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Planning

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- Expert Witness (LPAT)
- Wireless Industry

Landscape Architecture

- Streetscapes & Public Amenities
- Open Space, Parks & Recreation
- Community & Residential
- Commercial & Institutional
- Environmental Restoration

2095 Dilworth Road, Kars, ON

Servicing Options and Conceptual Stormwater Management Report

Prepared for: Dilworth Development Inc.

2095 DILWORTH ROAD

SERVICING OPTIONS AND CONCEPTUAL STORMWATER MANAGEMENT REPORT

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

July 17, 2024
Revised: October 21, 2025 (Revised per City comments)
Revised: April 6, 2026 (Revised per City comments)

Novatech File: 123081
Ref: R-2024-065

NOVATECH
Engineers, Planners & Landscape Architects

April 6, 2026

City of Ottawa
Development Review, Rural Services
Planning, Real Estate and Economic Development Department
110 av Laurier Avenue West - 4th Floor
Ottawa, ON, K1P 1J1

Attention: **Ms. Cass Sclauzero, Planner II**

Reference: **2095 Dilworth Road, Kars, ON**
Servicing Options and Conceptual Stormwater Management Report
Novatech File No.: 123081, City File No.: D02-02-24-0029

Please find enclosed the Servicing Options and Conceptual Stormwater Management Report for the 2095 Dilworth Road property in Kars, within the City of Ottawa.

The report has been prepared to show the proposed servicing and stormwater management concept for the subject site and is submitted in support of a Zoning Amendment Application. This report has been updated based on City comments provided and is re-submitted for approval.

If you have any questions or comments, please do not hesitate to contact us.

Sincerely,

NOVATECH

Cara Ruddle, P.Eng.
Senior Project Manager
Land Development Engineering

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

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LIST OF FIGURES

LIST OF APPENDICIES

1.0 INTRODUCTION

Novatech has been retained by Dilworth Development Inc. to prepare a Servicing Options and Conceptual Stormwater Management Report for the property located at 2095 Dilworth Road in Kars, within the City of Ottawa. The development is located just northeast of the Highway 416/Dilworth exit. **Figure 1** is a Key Plan showing the site location**.** The purpose of this report is to review the servicing options for the subject site and provide a concept for stormwater management.

2.0 EXISTING DEVELOPMENT

The existing property currently has a two-storey residential dwelling with associated garage/storage buildings and sheds and the remainder of the site is either agricultural or treed area with a few watercourses within the site. The property is approximately 33 hectares in size. The legal description of the property is identified as Part of Lot 35, Concession 3 (North Gower), City of Ottawa, Ontario. The property is bound by the Veterans Memorial Highway 416 to the west, adjacent residential properties along Third Line Road to the east, Dilworth Road to the south, and an undeveloped property to the north. The topography of the site is relatively flat and the site generally drains towards the watercourses within the site area. **Figure 2 - Existing Conditions** shows the existing site conditions of the subject property.

3.0 PROPOSED DEVELOPMENT

Dilworth Development Inc. is proposing to rezone areas of the Subject Site from *Rural Countryside – RU* to *Rural Commercial – RC* to permit future commercial and light industrial land uses. The applicants are proposing to rezone the Subject Site for the purposes of marketing it for future development. It is suggested to rezone the other areas from *Rural Countryside – RU* to *Parks and Open Space – O1R* for the preservation of the Subject Site's rural natural heritage features.

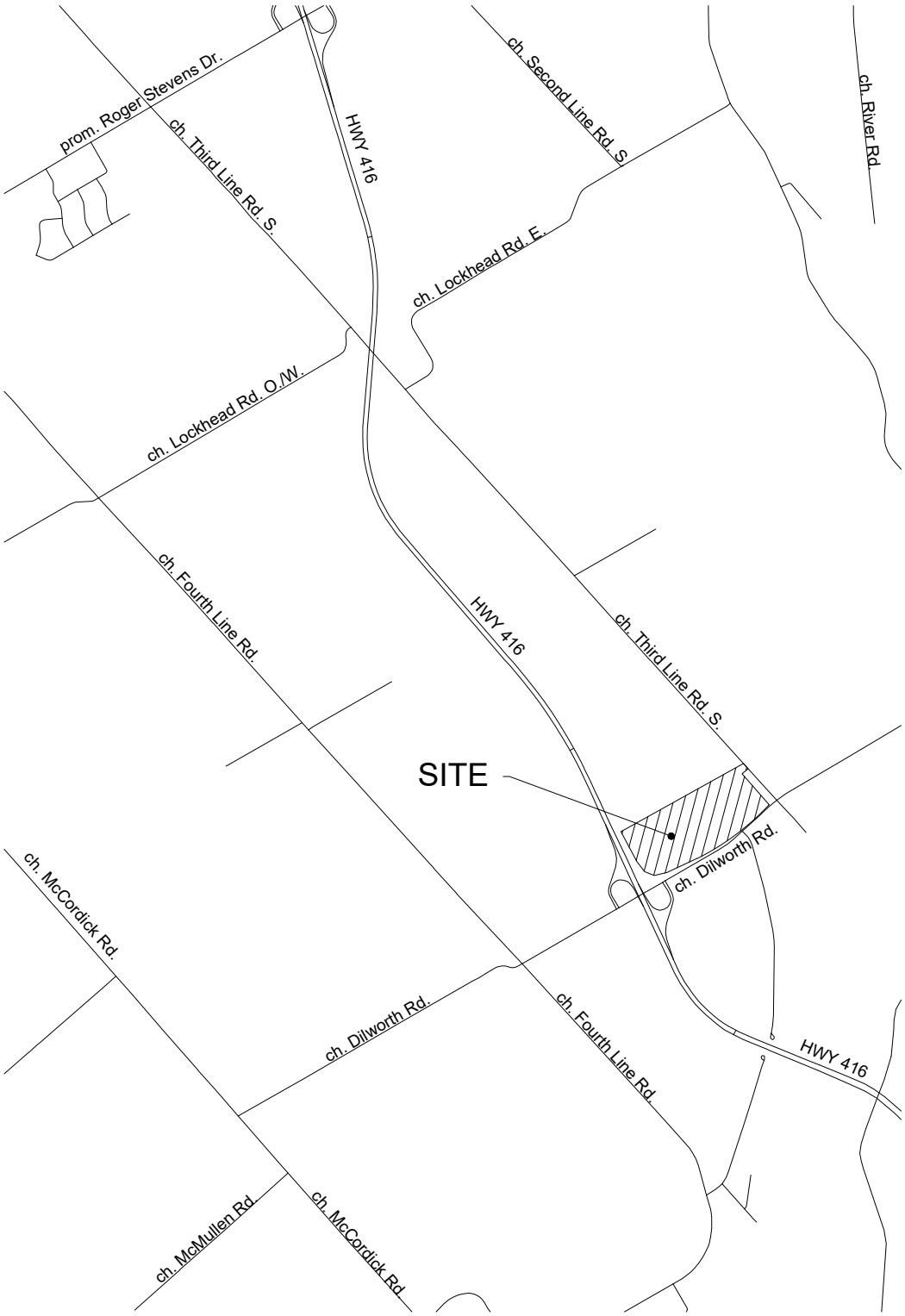
Since the proposed development is unknown at this time, a potential development concept has been prepared for the purpose of this report to demonstrate that the site is serviceable. The concept plan is based on a developable area which is derived from the remaining area outside of various setbacks and constraints. These are discussed subsequently.

4.0 SITE CONSTRAINTS

There are some site constraints noted in the supporting reports that may influence the engineering design of the subject development. These existing constraints are shown on **Figure 3 - Constraints and Developable Area Plan** and discussed subsequently.

A geotechnical investigation was completed by Englobe Corp. and a report prepared entitled 'Preliminary Geotechnical Investigation Report, Proposed Commercial Development, 2095 Dilworth Road, Kars, ON' dated May 1, 2024 and Revision 1 dated January 6, 2025. The report included the following recommendations.

- Groundwater is anticipated to be less than 2.0 m below ground surface.
- The Geotechnical Consultant assumed an anticipated grade raise of 1.0m which could result in approximately 40mm of settlement. Refer to Englobe letter entitled, "Proposed Commercial Development 1.0 m Grade Raise, 2095 Dilworth Road, Kars, ON", dated



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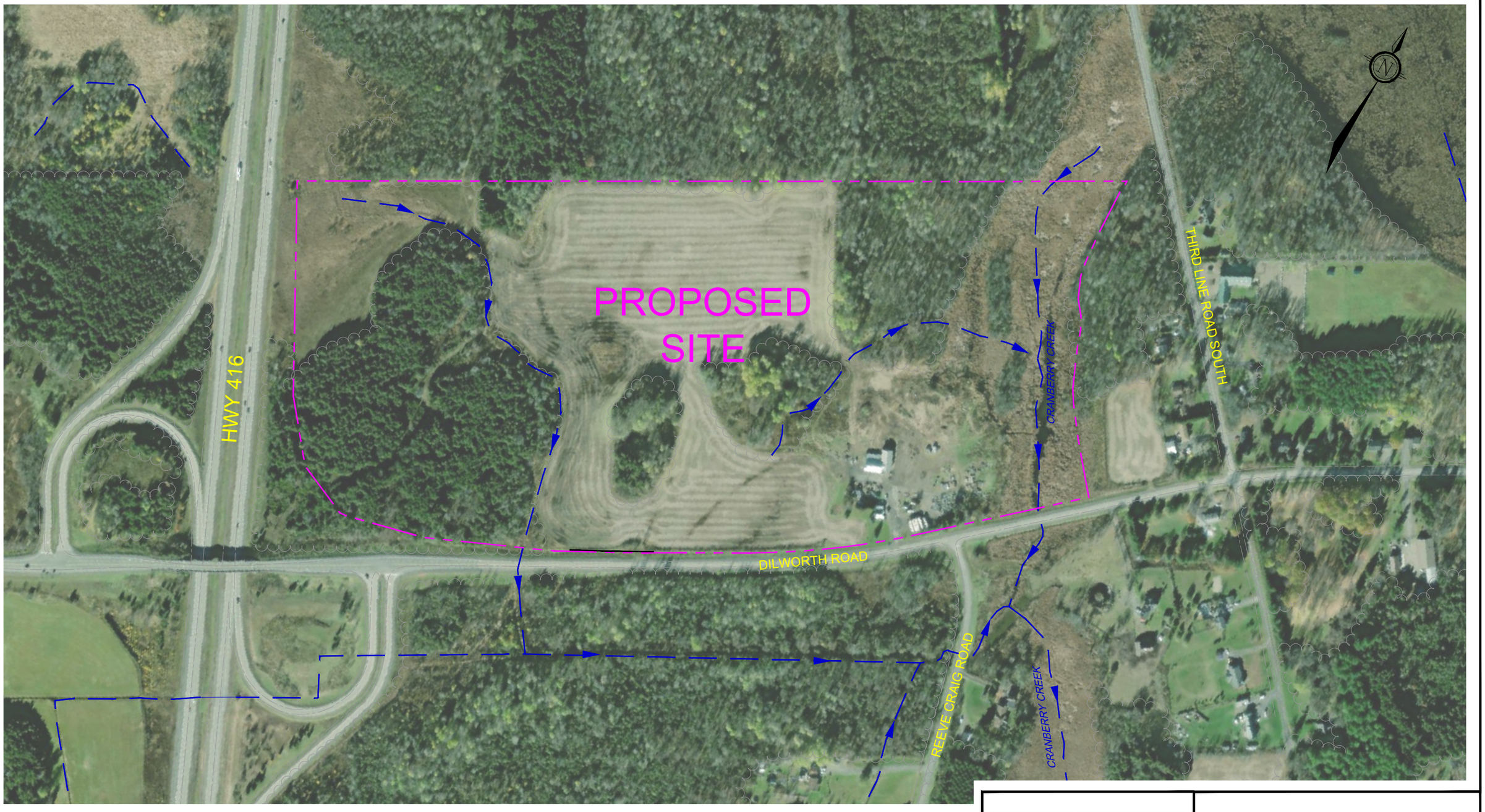
Website www.novatech-eng.com

