New Enclosure over the Division Road Drain

For Roll No. 350-00900 and 350-01000

The Town of Kingsville

November 9, 2023

Project No. 22-075

BAIRD|AE
architecture + engineering

27 Princess St., Unit 102
Leamington, ON N8H 2X8
519.326.6161 TF 1.844.842.9188
bairdAE.ca

November 9, 2023

Mayor and Municipal Council
The Town of Kingsville
2021 Division Road North
Kingsville ON N9Y 2Y9

Mayor and Members of Council,

Subject: New Enclosure over the Division Road Drain
Roll No. 350-00900 and 350-01000
In the Town of Kingsville
Our File Reference 22-075

1.0 Authorization

A request was received from 1078262 Ontario Limited (350-00900 and 350-01000) for an enclosure to the Division Road Drain under section 78 (3) of the Drainage Act. Baird AE was appointed by Council on November 9, 2022 to prepare an engineer's report.

2.0 Purpose of Report and Current Engineer's Report

The purpose of this report is to provide plans and specifications for the construction of a drain enclosure for a proposed development.

This report provides a description and estimated cost of the proposed work and a recommendation for the distribution of the construction and incidental costs related to the work. This report further provides for the distribution of future maintenance costs. The assessments provided in this report are based on the estimated cost of the work. These assessments will be pro-rated to the actual cost of the project upon completion of the work.

The last report related to this section of the drain was prepared in February 1967. Several smaller reports for culverts have been prepared since that time including a report prepared in 2007.

3.0 Site Meeting

A virtual meeting was held on January 17, 2023 to discuss the project. The following people were in attendance:

Name	Address
Jim Liovas	Owner
Ken Vegh	Town of Kingsville
Halliday Pearson, P.Eng.	Baird AE
David Basilious, P.Eng.	Baird AE

The drain is to be enclosed adjacent to Mr. Liovas' property to facilitate development at the request of the Town. The approximate length of the proposed enclosure is 93m; 20m of the drain is already enclosed by an existing concrete culvert.

Mr. Basilious discussed the Drainage Act process. After the report is received by the Town, it takes approximately three (3) months to move through the process. A meeting to consider the

technical aspects of the report will be held before Council. As the owner is being assessed 100% of the construction cost, a Court of Revision waiver may be signed. The Engineer and/ or the Drainage Superintendent will contact the owner at the appropriate time to discuss the waiver.

4.0 Survey and Investigation

The subject section of the Division Road Drain flows southerly along the east limit of Division Street North. A plan showing the drain layout and proposed enclosure location is attached to this report.

Cross-section information was obtained along the frontages of the subject parcels. The midpoint of the parcels is approximately 98 metres north of Cranberry Street. Drain bottom elevations and upstream and downstream culvert information were also recorded.

Approximately 4.5 metres upstream of the proposed culvert location, there is an existing culvert constructed of 7.16m of 3650mm x 2280mm aluminized CSPA with concrete jute bag headwalls providing access to parcel 350-80900 (waterway area = 6.60m^2). The downstream culvert, located approximately 3.5 metres south of the proposed culvert, provides access to residential lands and consists of a 4.88m x 2.04m open bottom concrete box (waterway area = 9.95m^2).

There is an existing structure serving the subject lands. The structure is constructed of a 4.88m x 2.04m open bottom concrete box.

5.0 Design Considerations

The total drainage area upstream of the proposed enclosure is approximately 855ha. The total length of the drain upstream of the proposed enclosure is 6,465m, with a grade of 0.2%. Generally, the upstream lands are agricultural with residential fronting the Town and County roads. A runoff coefficient of 0.2 was used in the design calculations.

The total flow calculated for a 25-year storm at the proposed enclosure location is 5,293.91L/s. The enclosure has been designed to accommodate this flow while the existing open drain allows for sufficient storage during larger storm events. Calculations are provided in Appendix A.

Subsequent to the site meeting, the Town of Kingsville requested an extension of the proposed enclosure to connect to the existing culvert of the same dimensions approximately 4.5 metres to the north at 1682 Division Street North (parcel 350-80900). This modification aims to eliminate the short section of open drain in between the culverts. The upstream landowner was consulted and has expressed no objections to the proposal.

6.0 Recommendations

Based on our hydraulic calculations, site survey, investigations and discussions with the Town and landowners, we would recommend the following:

- Remove the existing concrete jute bag headwall at the 1682 Division Street North culvert
- Supply and install 98.68m of 3650mm x 2280mm CSP arch with a concrete block headwall at Station 0+001
- Construction of swales and installation of catchbasins to direct overland flow
- Connect the existing 150mm Big ‘O’, 250mm CSP and 400mm CSP to the proposed CSP arch using prefabricated stubs.

The proposed invert elevations are based on the existing drain bottom elevations, upstream and downstream culvert inverts and the design grade provided in the 2007 report. The work shall be carried out in accordance with the attached specifications, accompanying drawings and under the provisions of the Act.

7.0 Fisheries Issues

The Division Road Drain is a Type 'F' drain. We would recommend the following measures be utilized to mitigate damage to the drain during construction:

- No work shall be undertaken between March 15 and June 30;
- All work shall be completed in the dry;
- Culverts shall be installed with a minimum of 10.0% embedment;
- All disturbed soils shall be stabilized upon completion of the work;
- Sediment control shall be implemented during construction;
- Contractor shall prevent entry of petroleum products, debris and deleterious substances into the water.

An ERCA permit will be required for the construction of this access culvert as the Division Road Drain is located within the regulated area and is under the jurisdiction of ERCA.

A Species at Risk Screening was completed. Standard mitigation measures apply and are available by contacting the Drainage Superintendent.

A self-assessment was completed to determine if Fisheries and Oceans Canada (DFO) would need to review this project. Based on the DFO Self-Assessment website, we have determined that the work laid out in this report does not require DFO review. However, standard measures for fish and habitat mitigation should be implemented.

8.0 Drawing and Specifications

Specifications are included in this report describing the dimensions, grades, disposal of material, working areas for construction and future maintenance, and other particulars pertaining to the recommended work. Specifications can be found in Appendix B of this report.

Attached to this report is Drawing No. 22-075, which consists of plans showing the location of the proposed works, the land affected and the details and cross-sections of the recommended work. The design drawings are attached to this report in Appendix C.

