

DRAINAGE REPORT
FOR THE

LACHANCE DRAIN
(LACHANCE BRIDGE)

TOWN OF TECUMSEH



(FINAL – COUNCIL CONSIDERATION)

24 FEBRUARY 2022

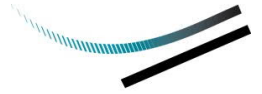
MARK D. HERNANDEZ, P.ENG.

DILLON FILE No. 21-2752

TECUMSEH FILE NO. E09LA(49)

File No. 21-2752

Mayor and Council
The Corporation of the Town of Tecumseh
917 Lesperance Road
Tecumseh, Ontario N8N 1W9



Drainage Report for the
LACHANCE DRAIN
(LACHANCE BRIDGE)
Town of Tecumseh

Ladies & Gentlemen:

Instructions

The Municipality received a request for a new residential access and lawn enclosure serving Pt. Lot 148, Concession 3 (Roll No. 570-34700) over the Lachance Drain that was filed at the Municipal Office on the 30th day of April 2021. Council accepted the request under Section 78 of the Drainage Act and on the 27th day of July 2021 appointed Dillon Consulting Limited to prepare a report. The new bridge is required as part of a recent severance. As part of the conditions of severance from the Town to allow the severance of property Roll No. 570-34700, a new bridge is required to provide access. The landowner also requested the enclosure of the drain along the entire frontage of the lot measuring approximately 46 metres.

Watershed Description

The Lachance Drain commences along the south side of Intersection Road at Shawnee Road where it flows westerly through a storm drain pipe to approximately the western boundary of Lot 148 where it begins to flow in an open channel until the centre of Lot 140. It then flows southerly for 243 metres and continuing as an open channel flowing westerly for 796 metres where it outlets into the Little River Drain.

The land comprising the watershed is under primarily residential use. From the Ontario Soil Survey (provided by the Ontario Ministry of Agriculture, Food and Rural Affairs), the principle surficial soil in the study area is described as Brookston Clay. Brookston clay is characterized as a very slow draining soil type. The residential lands located upstream consists of a storm sewer network which outlets into the Lachance Drain at its upstream end being Shawnee Road.

Drain History

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

- 3 May 2019 by Mark D. Hernandez, P.Eng.: This report recommended the repair and improvement of the entire drain including provisions for future maintenance of the five (5) existing bridges.
- 7 September 1988 by Lou Zarlenga, P.Eng.: This report recommends the improvement of the entire drain including the replacement of all culverts. The existing drain including culverts was found to be in disrepair. Further, a proposed residential development at the upstream end of the Lachance Drain required the improvements which were in addition to the maintenance activities. The report included a recommendation that all excess excavated material be trucked away.
- 3 August 1968 by C.G.R. Armstrong, P.Eng.: This report recommended the repair and improvement of the drain.

On-Site Meeting

Site meeting was held on 31 August 2021. A record of this meeting is provided in Schedule 'A', which is appended hereto.

Survey

Our initial survey and examination of the Lachance Drain was carried out on 26 March 2018 as part of the survey conducted for the previous 2019 Lachance Drain report. The work was then reviewed as part of the completed construction. As the work was recently completed, this report is based on the drain being in an 'as-designed' condition.

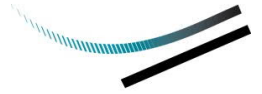
Design Considerations

The Design and Construction Guidelines published by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) recommends that open drainage systems and drain crossings serving residential lands be designed to effectively contain and convey the peak runoff generated from a storm event having a frequency of occurrence of 1 in 5 years. The new access bridge is designed for an upstream drainage area of approximately 11.11 ha. (27.46 acres).

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

Allowances

In accordance with Sections 29 and 30 of the Drainage Act, we do not anticipate any agricultural lands being damaged or taken as a result of the proposed drainage works. Any damage to the area shall be restored to original condition as part of the work. Therefore, 'Schedule B' for Allowances has not been included in this report.



Recommendations and Cost Estimate

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

Item	Description	Amount
1.	Removal and disposal off site of existing concrete jute bag headwall.	\$1,000.00
2.	Supply and place a new 46.0 m long, 900 mm diameter solid, corrugated, high density polyethylene (HDPE) smooth interior dual wall profile pipe (Armtex Boss 2000, 320 kPa or approved equal) (see Specifications) with bell & spigot joining system providing a 6.1 m (20 ft.) driveable top width and the remainder as lawn enclosure.	\$22,100.00
3.	Supply and installation of a large diameter coupler (Fernco Connectors Ltd. LDC-46.50 x 42.80 or approved equal) to connect existing 900 mm diameter concrete pipe to new 900 mm diameter HDPE.	\$1,000.00
4.	Supply and installation of three (3) new 450 mm diameter solid corrugated high density polyethylene (HDPE) smooth wall (Boss 2000 or approved equal) offset yard catch basins along the enclosure with minimum 600 mm deep sump, complete with cast iron grate, 150 mm diameter HDPE pipe lead and connection to drain with a prefabricated tee. Work includes fine grading and seeding of disturbed areas. Locations to be field fit based on site specific grading and in consultation with the homeowner.	\$4,500.00



Item	Description	Amount
5.	Supply and placement of clear stone bedding materials, minimum 150 mm thickness (approximately 35 tonnes).	\$1,900.00
6.	Supply and placement of Granular 'B' backfill materials up to springline of pipe for enclosure portion and full Granular 'B' backfill to underside of driveway materials for driveway portion (approximately 165 tonnes).	\$4,650.00
7.	Supply and placement of clean native or imported clean native backfill material from springline of pipe culvert up to the existing grade beyond the driveway portion and native buffer strip (approximately 270 m ³).	\$4,400.00
8.	Supply and install Granular 'A' (crushed limestone) compacted driveway surface, minimum 200 mm thickness (approximately 40 tonnes).	\$1,650.00
9.	Supply and placement of stone rip-rap minimum 300 mm thickness c/w filter cloth underlay for sloping end wall (approximately 20 m ²).	\$1,600.00
10.	Supply and placement of topsoil (100 mm minimum thickness). Restore all disturbed areas with fine grading and seeding (approximately 460 m ²).	\$2,750.00
11.	Excavate sediment trap located immediately downstream of new culvert (3 m long x 1 m wide x 0.3 m deep) complete with rock flow check dam on downstream side (1 m long x 2 m wide x 0.3 m high) (approximately 5 tonnes). The work shall include trucking of excavated materials off-site.	\$500.00
12.	Temporary silt control measures during construction.	<u>\$800.00</u>
	SUB-TOTAL – EXCLUDING SECTION 26 COSTS	\$46,850.00
13.	Survey, report, assessment and final inspection (cost portion)	\$8,500.00
14.	Expenses and incidentals (cost portion)	\$500.00
15.	ERCA application, review and permit fee	<u>\$500.00</u>
	TOTAL ESTIMATE – LACHANCE DRAIN	\$56,350.00

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

Assessment of Costs

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

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

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

Assessment Rationale

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

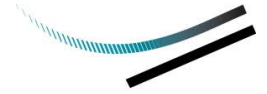
1. We recommend that the costs of the new driveway access portion including the engineering cost apportionment be assessed 100% to the severed lot landowner.
2. We recommend that the costs of the new lawn enclosure portion including the engineering cost apportionment be assessed 100% to the severed lot landowner.