KEY PLAN

LOT 35, CONCESSION 3
CITY OF OTTAWA

2095 DILWORTH ROAD

DATE	JOB	FIGURE
SEPT 2025	123081	1



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2095 DILWORTH ROAD

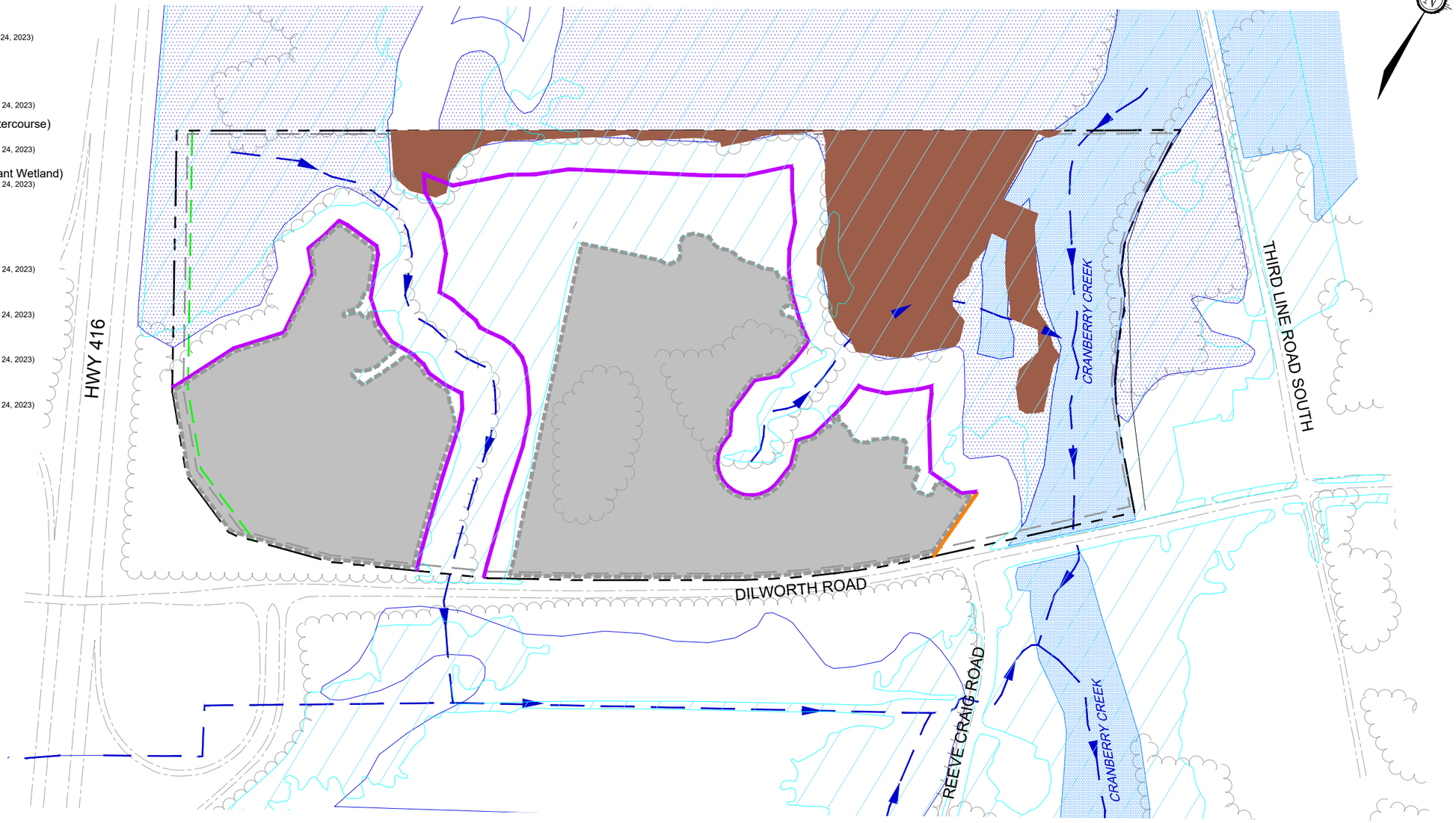
EXISTING CONDITIONS

SCALE 1 : 4000 (0, 40, 80, 120, 160)

DATE OCT 2025 | JOB 123081 | FIGURE 2

LEGEND

- Site Boundary
  (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- Property Setbacks
  (Zoning Bylaw, 2008-250)
- Watercourse
  (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- 30m Setback (From Local Wetland/Watercourse)
  Blanding's Turtle Category 2 Habitat
  (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- 50m Setback (From Provicially Significant Wetland)
  (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- MTO Setback (14m from Property Line)
  (MTO, Highway Corridor Management Manual, April 2022)
- Provincially Significant Wetland
  (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- Local Wetland
  (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- Exisiting Floodline
  (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- Significant Woodland
  (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- Development Area



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2095 DILWORTH ROAD

CONSTRAINTS AND DEVELOPMENT AREA PLAN

SCALE 1 : 4000 (0, 40, 80, 120, 160)
DATE OCT 2025 | JOB 123081 | FIGURE 3

SHT11X17.DWG - 279mmX432mm

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July 18, 2024 (provided in Appendix G of the Englobe Report). Lightweight fill and/or preloading may be a consideration for a proposed development on this site.

- The existing soils have low bearing capacity which will need to be considered during the building and foundation design.
- Since the groundwater is less than 2.0m below ground surface, there could be significant dewatering required during building construction depending on the type of foundation proposed. Therefore, it may be required to register on the Environmental Activity and Sector Registry (EASR) or obtain a Permit To Take Water.
- Clay seals should be installed in any underground trenches.
- Adequate slopes and subdrains should be installed to assist with pavement drainage. Geotextile is also recommended below the pavement structure.

An Environmental Impact Statement, Proposed Zoning Amendment, 2095 Dilworth Road, Ottawa, Ontario' was prepared by Gemtec dated May 10, 2024 (Gemtec EIS Report). The Gemtec EIS Report identifies a number of constraints that may impact development. The constraints are described briefly below.

- Watercourses – There are two unnamed watercourses that travel through the subject site which require setbacks. The watercourse within the western portion of the property is assumed to provide fish habitat. The Gemtec EIS Report recommends a minimum setback of 30m (from top of bank) for the watercourse. The setback area shall remain undisturbed and is to be left in a natural state. This 30 m setback will also provide protection of fish habitat.
- Provincially Significant Wetlands (PSW) – A portion of the Cranberry Creek PSW is located within the eastern portion of the property. Local wetlands are also located within the site area. A 50 m setback is recommended from the Cranberry Creek PSW and a 30m setback is recommended from the local wetland area.
- Significant Woodlands – There is a significant woodland area located in the northeastern corner of the property. The Gemtec EIS Report suggests that the 30m setback to the local wetlands will be sufficient to protect significant woodland area.
- Significant Valleylands – There are significant valleylands within the site area but are located within the floodplain areas. The Gemtec EIS Report indicates that the 30m setback to wetland and watercourses is sufficient to protect significant valleyland areas.
- Significant Wildlife Habitat – The Gemtec EIS Report indicates a number of species listed as significant wildlife habitat within the site area. The 30 m and 50 m setbacks to wetlands and PSW will provide sufficient protection for these species and their habitat. Reptile exclusion fencing will be required prior to the commencement of any construction.
- Turtle Habitat – The subject site is within a greater area of known Blanding's Turtle siting's. Therefore, there are areas of Category 1, 2 and 3 Blanding's Turtle Habitat throughout the site. Exclusion fencing will be required prior to the commencement of any construction. And consultation with the MECP will be required through the Overall Benefit Permit process.

Additional site constraints are noted as follows:

- MTO Setback – the site is located adjacent the Highway 416 and a 14m setback from the property line is required from provincial highways.
- Floodplain – The 100-year floodplain for the unnamed watercourses meanders through the site area and is another site constraint. Development is to occur outside the floodplain area and any storage of stormwater needs to be above the 100-year floodplain elevation.

The developable area for this site must abide by each of the constraints and setbacks noted above. As noted previously, a potential development concept plan has been prepared based on the developable areas of the site. **Figure 4 - Concept Plan** shows the Potential Concept Plan.