9.0 Working Area

The Contractor shall complete the work from the Division Street North right-of-way and the adjacent lands.

10.0 Estimate of Cost

Our estimate of the total cost of this work, including all incidental expenses, is the sum of **THREE HUNDRED THIRTY THOUSAND, NINE HUNDRED** ------ dollars (**$330,900**) made up as follows:

Construction – Estimated Developer Costs (Station 0+000 to Station 0+094)

Item	Quantity	Description		Amount
1.	L.S.	Clearing and grubbing of drain from Station 0+000 to Station 0+094	$	2,500
2.	L.S.	Remove existing concrete structure and catch basin from drain, dispose of offsite at location determined by the Contractor	$	10,000
3.	L.S.	Supply and placement of 92.33 metres of 3650x2280mm aluminized CSP arch including supply and placement of new granular 'A' and full depth granular 'B' material under driveway and walkway; imported clay material for fill under lawn portion; 600mm dia. CSP stub connected to CSPA to form catchbasin with rigid steel catch basin grate at Station 0+090; prefabricated stubs (2-200mm, 1-250mm and 1-400mm)	$	238,620
4.	L.S.	PROVISIONAL: Existing field tiles to be extended to downstream end of pipe, as required.	$	3,000
5.	L.S.	Existing 250mm and 400mm CSP to be extended and connected to CSPA using prefabricated stubs	$	1,000
6.	L.S.	Supply and install engineered concrete block headwall at Station 0+001 including 1m of gabion stone on drain banks adjacent to headwalls	$	12,500
7.	L.S.	Construct swales graded towards catchbasins. Includes supply and placement of good quality topsoil, seed and mulch over entire enclosure area between Station 0+010 and Station 0+083.	$	3,500
8.	L.S.	Supply and install 2-300mm round catchbasins with 200mm dia. PVC leads connecting to CSPA including all granular material and steel grates	$	1,000
9.	L.S.	Traffic control per MTO Book 7, Temporary Conditions	$	2,500
10.	L.S.	Supply, installation and maintenance of silt fence downstream of culvert.	$	1,000
Subtotal for Construction			**$**	**275,620**
11.		Survey, report, assessment	$	15,500
12.		Tendering, Contract Administration and Inspection	$	6,000
13.		ERCA Permit	$	800
14.		HST Payable	$	5,245
Subtotal for Engineering and Incidentals			**$**	27,545
Total – Estimated Developer Costs (Station 0+000 to Station 0+094)			**$**	**303,165**

Construction – Estimated Town of Kingsville Costs (Station 0+094 to Station 0+100)

Item	Quantity	Description		Amount
15.	L.S.	Clearing and grubbing of drain from Station 0+094 to Station 0+097	$	500
16.	L.S.	Remove existing jute bag headwall at Station 0+097, granular material and any pipe damaged during headwall removal	$	4,000
17.	L.S.	Existing 150mm Big 'O' to be extended and connected to CSPA using prefabricated stub	$	400
18.	L.S.	Supply and placement of 6.35 metres of 3650x2280mm aluminized CSP arch including supply and placement of new granular 'A' and full depth granular 'B' material under driveway; imported clay material for fill under lawn portion; prefabricated stubs (1-150mm, 1-200mm)	$	18,405
19.	L.S.	Construct swales graded towards catchbasin. Includes supply and placement of good quality topsoil, seed and mulch over entire enclosure area between Station 0+092 and Station 0+097.	$	750
20.	L.S.	Supply and install 1-300mm round catchbasin with 200mm dia. PVC lead connecting to CSPA including all granular material and steel grates	$	500
Subtotal for Construction – Town of Kingsville Costs			**$**	**24,555**
21.		Survey, report, assessment	$	2,000
22.		Tendering, Contract Administration and Inspection	$	700
23.		HST Payable	$	480
Subtotal for Engineering and Incidentals			**$**	3,180
Total Construction – Town of Kingsville Costs			**$**	**27,735**
TOTAL FOR DIVISION ROAD DRAIN ENCLOSURE			**$**	**330,900**

11.0 Construction Assessment

We would recommend that construction and incidental costs be assessed to the affected lands in accordance with the accompanying Schedule of Assessment and table below. Section 1 of the Act provides the following definition:

"Special Benefit" *means an additional work or feature included in the construction, repair or improvement of a drainage works that has no effect on the functioning of the drainage works.*

The parcels 350-00900 and 350-01000 shall be assessed the construction, engineering and incidental costs for the portion of the enclosure fronting their lots, as described below.

The Town of Kingsville, being the Division Street North Road Authority, shall be assessed the construction, engineering and incidental costs to extend and connect the proposed enclosure to the structure serving parcel 350-80900, as described below.

Roll No.	Percentage of Assessment
350-00900	29%
350-01000	63%
Division Street North	8%
Total	**100%**

12.0 Maintenance Assessment

Future maintenance of the subject enclosure shall be undertaken using the attached specifications. All maintenance costs shall be assessed as follows and in accordance with the by-law in effect at the time of maintenance.

Roll No.	Percentage of Maintenance Assessment
350-00900	25%
350-01000	59%
Town of Kingsville	3%
350-80900	3%
Upstream lands and roads	9%
Total	**100%**

The cost of future maintenance on surface materials other than Granular 'A' and the cost of any special features shall also be assessed 100% as Benefit to the lands served by the enclosure.

13.0 Future Recommendations

At such time that the concrete structure to the south requires replacement, we would recommend that it be replaced with 3650x2280mm CSPA. The headwall at Station 0+000 shall be removed and the structures connected to form a complete enclosure eliminating the short section of open drain.

14.0 Grant

In accordance with the provisions of Sections 85, 86 and 87 of the Act, a grant in the amount of 33-1/3 percent of the assessment eligible for a grant may be made in respect to the assessment made under this report upon privately owned lands used for agriculture. The subject lands do not qualify for this Provincial grant.

All of which is respectfully submitted,

BAIRD AE
27 PRINCESS STREET, SUITE 102
LEAMINGTON, ONTARIO
N8H 2X8

Halliday Pearson, P.Eng.