The yard catchbasins are part of the required works, but are not considered part of the Lachance Drain for purposes of future improvements or maintenance.

Utilities

It may become necessary to temporarily or permanently relocate utilities that may conflict with the construction recommended under this report. In accordance with Section 26 of the Drainage Act, we assess any relocation cost against the public utility having jurisdiction.

Under Section 69 of the Drainage Act, the public utility is at liberty to do the work with its own forces, but if it should not exercise this option within a reasonable time, the Municipality will arrange to have this work completed and the costs will be charged to the appropriate public utility.



Future Maintenance

We recommend that all future work for repair and maintenance of the access bridge's driveway portion (westerly 11 m length) be carried out by the Town of Tecumseh and assessed 50% against the affected property as a special benefit assessment. The remaining 50% shall be assessed to the upstream lands and roads as Outlet assessment in the same relative proportions listed in Schedule 'E.' The Schedule of Assessment has been developed on the basis of an arbitrary cost of \$10,000.00 for the Outlet assessment portion.

For the lawn enclosure portion (easterly 35 m length), we recommend that all future work of repair and maintenance be carried out by the Town of Tecumseh and assessed 100% against the respective property.

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

Drawings and Specifications

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

Page 1 of 3 - Watershed Plan

Page 2 of 3 - Bridge Details

Page 3 of 3 - Details

Approvals

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

Grants

No grant eligibility for the entire access bridge capital costs as per ADIP policy section 2.3(i)(ii). Concerning future maintenance, there is no grant eligibility for the lawn enclosure portion of the access bridge as per ADIP policy section 2.3(f).

Grant eligibility may apply to future maintenance costs of the driveway portion of the access bridge. We recommend that application be made to the Ontario Ministry of Agriculture and Food in accordance with Section 88 of the Drainage Act, for this grant, as well as for all other grants for which this work may be eligible.

Respectfully submitted,

DILLON CONSULTING LIMITED



Mark D. Hernandez, P.Eng.

MDH: wlb:lld



Lachance Drain – Onsite Meeting Notes

Tuesday, August 31, 2021 – Virtual Site Meeting.

Attendance: Sam Paglia, MDH,

Erin Armstrong - Landowner

Johnny Kaps - Landowner

Julie Lachance - Landowner

Gordon and Marlene Hambly - Landowner

General discussion regarding the Drainage Act

- 'User Pay System' unlike sewers owned by the municipality
- The process can generally be described as follows:
 - Request submitted
 - Engineer is appointed by the municipality
 - Site meeting held
 - Report prepared
 - PIC (not required by the Act)
 - Meeting to Consider
 - Court of Revision

What is the purpose of the site meeting in general?

- Gather information
 - Opportunity for landowners to provide feedback about the performance of the drain
 - Issues are not anticipated in this case since the drain was recently maintained.

What is the nature of the request(s)?

- S78 request from landowner to enclose a portion of drain fronting a residential property
 - Driveway and lawn enclosure
- Sam showed location on screen. Location is at approximately 2+288.

Who is going to pay and how?

- For the current request, new access culverts and lawn enclosures are paid 100% by the requesting landowner.
 - When there is an existing access culvert, a replacement becomes shared 50/50
 - Lawn enclosures are always 100% to the landowner as they are not considered essential / Special Benefit.
 - If any further work was required or requested, then that would be assessed separately. No additional work has been requested by other landowners.
- The engineer determines the assessment
 - Assessment is detailed in report for each property in the watershed
- Grants are available for properties with Farm Class Tax Rate (1/3)
 - Does not apply to residential properties
- The Municipality will bill the landowners after the work is complete for their net assessment (if applicable)
- The report will have a future maintenance schedule – it is used to show the proportion of costs assessable to upstream landowners for future maintenance of the work – only assessed based on actual costs incurred.
- Director of finance has made it so that now if under \$50, it is added to taxes but notice is still provided.
- Landowner asked about recent assessment. Town confirmed that was their share of the costs for the work recently completed on the LaChance and was a one-time cost for that work.
-

What should I expect in the report?

- All landowners receive copies of the draft report with their notice for the PIC (if required), Meeting to Consider and Court of Revision
- Reports generally contain:
 - Background information about the request
 - History on the drain
 - Design considerations
 - Recommended work
 - Cost estimate
 - Meeting minutes
 - Assessments including FM provisions
 - Specifications
- Will be printed and distributed in paper copies.

Environmental requirements

- DFO, MNRF and ERCA

- DFO has been sensitive about enclosures of open drains as it is seen as loss of habitat. This is something that will have to be reviewed with our biologists early in the process.

Next Steps

- Topographical survey will be completed and then the preparation of the report will commence
- PIC (if required)
- Board meetings
- Landowners have the ability to appeal technical aspects or assessment.

"SCHEDULE C"
SCHEDULE OF ASSESSMENT
LACHANCE DRAIN (LACHANCE BRIDGE)
TOWN OF TECUMSEH

MUNICIPAL LANDS:

Description	Area Affected (Acres) (Ha.)		Owner	Special Benefit	Benefit	Outlet	Total Assessment
Block 'A'							
Lands	18.66	7.55	Town of Tecumseh	\$0.00	\$0.00	\$0.00	\$0.00
Roads	6.08	2.46	Town of Tecumseh	\$0.00	\$0.00	\$0.00	\$0.00
Total on Municipal Lands.....				\$0.00	\$0.00	\$0.00	\$0.00

PRIVATELY-OWNED - NON-AGRICULTURAL LANDS:

Roll No.	Con.	Description	Area Affected (Acres) (Ha.)		Owner	Special Benefit	Benefit	Outlet	Total Assessment
570-34700 (Severed Parcel)	3	Pt. Lot 148	0.55	0.22	Clement & Jeannette Lachance	\$56,350.00	\$0.00	\$0.00	\$56,350.00
Total on Privately-Owned - Non-Agricultural Lands.....						\$56,350.00	\$0.00	\$0.00	\$56,350.00

PRIVATELY-OWNED - AGRICULTURAL LANDS

Roll No.	Con.	Description	Area Affected (Acres) (Ha.)		Owner	Special Benefit	Benefit	Outlet	Total Assessment
570-34700	3	Pt. Lot 148	2.17	0.88	Clement & Jeannette Lachance	\$0.00	\$0.00	\$0.00	\$0.00
Total on Privately-Owned - Agricultural Lands (Grantable).....						\$0.00	\$0.00	\$0.00	\$0.00