5.0 SITE SERVICING

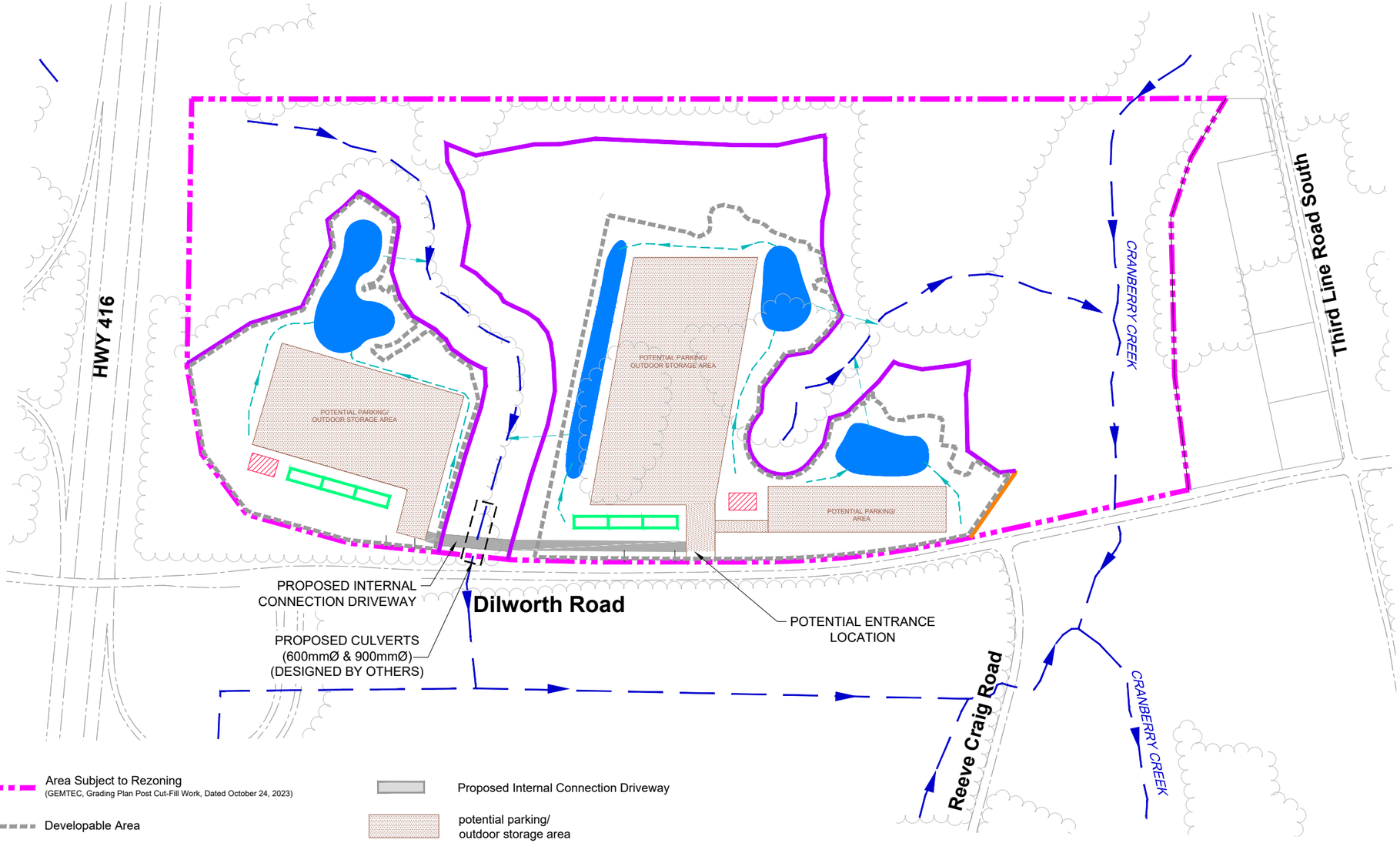
There are 2 developable areas within the total site area (4.47 ha and 7.26 ha in size). An internal road connection is shown as there is one entrance connection proposed to Dilworth Road. A separate entrance for the western developable area may be too close to the Highway 416 on/off ramps. This internal road connection requires a culvert crossing which has been designed, approved and a permit from the RVCA has already been issued. Supporting documents are included in **Appendix A**.

The site is located well outside the City of Ottawa urban boundary. Municipal services are not proposed or anticipated for the subject site as the closest municipal services are in Manotick, approximately 14 kilometres northeast of the subject property.

Proposed buildings would be serviced with a private well(s) and private sewage system(s).

A hydrogeological study was completed and a report prepared entitled 'Hydrogeological Study Report, 2095 Dilworth Road, Kars, Ontario' prepared by Englobe Corp. dated May 2024 and revised dated February 2025. This report provides information with respect to water quality and quantity for a well to service the site. The Englobe Report provided the following findings:

- There are exceedances with elevated levels of sodium and chloride within the development area closest to Hwy 416. It is understood that the zoning amendment for the subject site is for less sensitive uses where the number of employees would be low and there would not be a reliance on potable water. In general the quality of the groundwater is acceptable for a commercial development. Any observed exceedances such as elevated hardness, sodium, chloride and manganese in the aquifer are not uncommon and can be addressed with a treatment system.
- The report discussed the aquifer testing and pumping rates in relation to less sensitive development. A more detailed analysis would be completed once the proposed development concept has been confirmed through the site plan process.
- Assumptions were made to review a possible septic system to ensure it would comply with MECP Procedure D-5-4. One of the assumptions was a maximum daily sewage discharge of 9000L/day (equivalent to the assumed water demand). Given the assumptions made (including infiltration rates and nitrate input) the septic system would comply with MECP Procedure D-5-4 with respect to nitrate impacts. It is recommended that percolation testing be completed in the area designated for the septic bed. It is also noted that a partially or fully raised system will be required and may be impacted by the grade raise restriction.



LEGEND

- Area Subject to Rezoning (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- Developable Area
- 30m Setback (From Local Wetland/Watercourse) (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- 50m Setback (From Provicially Significant Wetland) (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- Watercourse (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- Treeline (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- Proposed Internal Connection Driveway
- potential parking/ outdoor storage area
- potential storm pond area
- potential footprint for building occupancies
- potential septic system area
- potential swale to storm pond area

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2095 DILWORTH ROAD

CONCEPT PLAN

SCALE 1 : 4000 (0, 40, 80, 120, 160)
DATE APR 2026
JOB 123081
FIGURE 4

SHT11X17.DWG - 279mmX432mm

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The private sewage system(s) would be designed based on Ontario Building Code or Ministry of the Environment (MECP) standards, depending on the theoretical design flow of the proposed building. Design flows in excess of 10,000L/day require approval from the MECP.

It should be noted that acceptable separation distances will be required between the floodplain, well and septic systems.

6.0 STORMWATER MANAGEMENT

Stormwater currently sheet drains across the property towards the unnamed watercourses and wetland areas within the property. The proposed development will continue to sheet drain stormwater and outlet to the unnamed tributaries. The stormwater management conceptual design is discussed subsequently.

6.1 Stormwater Management Criteria

Stormwater management design criteria are as follows:

- Quantity control of stormwater is required for storms up to and including the 100-year event controlled to the pre-development 2 year flow rates.
- Quality control of stormwater is required to a 'enhanced' level corresponding to 80% removal of Total Suspended Solids (TSS) is required.

6.2 Proposed Stormwater Management Design

Existing drainage patterns will be maintained under post-development conditions. The proposed drainage outlet is as per existing conditions to the two existing road crossing culverts under Dilworth Road. All runoff from the proposed development will continue to drain to the unnamed watercourses within the property per existing conditions which then drain to the two road crossing culverts under Dilworth Road. Only the developable areas are considered in the stormwater management design. The remaining undeveloped portion of the lots will remain untouched per existing conditions.

Stormwater management will be provided individually for each of the proposed developable areas. Quantity control of stormwater can be provided by ponding stormwater on building roofs and in surface detention areas such as grassed swales and in a proposed stormwater management pond.

The potential concept plan was used to complete a preliminary pond design to ensure that the site could drain to a pond and there is sufficient freeboard between the permanent pool elevation, the 100 year floodline elevation the watercourse/outlet elevation. The preliminary grading plan, included in **Appendix C**, shows preliminary site grading and the stormwater management concept with drainage arrows, swales and pond locations. A summary of the pond designs is show in the **Table 6.2.1** below.

Table 6.2.1: Pond Design Summary

STORMWATER MANAGEMENT POND SUMMARY					
POND ID	**STREAM ELEVATION**	**PERMENANAT POOL ELEV**	**100YR VOLUME ACTIVE STORAGE (m3)**	**PERMENANT POOL VOLUME (m3)**	**POND AREA REQUIRED (ha)**
A	87.00	87.75	2008	1232	0.29
B	87.00	87.75	2630	1318	0.39
C	87.00	87.75	1582	1308	0.21
D	87.00	87.75	896	594	0.13

Quality control of stormwater is required to a level of 80% removal of total suspended solids. Quality control will be achieved through the use of grassed ditches and a stormwater management facility. Increased levels of TSS removal in grassed swales is achieved by reducing flow velocities and increasing the density of vegetation. Stormwater ponds achieve high levels of TSS removal by slowing the release rates creating longer retention times of stormwater. Detailed calculations supporting this approach will be included at the detail design stage as part of the site plan application process.

In storm events greater than the 100-year storm, stormwater will continue to drain to the unnamed watercourses within the property similar to existing conditions.

The proposed stormwater management ponds could also be used as a water source for fire protection. A dry hydrant would be installed as part of the fire protection system. The detailed pond design would need to incorporate this function into the design (ie pond depth, access route, type of hydrant and location, frost protection etc.). This would be reviewed by Ottawa Fire Service (OFS) during the site plan application process. In the event the pond is not feasible for fire protection, underground storage tanks could be used.

The stormwater management design will require an MECP ECA. During the site plan application process it will need to be determined if the stormwater management design can be reviewed through the City's EASR process or if a direct submission to MECP will be required.

6.4 Best Management Practices

The proposed development can use the following stormwater best management practices (BMPs) to mitigate the reduction in groundwater infiltration/recharge resulting from development:

- Surface drainage will sheet drain through the grassed areas and swales and outlet directly to the existing unnamed watercourses within the site where possible.
- Roof leaders will be discharged to the grassed rear yards.
- Construction of swales at minimal slopes where possible.

By implementing stormwater management BMPs as part of the storm drainage design, the impacts of development on the hydrologic cycle can be reduced. The use and implementation of BMPs will be reviewed again during the detailed design process.

7.0 EROSION AND SEDIMENT CONTROL

Temporary erosion and sediment control measures will be implemented during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Silt fences around the area under construction placed as per OPSS 577 and OPSD 219.110.
- Light duty straw bale check dam per OPSD 219.180.
- Seed or sod the swales as soon as possible to reduce the sediment runoff to Cranberry Creek.

The erosion and sediment control measures are to be installed to the satisfaction of the engineer, the Municipality, and Rideau Valley Conservation Authority prior to construction and will remain in place during construction until vegetation is established. The erosion and sediment control measure will also be subject to regular inspection to ensure measures are operational.

Preliminary erosion an sediment control measures are shown on the Conceptual Erosion and Sediment Control Plan included in **Appendix C**. More detailed erosion and sediment control measures including any off-site measures will be provided at the detailed design stage in support of a site plan application.