CONSTRUCTION SCHEDULE OF ASSESSMENT
ENCLOSURE OVER THE DIVISION ROAD DRAIN

MUNICPAL LANDS (NON-GRANTABLE):

Roll No.	Con.	Lot or Part Lot	Area Owned (Acres)	Area Owned (Ha)	Area Affected (Acres)	Area Affected (Ha)	Special Benefit	Benefit	Outlet	Total Assessment
Division Road North							$ 27,735.00	$ -	$ -	$ 27,735.00
Total on Municipal Lands (Non-Grantable)							$ 27,735.00	$ -	$ -	$ 27,735.00

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

Roll No.	Con.	Lot or Part Lot	Area Owned (Acres)	Area Owned (Ha)	Area Affected (Acres)	Area Affected (Ha)	Special Benefit	Benefit	Outlet	Total Assessment
350-01000	1 E.D.	1	2.42	0.98	2.42	0.98	$ 209,184.00	$ -	$ -	$ 209,184.00
350-00900	1 E.D.	1	1.10	0.45	1.10	0.45	$ 93,981.00	$ -	$ -	$ 93,981.00
Total on Privately Owned Non-Agricultural Lands (Non-Grantable)							$ 303,165.00	$ -	$ -	$ 303,165.00

TOTAL ASSESSMENTS							$ 330,900.00	$ -	$ -	$ 330,900.00

APPENDIX A
Design Calculations

CULVERT SIZING CALCULATIONS

• Tc (Airport Method)

$$T_c = \frac{1.8(1.1-C)L^{0.5}}{S^{0.33}}$$

*Use if C < 0.4

Area	C	Slope	Length		Tc	Tp
ID		(%)	(m)	(ft)	(min)	(min)
2 year	**0.20**	**0.200**	**6464.93**	21204.97	**401**	**241**

$$t_c = \frac{0.057 \times L}{S_w^{0.2} \times A^{0.1}}$$

*Use if C > 0.4

Area	C	Slope	Length		Tc	Tp
ID		(%)	(m)	(ft)	(min)	(min)
~~2 year~~	~~**0**~~	~~**0.200**~~	~~**6464.93**~~	~~21204.97~~	~~**260**~~	~~**156**~~

• Q=2.78aci

*** USE CORRECT Tc IN i CALCULATION**

i --> using interpolation equation

	Area	C	i	Q
ID	(ha)		(mm/hr)	(L/s)
2 year	**854.84**	0.20	**6.27**	2,979.41
5 year	**854.84**	0.20	**8.16**	3,879.26
25 year	**854.84**	0.20	**11.14**	5,293.91
100 year	**854.84**	0.20	**13.57**	6,447.73

• Pipe Diameter

	AREA (ha)		FLOW							SEWER DATA									
	R= 0.20		Indiv 2.78 AC	Accum 5 2.78AC	Time of Conc.	Design Storm	Rainfall Intensity	Peak Flow	Qtotal (L/s)	Dia. (m) Actual	Dia. (mm)	Type	Slope (%)	Length (m)	Manning n	Capacity (L/s)	Velocity (m/s)	Flow Time	Ratio Q/Q full
2 year	854.84		475.29	475.29	401	2	6.27	2,979.4	2,979.4	3.023	**3000**	CSP	0.480		0.022	18,745.1	2.61		16%
5 year	854.84		475.29	475.29	401	5	8.16	3,879.3	3,879.3	3.023	**3000**	CSP	0.480		0.022	18,745.1	2.61		21%
25 year	832.78		463.03	463.03	401	25	11.14	5,157.3	5,157.3	3.023	**3000**	CSP	0.480		0.022	18,745.1	2.61		28%
100 year	854.84		475.29	475.29	401	100	13.57	6,447.7	6,447.7	3.023	**3000**	CSP	0.480		0.022	18,745.1	2.61		34%

* 3650 x 2280mm CSPA is equivalent to 3000mm dia. CSP

APPENDIX B
Specifications

1.0 Proposed Work and Pipe Material

The Contractor shall supply and place the following materials in order to complete the proposed work according to the enclosed specifications.

The Contractor shall endeavour to damage the minimum amount of existing 3650x2280mm CSPA near Station 0+097 as possible when removing the existing concrete jute bag headwall.

The Contractor shall supply and place the following:

- 98.68 metres of 3650x 2280mm corrugated steel pipe arch with 125x25mm corrugations, 3.5mm thick and ALT-2 coating including prefabricated stubs as described in the attached plans
- 0.65m of 600mm corrugated steel pipe for catchbasin at Station 0+090 including steel catchbasin grate
- 150mm Big 'O', 250mm CSP and 400mm CSP
- Big 'O' field tile, as required
- 3-300mm RCB with 200mm PVC catchbasin leads

2.0 Working Area

The Contractor shall complete the works from the Division Street North right-of-way and the adjacent lands as provided for under Section 63 of the Act. The Contractor is responsible for providing appropriate traffic control per Book 7 Temporary Conditions.

The Contractor shall note the presence of Bell pedestals, hydro poles, guy wires and a hydrant in the immediate working area.

3.0 Excavated Material and Removals

The Contractor shall cast all excavated material on the adjacent lands. Excavated material shall be spread to a depth of no more than 100 mm and shall be kept at least 0.5 metres clear from the finished edge of the drain, care being taken not to fill any existing tiles, ditches, furrows or drains with the excavated material. Debris (garbage, wood pieces, concrete, etc.) shall be removed from the excavated material and disposed of offsite at a location determined by the Contractor at their expense.

The Contractor shall remove and dispose of offsite the existing concrete box structure and the existing catchbasin.

4.0 Location and Elevation of Enclosure

The proposed location and elevations of the enclosure shall be according to the drawings, 22-075.

5.0 Placement of Enclosure & Headwalls

The Contractor shall construct suitable dykes in the drain so that installation of the pipe can be completed in the dry. The Contractor shall perform the excavation, placement of pipe and backfill in a dry condition and shall provide all required pumps and/ or equipment to enable the work to proceed in the dry. The Contractor shall ensure that flows in the open drain are maintained and that the dyked drain does not result in flooding upstream of the construction area. Weather conditions shall be monitored by the Contractor.

The Contractor shall excavate all vegetation, topsoil and existing granular material from the bank slopes and bottom of the existing drain. Excavated material shall be spread as described in Item 3.0. Topsoil shall be stockpiled and retained for use in swale construction.

