is **not** permitted.
  - Trucking and disposal of contaminated material at a MECP-licenced waste disposal facility (approximately 1,560 m^3). Work shall comply to requirements under *O.Reg 406/19* including all documentation requirements.
  - **Provisional:** Trucking and disposal of contaminated material at a MECP-licenced waste disposal facility (approximately 1,180 m^3). Work shall comply to requirements under *O.Reg 406/19* including all documentation requirements.

- Removal and disposal off-site of accumulated groundwater within the work area, considered to be liquid waste (approximately 10,000 Litres with Ontario Waste Class 221L Oily Water) in accordance with the Ontario Water Resources Act, O. Reg 387/04 and the Environmental Protection Act, O. Reg. 63/16. *Note: Groundwater is not acceptable quality for discharge as surface water*
- Supply & installation of 10 mil polypropelene (PP) sheeting over walls of excavated zone for an approximate area of 605 m^2.
- Backfill of Soil Remediation Zone as specified on the Drawings and the RWDI report attached herein with clean clay material, compacted to 95% S.P.D. (maximum 300 mm thick lifts) (approximately 990 m^3). Imported material shall adhere to Table 3.1 or better of the Excess Soil Quality Standards (ESQS) from the Rules for Soil Management and Excess Soil Quality Standards (MECP, 2022)
- **Provisional:** Backfill of Soil Remediation Zone as specified on the Drawings and the RWDI report attached herein with clean clay material, compacted to 95% S.P.D. (maximum 300 mm thick lifts) (approximately 1,180 m^3). Imported material shall adhere to Table 3.1 or better of the Excess Soil Quality Standards (ESQS) from the Rules for Soil Management and Excess Soil Quality Standards (MECP, 2022)
- Supply & installation of the stone erosion protection, as follows:
    - Station 0+938 to Station 0+986 - Supply and installation of stone erosion protection (SEP) (min. 300 mm thickness) including new filter fabric underlay across full channel (approximately 520 m^2).
    - Station 0+987 – Supply and installation of stone erosion protection (SEP) (min. 300 mm thickness) including new filter fabric underlay at hydro pole location on drain bank (approx. 10 m^2).
- Co-ordination with Hydro One for working in close proximity to hydro lines and poles, including but not limited to two (2) pole hold requests and line cover-up.
- Supply and place temporary steel plates to protect future road subgrade for Bell Avenue starting from Allen Avenue southward to south side of Rush Drain (box culvert) approx. 90 m length for truck haul route.
- Stormwater Runoff Management Plan.
- Temporary flow diversion during construction.
- Temporary fencing during construction.

- Drain Enclosure - Station 1+424 to Station 1+452 - Remove and dispose of existing bagged concrete headwall off-site. Supply and install 2010 mm x 1530 mm corrugated steel pipe arch, 27.6 m long complete with prefabricated pipe sections including 22 degree bend, 45 degree bend, and pre-fabricated 600 mm diameter and 150 mm diameter 'Tees'. Coupled to existing 2010 mm x 1530 mm corrugated steel pipe arch and stone erosion end protection (min. 300 mm thickness) (approximately 155 m^2). 19 mm clearstone bedding and backfill up to pipe springline (approx. 90 tonnes), and native material above (approx. 80 m^3). Minimum 100 mm of topsoil, fine graded and seeded to be placed over disturbed areas. Work includes rerouting two (2) existing 100 mm diameter Big 'O' pipes, including appurtenances. The Contractor shall be responsible for costs of, and coordination with Hydro One related to temporary utility pole supports where required.

  <u>Note:</u> This work shall be completed following completion of the open drain within the Soil Remediation Zone.

- Temporary Silt Control Measures During Construction

3.0 ACCESS TO THE WORK

Access to the Rush Drain shall be from the Bell Avenue right-of-way entering the working area on the Block 'B' lands. From there, the designated access corridors shall be used as defined herein.

The Contractor shall make his/her own arrangements for any additional access for his/her convenience. All roads, pedestrian trail and grassed areas disturbed during construction and/or future maintenance of the drain shall be restored to original conditions at the Contractor's expense.

4.0 DRAIN CONSTRUCTION & FUTURE MAINTENANCE CORRIDORS

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 nearest drain bank and shall be as follows:

FROM STA.	TO STA.	PRIMARY (See Note 1)	SECONDARY (See Note 2)
<u>RUSH DRAIN (CONSTRUCTION)</u>			
0+925	1+445	15.0 m wide on south side of drain	4.5 m wide on north side of drain (4 m width at the back of the Allen Avenue industrial lots)
<u>RUSH DRAIN (OLD ALIGNMENT)</u>			
0+000	1+445	9.0 m wide on the north and east side of the existing drain, including footprint of drain	N/A

FROM STA.	TO STA.	PRIMARY (See Note 1)	SECONDARY (See Note 2)
RUSH DRAIN (FUTURE MAINTENANCE)			
0+925	1+445	4.5 m wide on north side of drain (4 m width at the back of the Allen Avenue industrial lots)	N/A

Note 1: *Primary working corridor* indicates the access corridor along the side of the drain where drain excavation, levelling or trucking of drain spoils 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 equipment may travel for the purpose of trucking, drain bank repairs, culvert work, tile outlet repairs, surface water inlet repairs, 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.**

SPECIAL PROVISIONS – OPEN DRAIN

5.0 NEW OPEN DRAIN CONSTRUCTION

5.1. Excavation & Backfill in the Soil Remediation Zone

The Contractor shall excavate and backfill the Soil Remediation Zone in accordance with the method outlined by the Qualified Person's (QP) in the RWDI Air Inc. report, dated May 2, 2025.

Prior to the work, the Contractor shall prepare and submit a Stormwater Runoff Plan for the management of runoff around the site for approved by the Engineer. The plan shall minimize the amount of contact between precipitation and the Soil Remediation Zone. Water deemed to have been contaminated through contact with contaminated soils, as determined by the Owner's Qualified Person (under O.Reg 406/19), shall be disposed of in accordance with Section 11.0 of this Specification at the expense of the Contractor.

Upon approval of the QP, the Contractor shall excavate the Soil Remediation Zone based on the cross section shown on the Drawings and work from the downstream end and progress upstream. Soil samples are required at depth greater than 2.0 metres below ground surface. The Contractor shall stop work at said depth and allow sufficient time for the QP to collect soil samples prior to further excavation. Results from soil samples may take up to 5 business days to return. The Contractor shall make no claims for delays associated with soil sampling and testing.

Stockpiling of contaminated material on-site is **not** permitted. Contaminated material shall be directly loaded into trucks for hauling. Contaminated material shall be transported and disposed of at an MECP-licensed disposal facility.

Backfill materials shall consist of dry clean clay, free of topsoil, organic matter, broken concrete, steel, wood, and deleterious substances and as described on the Drawings. Backfill material shall be compacted with a sheepsfoot roller to 95% of its standard proctor density, compacted in lifts no greater than 300 mm thick.

Upon approval from the QP, the Contractor shall lay polypropylene sheeting (10 mil thickness) along the walls of excavation. Where sheeting cannot be laid continuously, sheeting shall be overlapped a minimum 600 mm where the upstream segment overlays the downstream segment.

Where backfill material is to be imported from outside of the Project Area as shown on the drawings, the soil quality shall adhere to Table 3.1 or better of the Excess Soil Quality Standards (ESQS) taken from the *Rules for Soil Management and Excess Soil Quality Standards* (MECP, 2022). The Contractor shall be responsible for providing soil analysis results to the QP for review and acceptance prior to the material being delivered to site. The Contractor shall be responsible for adhering to O.Reg. 406/19 On-Site and Excess Soil Management and acquiring any permits related thereto.