8.0 CONCLUSIONS

The conclusions of this report are as follows:

- Quantity control of stormwater will be provided to the 2 year pre-development levels through ponding of stormwater on building roofs and at the surface in grassed swales and in a stormwater management pond within each of the development areas.
- Quality control of stormwater will be provided through the installation of a stormwater management ponds.
- An overland flow route will be provided to the unnamed watercourses within the site similar to existing conditions.
- Erosion and sediment control measures will be required during construction.

This report is respectfully submitted for approval. Please contact the undersigned should you have questions or require additional information.

NOVATECH

Prepared by:

Cara Ruddle, P.Eng.
Senior Project Manager
Land Development Engineering

Reviewed by:

Lee Sheets C.E.T.
Director
Land Development & Public Sector Infrastructure

APPENDIX A
CULVERT INFORMATION

RVCA Letter of Permission —

Ont. Reg. 174/06, S. 28 *Conservation Authorities Act* 1990, As Amended.

Rideau Valley Conservation Authority

3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504
F 613-692-0831 | www.rvca.ca

Date: November 24, 2023
File: RV6-4923
Contact: eric.lalande@rvca.ca; 613-692-3571 x1137

Dilworth Development Inc.
92 Bentley Avenue,
Ottawa, ON K2E 6T9

Permit for: Development and Alteration to a Watercourse
Under Section 28 of the Conservation Authorities Act for grading within the floodplain to allow for the construction of a driveway access at 2095 Dilworth Drive, Lot 35, Concession 3, former Township of Rideau, now in the City of Ottawa.
Roll Number: 061414828401030000000

Dear Mr. Griesseier,

The Rideau Valley Conservation Authority has reviewed the application and understands the proposal to be for:

a) **Installation of a new driveway access within the floodplain**
b) **Installation of a 900mm and 600mm culvert for watercourse crossing.**

This proposal was reviewed under Ontario Regulation 174/06, the "*Development, Interference with Wetlands, and Alteration to Watercourse and Shorelines"* regulation and the RVCA Development Policies, specifically Section 1.0 General Principles, Section 1.2.6 Minor Works and Section 3.2 Channel Realignment, Road Crossings, Diversions, Dams. The proposal is not expected to impact the control of flooding, pollution, erosion or conservation of land providing conditions are followed.

PERMISSION AND CONDITIONS

By this letter the Rideau Valley Conservation Authority hereby grants you approval to undertake this project as outlined in your permit application but subject to the following conditions:

1. Approval is subject to the understanding of the project as described above and outlined in the application and submitted plans:
    a) Road and Culver Plan, Profiles and Details, completed by GEMTEC, Numbered C1, dated October 11, 2023 Project #65007.01
    b) Access Road Culvert Design Summary, 2095 Dilworth Road, Ottawa, ON dated October 11, 2023, prepared by GEMTEC, project no. 65007.001 -R0

2. The proposed development shall be supervised and certified by a professional engineer to ensure compliance with the approved plans.

3. Work in-water shall not be conducted at times when flows are elevated due to local rain events, storms or seasonal floods.

4. A De-watering Plan and Sediment and Erosion Control Plan must be submitted by the contractor to this office for review prior to construction activities commencing.

5. Any changes to the proposed work must be submitted in writing to the Conservation Authority for review and approval prior to implementation. No conditions are subject to change/revision by the on-site contractor(s).

6. All excavated material not utilized for the purposes of the approved development (if appropriate material) must be removed from the site to a suitable disposal site outside of any 1:100-year floodplain, wetland, and regulated area.

7. No grade changes are permitted other than those explicitly permitted by approved drawings identified in Condition 1.

8. A finished grading plan will be submitted as soon as the work is complete to confirm the final grade of the driveway on the property. A refundable deposit of $1720 is required to be submitted prior to commencement of the work. Satisfactory review of the finished grading plan and compliance with other conditions of approval will result in the return of the deposit (less 10% administrative fee).

9. Any on-site drainage works should not disrupt natural drainage patterns.

10. The applicant must notify the RVCA two business days prior to project commencement and within two business days of project completion.

11. The existing vegetated buffer consisting of a mixture of native vegetation and non-manicured grasses is to be retained in a natural state and vegetation removal is limited to what is necessary to complete the work. Any vegetation that is removed shall be re-established.

12. The applicant agrees that Authority staff may visit the subject property before, during and after project completion to ensure compliance with the conditions as set out in this letter of permission.

13. Only clean material free from particulate matter may be placed in the water.

14. Silt or debris that has accumulated around the temporary cofferdams should be cautiously removed prior to their withdrawal. No channel modifications or dredging is permitted or implied by this letter.

15. A De-watering Plan and Sediment and Erosion Control Plan must be submitted by the contractor to this office for review prior to construction activities commencing

16. Sediment control will be established to ensure no sediment migration from the site. All grubbing and equipment storage and operation will be limited to the development envelope. All areas located outside the development envelope will be left untouched. No fill including topsoil, sand, etc. will be placed outside the development envelope for any

reason. No equipment will be permitted to disturb area outside the development envelope.

17. Sediment barriers should be used on site in an appropriate method according to the Ontario Provincial Standard Specifications (OPSS) for silt barriers as a minimum. In-water work will require the use of a properly secured silt curtain. Soil type, slope of land, drainage area, weather, predicted sediment load and deposition should be considered when selecting the type of sediment/erosion control.

18. A new application must be submitted should any work as specified in this letter be ongoing or planned for or after November 24, 2025

By this letter the Rideau Valley Conservation Authority assumes no responsibility or liability for any flood, erosion, or slope failure damage which may occur either to your property or the structures on it or if any activity undertaken by you adversely affects the property or interests of adjacent landowners. All other approvals as might be required from the Municipality, and/or other Provincial or Federal Agencies must be obtained prior to initiation of work. This includes but is not limited to the Drainage Act, the Endangered Species Act, the Ontario Water Resources Act, Environmental Protection Act, Public Lands Act, or the Fisheries Act.

This permit is not transferable to subsequent property owners.

Should you have any questions regarding this letter, please contact Eric Lalande, Senior Planner at the contact information listed above.

Terry K. Davidson P.Eng
Conservation Authority S. 28 Signing delegate
O. Reg. 174/06

Owner's Acknowledgement of Conditions

- Pursuant to the provisions of S. 28(12) of the *Conservation Authorities Act* (R.S.O.1990, as amended) any or all of the conditions set out above may be appealed to the Executive Committee of the Conservation Authority in the event that they are not satisfactory or cannot be complied with.
- Failure to comply with the conditions of approval or the scope of the project may result in the cancelling of the permission and/or initiation of legal action under S. 28(16) of the Act.
- Commencement of the work and/or a signed and dated copy of this letter indicates acknowledgement and acceptance of the conditions of the RVCA's approval letter concerning the application and the undertaking and scope of the project.
- Where a permit has been issued pursuant to the *Conservation Authorities Act* (R.S.O.1990, as amended), the person to whom it is issued shall have the permit or a copy of it posted at all times throughout the duration of the project in a conspicuous place on the property in respect of which the permit was issued.

Name: _____ (print)

Signed: _____ Date: _____

GEMTEC
Consulting Engineers and Scientists

GEMTEC Consulting Engineers and Scientists Limited
191 Doak Road
Fredericton, NB, Canada
E3C 2E6

tel: 506.453.1025
fax: 506.453.9470
fredericton@gemtec.ca
www.gemtec.ca

October 11, 2023

File: 65007.001 – R0

Dilworth Development Inc.
92 Bentley Avenue
Ottawa, Ontario
K2E 6T9

Attention: Mr. Walter Griesseier,

Re: Access Road Culvert Design Summary
2095 Dilworth Road, Ottawa, Ontario

This letter presents a design summary for the proposed access road culvert at 2095 Dilworth Road. The summary has been prepared for submission to the Rideau Valey Conservation Authority (RVCA) as a component of the application for approval to the watercourse crossing application as per requirements of Section 28 of the Conservation Authorities Act and Ontario Regulation 174/06.

The following files are included as attachments to the culvert design summary:

- completed Application for “Development, Interference with Wetlands and Alterations to Shorelines and Watercourses” Ont. Reg. 174/06
- Dilworth Developments Inc. letter of authorization for GEMTEC to act as an agent for submissions to RVCA
- culvert design drawing
- peak flow calculations
- culvert capacity calculations

Culvert Design

The proposed watercourse crossing is located upstream of an existing culvert crossing of Dilworth Road. Although the existing culvert is a 900 mm diameter pipe, the proposed culvert installation will have 2 barrels (900 mm and 600 mm) to ensure the peak design flow can be conveyed without surcharging. It should be noted the field survey indicated a slight reverse grade for the existing culvert with the outlet invert being 0.137 m higher than the inlet. This creates a backwater condition upstream of the culvert, where the new crossing is proposed. The proposed culvert will use this backwater condition to ensure constant flow depth in the new culvert barrels, without the need to countersink the pipe. It will also promote silt/sediment deposition in the bottom of the pipe for fish habitat.

Peak design flow and culvert sizing calculations for the access road culvert are attached to this design summary and include the following:

- proposed culvert details
    - 900 mm and 600 mm Boss 2000 HDPE pipe
    - culvert lengths = 16 m
    - pipe slope = 0.5%
- Q_{100} design flow: 1.05 m^3/s
- capacity of proposed culverts: 1.26 m^3/s
- minimum access road elevation: 88.1 m (exceeds 87.29 m Regulatory flood elevation)

Site Photo

The following photo shows the proposed crossing location looking upstream while standing above the existing culvert crossing of Dilworth Road.

Erosion and Sediment Control

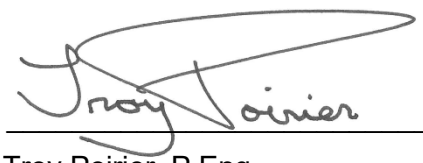
Erosion and sediment control is to be provided by isolating the work and access area from the watercourse using sediment control fencing. The fencing will be installed prior to site work and will be inspected and repaired on a daily basis. Any water pumped from the worksite during dewatering activities will be discharged to an undisturbed and stable location east of the proposed crossing.

Temporary Water Control During Culvert Installation

The small watercourse has a catchment area of 23.2 hectares and flow is intermittent. It is advised that the culvert installation be performed during relatively dry conditions, when there is little to no flow. Temporary water control will be performed by isolating the worksite from the rest of the stream using sandbags and plastic liners, with pumping to be performed from upstream of the site to the downstream culvert, as required.