The required work includes supply and placement of the pipe specified in 1.0 Pipe Material. The Contractor shall supply new granular 'A' and 'B' materials under the proposed driveways and path. Imported clay material shall be used as backfill under the lawn portions of the enclosure.

The Contractor shall carefully unload, handle and place the specified pipe so as not to damage. Damaged material or distorted from improper installation will not be accepted.

The Contractor shall construct one engineered concrete lock block headwall at Station 0+001. The Contractor shall supply to the Engineer a shop drawing for approval prior to commencing construction. Gabion stone shall be placed on the drain bank adjacent to the concrete block headwall as erosion protection (300mm thick and 1m wide). The headwall shall be installed per manufacturer's instructions. The price tendered by the Contractor shall include all necessary materials required to satisfy said instructions.

The Contractor shall extend and connect the existing pipes as follows:

- 400mm CSP to the prefabricated stub at Station 0+002.5
- 250mm CSP to the prefabricated stub at Station 0+052.4
- 150mm Big 'O' to the prefabricated stub at Station 0+096.8

A 600mm CSP shall be installed at Station 0+090 to form a catchbasin chimney. The Contractor shall supply all necessary granular material and a steel catchbasin grate.

The Contractor shall supply and install 300mm round catchbasins at Station 0+036.8, Station 0+069.2 and Station 0+097. Installation shall include all necessary granular material and steel catchbasin grates. PVC leads shall be connected to the CSPA using prefabricated stubs.

6.0 Granular 'A' Driveways

The Contractor shall construct a driveway approach from the edge of the road across the drain to a minimum of 1.0 metre beyond the east drain bank. The Contractor shall supply, place and compact a minimum of 300mm of granular 'A' for the driveway surface. At the road edge, the driveway shall be widened as shown on the attached plans.

7.0 Alignment

The alignment of the pipes throughout shall be to the full satisfaction of the Drainage

Superintendent or Engineer in charge. The whole of the work shall be done in a neat, thorough and workmanlike manner to the full satisfaction of the Drainage Superintendent or Engineer.

8.0 Location of Structures, Etc.

The Contractor shall satisfy himself as to the exact location, nature and extent of any existing structure, utility or other object which he may encounter during the course of the work. The Contractor shall indemnify and save harmless, the Municipality and the Engineer for any damages which he may cause or sustain during the progress of the work. He shall not hold the Municipality or the Engineer liable for any legal action arising out of any claims brought about by such damage caused by him.

9.0 Damage to Travelled Portion of Municipal Road

The Contractor will be responsible for any damage caused by him to any portion of the municipal road system, especially to the travelled portion. When excavation work is being carried out and the excavation equipment is placed on the travelled portion of a road, the travelled portion shall be protected by having the excavation equipment placed on satisfactory timber planks or timber pads. If any parts of the travelled portion of the road is damaged by the Contractor, the road authority shall have the right to have the necessary repair work done by its employees and the cost of all labour and materials used to carry out the repair work shall be deducted from the Contractor's contract and credited to the road authority.

10.0 Construction Safety

The Contractor shall comply with all the requirements of the Occupational Health and Safety Act, 1990 and the regulations passed in connection therewith, as administered by the Ontario Ministry of Labour and all subsequent amendments of the said Act.

The Contractor shall exercise all possible precaution against injury to persons or property resulting from his work. The Contractor shall leave no trenches, pits, holes or excavations uncovered, without providing sufficient protection at all times. The Contractor shall install, erect and provide barricades, signs, traffic cones, flashers, lights, plates, warning and other devices, materials and personnel as may be required and at his own expense in order to provide for the safe passage and control of traffic and to ensure public safety. All traffic control shall be in accordance with the latest standards of the Ministry of Transportation.

11.0 Certificate of Clearance

The Contractor will be required to submit to the Municipality a Certificate of Good Standing from the Workplace Safety & Insurance Board prior to the commencement of the work and the Contractor will be required to submit to the Municipality, a Certificate of Clearance for the project from the Workplace Safety & Insurance Board before final payment is made to the Contractor.

12.0 Progress Orders

Monthly progress orders for payment shall be furnished to the Contractor by the Commissioner in charge; said orders shall not be for more than 90% of the value of the work done and the materials furnished on the site. The paying of the full 90% does not imply that any portion of the work has been accepted. The remaining 10% will be paid 60 days after the final acceptance and completion of the work.

13.0 Cleaning Up

The Contractor shall leave the whole of the site of the work in a neat, thorough and workmanlike appearance to the full satisfaction of the Drainage Superintendent or Engineer. The Contractor shall haul away any excess earth from the site. He shall haul to the site, sufficient earth to fill any depressions caused by his work at his own expense. The site shall be left as close as possible in the same condition as it was prior to the commencement of the work.

14.0 Measurement and Payment

Payment for the work shall be on a unit price basis unless otherwise indicated and shall include all the work shown on the accompanying drawings and specifications.

15.0 Maintaining Flow

The Contractor shall maintain the flow of any drainage works encountered in the progress of the work and at no expense to the Owner. The Contractor shall obtain written approval from the Drainage Superintendent or Engineer in charge to stop up any drain and if necessary, provide pumping equipment, build necessary by-passes, etc. at no expense to the Owner.

16.0 Notification of Work

Prior to commencing any work of installing the extension of the culvert or removing any existing structures, the Contractor shall inform the Drainage Superintendent of his intent to commence work at least 48 hours prior to commencing any work. The Owner or Contractor shall endeavour to install and complete the new structure without delay once he has commenced the work. If for any reason the work does not proceed continuously then the Owner or Contractor shall notify the Drainage Superintendent in advance of any backfilling operation or headwall construction so that he may schedule inspection of same. The completed work must be done to the satisfaction of the Drainage Superintendent and be approved by him.

17.0 Final Inspection

Upon completion of the work, the Drainage Superintendent and/ or Engineer shall perform a final inspection to ensure the work complies with the drawings and specifications provided herein. Should deficiencies be noted, the Contractor shall immediately make repairs satisfactory to the Drainage Superintendent and/ or Engineer.

18.0 Maintenance

The Contractor shall repair and make good at his expense any damages or faults in the work

that may appear within one year after its completion (as evidenced by the final inspection report), as the result of imperfect or defective work done or materials furnished. Nothing herein contained shall be construed as any way restricting or limiting the liability of the Contractor under the appropriate laws under which the work is being done.