At the end of each day, and during construction delays, the Contractor shall protect contaminated soil regions from precipitation with the use of polypropylene sheeting in accordance with the Stormwater Runoff Plan (prepared by the Contractor). Temporary grading during construction shall generally be graded such that runoff sheds downstream of the works. No additional payment shall be made for pumping and/or disposal of contaminated runoff.

The Contractor is responsible for coordinating with and abiding by any safety requirements from Hydro One related to the existing hydro poles and overhead power lines, including the costs thereof. Work include but not limited to temporary utility pole supports and power line cover-ups while working in the vicinity of the utility.

5.2. Setting Out

Benchmarks are provided on the attached drawings. From these benchmarks, the Contractor will do their 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, the Contractor 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/her 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.

5.3. Stone Erosion Protection on New Drain Banks

Stone erosion protection across the entire channel shall be constructed at same time as the new channel excavation between Station 0+938 and Station 0+986 in the Soil Remediation Zone in accordance with Section 7.0 of this Specification. For the locations where the new drain channel will be constructed parallel to and in close proximity (minimum 1 m clearance) to the existing overhead hydro transmission, the north drain bank shall be provided with a 3 m wide strip of stone erosion protection centred at the existing pole at Station 0+987.

6.0 ENCLOSURE CONSTRUCTION

6.1 Location of New Drain Enclosure

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

6.2 Materials for New Drain Enclosure

Materials shall be as follows:

Culvert Pipe	*New 27.6 m long, 2010 mm x 1530 mm corrugated steel pipe arch (CSPA) wall thickness of 2.8 mm and 125 x 25 mm corrugations with 22 degree prefabricated corrugated steel pipe arch elbow and 45 degree prefabricated corrugated steel pipe arch elbow meeting the pipe manufacturer's specifications. New culvert shall be joined with annular corrugated wide bolt and angle couplers (minimum of 8 corrugations overlap and 2.0 mm wall thickness) and no single pipe less than 6.0 m in length. All pipes connected with couplers shall abut to each other with no more than a 25 mm gap between pipes prior to installation of the coupler and wrapped with filter fabric.*
Culvert Bedding	*20-25 mm size clearstone conforming to OPSS Division 10. Minimum 150 mm thickness*

Backfill up to culvert springline	*20-25 mm size clearstone conforming to OPSS Division 10.*
Beyond Road Surface, Backfill Above Pipe Springline	*Dry native material free of topsoil, organic matter, broken concrete, steel, wood and deleterious substances.*
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.*

6.3 Culvert Installation

Suitable dykes shall be constructed in the drain so that the installation of the bridge 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.

6.4 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.

6.5 Native Materials

Native materials suitable for use as backfill, as defined under Section 6.2, shall be imported as required to complete the work as shown on the drawings. Alternatively, the Contractor may elect to import additional non-contaminated dry native materials at their own expense.

6.6 Lateral Tile Drains

Should the Contractor encounter any lateral tiles or surface swale drains within the proposed culvert limits not shown on the attached drawings, the Contractor shall re-route in consultation with the Drainage Superintendent, as required, to accommodate the new culvert. **Tile drain outlets through the wall of the new culvert pipe will not be permitted.** All costs associated with re-routing (if any) shall be at the Contractor's expense.

7.0 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.

8.0 NEW HDPE CATCH BASINS (RYCB)

The Contractor shall supply and install 450 mm diameter solid corrugated high-density polyethylene (HDPE) smooth wall 320 kPa pipe (Boss 2000 or approved equal) rear yard catch basins complete with cast iron grate and 300 mm diameter solid corrugated high-density polyethylene (HDPE) smooth wall 320 kPa pipe (Boss 2000 or approved equal) connection. The base of the rear yard catch basin shall consist of a minimum 300 mm layer of 19 mm size free draining clear stone material with no bottom within catch basin. The base elevation shall be at least 600 mm below the invert of the lowest outlet pipe in the wall of the catch basin.

Rear yard catch basins shall be backfilled with clean native materials in maximum 300 mm lifts and compacted to 98% of the maximum standard proctor density.

9.0 DECOMMISSIONING OF MONITORING WELLS

The Contractor shall provide all equipment, labour, and materials necessary for the decommissioning of the monitoring wells. As per Ontario Regulation 903, the well decommissioning procedure involves properly plugging and sealing the well to prevent contamination of groundwater and eliminate physical hazards. This typically includes removing any equipment or debris from the well, disinfecting it, filling it with appropriate abandonment materials like bentonite slurry or chips from the bottom upwards, and removing the casing to a certain depth below the ground surface if reasonably possible. A licensed well contractor must perform the decommissioning, and a well record must be completed and submitted to the Ministry of the Environment, Conservation and Parks.

10.0 TEMPORARY BY-PASS PUMPING

The Contractor shall be solely responsible for ensuring that all work is carried out in the dry and that partially completed work shall remain dry.

The method or methods of controlling surface or sub-surface water shall be by pumping, dyking, close sheet piling, or a combination of these or other methods as may be approved by the Engineer.

Temporary cofferdams shall be established at the east and/or west ends of the Soil Remediation Zone as necessary to complete the work in the dry. The Contractor shall implement a temporary by-pass pumping arrangement capable of discharging **19 L/s** to be operational throughout the construction period. The temporary by-pass pumping arrangement shall convey flows downstream of the Soil Remediation Zone. At no time shall by-pass flows contact contaminated soils. By-pass flows which enter the Soil Remediation Zone excavation and become contaminated, as determined by the Owner's Qualified Person, shall be managed and disposed of in accordance with Section 11.0 of this Specification at the Contractor's expense.

The Contractor shall submit a detailed plan/approach of the temporary by-pass pumping strategy to the Engineer / Owner for review prior to proceeding with the work.

The Contractor shall assume full responsibility for all damages done to the works through the influence of water. He/she shall immediately make good any damage so caused without cost to the Owner.

11.0 DISPOSAL OF LIQUID WASTE (CONTAMINATED GROUNDWATER)

Based on the RWDI Report dated 8 April 2025, groundwater infiltrating the works and surface water contacting impacted soils in the works should be assumed to be impacted and shall not be discharged to surface. Water within the works shall be properly contained, transported and disposed of off-site in accordance with Regulation 347, General – Waste Management. Water within the works is considered to be a liquid waste and shall be disposed of off-site by a licensed hauler to an approved Ministry of the Environment, Conservation and Parks (MECP) licensed facility. The liquid waste shall be classified as 221L Oily water. The Contractor will be responsible for identifying a licensed receiving facility, obtaining approval from the receiving facility, and collecting and submitting sample(s) to the laboratory in order to verify the waste class (if requested by the receiving facility). The Contractor will be responsible for obtaining the waste generator number from the Owner and verify the site has been registered on the Resource Productivity & Recover Authority (RPRA). The Contractor will be responsible for tracking the volumes of liquid waste bring removed from site and for manifesting the liquid waste on RPRA.

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 and all those for whom they are legally responsible from and against claims, demands, losses, costs, damages, actions, suits, or proceedings and reasonable legal fees related thereto 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 thereof 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 and shall comply therewith such requirements.

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.