Closing

We trust the above information sufficiently describes the prosed watercourse crossing and culvert design. If you have any questions, or require additional information, please contact us at your convenience.



Troy Poirier, P.Eng.

Enclosures

N:\Projects\65000\65007.01\Hydrology Review\65007.001_LTR_Culvert-Summary_2023-10-11_Rev0.docx

RIDEAU VALLEY CONSERVATION AUTHORITY
Box 599, 3889 Rideau Valley Drive
Manotick, Ontario K4M 1A5
613-692-3571
www.rvca.ca

Application/File #:

Prior to application submission, please contact the RVCA for pre-consultation or visit www.rvca.ca

Official Use Only
Date Received Stamp

Related Files

Fee

Application for "Development, Interference with Wetlands and Alterations to Shorelines and Watercourses" Ont. Reg. 174/06

Pursuant to Section 28 of the *Conservation Authorities Act* and Ontario Regulation 97/04

The Rideau Valley Conservation Authority will consider your application based on the information you provide below. Any false or misleading statement made on this application will render null and void any permission granted. Complete all relevant sections, date, sign and return the application along with applicable scale drawings and other documents necessary (refer to minimum guideline requirements) as well as application fee "Schedule B."

Contact Information (please print clearly)

Property Owner's Name(s): Dilworth Developments Inc. (President: Walter Griesseier)

Mailing Address (Street, P.O. Box)	City	Postal Code
92 Bentley Avenue	Ottawa, ON	K2E 6T9

Telephone: Home	Work	Mobile
	613-223-4900	

E-mail: walterg@louconmetal.com

Agent's Name: Troy Poirier, P.Eng. (GEMTEC Consulting Engineers and Scientists)

Property owner's letter of authorization required

Mailing address (Street, P.O. Box)	City	Postal Code
191 Doak Road	Fredericton, NB	E3C 2E6

Telephone: Home	Work	Mobile
n/a	506-453-1025	506-461-8474

E-mail: troy.poirier@gemtec.ca

Location of Proposed Works

Property Assessment Roll Number (From Property Tax Notice, required): 0614.1482.840.10300.0000

Municipal Street Address: 2095 Dilworth Road

Municipality	Former Municipality	Watercourse/Drain
Ottawa	Rideau	Cranberry Creek

Lot	Concession	Registered Plan Number	Sub-lot
35	3		

Culvert Identification Number:

Description of Works (please check each that apply)

- [ ] Placement of fill, site alteration, changes in land elevation
- [ ] Pond construction, cleanout and/or repair
- [ ] Dam re-construction/repair
- [ ] Dredging
- [ ] Drainage works and ditching
- [ ] Interference with a wetland
- [ ] Construction of a structure (building, septic system, pools)
- [x] Watercourse crossing (culvert or bridge)
- [ ] Bank protection
- [x] Alteration to a watercourse or shoreline
- [ ] Other _____

What is the purpose of the work?

Installation of a new culvert crossing of a small watercourse within the Regulation Limit. This culvert is needed to access lands on the west side of the watercourse and outside the current Regulation Limit.

Proposed Starting Date: September 01, 2023 | Completion Date: December 31, 2023

Existing use of land (i.e., residential, commercial, vacant): Agricultural | Proposed use of land: Commercial

			Details (e.g. Permit Number, Application Number)
Previous RVCA application on this property?	[x] yes	[ ] no	Cut fill application (RV6-0122)
Planning approval required? (e.g. site plan approval or re-zoning, minor variance)	[ ] yes	[x] no	
Applications made to other agencies? (e.g., MNRF, MOECC, Parks Canada, DFO)	[ ] yes	[x] no	
Municipal Building Permit required?	[ ] yes	[x] no	
Septic application/permits required?	[ ] yes	[x] no	
Is fill remaining on site? (If the answer is "no" you must specify an address where the fill is to be removed to:)	[ ] yes	[x] no	address

Submission Requirements and Terms

Digital transmission of PDFs are: USB/flash drive, CD or email (development@rvca.ca)

- **Applications must be submitted digitally with one hard copy to scale.**
- Permits or Approvals granted by the Rideau Valley Conservation Authority are non-transferable.
- Permits, approvals, etc. may be required from other agencies prior to undertaking the proposed work. Rideau Valley Conservation Authority permission, if granted for the proposed work, does not exempt the owner/agent from complying with any or all other laws, statutes ordinances, directives, regulations, approvals, etc. that may affect the property or the use of same.
- Fees paid are for application processing only; the RVCA reserves the right to refuse permission based on policy provisions and the applicant's right to a hearing under Section 28(12) of the Act.
- Section 28 (20) *Conservation Authorities Act* — An officer appointed by the RVCA may enter on private property, other than a dwelling or building, if the entry is for the purpose of considering a request related to the property for permission that is required by a regulation. By signing this form consent is being granted.
- Cancellation fee may apply to applications that have been accepted.

*** I/we the undersigned hereby certify to the best of my/our knowledge and belief that all of the above-noted, attached and/or supporting documentation information is correct and true. I/we further solemnly declare that I/we have read and fully understand the contents of this application and specifically the terms and conditions, and the declaration which is written below.**

By signing this application, consent is given to the Rideau Valley Conservation Authority, its employees and authorized representatives to access the property for the purposes of obtaining information and monitoring any approved works pursuant to Section 28(20) of the Act.

Owner's name: Walter Griesseier **Date:** 2023 / 08 / 25

Authorized Agent: Troy Poirier, P.Eng.

[x] **Letter of Authorization from owner must be attached if agent is signing off on all works**

Notice of Collection

Pursuant to the municipal Freedom of Information and Protection of Privacy Act, the personal information contained on this form is collected under the Authority of the *Conservation Authorities Act*, R.S.O. 1990, Chapter C. 27, and O Regulation 174/06 RVCA Regulation of Development, Interference with Wetlands and Alteration to Shorelines and Watercourses. This information is used to access applications and where approved issue permits. Information on this form will be disclosed to government and municipal agencies for review and comments and may be disclosed to members of the public through the Freedom of Information process.

Dilworth Developments Inc
2095 Dilworth Rd
Kars, Ontario

January 13 2022

To whom it may concern,

Dilworth Developments is the owner of 2095 Dilworth Rd and hereby authorizes Troy Poirier from Gemtech to act as our agent for any and all submission of all relevant permits required for the said property with the Rideau Valley Conservation Authority.

Please do not hesitate to contact me should you have and questions.

Sincerely,

Walter Griesseier
President
Dilworth Developments
613-223-4900
Walterg@louconmetal.com

Peak Runoff Estimate for Culvert at 2095 Dilworth Road

Use Ottawa CDA Station to Estimate Local Rainfall Rates

Rainfal Intensity - Ottawa CDA Climate Station 6105978
Rainfall Interpolation Eqn: R = A * T^B (R=mm/hr; T = hrs)

Return Period (years)		2	5	10	25	50	100
Coefficient	(A)	21.6	27.7	31.8	36.9	40.8	44.5
Exponent	(B)	-0.711	-0.697	-0.691	-0.685	-0.682	-0.679

Peak Runoff and Time of Concentration Equations

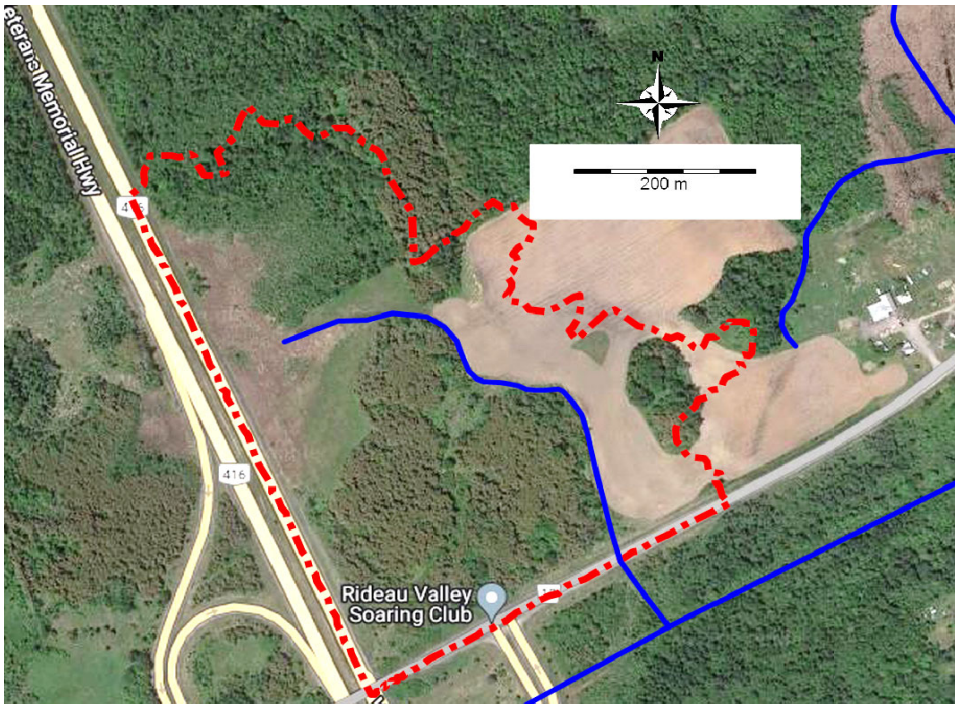
Rational Equation (Peak Runoff)
Q = 0.0028 ciA
i = intensity (mm/hr)
A = area (ha)
Q = peak flow (m^3/s)

Bransby Williams (Time of Concentration)
*Tc = 0.605 L / (S^0.2 * A^0.1)*
Tc = time of concentration (hrs)
L= drainage length (km)
S = drainage slope (%)
A = catchment area (km^2)

Runoff Coeff.	Catchment Area (ha)	Drainage Length (km)	Drainage Slope (%)	Time of Concentration (hrs)
0.25	23.2	0.6	0.2	0.58

Peak Runoff Estimates - Current Conditions

Return Period (years)	**Rainfall Intensity** (mm/hr)	**Peak Flow** (m^3/s)
2	31.8	0.52
5	40.5	0.66
10	46.4	0.75
25	53.6	0.87
50	59.2	0.96
100	64.4	1.05