19.0 Tile Drains

Should the Contractor encounter tile drains with the proposed culvert limit, the Contractor shall re-route the tile drain in consultation with the Drainage Superintendent and/ or Engineer. The tiles shall be extended and routed downstream. Tile drain connections through the wall of the pipe will not be permitted.

20.0 Restoration

The complete maintenance works shall be done in a neat, thorough, and workmanlike manner, and shall be cleaned up to the full satisfaction of the Consultant and Drainage Superintendent.

The whole of the work shall be satisfactorily cleaned up and during the course of the construction no portion shall be left in any untidy or incomplete state before subsequent portions are undertaken.

All driveways, access bridges, or any other means of access onto the job site shall be fully restored to their former condition at the Contractor's expense. Before authorizing Final Payment, the Consultant shall inspect the work in order to be sure that the proper restoration has been performed.

The Contractor will be fully responsible for the restoration of all areas disturbed by his operations in the carrying out of this work.

21.0 Seeding and Mulching

The Contractor shall fine grade the finished surfaces and shall apply hydroseeding and mulch. The seeding and mulching operation shall be carried out according to O.P.S.S. Spec. 572 or as amended herein and the operation shall include the supplying and placing of the following:

A)	Seed Mixture	- Creeping Red Fescue	- 50%
		- Red Top	- 20%
		- Canada Blue Grass	- 15%
		- Kentucky Blue Grass	- 15%
B)	Nurse Crop	- Oats if seeding and mulching is performed during May or June.	
		- Annual Rye Grass if seeding and mulching is performed during Sept. or Oct.	
C)	Fertilizer	- 5·20·10 mixture	
D)	Mulch	- Wood Cellulose Fibre or Straw	
E)	Adhesive	- Asphalt Emulsion if straw mulch used	
		- Liquid Polyvinyl Acetate if wood fibre mulch used	

The application rates shall be as follows:

A)	Grass Seed Mixture	- 90 lbs./acre
B)	Fertilizer	- 350 lbs./acre
C)	Nurse Crop Seed	- 55 lbs./acre
D)	Mulch	- 1300 lbs./acre if wood fibre used
		- 1" to 2" depth if straw used
E)	Adhesive	- 200 imp.gal/acre for Asphalt Emulsion
		- 205 lbs./acre for Liquid Polyvinyl Acetate

The seeding and mulching operation shall be only carried out as weather conditions permit during the months of May and June in the Spring, and September and October in the Fall. If the excavation work is carried out during the months of May and June, or September or October, the Contractor has the option of contacting the Drainage Superintendent and if the Contractor receives his written permission, the seed mixture as above specified, may be placed on the excavated side slopes by the Contractor by hand, daily, at the completion of his daily excavation operation. If the Contractor has been given written permission by the Drainage Superintendent to place the seeding mixture by hand daily, at the completion of his daily excavation operation, the Contractor shall be responsible to give the side slopes a rough, harrowed texture prior to placing the seed mixture.

22.0 Fires and Disposal of Wastes

Fires and burning of rubbish on site will be permitted only with special approval from the Municipality.

The Contractor shall not bury rubbish and waste materials on site unless approved by the Engineer and all applicable approving authorities. The site shall be maintained free of accumulated waste and rubbish. All waste materials should be disposed of in a legal manner at a site approved by all local approving authorities and the Engineer.

The Contractor shall not allow deleterious substances, waste or volatile materials such as mineral spirits, or paint thinner, to enter into waterways, storm or sanitary sewers.

23.0 Pollution Control

The Contractor shall maintain under this Contract temporary erosion, sediment and pollution control features installed. The Contractor shall control emissions from equipment and plant to local authorities' emission requirements. The Contractor shall not cause excessive turbidity when performing in-water work. The Contractor shall not allow any debris, fill or other foreign matter to enter into the waterway. The Contractor shall remove from the waterway, all extraneous materials resulting from in-water work.

The Contractor shall abide by local noise By-Laws for the duration of the Contract.

Spills of deleterious substances into waterways and on land shall be immediately contained by the Contractor and the Contractor shall clean up in accordance with Provincial regulatory requirements. All spills shall be reported to the Ontario Spills Action Centre (1-800-268-6060), local authorities having jurisdiction and the Engineer.

To reduce the risk of fuel entering the waterway, refuelling of machinery must take place a safe distance from the waterway. The Contractor shall note that the Engineer or the Owner

takes no responsibility for spills, this shall be the sole responsibility of the Contractor.

24.0 Drainage

The Contractor shall not pump water containing suspended materials into waterways, sewers or drainage systems. The Contractor shall be solely responsible for the control, disposal or runoff of water containing suspended materials or other harmful substances in accordance with these specifications, and local authority requirements. The Contractor shall provide temporary drainage and pumping as necessary to keep excavations and site free from water. The Contractor shall install and maintain sediment control devices as indicated on the Contract Drawing and as directed by the Engineer.

25.0 Protection of Vegetation

The Contractor shall exercise the utmost caution to ensure that existing trees and plants on-site and on adjacent properties are not damaged or disturbed unless noted otherwise in the Removals Special Provisions of this Contract. The Contractor shall restrict tree removal to areas indicated on the Contract Drawings and/or designated on-site. No trees or shrubs shall be removed without the approval of the Engineer.

26.0 Dust Control

The Contractor will be solely responsible for controlling dust nuisance resulting from his operations, both on the site and within adjacent right-of-ways.

Water and calcium chloride shall be applied to areas on or adjacent to the site as authorized by the Engineer as being necessary and unavoidable for the prevention of dust nuisance or hazard to the public. No payment will be made for dust control unless otherwise specified in the Special Provisions.

27.0 Restrictions for In-Water Works

The Contractor shall only perform in-water works during times when conditions permit reasonable production rates to be achieved. The Contractor shall be required to adopt good housekeeping practices that minimize disturbance to the site and the adjacent waterway.

The Contractor shall note that this Project is subject to approval from the Essex Region Conservation Authority and as such, any possible turbidity caused by the construction of the shore protection works is of key importance.