TOTAL ASSESSMENT (Town of Tecumseh) \$56,350.00 \$0.00 \$0.00 \$56,350.00

	(Acres)	(Ha.)
Total Area:	27.46	11.11

"SCHEDULE D"
DETAILS OF SPECIAL BENEFIT
LACHANCE DRAIN (LACHANCE BRIDGE)
TOWN OF TECUMSEH

SPECIAL BENEFIT ASSESSMENT
(NON - AGRICULTURAL LANDS)

Roll No.	Owner	Item Description	Estimated Cost	Cost of Report	Special Benefit
570-34700 (Severed Parcel)	Clement & Jeanette Lachance	<u>Driveway Portion</u> - Supply & install new 11.0 m long, 900 mm diameter HDPE pipe complete with clearstone bedding , full Granular 'B' backfill, Granular 'A' driveway surface and end wall providing a 6.1 m (20 ft.) driveable top width. (100%)	\$15,600.00	\$3,163.00	\$18,763.00
570-34700 (Severed Parcel)	Clement & Jeanette Lachance	<u>Lawn Enclosure Portion</u> - Supply & install new 35.0 m long, 900 mm diameter HDPE pipe complete with clearstone bedding, Granular 'B' backfill material up to pipe springline, native material backfill, three (3) yard catch basins, sediment trap and restoration topsoil & seeding (100%)	\$31,250.00	\$6,337.00	\$37,587.00
Total Special Benefit Assessment (Non - Agricultural Lands).....			\$46,850.00	\$9,500.00	\$56,350.00

"SCHEDULE E"
SCHEDULE OF ASSESSMENT FOR FUTURE MAINTENANCE
LACHANCE DRAIN (LACHANCE BRIDGE-DRIVEWAY PORTION ONLY)
TOWN OF TECUMSEH

MUNICIPAL LANDS:

Description	Area Affected (Acres) (Ha.)		Owner	Special Benefit	Benefit	Outlet	Total Assessment
Block 'A'							
Lands	18.66	7.55	Town of Tecumseh	\$0.00	\$0.00	\$6,211.00	\$6,211.00
Roads	6.08	2.46	Town of Tecumseh	\$0.00	\$0.00	\$3,373.00	\$3,373.00
Total on Municipal Lands.....				\$0.00	\$0.00	\$9,584.00	\$9,584.00

PRIVATELY-OWNED - NON-AGRICULTURAL LANDS:

Roll No.	Con.	Description	Area Affected (Acres) (Ha.)		Owner	Special Benefit	Benefit	Outlet	Total Assessment
570-34700 (Severed Parcel)	3	Pt. Lot 148	0.55	0.22	Clement & Jeannette Lachance	\$0.00	\$0.00	\$175.00	\$175.00
Total on Privately-Owned - Non-Agricultural Lands.....						\$0.00	\$0.00	\$175.00	\$175.00

PRIVATELY-OWNED - AGRICULTURAL LANDS (GRANTABLE)

Roll No.	Con.	Description	Area Affected (Acres) (Ha.)		Owner	Special Benefit	Benefit	Outlet	Total Assessment
570-34700	3	Pt. Lot 148	2.17	0.88	Clement & Jeannette Lachance	\$0.00	\$0.00	\$241.00	\$241.00
Total on Privately-Owned - Agricultural Lands (Grantable).....						\$0.00	\$0.00	\$241.00	\$241.00
TOTAL ASSESSMENT.....						\$0.00	\$0.00	\$10,000.00	\$10,000.00

	(Acres)	(Ha.)
Total Area:	27.46	11.11

“SCHEDULE F”
DRAINAGE REPORT FOR THE
LACHANCE DRAIN (LACHANCE BRIDGE)
IN THE TOWN OF TECUMSEH
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:

- Removal and disposal off site of existing concrete jute bag headwall.
- Supply and place a new 46.0 m long, 900 mm diameter solid, corrugated, high density polyethylene (HDPE) smooth interior dual wall profile pipe (Armtec Boss 2000, 320 kPa or approved equal) (see Specifications) with bell & spigot joining system providing a 6.1 m (20 ft.) driveable top width and the remainder as lawn enclosure.
- Supply and installation of a large diameter coupler (Fernco Connectors Ltd. LDC-46.50 x 42.80 or approved equal) to connect existing 900 mm diameter concrete pipe to new 900 mm diameter HDPE.
- Supply and installation of three (3) new 450 mm diameter solid corrugated high density polyethylene (HDPE) smooth wall (Boss 2000 or approved equal) offset yard catch basins along the enclosure with minimum 600 mm deep sump, complete with cast iron grate, 150 mm diameter HDPE pipe lead and connection to drain with a prefabricated tee. Work includes fine grading and seeding of disturbed areas. Locations to be field fit based on site specific grading and in consultation with the homeowner.
- Supply and placement of clear stone bedding materials, minimum 150 mm thickness (approximately 35 tonnes).
- Supply and placement of Granular 'B' backfill materials up to springline of pipe for enclosure portion and full Granular 'B' backfill to underside of driveway materials for driveway portion (approximately 165 tonnes).

- Supply and placement of clean native or imported clean native backfill material from springline of pipe culvert up to the existing grade beyond the driveway portion and native buffer strip (approximately 270 m³).
- Supply and install Granular 'A' (crushed limestone) compacted driveway surface, minimum 200 mm thickness (approximately 40 tonnes).
- Supply and placement of stone rip-rap minimum 300 mm thickness c/w filter cloth underlay for sloping end wall (approximately 20 m²).
- Supply and placement of topsoil (100 mm minimum thickness). Restore all disturbed areas with fine grading and seeding (approximately 460 m²).
- Excavate sediment trap located immediately downstream of new culvert (3 m long x 1 m wide x 0.3 m deep) complete with rock flow check dam on downstream side (1 m long x 2 m wide x 0.3 m high) (approximately 5 tonnes). The work shall include trucking of excavated materials off-site.
- Temporary silt control measures during construction.

3.0 ACCESS TO THE WORK

Access to the drain shall be from Intersection Road. Through traffic must be maintained at all times along municipal roads with the required traffic control as per Section 13.0 in General Specifications.

Any damage resulting from the Contractor's access to the drain enclosure site shall be rectified to pre-existing conditions at his expense.

4.0 WORKING AREA

The working area for construction purposes shall be restricted to the Intersection Road right-of-way and a 6 metre wide corridor located on the severed parcel adjacent to roadway for the entire length of the new culvert.

5.0 PRIVATE ACCESS BRIDGE CONSTRUCTION

5.1. Location of New Bridge

The new drain enclosure shall be installed as shown on the drawings attached hereto.