CULVERT SIZING CHECK
Project : 65007.001 - 2095 Dilworth Road

Capacity Check for Non-Embedded Culverts

Q_{100} Design Flow	1.05	m^3/s
Combined Culvert Capacity	1.26	m^3/s

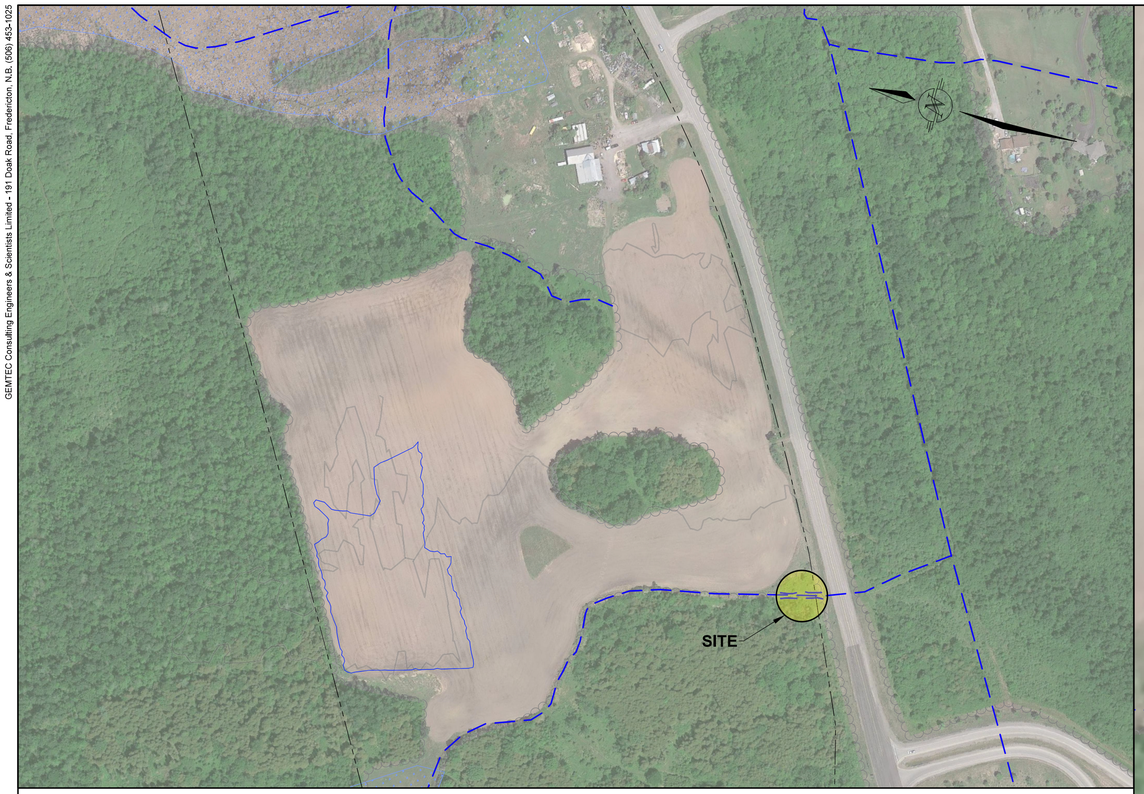
Barrel #1: 900 mm HDPE		
barrel diameter	0.9	m
barrel length	16.0	m
barrel slope	0.005	m/m
Manning's "n"	0.012	
discharge coefficient "Cd"	0.5	
inlet loss coefficient "Ke"	0.5	
headwater depth ratio	1.0	(1 = full pipe)
headwater depth	0.9	m
tailwater depth	0.80	m
INLET CONTROL		
Discharge capacity	0.95	m^3/s
OUTLET CONTROL		
Discharge capacity	0.88	m^3/s
Outlet Control Governs		

Barrel #2: 600 mm HDPE		
barrel diameter	0.6	m
barrel length	16.0	m
barrel slope	0.005	m/m
Manning's "n"	0.012	
discharge coefficient "Cd"	0.5	
inlet loss coefficient "Ke"	0.5	
headwater depth ratio	1.5	(1.5 = surcharged)
headwater depth	0.9	m
tailwater depth	0.80	m
INLET CONTROL		
Discharge capacity	0.49	m^3/s
OUTLET CONTROL		
Discharge capacity	0.37	m^3/s
Outlet Control Governs Design		

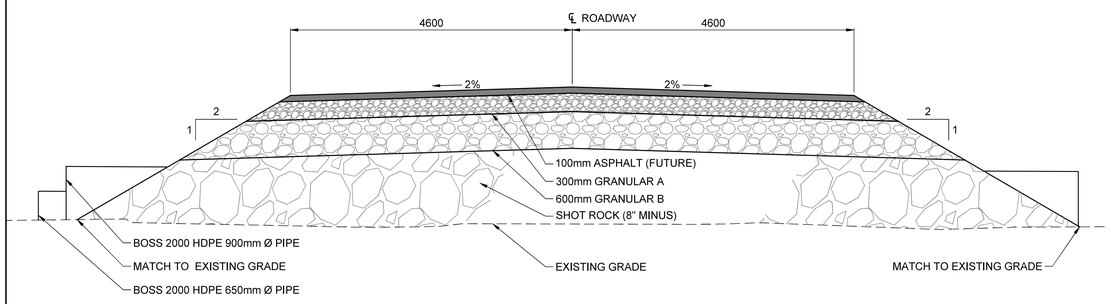
Discharge Coefficients "Cd"	
thin walled projecting	0.50
flush headwall	0.60
cylinder inlet	0.67
socket inlet	0.70
bellmouth inlet	0.97
(after C.D. Smith, 1985)	

Inlet Loss Coefficients "Ke"	
thin walled projecting	1.00
flush headwall	0.50
cylinder inlet	0.30
socket inlet	0.20
bellmouth inlet	0.10
(after C.D. Smith, 1985)	

GEMTEC Consulting Engineers & Scientists Limited • 191 Dusk Road, Fredericton, N.B. (506) 453-1025

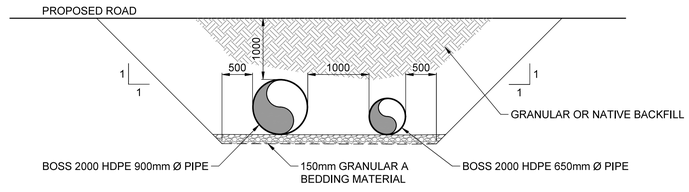


KEY PLAN
SCALE: 1:2500



NOTE:
1. ALL DIMENSIONS SHOWN IN MILLIMETERS.

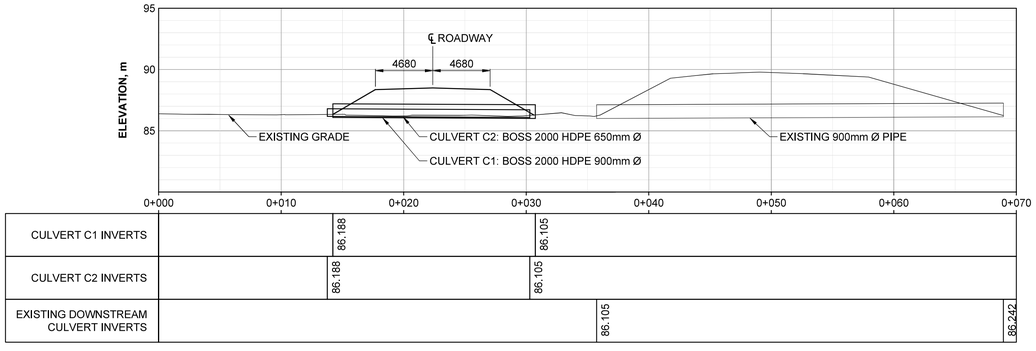
TYPICAL ROADWAY SECTION
SCALE: 1:50



NOTE:
1. ALL DIMENSIONS SHOWN IN MILLIMETERS.

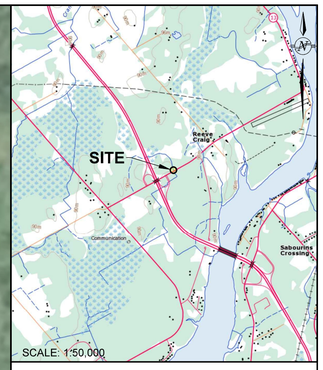
TYPICAL CULVERT CROSS SECTION AND BACKFILL
SCALE: 1:50

PARTIAL PLAN VIEW
SCALE: 1:250



CULVERT C1 INVERTS		86.188	86.105
CULVERT C2 INVERTS		86.188	86.105
EXISTING DOWNSTREAM CULVERT INVERTS		86.105	86.242

STREAM PROFILE VIEW
SCALE: 1:250



LEGEND
- WATERCOURSE
- WETLAND
- ROAD CENTER LINE
- EDGE OF ROAD
- PROPERTY LINE

NUMBER	ISSUE	DATE (YYYY/MM/DD)
1	ISSUED FOR REGULATORY REVIEW	2023/10/11

ENGINEER'S STAMP

DRAWN BY	CHECKED BY
TLR	TP
CALCULATIONS BY	CHECKED BY
TP	HA

PROJECT

2095 DILWORTH ROAD
DEVELOPMENT
OTTAWA, ONTARIO

DRAWING

PROPOSED ROAD AND CULVERT
PLAN, PROFILES AND DETAILS

SCALE

AS NOTED

FILE NO.	SHEET NO.
65007.01	C1

GEMTEC
CONSULTING ENGINEERS AND SCIENTISTS

Wed, Sep 26, 2023 10:32 AM • By: THERESA ROY • File: c:\projects\65000\65007.01\drafting\dwg\65007.01-dilworth-road-development_culvert-design.dwg

APPENDIX B
Stormwater Management Calculations

LEGEND

PRE DEVELOPMENT DRAINAGE AREA

DEVELOPABLE AREA

4.82ha / PRE1 / 0.25

DRAINAGE AREA (ha)

AREA ID

RUNOFF COEFFICIENT

DIRECTION OF DRAINAGE ARROWS

Treeline
(GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

2095 DILLWORTH ROAD

PRE DEVELOPMENT DRAINAGE AREAS

SCALE 1 : 2500 (0 25 50 75 100)

DATE MAR 2026 | JOB 1253081 | FIGURE SWM - PRE

SHT11X17.DWG - 279mmX432mm

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Rear Lot Line

Interior Lot Line

Interior Lot Line

Front Lot Line

DILWORTH RD.

VETERANS ST...

REEVECRAIG R...