The Contractor shall minimize the turbidity (sedimentation) produced by any in-water works construction or operations. The Contractor will be ordered to cease operations if, in the opinion of the Engineer or authorities having jurisdiction, the in-water work is producing unacceptable amounts of turbidity in the waterway. Based on this, the Contractor shall either adjust his operation(s) to produce lower turbidity levels, wait for more favourable conditions before operations will be allowed to continue, or undertake approved mitigating measures (e.g. sediment control, etc.). All costs associated with the above will be the sole responsibility of the Contractor, and no claims for extras or delays will be considered.

28.0 Fish Habitat

No work shall be undertaken when there is likelihood of adverse effects on fish spawning or fish habitat in downstream water.

29.0 Material Testing

All imported clay fill material shall be tested by a geotechnical consultant to ensure suitability for use prior to importing said material to the site.

Any excavated material that cannot be spread, shall be disposed of offsite subject to O. Reg. 406/19: On-Site and Excess Soil Management at the cost of the Contractor.

All granular material, including that used as backfill for driveway portions of the enclosure, shall be tested by a geotechnical consultant to ensure suitable compaction is achieved in accordance with OPSS 1010.

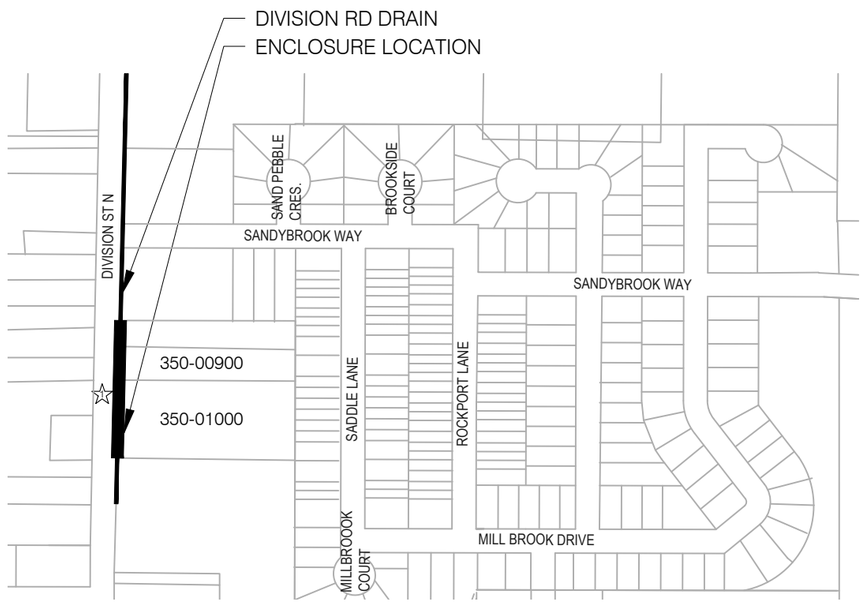
APPENDIX C
Drawings

SHEET INDEX:

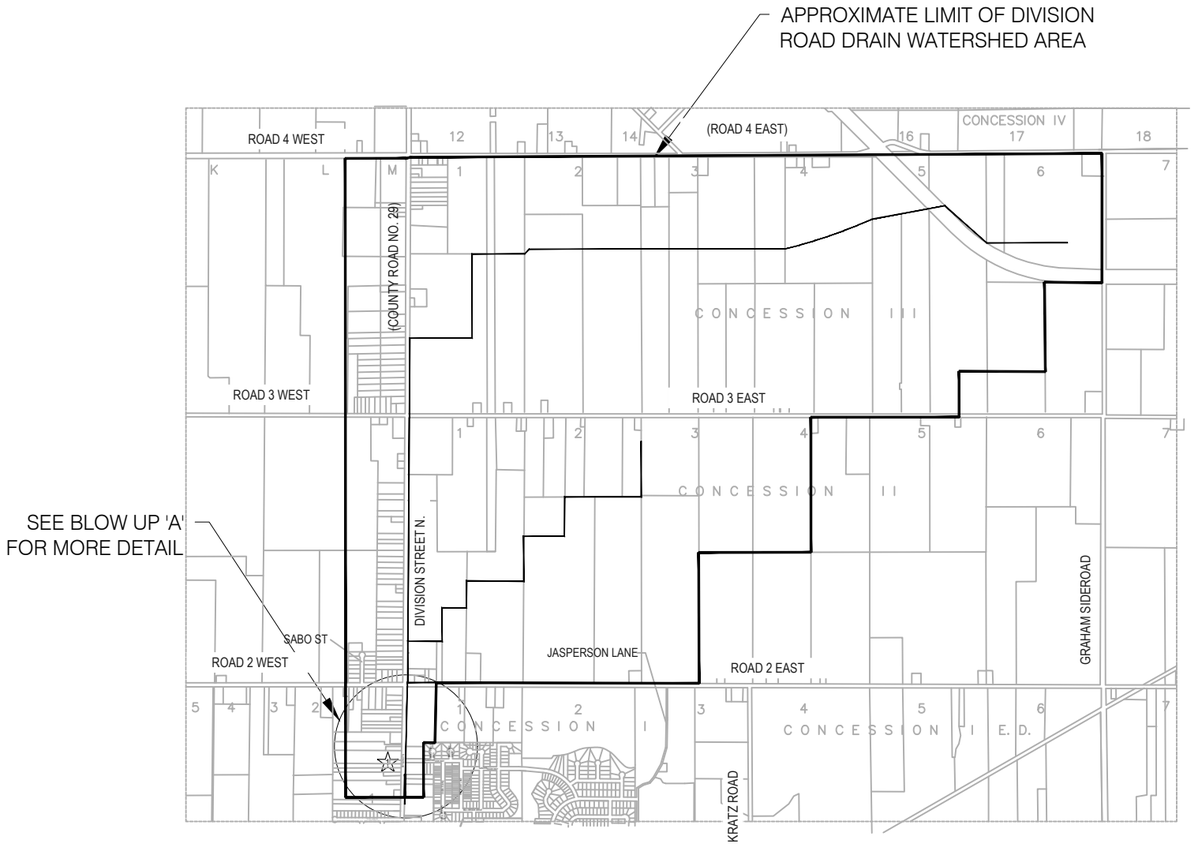
SHEET NUMBER	SHEET TITLE
SHEET 1	TITLE PAGE & DRAINAGE AREA
SHEET 2	PROPOSED ENCLOSURE
SHEET 2	PROPOSED CULVERT CROSS SECTIONS