5.2. Materials for New Bridge

Materials shall be as follows:

Culvert Pipe	New 46.0 metres long, 900 mm diameter solid (non-perforated corrugated High Density Polyethylene (H.D.P.E.) smooth wall interior (Armtec Boss 2000 for approved equivalent) unless otherwise specified conforming to the following specifications: ASTM @ 3350, CSA B182.8-02 and OPSS 1840. The pipe is to provide a minimum pipe stiffness of 320 kPa. Joined using (soil tight) "gasketed bell & spigot" Ultra Stab joining system (as manufactured by Armtec Limited or approved equal), supplied by the pipe manufacturer and conforming to ASTM D3350, CSA 182.8-02 and OPSS 1840.
Pipe Bedding Below Pipe	20-25 mm clear stone conforming to OPSS Division 10.
Backfill up to Pipe Culvert Springline for Lawn Enclosure	Granular 'B' conforming to OPSS Division 10.
Backfill Above Pipe Springline up to Surface Grade for Lawn Portion	Dry native material free of topsoil, organic matter, broken concrete, steel, wood and deleterious substances. Alternatively, Granular 'A' or 'B' conforming to OPSS Division 10 at the Contractor's expense.
Backfill up to underside of Driveway Surface Materials for Driveway Portion	Granular 'B' conforming to OPSS Division 10.
Driveway Surface	Granular 'A' made from crushed limestone conforming to OPSS Division 10. Minimum 200 mm thickness.
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.
Buffer Strips	Dry native material free of topsoil, organic matter, broken concrete, steel, wood and deleterious substances.
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.

5.3. Culvert Installation

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

5.4. Large Diameter Coupler

The Contractor shall supply and install the custom Fernco Ltd. large diameter coupler complete with all appurtenances (or approved equal) to join the existing 900 mm diameter concrete pipe to the new 900 mm diameter HDPE pipe as per the manufacturer's specifications.

5.5. New Yard Catch Basins (YCB)

The Contractor shall arrange for the supply and installation of three (3) 450 mm diameter solid corrugated high density polyethylene (HDPE) smooth wall 320 kPa pipe (Boss 2000 or approved equal) yard catch basin complete with a 450 mm diameter cast iron grate and 150 mm diameter solid corrugated high density polyethylene (HDPE) smooth wall 320 kPa (or approved equal) connection to the catch basin using a prefabricated HDPE tee.

The base of the yard catch basin shall consist of a minimum layer of 300 mm of 19 mm clearstone. The base elevation shall be at least 600 mm below the invert of the outlet pipe in the wall of the catch basin.

Yard catch basins shall be backfilled with clean native materials in maximum lifts of 300 mm lifts and compacted to 98% of the maximum standard proctor density. Locations to be field fit based on site specific grading and in consultation with the homeowner.

5.6. Sediment Trap

A sediment trap and rock check dam shall be installed at the downstream end of the proposed works prior to commencing construction. The location and exact dimensions of the sediment trap and rock check dam will be confirmed with the Drainage Superintendent prior to installation. Installation shall be in accordance with OPSD 219.220 with the modifications to size as discussed with the Drainage Superintendent.

5.7. Sloping Stone End Walls

End walls shall be constructed of quarry stone rip-rap, as shown on the drawings and as specified herein. Each end wall shall extend from the invert of the new culvert to the top of the proposed lane. The end walls shall be sloped 1 vertical to 1.5 horizontal, with a filter fabric underlay surrounding the pipe and spanning across the entire width of the drain 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.

5.8. Granular 'A' Driveway

The Contractor shall construct the driveway with a maximum 3% cross-fall grade consisting of a minimum 200 mm thickness of compacted Granular 'A' (crushed limestone) surface.

The minimum top width of the driveway shall be as shown on the drawings.

5.9. Imported, Clean Native Materials

Clean native materials suitable for use as backfill, as defined under Section 5.2, shall be imported to enclose the drain as required to complete the work as shown on the drawings.

5.10. Lateral Tile Drains

Should the Contractor encounter any lateral tiles within the proposed culvert limits not shown on attached drawings, the Contractor shall re-route the outlet tile drain(s) 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 lateral tile drains (if any) shall be at the Contractor's expense.

Care must be taken in handling plastic drain pipe in cold weather to avoid causing damage.

Plastic drain pipe shall be held in position on planned grade immediately after installation by careful placement of backfill material.

5.11. Seeding

The Contractor shall seed all disturbed grassed lawn areas including buffer strips, existing lawns and grassed areas within the road allowance. Topsoil shall be salvaged from the site and/or trucked to site to provide a minimum of 100 mm of topsoil in all lawn areas.

Prior to seeding, all areas to be seeded shall be fine graded, and loosened to a minimum depth of 25 mm and shall be rendered uniformly loose for that 25 mm depth. The surface shall be predominantly fine graded and free from weeds and other unwanted vegetation. All other loose surface litter shall be removed and disposed of.

Grass seed shall be Canada No. 1 residential lawn grass seed mixture, as follows:

Creeping Red Fescue	30%
Premium Kentucky Bluegrass	25%
Turf-type Perennial Rye Grass	45%

Bags shall bear the label of the supplier indicating the content by species, grade and mass. Seed shall be applied at a rate of 200 kg per 10,000 m². Fertilizer shall be 8-32-16 applied at 350 kg per 10,000 m². It shall be in granular form, dry, free from lumps and in bags bearing the label of the manufacturer, indicating mass and analysis.

Seeding shall be carried out immediately following the bridge construction and shall be drilled into the topsoil layer. The contractor shall note that seeding will not be deemed complete, until the seed has established and formed a protective mat over the soil. Accordingly, the Contractor will be required to continue seeding until the Engineer and the Drainage Superintendent are satisfied with the area seeded under this item.

5.12. 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.

GENERAL SPECIFICATIONS

1.0 AGREEMENT AND GENERAL CONDITIONS

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

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

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

2.0 EXAMINATION OF SITE, PLANS AND SPECIFICATIONS

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

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

3.0 MAINTENANCE PERIOD

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

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

4.0 GENERAL CO-ORDINATION

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

5.0 RESPONSIBILITY FOR DAMAGES TO UTILITIES

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

6.0 CONTRACTOR'S LIABILITY

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

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

7.0 PROPERTY BARS AND SURVEY MONUMENTS

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

8.0 MAINTENANCE OF FLOW

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

9.0 ONTARIO PROVINCIAL STANDARDS

Ontario Provincial Standard Specifications (OPSS) and Ontario Provincial Standard Drawings (OPSD) shall apply and govern at all times unless otherwise amended or extended in these Specifications or on the Drawing. Access to the electronic version of the Ontario Provincial Standards is available online through the MTO website, free of charge to all users. To access the electronic standards on the Web go to <http://www.mto.gov.on.ca/english/transrd/>. Under the title Technical Manuals is a link to the Ontario Provincial Standards. Users require Adobe Acrobat to view all pdf files.

10.0 APPROVALS, PERMITS AND NOTICES

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

11.0 SUBLETTING

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

12.0 TIME OF COMPLETION

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

13.0 TRAFFIC CONTROL

The Contractor will be required to control vehicular and pedestrian traffic along roads at all times and shall, at his/her own expense, provide for placing and maintaining such barricades, signs, flags, lights and flag persons as may be required to ensure public safety. The Contractor will be solely responsible for controlling traffic and shall appoint a representative to maintain the signs and warning lights at night, on weekends and holidays and at all other times that work is not in progress. All traffic control during construction shall be strictly in accordance with the Occupational Health and Safety Act and the current version of the Ontario Traffic Manuals. Access to the electronic version of the Ontario Traffic Manual is available online through the MTO website, free of charge to all users. To access the electronic standards on the Web go to <http://www.mto.gov.on.ca/english/transrd/>, click on "Library Catalogue," under the "Title," enter "Ontario Traffic Manual" as the search. Open the applicable "Manual(s)" by choosing the "Access Key," once open look for the "Attachment," click the pdf file. Users require Adobe Acrobat to view all pdf files.