4.47ha
POST1
0.78

2.44ha
POST2
0.78

3.03ha
POST3
0.78

1.78ha
POST4
0.78

POND A

POND B

POND C

POND D

POTENTIAL PARKING/
OUTDOOR STORAGE AREA

POTENTIAL PARKING/
OUTDOOR STORAGE AREA

POTENTIAL PARKING/
AREA

LEGEND

POST DEVELOPMENT DRAINAGE AREA

DEVELOPMENT DRAINAGE AREA

4.82ha
PRE1
0.25

DRAINAGE AREA (ha)

AREA ID

RUNOFF COEFFICIENT

Treeline
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Facsimile (613) 254-5867
Website www.novatech-eng.com

2095 DILLWORTH ROAD

POST DEVELOPMENT DRAINAGE AREAS

SCALE 1 : 2500 (0, 25, 50, 75, 100)

DATE MAR 2026 | JOB 1253081 | FIGURE SWM-POST

SHT11X17.DWG - 279mmX432mm

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PROJECT #: 123081
PROJECT NAME: 2095 Dillworth Road
LOCATION: City of Ottawa

Date: October 2025

PRE - 1 Runoff Coefficient "C"

Area	Surface	Ha	"C"	C_{avg}	$*C_{100}$
Total	Hard	N/A	0.90	0.25	0.31
4.47	Soft	N/A	0.20		

PRE - 2 Runoff Coefficient "C"

Area	Surface	Ha	"C"	C_{avg}	$*C_{100}$
Total	Hard	N/A	0.90	0.25	0.31
2.44	Soft	N/A	0.20		

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

* Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100-year event

PRE - 3 Runoff Coefficient "C"

Area	Surface	Ha	"C"	C_{avg}	$*C_{100}$
Total	Hard	N/A	0.90	0.25	0.31
3.03	Soft	N/A	0.20		

PRE - 4 Runoff Coefficient "C"

Area	Surface	Ha	"C"	C_{avg}	$*C_{100}$
Total	Hard	N/A	0.90	0.25	0.31
1.78	Soft	N/A	0.20		

Pre-Development (uncontrolled)

Outlet Options	Area (ha)	$Q_{2\ Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
PRE1	4.47	**209.9**	**284.3**	**608.2**
PRE2	2.44	**46.0**	**61.7**	**131.0**
PRE3	3.03	**122.3**	**165.4**	**353.3**
PRE4	1.78	**88.1**	**119.4**	**255.7**

PRE-1 TC	Tc=	13	min	PRE-3 TC	Tc=	17	min
Rainfall Intensity (2 Year Event)	I_2=	67.56	mm/hr	Rainfall Inte	I_2=	58.09	mm/hr
Rainfall Intensity (5 Year Event)	I_5=	91.50	mm/hr	Rainfall Inte	I_5=	78.53	mm/hr
Rainfall Intensity (10 Year Event)	I_{10}=	107.20	mm/hr	Rainfall Inte	I_{10}=	91.94	mm/hr
Rainfall Intensity (25 Year Event)	I_{25}=	126.93	mm/hr	Rainfall Inte	I_{25}=	108.81	mm/hr
Rainfall Intensity (50 Year Event)	I_{50}=	141.62	mm/hr	Rainfall Inte	I_{50}=	121.38	mm/hr
Rainfall Intensity (100 Year Event)	I_{100}=	156.61	mm/hr	Rainfall Inte	I_{100}=	134.23	mm/hr

PRE-2 TC	Tc=	52	min	PRE-4 TC	Tc=	12	min
Rainfall Intensity (2 Year Event)	I_2=	27.11	mm/hr	Rainfall Inte	I_2=	71.25	mm/hr
Rainfall Intensity (5 Year Event)	I_5=	36.40	mm/hr	Rainfall Inte	I_5=	96.55	mm/hr
Rainfall Intensity (10 Year Event)	I_{10}=	42.50	mm/hr	Rainfall Inte	I_{10}=	113.15	mm/hr
Rainfall Intensity (25 Year Event)	I_{25}=	50.16	mm/hr	Rainfall Inte	I_{25}=	134.00	mm/hr
Rainfall Intensity (50 Year Event)	I_{50}=	55.89	mm/hr	Rainfall Inte	I_{50}=	149.52	mm/hr
Rainfall Intensity (100 Year Event)	I_{100}=	61.81	mm/hr	Rainfall Inte	I_{100}=	165.35	mm/hr

100 year Intensity = $1735.688 / (\text{Time in min} + 6.014)^{0.820}$
10 year Intensity = $1174.184 / (\text{Time in min} + 6.014)^{0.816}$
5 year Intensity = $998.071 / (\text{Time in min} + 6.053)^{0.814}$
2 year Intensity = $732.951 / (\text{Time in min} + 6.199)^{0.810}$

For 25 year storms add 10% to C value
For 50 year storms add 20% to C value
For 100 year storms add 25% to C value

TABLE C8: Time of Concentration (Uplands Overland Flow Method)

Area ID	Overland Flow						Channel Flow			Overall	
	Length (m)	Elevation U/S (m)	Elevation D/S (m)	Slope (%)	Velocity (Uplands) (m/s)	Travel Time (min)	Length (m)	Velocity (Uplands) (m/s)	Travel Time (min)	Time of Concentration (min)	Time to Peak (min)
PRE-1	230	92.25	87.75	2.0%	0.30	12.8	560	N/A	N/A	13	9
PRE-2	220	87.25	87.00	0.1%	0.07	52.4	561	N/A	N/A	52	35
PRE-3	100	87.50	87.30	0.2%	0.10	16.7	562	N/A	N/A	17	11
PRE-4	125	87.50	86.60	0.7%	0.18	11.6	563	N/A	N/A	12	8

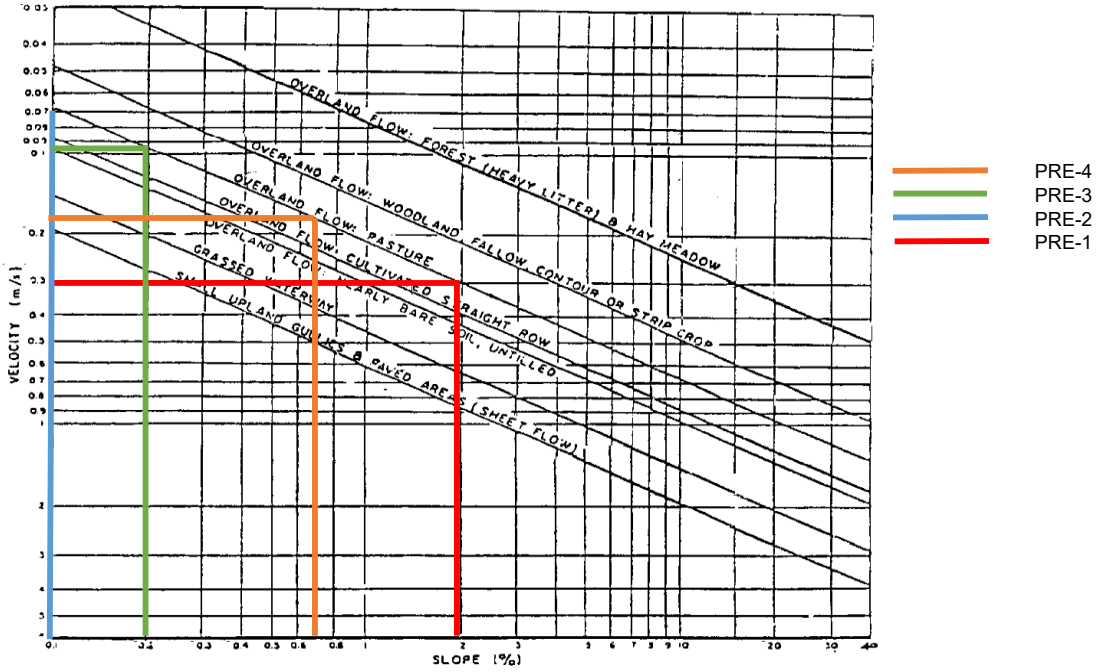

Figure A.5.2: Upland Method for Estimating Time of Concentration
(SCS National Engineering Handbook, 1971)

PROJECT #: 123081
PROJECT NAME: 2095 Dillworth Road
LOCATION: City of Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date: October 2025

POND 'A'

Post-Development Runoff Coefficient "C"

Area	Surface	Ha	"C"	C_{avg}	*C_{100}
Total	HARD	3.35	0.95	0.78	0.97
4.47	SOFT	1.12	0.25		

QUANTITY STORAGE REQUIREMENT - 100 YEAR

4.47 =Area (ha)
0.97 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	40	75.15	904.62	209.9	694.72	1667.33
	45	69.05	831.25	209.9	621.35	1677.64
	50	**63.95**	**769.90**	**209.9**	**560.00**	**1679.99**
	55	59.62	717.77	209.9	507.87	1675.96
	60	55.89	672.87	209.9	462.97	1666.71

PERMENANT POOL VOLUME REQUIRED PER MOE TABLE 3.2 **1118**

P.P. Depth	**1.5**	**m**	**<---Input**
Active Depth (100yr)	**1**	**m**	
side slopes	**4**	**:1**	
freeboard	**0.3**	**m**	
pathway	**0**	**m**	

	Length (m)	**Width (m)**	
Bottom	*93.19*	*1.15*	
Perm Pool	**105.19**	**13.15**	**<---Input**
100yr	*113.19*	*21.15*	
Freeboard +0.3m	*115.59*	*23.55*	
Pond Block +5m	*115.59*	*23.55*	

P.P. Volume	**1,118**	**m3**
100yr Volume:	**1,888**	**m3**
Footprint:	**0.27**	**ha**

WET POND DESIGN PER MOE TABLE 4.6

PROJECT #: 123081
PROJECT NAME: 2095 Dillworth Road
LOCATION: City of Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date: October 2025

POND 'B'

Post-Development Runoff Coefficient "C"

Area	Surface	Ha	"C"	C_{avg}	$*C_{100}$
Total	HARD	1.83	0.95	0.78	0.97
2.44	SOFT	0.61	0.25		

QUANTITY STORAGE REQUIREMENT - 100 YEAR

2.44 =Area (ha)
0.97 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	115	34.01	223.46	46.0	177.46	1224.45
	120	32.89	216.16	46.0	170.16	1225.15
	125	**31.86**	**209.37**	**46.0**	**163.37**	**1225.29**
	130	30.90	203.04	46.0	157.04	1224.90
	135	30.00	197.12	46.0	151.12	1224.04

PERMENANT POOL VOLUME REQUIRED PER MOE TABLE 3.2 **610**

P.P. Depth	**1.5**	**m**	**<---Input**
Active Depth (100yr)	**1**	**m**	
side slopes	**4**	**:1**	
freeboard	**0.3**	**m**	
pathway	**0**	**m**	

	Length (m)	Width (m)	
Bottom	*121.58*	*-3.09*	
Perm Pool	**133.58**	**8.91**	**<---Input**
100yr	*141.58*	*16.91*	
Freeboard +0.3m	*143.98*	*19.31*	
Pond Block +5m	*143.98*	*19.31*	