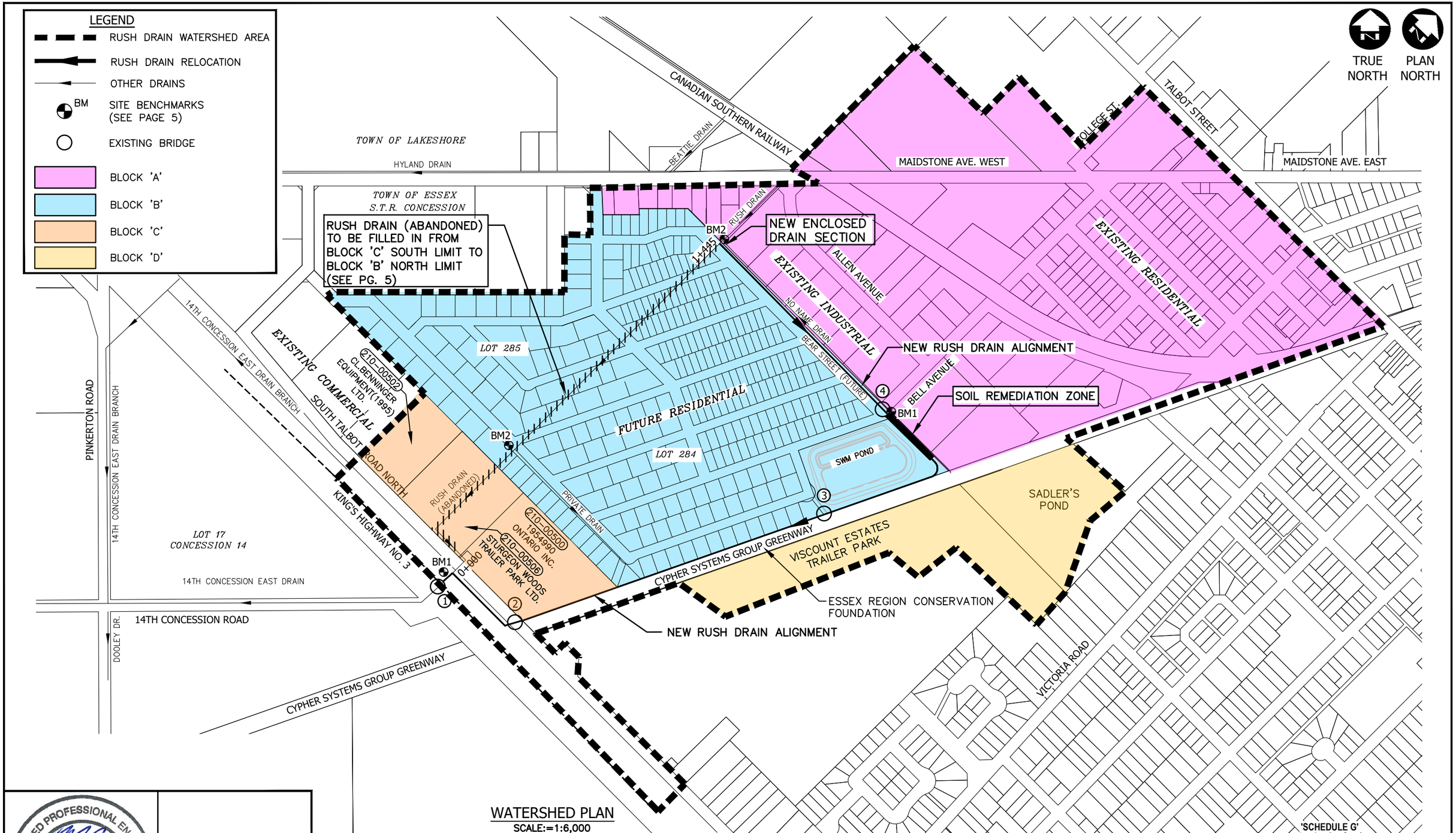
16.0 FINAL INSPECTION

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.



WATERSHED PLAN
SCALE:=1:6,000

LICENSED PROFESSIONAL ENGINEER
M. D. HERNANDEZ
100078099
May 2/25
PROVINCE OF ONTARIO

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1	CLIENT REVIEW	FEB. 21/25	MDH

DESIGN MDH	REVIEWED BY JWM
DRAWN WLB	CHECKED BY OEM
DATE May 2, 2025	
SCALE AS SHOWN	

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DRAWING SCALES BASED ON A 11" X 17" SHEET

Drainage Report for the
RUSH DRAIN RELOCATION AMENDMENTS
Town of Essex

PROJECT NO. 19-1023

SHEET TITLE WATERSHED PLAN

PAGE NO. 1 of 8

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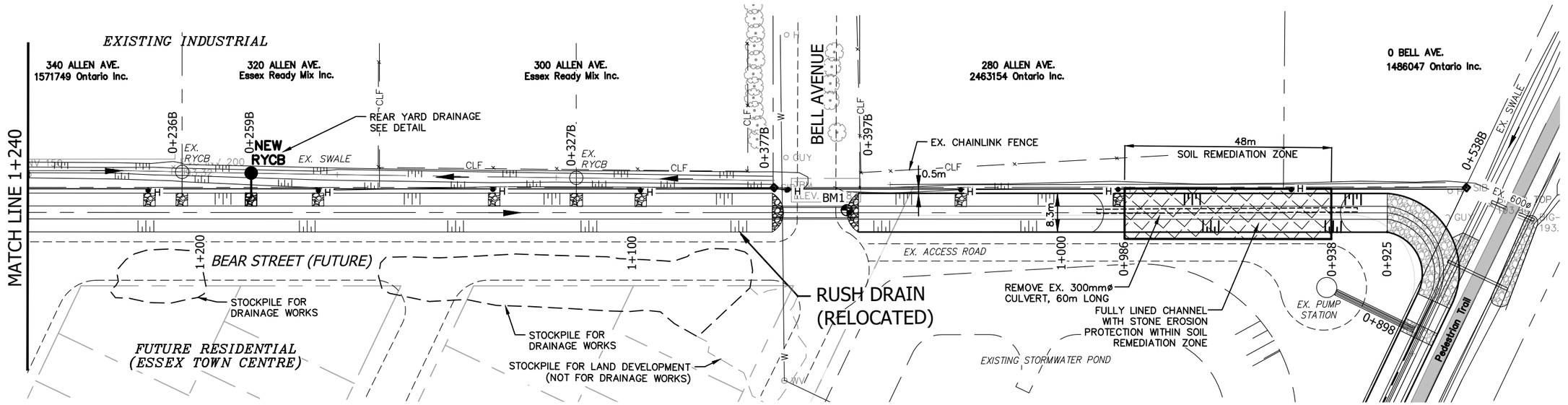
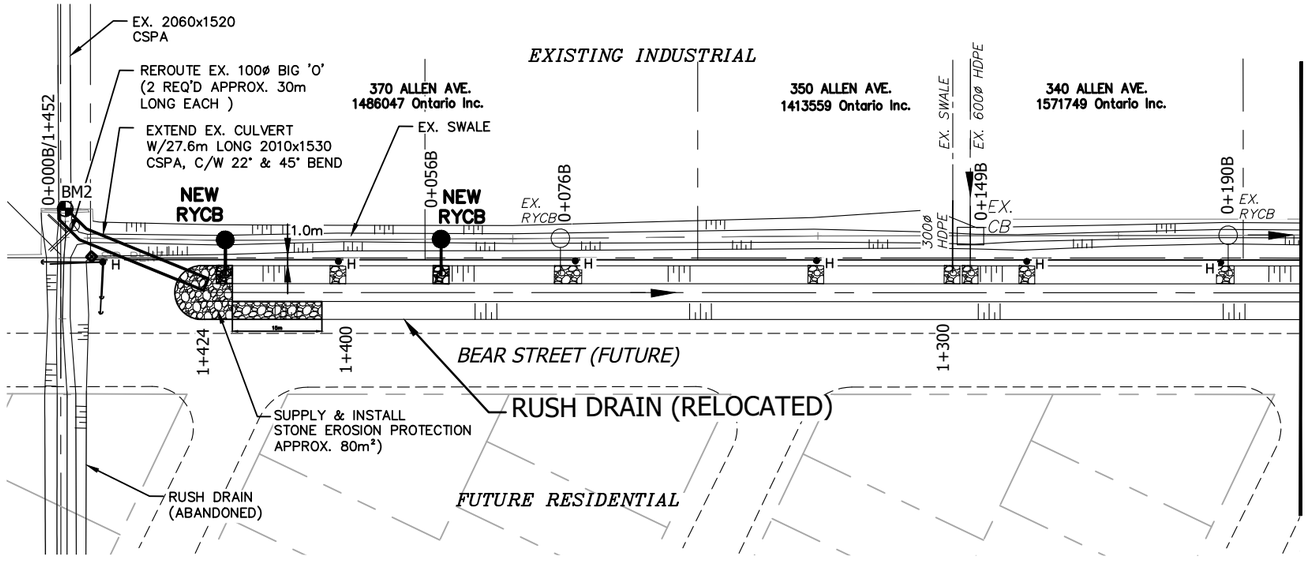
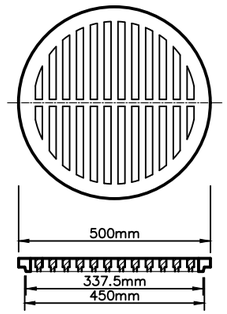


NOTE: NEW RYCB'S HAVE ALREADY BEEN CONSTRUCTED.