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

14.0 SITE CLEANUP AND RESTORATION

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

15.0 UTILITY RELOCATION WORKS

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

16.0 FINAL INSPECTION

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

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

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

17.0 FISHERIES CONCERNS

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

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LEGEND

MUNICIPAL BOUNDARY

LACHANCE DRAIN
DRAINAGE BOUNDARY

LACHANCE BRIDGE
DRAINAGE AREA

LACHANCE DRAIN

OTHER DRAINS

NEW BRIDGE

LOCAL BENCHMARK

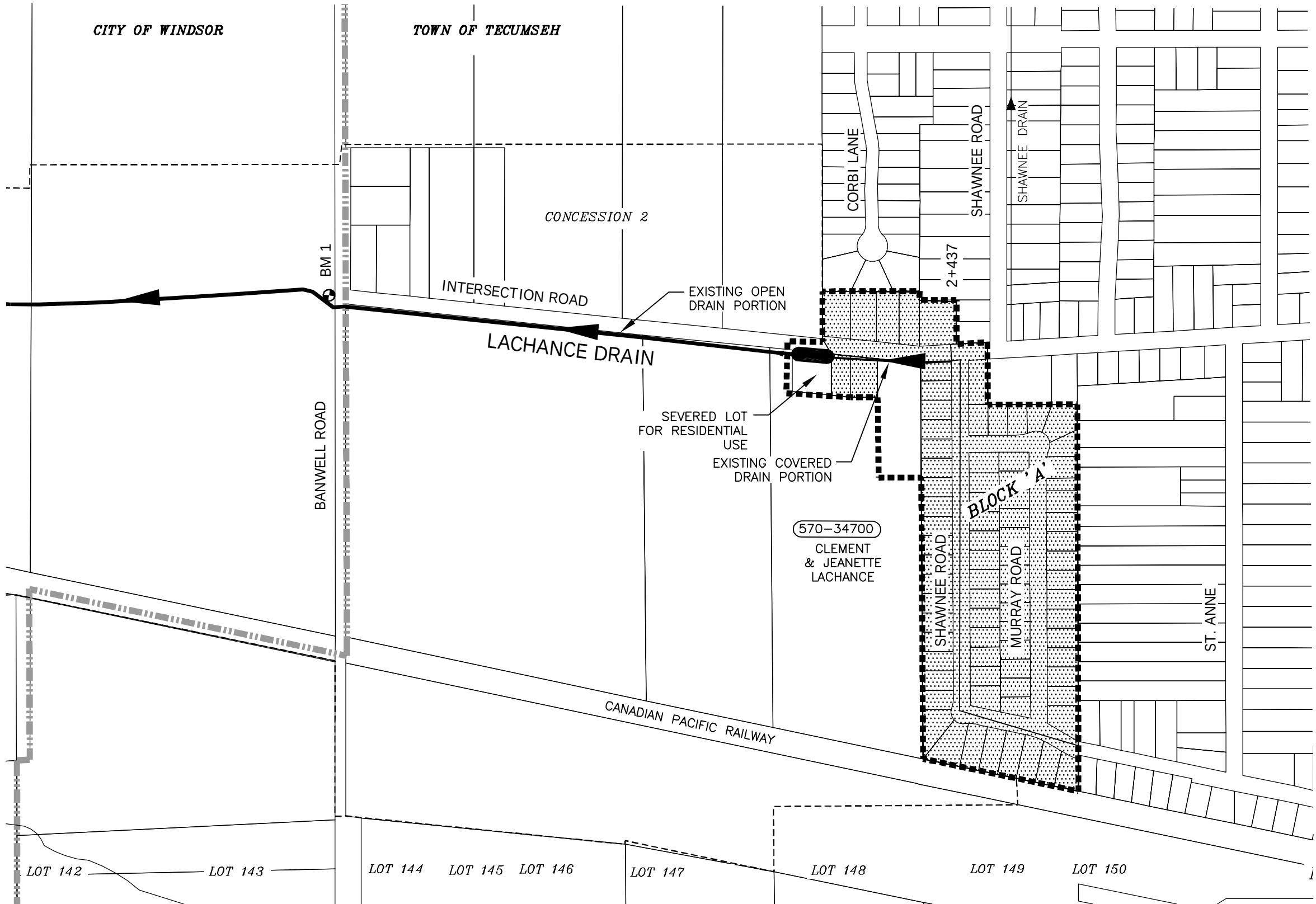
BLOCK 'A'

SITE BENCHMARK

BM1—PKNAIL IN TOP OF CONCRETE
MANHOLE ON WEST SIDE OF BANWELL
ROAD AT INTERSECTION ROAD. PKNAIL
IS 0.4m WEST OF THE EDGE OF
MANHOLE AND 0.7m SOUTH OF THE
NORTH EDGE OF MANHOLE.

ELEVATION=182.774m

NOTE: CONTRACTOR TO VERIFY
BENCHMARKS PRIOR TO CONSTRUCTION.



WATERSHED PLAN
NOT TO SCALE



Conditions of Use

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Report any discrepancies to Dillon Consulting Limited.

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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.