BENCHMARK:

BENCHMARK 1: ☆
TOP NUT OF FIRE HYDRANT ON DIVISION STREET N.
ELEVATION *192.882*m



DIVISION ROAD DRAIN 'A' - KINGSVILLE
SCALE 1:5,000



DIVISION ROAD DRAIN - KINGSVILLE
SCALE N.T.S

BAIRD|AE
architecture + engineering

27 PRINCESS STREET, SUITE #102
LEAMINGTON, ONTARIO
N8H 2X8

700 – 1350 PROVINCIAL ROAD,
WINDSOR, ONTARIO
N8W 5W1

PROJECT TITLE:

ENCLOSURE OVER THE DIVISION ROAD DRAIN

1666 DIVISION STREET NORTH, TOWN OF KINGSVILLE, ONTARIO

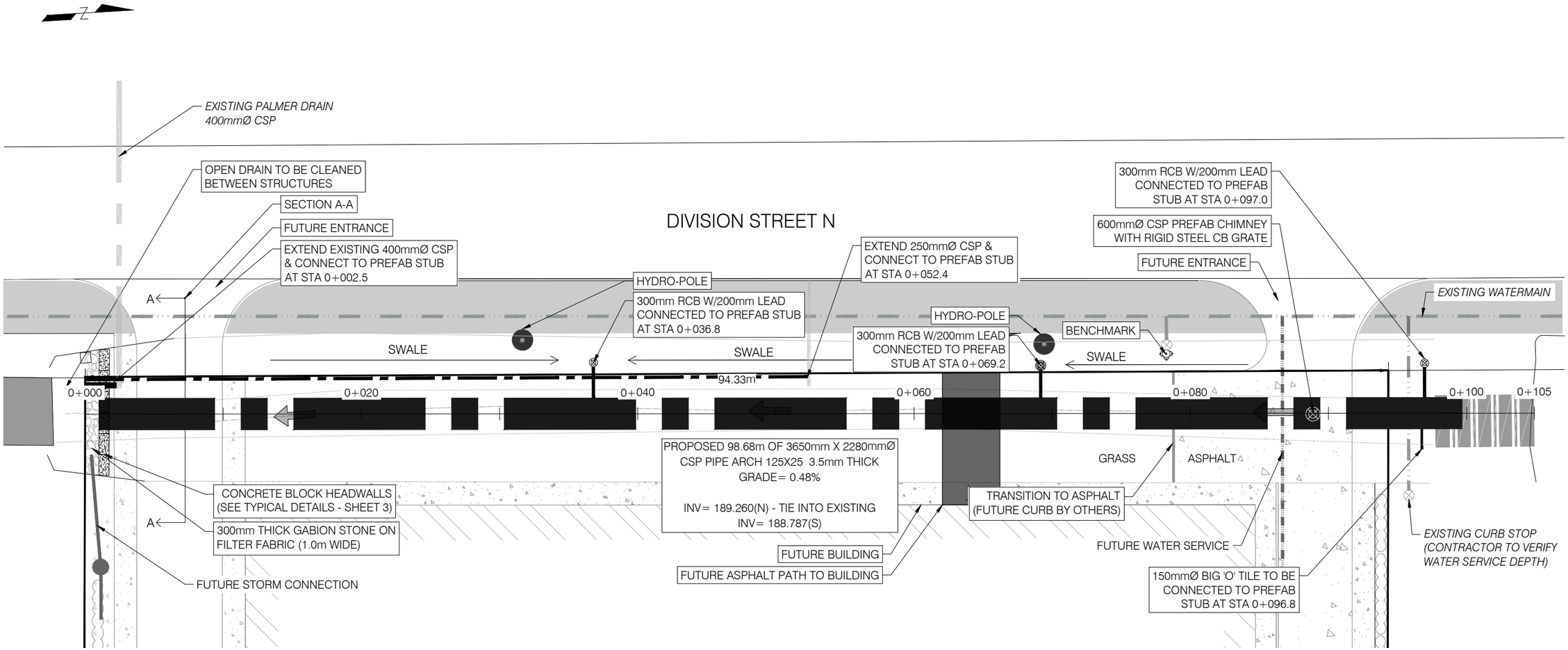
SHEET:

TITLE PAGE & DRAINAGE AREA

LICENSED PROFESSIONAL ENGINEER
H.P. PEARSON
100155996
23/11/09
PROVINCE OF ONTARIO

HALLIDAY P. PEARSON, P.ENG.