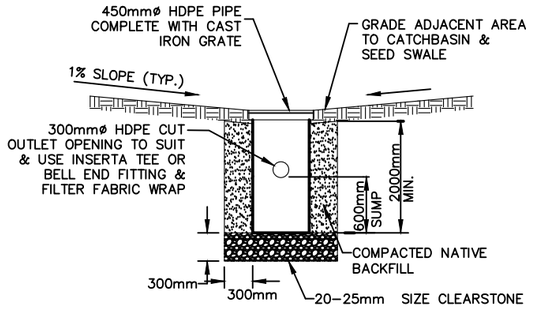
PLAN STA. 0+925 TO STA. 1+240
SCALE–1:1,000



PLAN STA. 1+240 TO STA. 1+452
SCALE–1:1,000



STANDARD CAST IRON GRATE FOR 450mmø HDPE CATCHBASIN
NOT TO SCALE



YARD CATCHBASIN DETAIL (450mmø HDPE)
NOT TO SCALE

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MDH	JWM
DRAWN	CHECKED BY
WLB	OEM
DATE	May 2, 2025
SCALE	AS SHOWN

DILLON CONSULTING

PROJECT NO. 19-1023

DRAWING SCALES BASED ON A 11" X 17" SHEET

'SCHEDULE G'

Drainage Report for the
RUSH DRAIN RELOCATION AMENDMENTS
Town of Essex

SHEET TITLE: PLAN (STA. 0+925 TO STA. 1+452)

PAGE NO. 2 of 8

May 02, 2025 - 10:31am C:\pw working directory\projects 2019\33oem\d0109885\191023-03-DRN-DES.dwg

0+898–START OF DRAIN CURVE

0+907–EX. 600mmø HDPE FROM EAST
0+925–END OF DRAIN CURVE
DRAIN TURNS WEST

0+938–EX. 300ø HDPE **TO BE REMOVED AS REMEDIATION PROGRESSES**

0+938–0+986–SUPPLY & INSTALL STONE EROSION PROTECTION ON ENTIRE CHANNEL CROSS SECTION

1+055–BRIDGE NO. 4
BELL AVENUE
EX. 2400x1200 CULVERT, 20m LONG

1+115–EX. 300ø HDPE OUTLET
(MUN. NO. 300 ALLEN AVE.)

1+183–300ø HDPE OUTLET (MUN. NO. 320 ALLEN AVE.)

1+206–EX. 300ø HDPE OUTLET
(MUN. NO. 320/340 ALLEN AVE.)
EX. 200ø DRAIN CONNECTION

1+252–EX. 300ø HDPE OUTLET
(MUN. NO. 340 ALLEN AVE.)
EX. 100ø & 150ø STORM DRAINS

1+293–EX. 600ø HDPE OUTLET
(MUN. NO. 340/350 ALLEN AVE.)

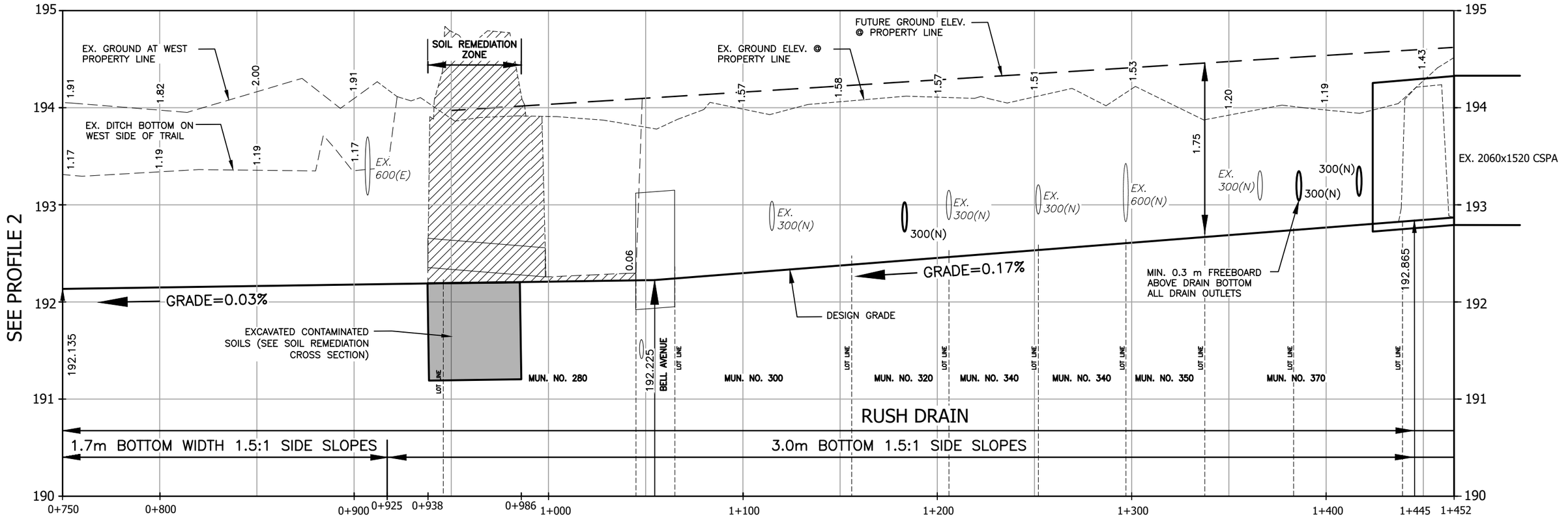
1+366–EX. 300ø HDPE OUTLET
(MUN. NO. 370 ALLEN AVE.)
EX. 150ø STORM DRAIN

1+386–300ø HDPE OUTLET (MUN. NO. 370 ALLEN AVE.)

1+417–300ø HDPE OUTLET (MUN. NO. 370 ALLEN AVE.)