P.P. Volume	**610**	**m3**
100yr Volume:	**1,792**	**m3**
Footprint:	**0.28**	**ha**

WET POND DESIGN PER MOE TABLE 4.6

PROJECT #: 123081
PROJECT NAME: 2095 Dillworth Road
LOCATION: City of Ottawa

Date: October 2025

POND 'C'

Post-Development Runoff Coefficient "C"

Area	Surface	Ha	"C"	C_{avg}	$*C_{100}$
Total	HARD	2.27	0.95	0.78	0.97
3.03	SOFT	0.76	0.25		

QUANTITY STORAGE REQUIREMENT - 100 YEAR

3.03 =Area (ha)
0.97 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	45	69.05	563.46	122.3	441.16	1191.14
	50	63.95	521.88	122.3	399.58	1198.73
	55	**59.62**	**486.54**	**122.3**	**364.24**	**1201.99**
	60	55.89	456.11	122.3	333.81	1201.71
	65	52.65	429.60	122.3	307.30	1198.49

PERMENANT POOL VOLUME REQUIRED PER MOE TABLE 3.2 **758**

P.P. Depth	**1.5**	**m**	**<---Input**
Active Depth (100yr)	**1**	**m**	
side slopes	**4**	**:1**	
freeboard	**0.3**	**m**	
pathway	**0**	**m**	

	Length (m)	Width (m)	
Bottom	*31.72*	*9.86*	
Perm Pool	**43.72**	**21.86**	**<---Input**
100yr	*51.72*	*29.86*	
Freeboard +0.3m	*54.12*	*32.26*	
Pond Block +5m	*54.12*	*32.26*	

P.P. Volume	**951**	**m3**
100yr Volume:	**1,250**	**m3**
Footprint:	**0.17**	**ha**

WET POND DESIGN PER MOE TABLE 4.6

PROJECT #: 123081
PROJECT NAME: 2095 Dillworth Road
LOCATION: City of Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date: October 2025

POND 'D'

Post-Development Runoff Coefficient "C"

Area	Surface	Ha	"C"	C_{avg}	$*C_{100}$
Total	HARD	1.34	0.95	0.78	0.97
1.78	SOFT	0.45	0.25		

QUANTITY STORAGE REQUIREMENT - 100 YEAR

1.78 =Area (ha)
0.97 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	25	103.85	497.82	122.3	375.52	563.28
	30	91.87	440.39	122.3	318.09	572.57
	35	**82.58**	**395.86**	**122.3**	**273.56**	**574.48**
	40	75.15	360.23	122.3	237.93	571.03
	45	69.05	331.01	122.3	208.71	563.52

PERMENANT POOL VOLUME REQUIRED PER MOE TABLE 3.2 **445**

P.P. Depth	**1.5**	**m**	**<---Input**
Active Depth (100yr)	**1**	**m**	
side slopes	**4**	**:1**	
freeboard	**0.3**	**m**	
pathway	**0**	**m**	

	Length (m)	Width (m)	
Bottom	*20.03*	*4.01*	
Perm Pool	**32.03**	**16.01**	**<---Input**
100yr	*40.03*	*24.01*	
Freeboard +0.3m	*42.43*	*26.41*	
Pond Block +5m	*42.43*	*26.41*	

P.P. Volume	**445**	**m3**
100yr Volume:	**737**	**m3**
Footprint:	**0.11**	**ha**

WET POND DESIGN PER MOE TABLE 4.6

3.3.2 Water Quality Sizing Criteria

The volumetric water quality criteria are presented in Table 3.2. The values are based on a 24 hour drawdown time and a design which conforms to the guidance provided in this manual. Requirements differ with SWMP type to reflect differences in removal efficiencies. Of the specified storage volume for wet facilities, 40 m^3/ha is extended detention, while the remainder represents the permanent pool.

Table 3.2 Water Quality Storage Requirements based on Receiving Waters[1, 2]

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	**55%**	**70%**	**85%**
Enhanced 80% long-term S.S. removal	Infiltration	25	30	35	40
	Wetlands	80	105	120	140
	Hybrid Wet Pond/Wetland	110	150	175	195
	Wet Pond	140	190	225	250
Normal 70% long-term S.S. removal	Infiltration	20	20	25	30
	Wetlands	60	70	80	90
	Hybrid Wet Pond/Wetland	75	90	105	120
	Wet Pond	90	110	130	150
Basic 60% long-term S.S. removal	Infiltration	20	20	20	20
	Wetlands	60	60	60	60
	Hybrid Wet Pond/Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

[1]*Table 3.2 does not include every available SWMP type. Any SWMP type that can be demonstrated to the approval agencies to meet the required long-term suspended solids removal for the selected protection levels under the conditions of the site is acceptable for water quality objectives. The sizing for these SWMP types is to be determined based on performance results that have been peer-reviewed. The designer and those who review the design should be fully aware of the assumptions and sampling methodologies used in formulating performance predictions and their implications for the design.*

[2]*Hybrid Wet Pond/Wetland systems have 50-60% of their permanent pool volume in deeper portions of the facility (e.g., forebay, wet pond).*

Table 4.6: Wet Ponds – Summary of Design Guidance

Design Element	Design Objective	Minimum Criteria	Preferred Criteria
Drainage Area	Volumetric turnover	5 hectares	≥ 10 hectares
Treatment Volume	Provision of appropriate Level of protection (see Section 3.3.1.1)	As per Table 3.2	1. Permanent Pool volume increased by expected maximum ice volume 2. Active Storage increased from 40 m^3/ha to 25% of total volume
Active Storage Detention	Suspended Solids Settling	24 hrs (12 hrs if in conflict with minimum orifice size)	24 hrs
Forebay	Pre-treatment	Minimum Depth: 1 m Sized to ensure non-erosive velocities leaving forebay Maximum Area: 33% of total Permanent Pool	Minimum Depth: 1.5 m Maximum Volume: 20% of total Permanent Pool
Length-to-Width Ratio	Maximize flow path and minimize short-circuiting potential	Overall: minimum 3:1 (may be accomplished by berms, etc.) Forebay: minimum 2:1	From 4:1 to 5:1
Permanent Pool Depth	Minimize re-suspension, avoid anoxic conditions	Maximum Depth: 3 m Mean Depth: 1 m - 2 m	Maximum Depth: 2.5 m Mean Depth: 1 m - 2 m
Active Storage Depth	Storage/Flow Control	Water Quality and Erosion Control: maximum 1.5 m Total (including quantity control): 2 m	Water Quality and Erosion Control: maximum 1.0 m Total (including quantity control): 2 m
Side slopes	Safety Maximize the functionality of the pond	5:1 for 3 m on either side of the permanent pool Maximum 3:1 elsewhere	7:1 near normal water level plus use of 0.3 m steps 4:1 elsewhere

Table 4.6: Wet Ponds – Summary of Design Guidance (cont'd)

Design Element	Design Objective	Minimum Criteria	Preferred Criteria
Inlet	Avoid clogging/ freezing	Minimum: 450 mm Preferred pipe slope: > 1% If submerged, obvert 150 mm below expected maximum ice depth	
Outlet	Avoid clogging/ freezing	Minimum: 450 mm outlet pipe Reverse sloped pipe should have a minimum diameter of 150 mm Preferred pipe slope: > 1% If orifice control used, 75 mm diameter minimum	Minimum 100 mm orifice
Maintenance Access	Access for backhoes or dredging equipment	Provided to approval of Municipality	Provision of maintenance drawdown pipe
Sediment Drying Area	Sediment removal	While preferable, should only be incorporated into the design when it imposes no additional land requirement	To be provided above maximum water quality water level Drainage returned to Pond
Buffer	Safety	Minimum 7.5 m above maximum water quality/erosion control water level Minimum 3 m above high water level for quantity control	

APPENDIX C
Drawings

VETERANS MEMORIAL HWY. (HWY 416)

DILWORTH RD.

REEVECRAIG

M M

LEGEND

- Site Boundary (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- DEVELOPABLE AREA LIMIT
- M M PROPOSED MUD MAT
- STRAWBALE CHECK DAM (OPSD 219.180)
- Watercourse (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- Treeline (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- Proposed Internal Connection Driveway
- POTENTIAL SWALE TO STORM POND AREA
- POTENTIAL PARKING/ OUTDOOR STORAGE AREA
- POTENTIAL STORM POND AREA
- POTENTIAL FOOTPRINT FOR BUILDING OCCUPANCIES
- POTENTIAL SEPTIC SYSTEM AREA

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CITY OF OTTAWA
2095 DILWORTH ROAD

CONCEPTUAL EROSION SEDIMENT CONTROL PLAN

SCALE 1 : 2500 (0, 25, 50, 75, 100)

DATE	JOB	FIGURE
MAR 2026	123081	ESC

M:\2023\123081\CAD\CIVIL\123081-ESC.DWG 3/25/2026 11:25 AM - ABIBI

SHT11X17.DWG - 279mmX432mm

POND A
PERMANENT POOL = 87.75

POND B
PERMANENT POOL = 87.75

POND C
PERMANENT POOL = 87.75

POND D
PERMANENT POOL = 87.75

100YR FLOOD = 87.29

APPROX. BOTTOM OF WATERCOURSE = 87.00

SWALE

88.75

89.00

90.30

89.45

90.75

91.00

89.60

90.60

89.30

89.75

DILWORTH RD.

CULVERT

REEVE CRAIG

LEGEND

- Site Boundary (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- 100YR FLOODPLAIN (ELEVATION = 87.29) (GEMTEC, Cut Fill Balance Analysis, Dated December 22, 2021)
- 91.00 PRELIMINARY GRADE
- DIRECTION OF FLOW ARROW
- Watercourse (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- Treeline (GEMTEC, Grading Plan Post Cut-Fill Work, Dated October 24, 2023)
- Proposed Internal Connection Driveway
- Developable Area Limit
- POTENTIAL PARKING/ OUTDOOR STORAGE AREA
- POTENTIAL STORM POND AREA
- POTENTIAL FOOTPRINT FOR BUILDING OCCUPANCIES
- POTENTIAL SEPTIC SYSTEM AREA
- POTENTIAL SWALE TO STORM POND AREA

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Website www.novatech-eng.com

CITY OF OTTAWA
2095 DILWORTH ROAD

CONCEPTUAL GRADING & SERVICING PLAN

SCALE 1 : 2500 (0 25 50 75 100)

DATE MAR 2026 | JOB 123081 | FIGURE GR