2	FINAL REPORT CONSIDERATION	FEB. 24/22	MDH		
1	CLIENT REVIEW	JAN. 19/22	MDH		
No.	ISSUED FOR	DATE	BY		

DESIGN	REVIEWED BY
MDH	CDP
DRAWN	CHECKED BY
WLB	TRO
DATE	February 24, 2022
SCALE	AS SHOWN

PROJECT NO.
21-2752

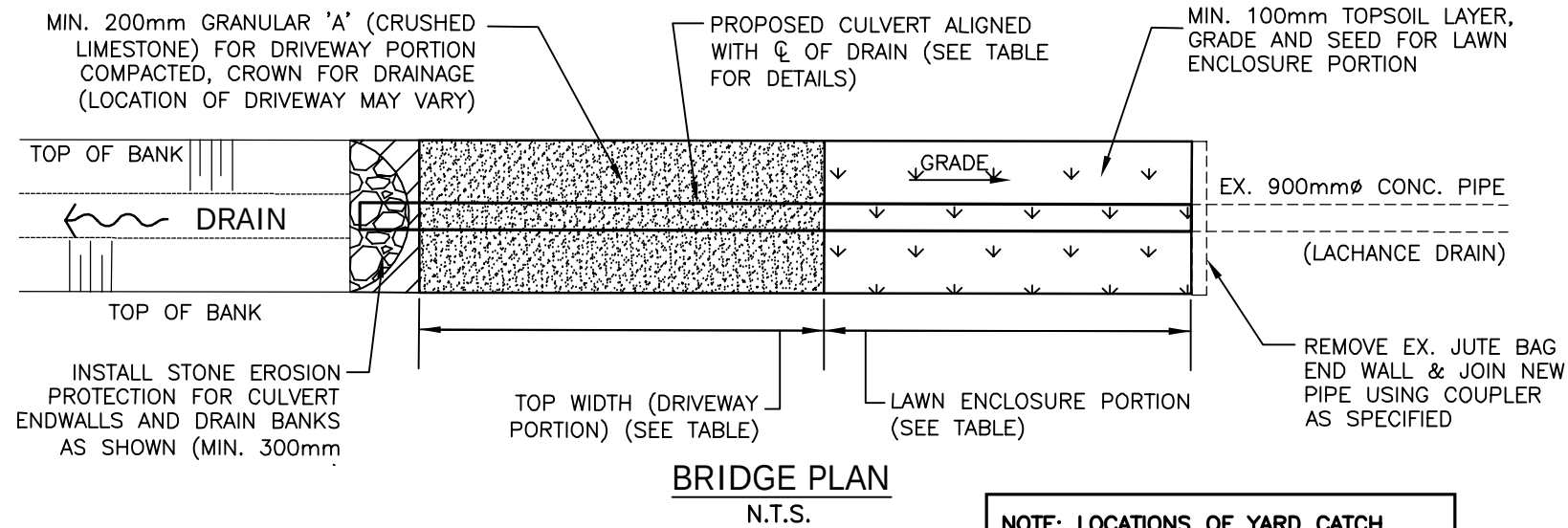
DRAWING SCALES BASED
ON A 11" X 17" SHEET

'SCHEDULE G'
Drainage Report for the
LACHANCE DRAIN
(LACHANCE BRIDGE)
Town of Tecumseh

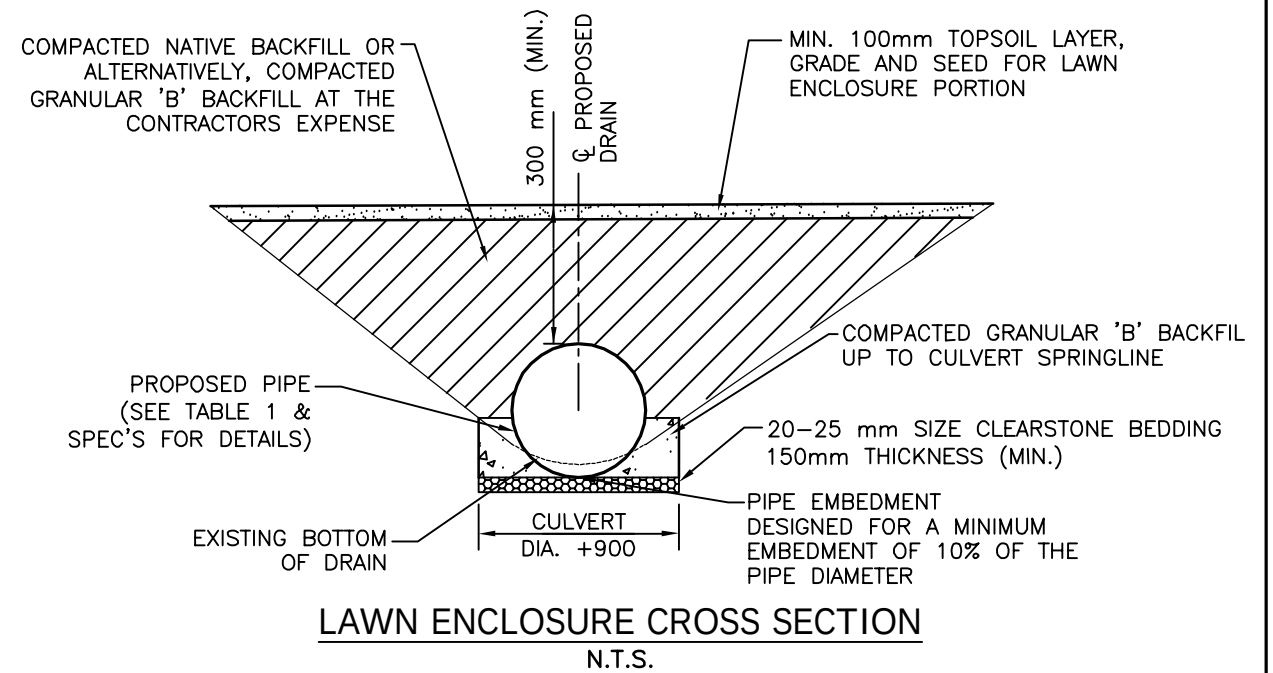
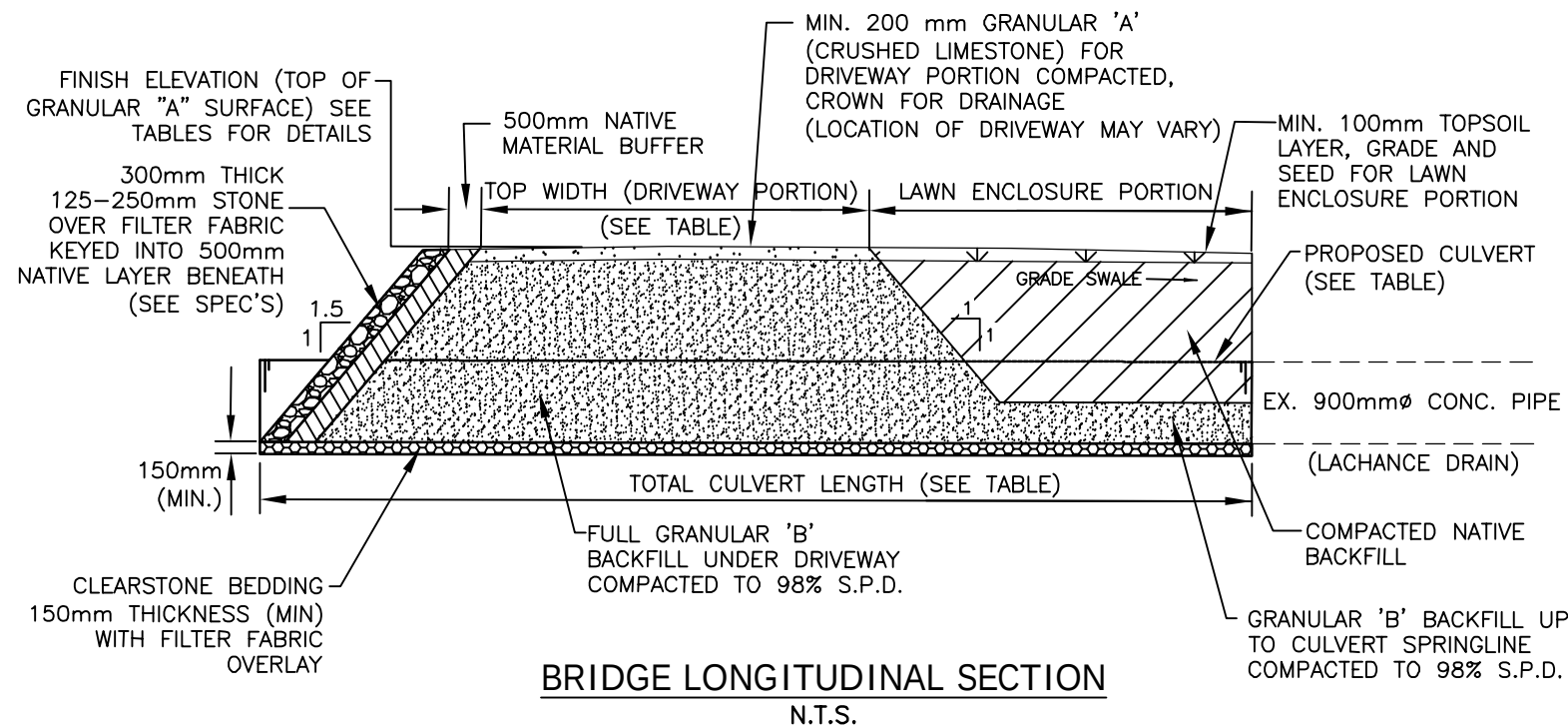
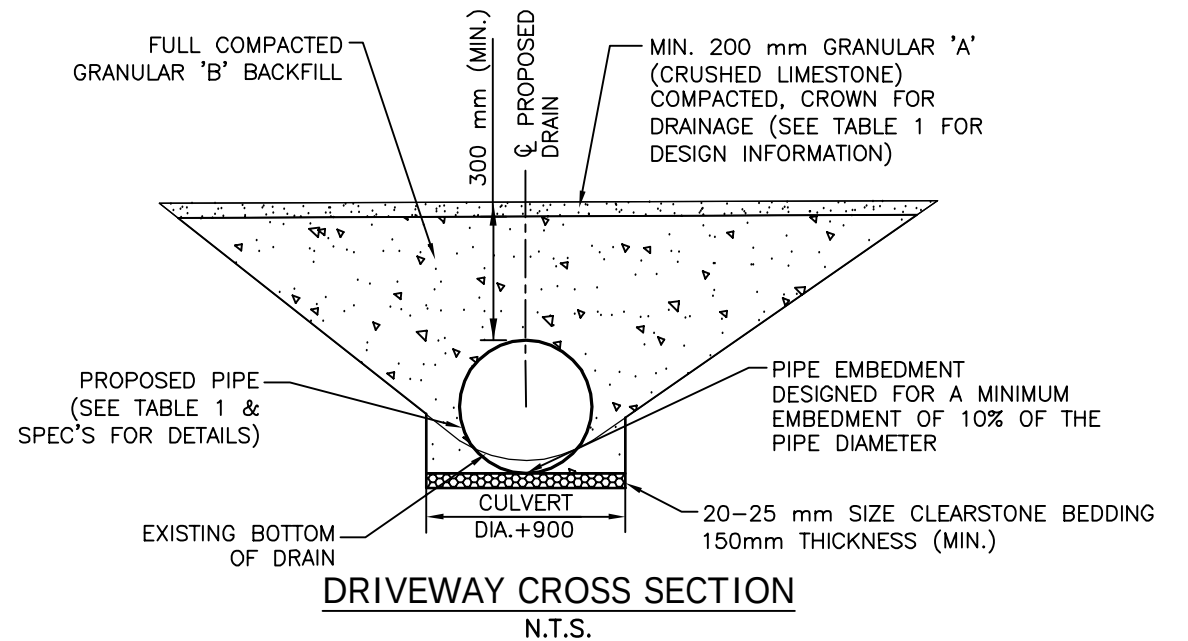
SHEET TITLE
WATERSHED PLAN