1+424–END OF RUSH DRAIN CULVERT EXTENSION

1+452–RUSH DRAIN TURNS NORTH



RUSH DRAIN PROFILE (STA. 0+750 TO STA. 1+452)

SCALE–HORIZ=1:2,000
VERT. =1:40

'SCHEDULE G'

LICENSED PROFESSIONAL ENGINEER
M. D. HERNANDEZ
100078099
May 2/25
PROVINCE OF ONTARIO

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DESIGN	MDH
REVIEWED BY	JWM
DRAWN	WLB
CHECKED BY	OEM
DATE	May 2, 2025
SCALE	AS SHOWN

DILLON CONSULTING

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Drainage Report for the
RUSH DRAIN RELOCATION AMENDMENTS
Town of Essex

PROJECT NO. 19-1023

SHEET TITLE RUSH DRAIN PROFILE

PAGE NO. 3 of 8

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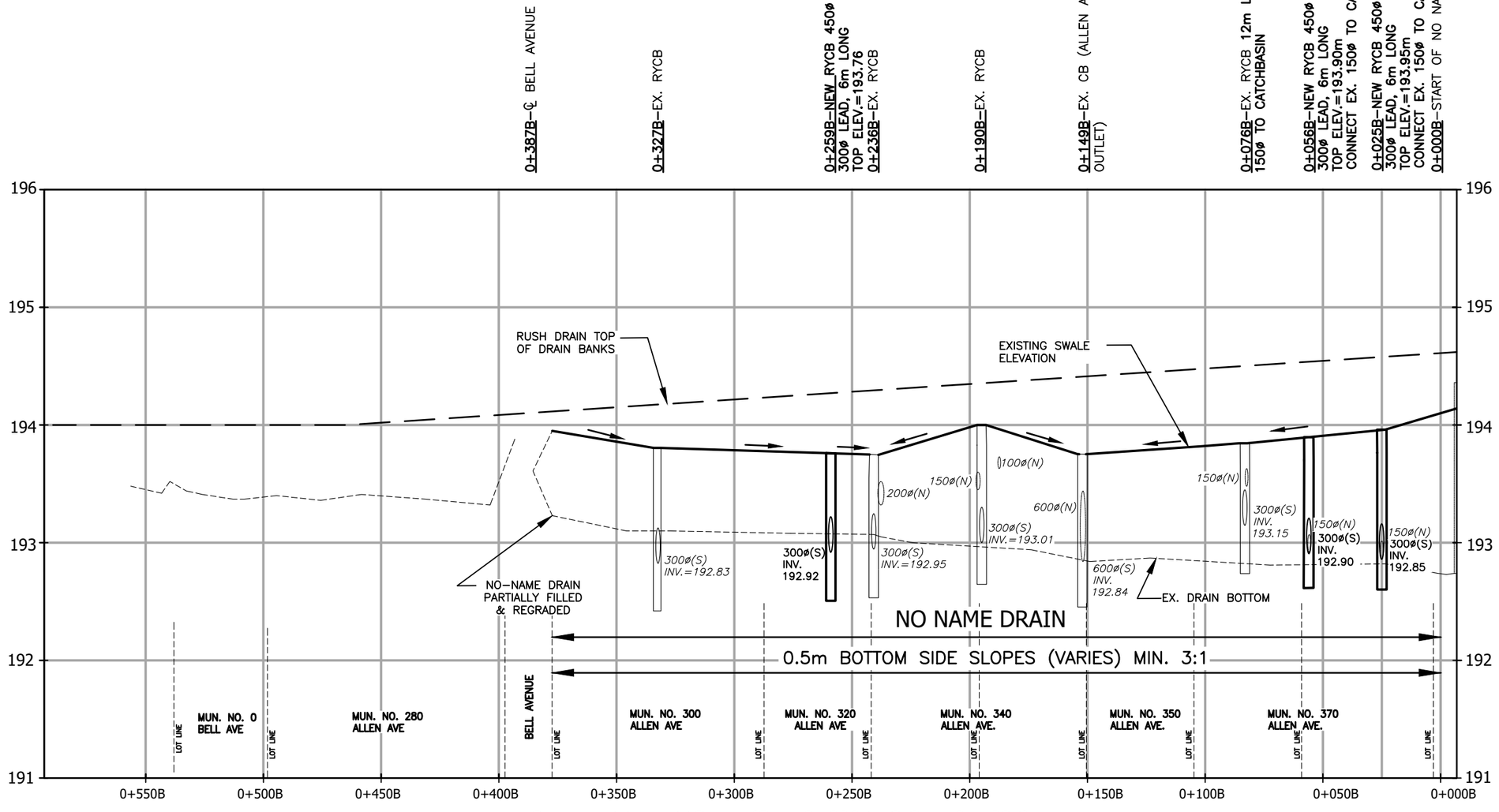

NO NAME DRAIN PROFILE (STA. 0+000B TO STA. 0+538B)

SCALE–HORIZ=1:2,000
VERT. =1:40

'SCHEDULE G'

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Drainage Report for the
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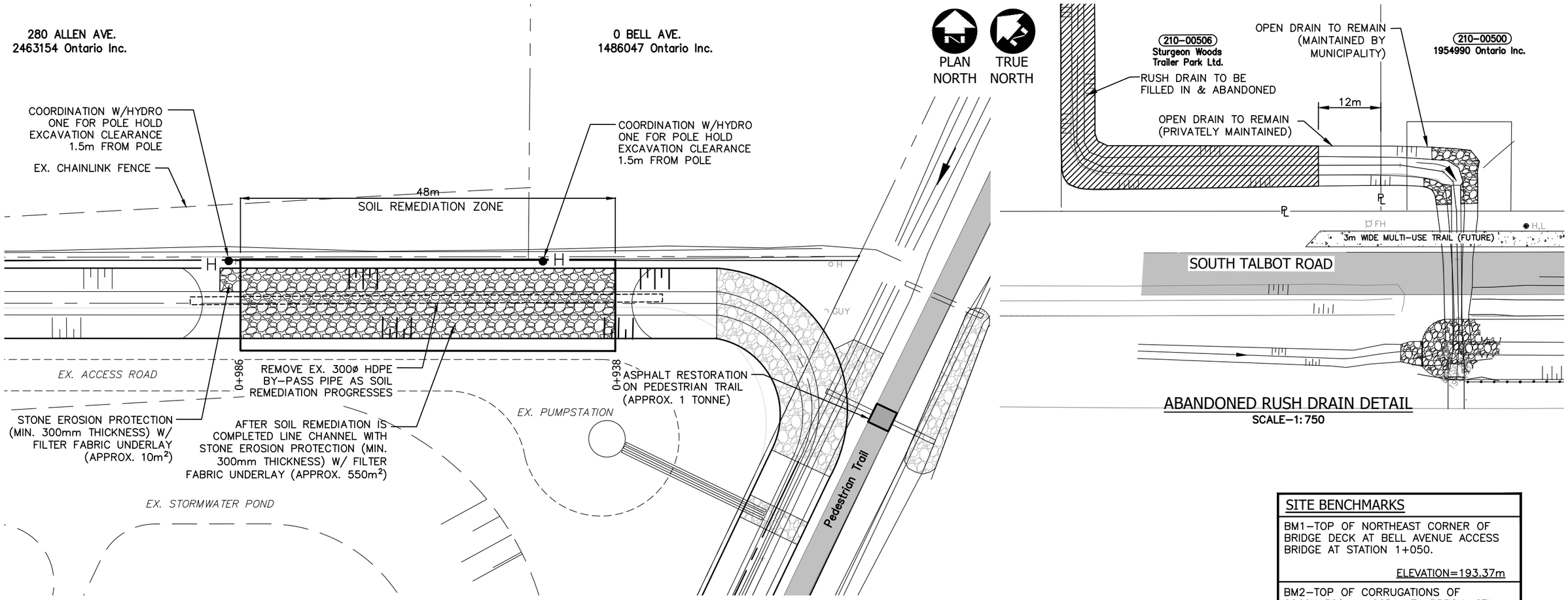
SHEET TITLE: NO NAME DRAIN PROFILE
PAGE NO. 4 of 8

May 02, 2025 – 10:32am C:\pw working directory\projects 2019\33oem\d0109885\191023-03-PROF-DES.dwg



SOIL REMEDIATION ZONE DETAIL
SCALE–1: 500

ABANDONED RUSH DRAIN DETAIL
SCALE–1: 750

NOTES:

- NO STOCKPILING OF CONTAMINATED MATERIAL ONSITE ALLOWED.
- CONTRACTOR TO COVER CONTAMINATED SOILS WITH SHEETING AT THE END OF EACH DAY & DURING PERIODS OF RAIN.