DRAWN BY:	SCALE:	DATE:
J.H.	AS NOTED	NOV 09, 2023
CHCK'D BY:	SHEET No. :	PROJECT No. :
H.P.P.	1 OF 3	22-075



PLAN VIEW - CULVERT

SCALE 1:300

PROJECT TITLE:
ENCLOSURE OVER DIVISION ROAD DRAIN

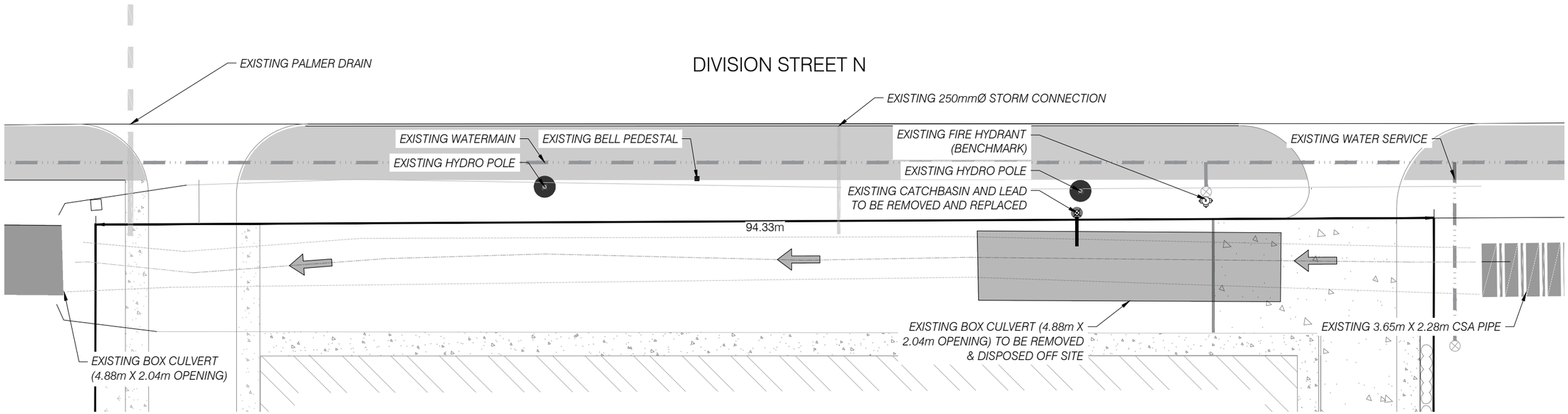
1666 DIVISION STREET NORTH, TOWN OF KINGSVILLE, ONTARIO

SHEET TITLE:	DRAWN BY:	SCALE:	DATE:
PROPOSED ENCLOSURE	J.H.	AS NOTED	NOV 09, 2023
	CHCK'D BY: H.P.P.	SHEET No. : 2 OF 3	PROJECT No. : 22-075

BENCH MARK ELEVATION: 192.882

BENCH MARK LOCATION: TOP NUT OF FIRE HYDRANT | 192.882m

CULVERT SIZE	PIPE LENGTH	PIPE GAUGE	CORRUGATIONS	CULVERT TYPE	PIPE INVERT ELEVATIONS	FINISHED DRIVEWAY ELEVATIONS
3650mm X 2280mm	98.68	3.5mm	125mm X 25mm	CORRUGATED STEEL PIPE ARCH	UPSTREAM END: 189.260m DOWNSTREAM END: 188.787m	192.10m

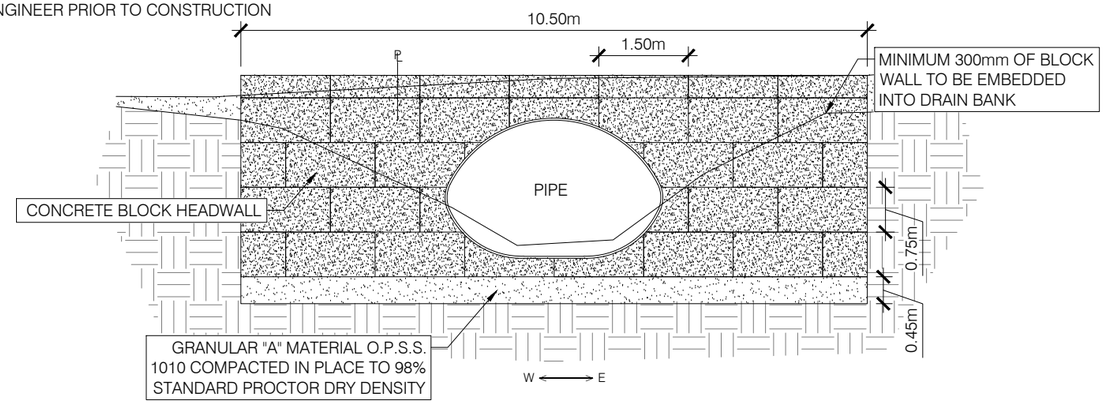


PLAN VIEW - REMOVALS

SCALE 1:300

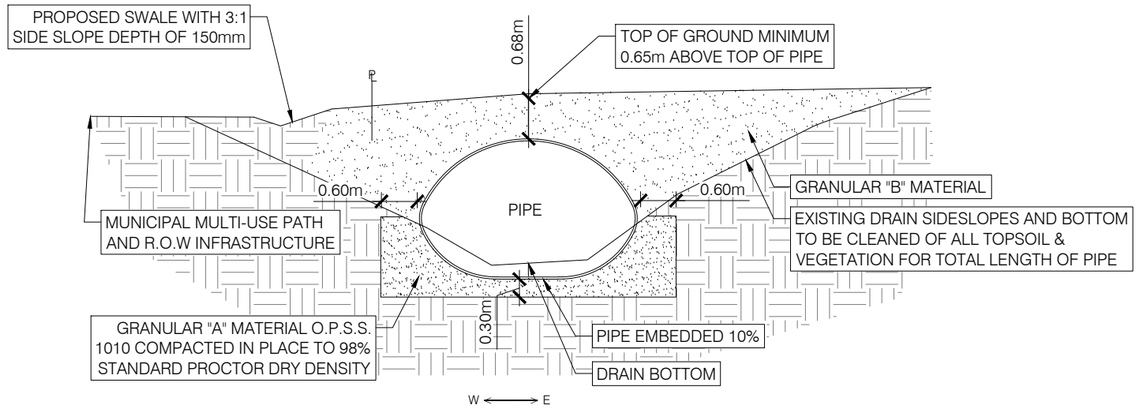
NOTE: GABION STONE TO BE PLACED (300mm THICK X 1m WIDE) ON SLOPES ABUTTING HEADWALL AS EROSION PROTECTION (LAID ON FILTER FABRIC)

NOTE: CONTRACTOR TO SUPPLY SHOP DRAWING TO ENGINEER PRIOR TO CONSTRUCTION



TYPICAL CROSS SECTION - CONCRETE HEADWALL

SCALE 1:100



TYPICAL CROSS SECTION 'A'-'A'

SCALE 1:100

PROJECT TITLE:
ENCLOSURE OVER DIVISION ROAD DRAIN

1666 DIVISION STREET NORTH, TOWN OF KINGSVILLE, ONTARIO

SHEET TITLE:	DRAWN BY:	SCALE:	DATE:
PROPOSED CULVERT CROSS-SECTIONS	J.H.	AS NOTED	NOV 09, 2023
	CHCK'D BY: H.P.P.	SHEET No. : 3 OF 3	PROJECT No. : 22-075

BENCH MARK ELEVATION: 192.882

BENCH MARK LOCATION: TOP NUT OF FIRE HYDRANT | 192.882m

CULVERT SIZE	PIPE LENGTH	PIPE GAUGE	CORRUGATIONS	CULVERT TYPE	PIPE INVERT ELEVATIONS	FINISHED DRIVEWAY ELEVATIONS
3650mm X 2280mm	98.68m	3.5mm	125mm X 25mm	CORRUGATED STEEL PIPE ARCH	UPSTREAM END: 189.260m DOWNSTREAM END: 188.787m	192.10m