PAGE NO.
1 of 3

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NOTE: LOCATIONS OF YARD CATCH BASINS TO BE FIELD FIT BASED ON SITE SPECIFIC GRADING AND IN CONSULTATION WITH THE HOMEOWNER. CONNECTIONS TO NEW TILE DRAIN USING A PREFABRICATED TEE.



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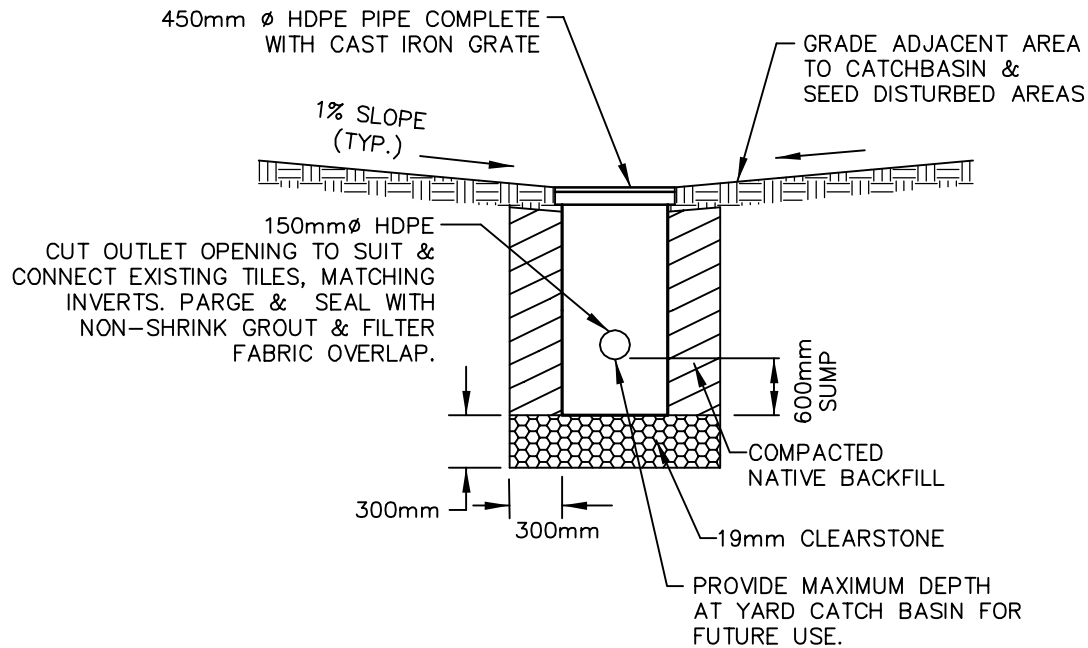
2	FINAL REPORT CONSIDERATION	FEB. 24/22	MDH		
1	CLIENT REVIEW	JAN. 19/22	MDH		
No.	ISSUED FOR	DATE	BY		