SITE BENCHMARKS

BM1–TOP OF NORTHEAST CORNER OF BRIDGE DECK AT BELL AVENUE ACCESS BRIDGE AT STATION 1+050.
ELEVATION=193.37m

BM2–TOP OF CORRUGATIONS OF 2060X1520mm CSPA AT APPROX. STA. 1+452.
ELEVATION=194.36m

NOTE: CONTRACTOR TO VERIFY BENCHMARKS PRIOR TO CONSTRUCTION.

NOTE: CONTRACTOR SHALL ARRANGE TO HAVE ALL UTILITY LOCATES COMPLETED ONSITE PRIOR TO ANY EXCAVATION WORK. DILLON CONSULTING LIMITED DOES NOT GUARANTEE THE ACCURACY OF THE EXISTING UTILITIES SHOWN ON THE DRAWINGS. CONTRACTOR TO VERIFY THE LOCATION PRIOR TO COMMENCING WORK.

LICENSED PROFESSIONAL ENGINEER
M. D. HERNANDEZ
100078099
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DILLON CONSULTING

'SCHEDULE G'

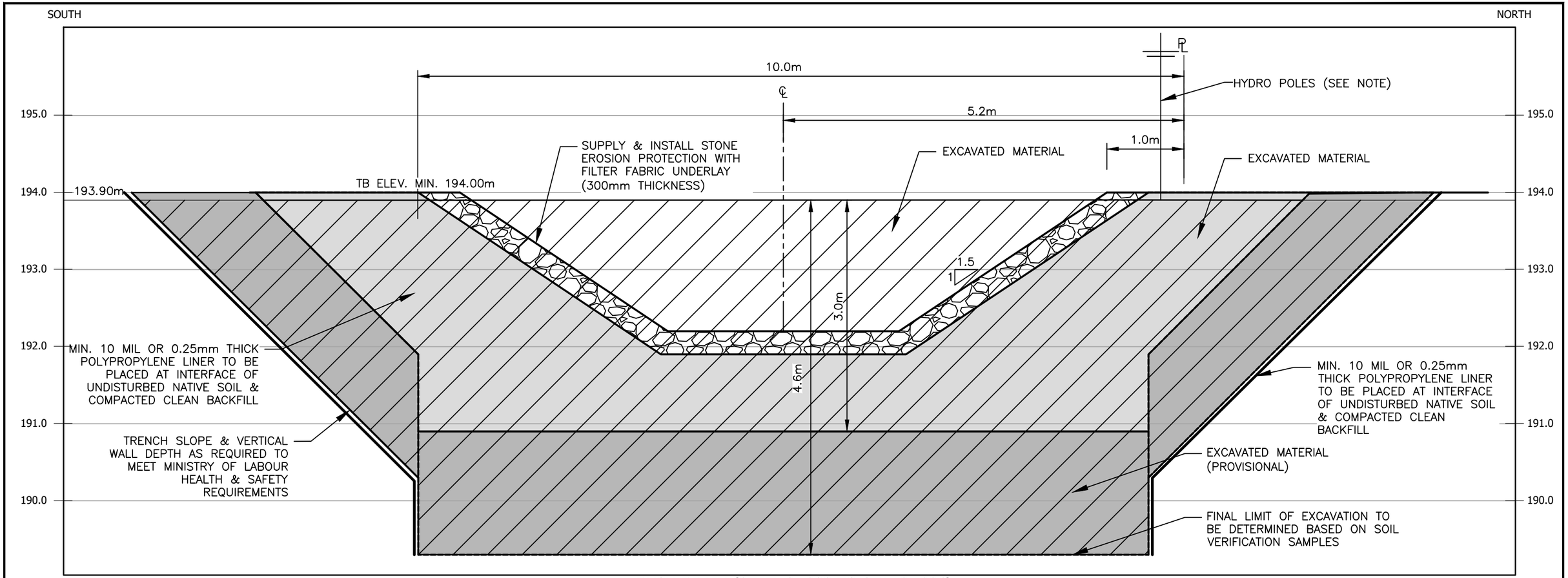
Drainage Report for the
RUSH DRAIN RELOCATION AMENDMENTS
Town of Essex

PROJECT NO. 19-1023

SHEET TITLE SOIL REMEDIATION ZONE DETAIL

DRAWING SCALES BASED ON A 11" X 17" SHEET

PAGE NO. 5 of 8



RUSH DRAIN (STAT. 0+938 TO STA. 0+986)

SCALE–1:50

CONSTRUCTION NOTES:

EXCAVATION & BACKFILL NOTES

1. APPROVAL OF THE QUALIFIED PERSON REQUIRED PRIOR TO PLACEMENT OF LINER AND BACKFILL.
2. THE PERIMETER OF THE DELINEATED CONTAMINATED SOIL REGION TO BE SURROUNDED W/ SAFETY FENCE AT END OF EACH DAY
3. CONTRACTOR SHALL BE RESPONSIBLE TO TAKE ALL HEALTH & SAFETY PRECAUTIONS NECESSARY INCLUDING USE OF AIR MONITORING EQUIPMENT,APPLICATION OF RESPIRATORS,FACE SHIELDS FOR ALL EQUIPMENT OPERATORS. CONTRACTOR SHALL HAVE H&S PLAN PREPARED & SUBMITTED TO TOWN OF ESSEX & DILLON CONSULTING LIMITED PRIOR TO STARTUP
4. ANY BACKFILL WITHIN THE LIMITS OF THE CONTAMINATED ZONE, SHALL CONSIST OF HOMOGENEOUS, UNIFORMLY COMPACTED SOIL CONSISTING OF NATURALLY OCCURRING SILT TILL OR, CLAY TILL WITH LOW TO MEDIUM PLASTICITY, WITH THE FOLLOWING PROPERTIES:
   - 4.1. MINIMUM CLAY/SILT SIZED PARTICLE CONTENT OF 20%.
   - 4.2. SHALL CONTAIN NO ROCK GREATER THAN 100mm IN THE MAXIMUM DIMENSION.
   - 4.3. FRACTION (BY DRY WEIGHT) PASSING THE 4.75mm (NO. 4) SIEVE: 20% OR LESS.
   - 4.4. FRACTION (BY DRY WEIGHT) PASSING THE 75 um (NO. 200) SIEVE: 30% OR GREATER.
   - 4.5. LIQUID LIMIT: 30% OR GREATER.
   - 4.6. PLASTICITY INDEX: 15 OR GREATER.
   - 4.7. SHALL BE FREE OF: REFUSE, GRANULAR/ANGULAR MATERIAL, LOAM, ROOTS, ORGANIC MATTER, FROZEN MATERIAL, INORGANIC CLAYS OF HIGH PLASTICITY, SWELLING CLAYS, SILTS OF LOW STRENGTH, ORGANIC CLAYS, AND CLODS.
   - 4.8. SHALL BE SCREENED TO REMOVE COBBLES OR STONES LARGER THAN 100 MILLIMETRES REMOVED. ANY LINER SOIL CONTAINING UNSUITABLE MATERIAL SHALL BE REMOVED AND DISCARDED.
5. THE MAXIMUM COMPACTED LIFT THICKNESS FOR THE BACKFILL SHALL BE 300mm.
6. CLAY BACKFILL SHALL BE COMPACTED IN LAYERS AT BETWEEN 0 AND 2% ABOVE OPTIMUM MOISTURE TO A MINIMUM OF 95% OF DRY DENSITY AS DETERMINED BY ASTM D–698.
7. NO GRANULAR MATERIAL MATERIAL IS PERMITTED UNDER LINER.

HYDRO UTILITY NOTES

8. TWO HYDRO POLES EXIST WITHIN THE SOIL REMEDIATION ZONE. THE CONTRACTOR SHALL COORDINATE WITH HYDRO ONE FOR ALL NECESSARY SAFETY REQUIREMENTS FOR WORKING IN PROXIMITY TO THE UTILITY, INCLUDING BUT NOT LIMITED TO POLE HOLDS AND POWER LINE COVER–UPS.
9. WHERE THE PRESENCE OF A HYDRO POLE INTERFERES WITH THE EXCAVATION AS SHOWN, THE CONTRACTOR SHALL EMPLOY THE USE OF A TRENCH BOX AND MANUALLY COMPACT BACKFILL SOILS IN LIFTS, OR OTHER METHODOLOGY AS SUBMITTED TO AND APPROVED BY THE ENGINEER.
10. NEWLY ESTABLISHED DRAIN TOP OF BANK IMMEDIATELY ADJACENT TO HYDRO POLES SHALL BE MINIMUM 0.5m OFFSET FROM POLE. BANK SIDE SLOPE TO BE NO STEEPER THAN 1:1.

'SCHEDULE G'

LICENSED PROFESSIONAL ENGINEER
M. D. HERNANDEZ
100078099
May 2/25
PROVINCE OF ONTARIO

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DILLON CONSULTING

PROJECT NO. 19-1023

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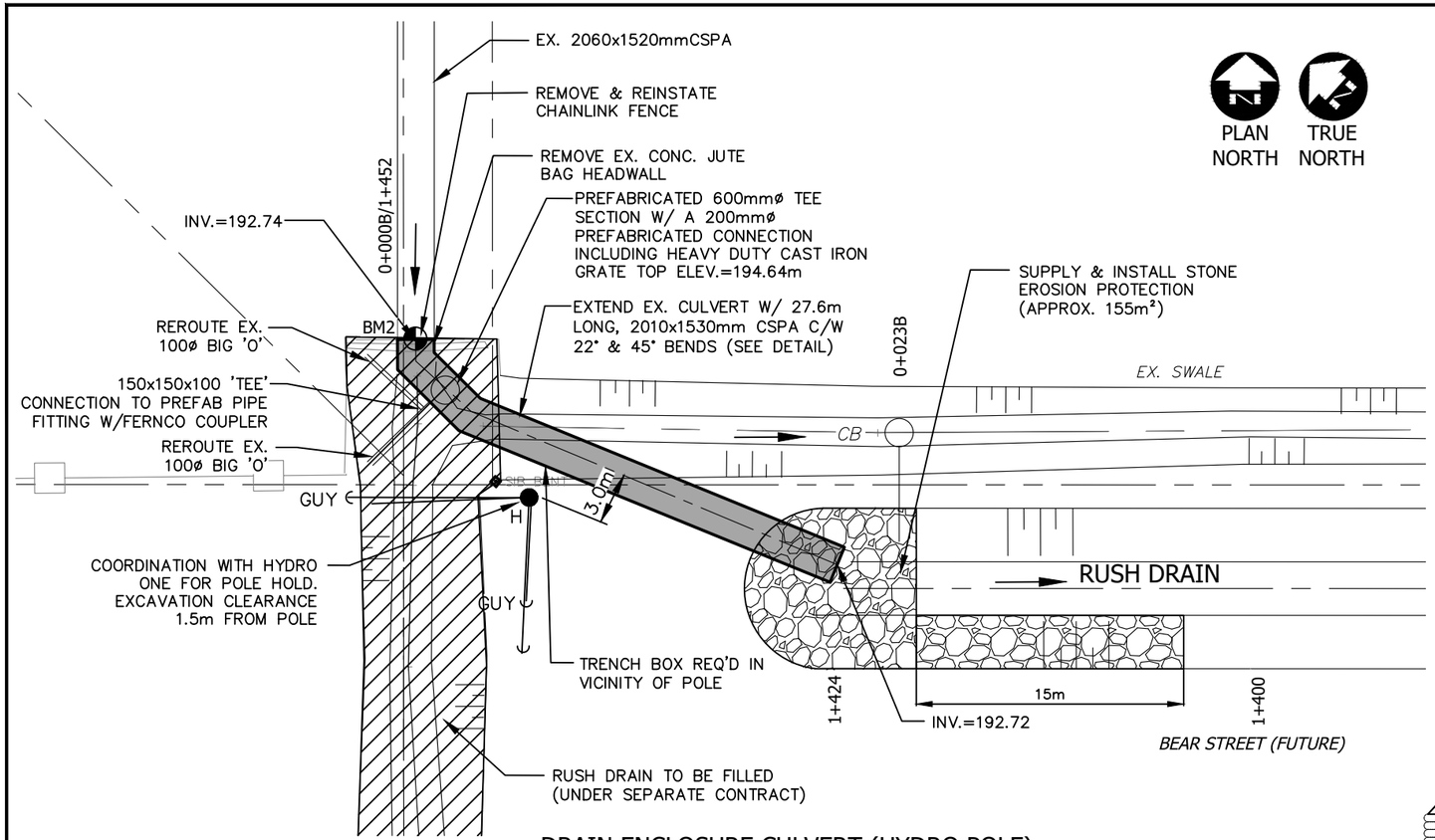
Town of Essex

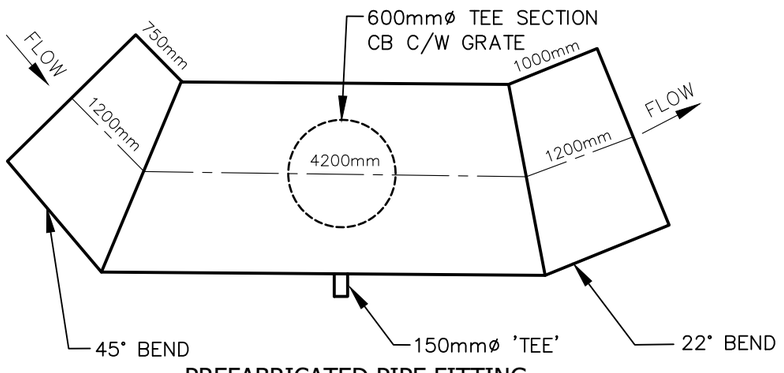
SHEET TITLE: SOIL REMEDIATION ZONE SECTION

PAGE NO. 6 of 8



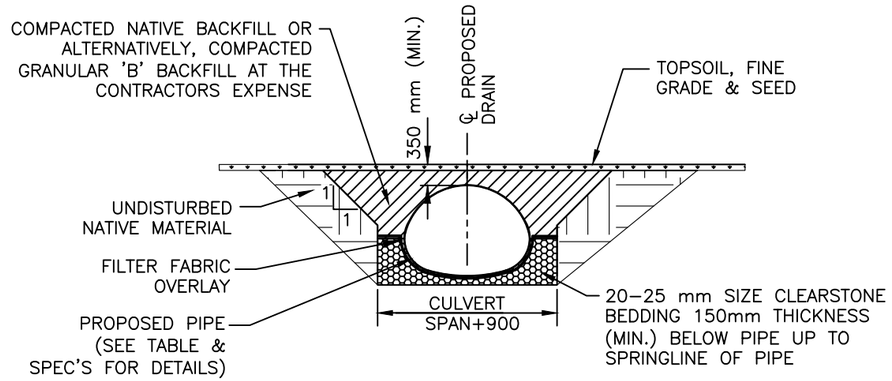
DRAIN ENCLOSURE CULVERT (HYDRO POLE)