DESIGN	REVIEWED BY
MDH	CDP
DRAWN	CHECKED BY
WLB	TRO
DATE	February 24, 2022
SCALE	AS SHOWN

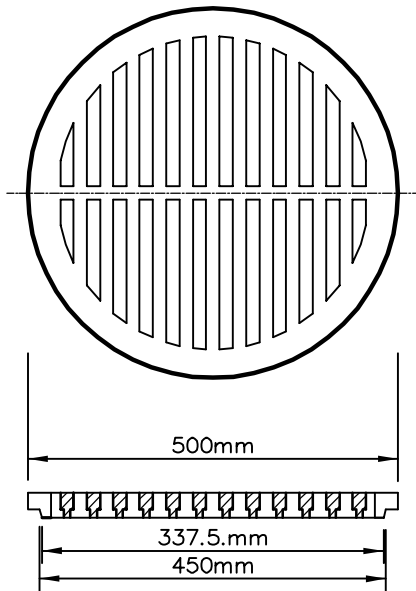
 PROJECT NO. 21-2752 DRAWING SCALES BASED ON A 11" X 17" SHEET

'SCHEDULE G' Drainage Report for the LACHANCE DRAIN (LACHANCE BRIDGE) Town of Tecumseh
SHEET TITLE BRIDGE DETAILS
PAGE NO. 2 of 3

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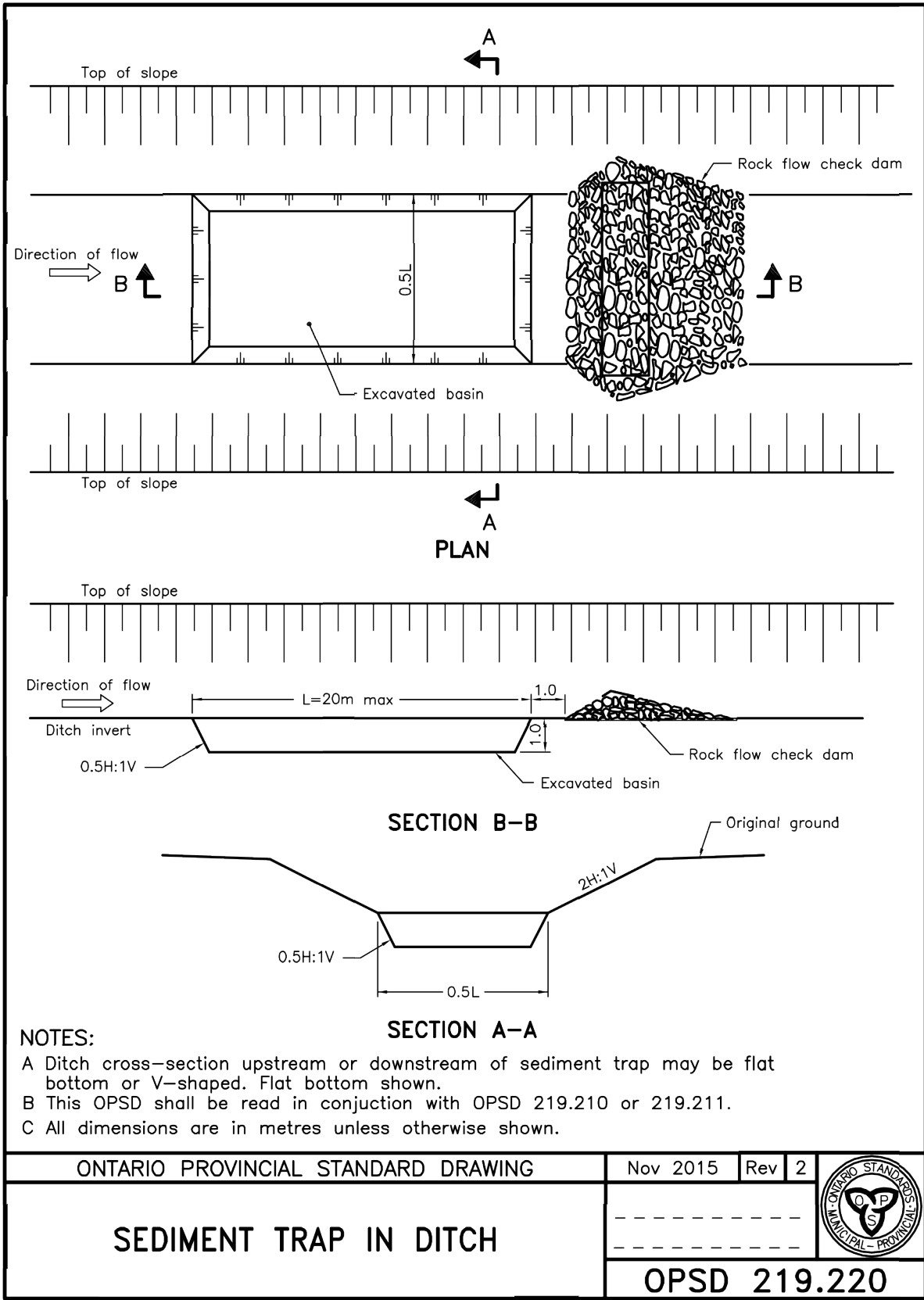
YARD CATCH BASIN DETAIL
(450mmØ HDPE)
N.T.S.



STANDARD CAST IRON GRATE FOR
450mmØ HDPE CATCH BASIN
N.T.S.

TABLE 1 - BRIDGE DESIGN INFORMATION	
DESCRIPTION	BRIDGE
PIPE INVERT ELEV. U/S SIDE(m)	179.98
PIPE INVERT ELEV. D/S SIDE(m)	179.95
TOP OF ¢ DRIVEWAY SURFACE ELEV. (m)	182.22
DRAIN BOTTOM (m) (DESIGN) (AT CENTRELINE OF CULVERT)	180.04
MIN. TOP WIDTH OF DRIVEWAY (m)	6.1
MIN. CULVERT GRADE (%)	0.10%
CULVERT TYPE	320kPa
CULVERT MATERIAL	HDPE
CULVERT LENGTH (m)	46
PIPE SIZE (mm)	900
CULVERT ENDWALL TYPE	SLOPING

NOTE: LOCATIONS OF YARD CATCH
BASINS TO BE FIELD FIT BASED ON
SITE SPECIFIC GRADING AND IN
CONSULTATION WITH THE HOMEOWNER.
CONNECTIONS TO NEW TILE DRAIN
USING A PREFABRICATED TEE.



NOTES:

- A Ditch cross-section upstream or downstream of sediment trap may be flat bottom or V-shaped. Flat bottom shown.
B This OPSD shall be read in conjunction with OPSD 219.210 or 219.211.
C All dimensions are in metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2	
SEDIMENT TRAP IN DITCH			
			OPSD 219.220



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WLB	TRO
DATE	
February 24, 2022	
SCALE	
AS SHOWN	

PROJECT NO.
21-2752
DRAWING SCALES BASED ON A 11" X 17" SHEET

'SCHEDULE G' Drainage Report for the LACHANCE DRAIN (LACHANCE BRIDGE) Town of Tecumseh
SHEET TITLE
DETAILS
PAGE NO.
3 of 3