NOT TO SCALE



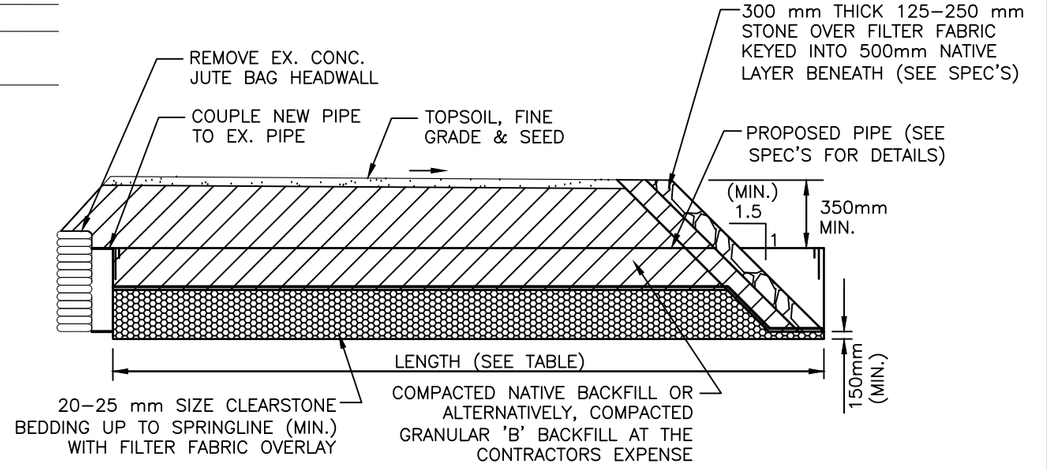
PREFABRICATED PIPE FITTING (2010mm x1530mm CSPA)

NOT TO SCALE



CROSS SECTION

NOT TO SCALE



LONGITUDINAL SECTION

NOT TO SCALE

'SCHEDULE G'

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M. D. HERNANDEZ
100078099
May 2/25
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Drainage Report for the
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Town of Essex

SHEET TITLE DRAIN CONNECTION (STA. 1+452)

PAGE NO. 7 of 8

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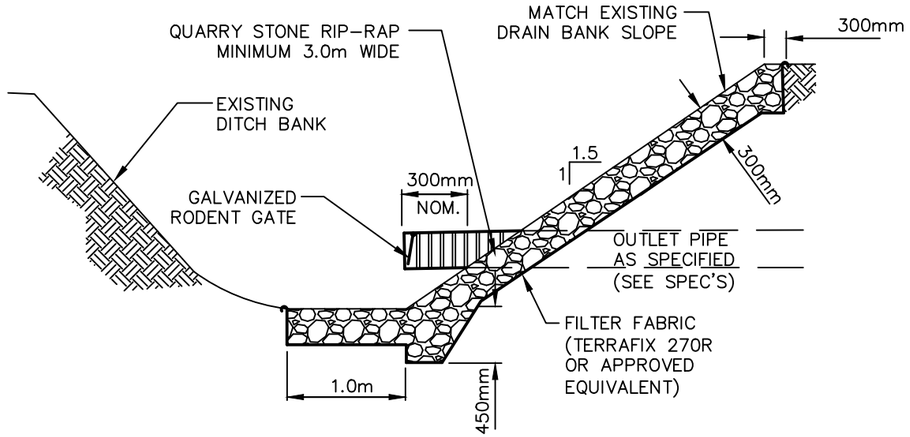
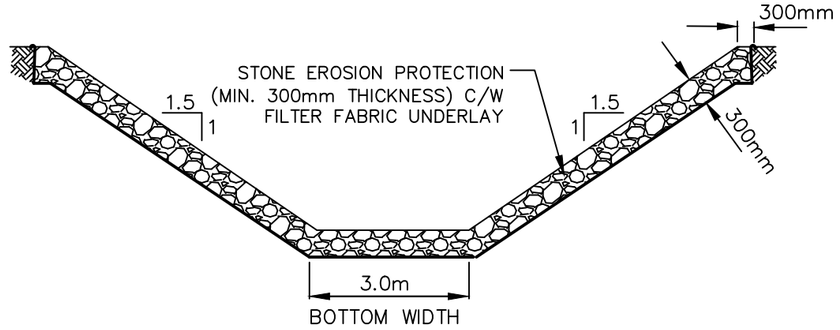
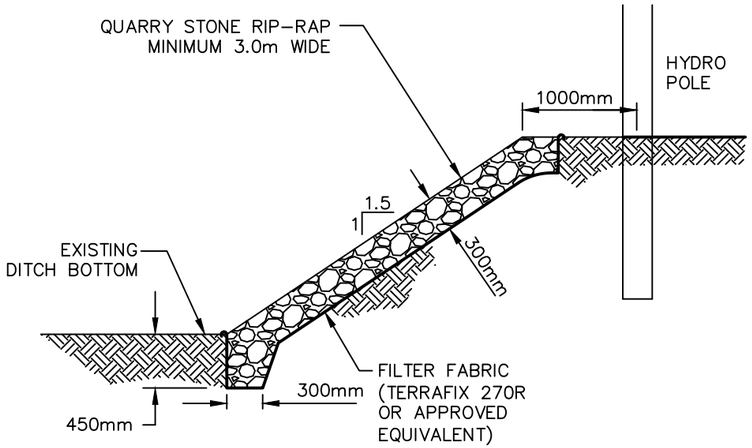


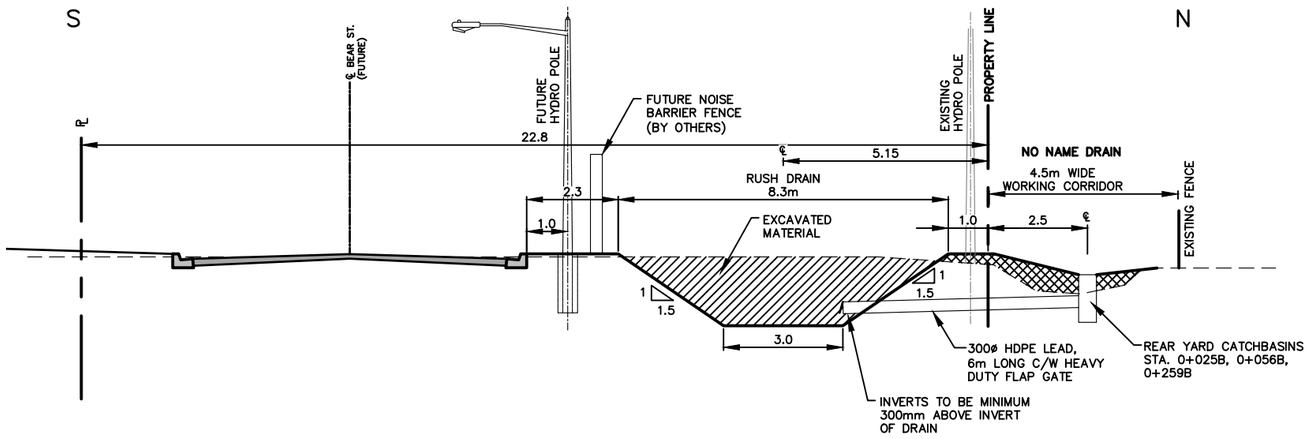
DRAIN CONNECTION
OUTLET DETAIL
N.T.S.



SOIL REMEDIATION ZONE
FINAL SECTION
N.T.S.



DRAIN BANK EROSION PROTECTION AT
EXISTING HYDRO POLE LOCATIONS
N.T.S.



(STA. 1+200 - STA. 1+445) (LOOKING UPSTREAM)
RUSH DRAIN CROSS SECTION
NOT TO SCALE

LICENSED PROFESSIONAL ENGINEER
M. D. HERNANDEZ
100078099
May 2/25
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
2	FINAL REPORT SUBMISSION	MAY 2/25	MDH
1	CLIENT REVIEW	FEB. 21/25	MDH

DESIGN MDH	REVIEWED BY JWM
DRAWN WLB	CHECKED BY OEM
DATE May 2, 2025	
SCALE AS SHOWN	

DILLON CONSULTING

PROJECT NO. 19-1023

DRAWING SCALES BASED ON A 11" X 17" SHEET

'SCHEDULE G'

Drainage Report for the
RUSH DRAIN RELOCATION AMENDMENTS
Town of Essex

SHEET TITLE MISCELLANEOUS DETAILS

PAGE NO. 8 of 8