September 29, 2025 – 7504 McLeans Road

	Drawing/Document	Comment
CONVERSATION AUTHORITY – Grand River Conservation	1. 8368 - Site Development Documents - September 2025 - Submission 2 2. 8368 - Site Alteration Permit - Schedule & Timing Letter 3. 8368 - Major Site Alteration Permit Requirement Checklist, Control Plan, and Details - 7504 McLean Road, Puslinch, ON 4. 8368 - Soil Investigation & Characterization Report - 7504 McLean Road, Puslinch, ON 5. 7504 McLean Rd - Haul Route Permit FINAL 6. 8368 - Site Alteration Permit - Owner QP Declaration 7. DDRA- 7504 McLean - Report - FINAL - revised	See Attached.
Trace Associates Inc /XCG– Thomas Kolodziej, P. Eng.		The updated documents submitted in support of the site alteration permit application address Trace's comments provided in the letter dated April 30, 2025. Trace has no additional comments.
Grit Engineering Inc.		No comments.
Ecologist - Dougan Ecology Christina Olar		Requested documents have been provided. Comments have been prepared as part of the 2nd SPA submission (separate circulation).
Township of Puslinch – Andrew Hartholt, Chief Building Official		No comments.
Township of Puslinch – Mike Fowler, Director of Public Works, Parks and Facilities		Public works has no concerns or comments at this time.

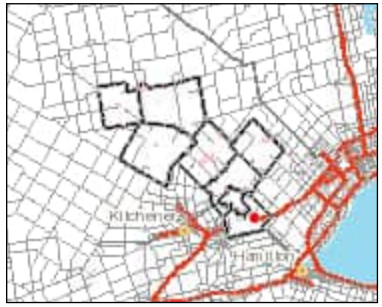
Oct 31, 2025 – 7504 McLeans Road

	Drawing/Document	Comment
County of Wellington Source Water	1. Preliminary Geotechnical Engineering Report, 7504 McLean Rd., Puslinch, ON, A &A Environmental Consultants Inc., July 3, 2024 2. Due Diligence Risk Assessment Report, Hugh Scobie, MSc., DABT, C. Chem, QPRA, May 14, 2025 3. Soil Identification & Characterization Report, 7504 McLean Road, Puslinch Ontario, report #8368 – BVD Puslinch, March 6, 2024 (Note: Should read March 6, 2025). 4. Small-Scale Hydrogeological Assessment, Proposed Commercial Development, 7504 McLean Road, Puslinch, Ontario, Report #8296 – BVD Puslinch HG – Ver 2.0, July 25, 2025	As this application pertains to a Site Alteration, there are no legal requirements under the Clean Water Act, and this application would not require a Notice and is not subject to a Risk Management Plan or Prohibition. Please note that due to the property's location within a vulnerable area, we may provide comments on future applications related to this site. For your reference, I have attached a map showing the property and Wellhead Protection areas. See attached map.
Harden Environmental Services - Hydrogeology Stan Denhoed P. Eng		See attached
Trace Associates Inc /XCG– Thomas Kolodziej, P. Eng.		Please confirm the proposed risk management measures for addressing soil impacts. The DDRA indicates the placement of a 0.5-m thick soft (granular material) cap; however, during the meeting, A&A indicated that the site will be paved with asphalt, which is considered a hard cap (pavement). Although the two options are not mutually exclusive, it is not likely (it does not make economic sense) that both caps will be constructed over the Site. Also, the proponent should clarify if the DDRA findings and recommendations (the prohibition of use for potable purposes) only pertain to the shallow groundwater (which likely does, since deep groundwater was not sampled), or all (shallow and deep) groundwater.

Oct 31, 2025 – 7504 McLeans Road

Township of Puslinch Justine Brotherston Director of Corporate Services/Municipal Clerk		- The applicant is to amend the application to include the finished grade for the Site Alteration to be completed through the Site Alteration Application o If the importation of fill is required to complete the finished grade additional permit fees may be required - The applicant is to provide comments on a mechanism to notify future property owners of the contaminated soils on site or proposed monitoring program for the contaminated soils to ensure it is not entering the groundwater system - The applicant is to provide a plan for sampling wells on the site and potentially the surround sites for peer review by the Township's hydrogeologist to address the concerns raised at the Public Information Meeting by Council

7504 McLean Road East, Puslinch



Legend

- Parcels
- Roads
  - Local Road
  - County Road
  - Highway
- Well Locations
  - Existing
  - Proposed
- WHPA Q1_Q2_Boundary
- WHPA Q1_Q2
  - Approved
  - Draft
- SGRA
- RoadsLookup

Notes

0.1 0 0.07 0.1 Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

Includes material © 2022 of the Queen's Printer for Ontario. All rights reserved.

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

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THIS IS NOT SURVEY DATA. Parcels - Teranet 2002, Wellington County 2022

Harden Environmental Services Ltd.
4622 Nassagaweya-Puslinch Townline
Moffat, Ontario, L0P 1J0
Phone: (519) 826-0099 Fax: (519) 826-9099

Hydrogeological Assessment

Geochemistry

Phase I / II ESA

Regional Flow Studies

Contaminant Investigations

OLT Hearings

Water Quality Sampling

Groundwater & Surface Water Monitoring

Groundwater Protection Studies

Groundwater Modelling

Groundwater Mapping

Permits to Take Water

Environmental Compliance Approvals

Designated Substance Surveys

Our File: 2314

October 28, 2025

Township of Puslinch
7404 Wellington Road 34
Puslinch, Ontario N0B 2J0

Attention: Monika Farncombe
Development and Legislative Coordinator

Re: 7504 McLean Road – Site Alteration Plan Application

Dear Monika,

Harden Environmental Services Ltd. (Harden) is pleased to provide hydrogeological comments for a proposed transportation depot located at 7504 McLean Road in Puslinch, Ontario (the site). These comments area related to the importation of fill material and subsequent application for a Site Alteration Permit.

Determination of Completeness – Complete

Additional Requirements – Revisions to Technical Report are required.

Application Support – We are not in support of the application.

If you cannot support the application – See technical comments

Are there any technical items required to support the application? Yes, see the comments below.

Technical Comments –

We have reviewed the following documents.

Preliminary Geotechnical Engineering Report, 7504 McLean Rd., Puslinch, ON, A &A Environmental Consultants Inc., July 3, 2024

Due Diligence Risk Assessment Report, Hugh Scobie, MSc., DABT, C. Chem, $QP_{RA,}$ May 14, 2025

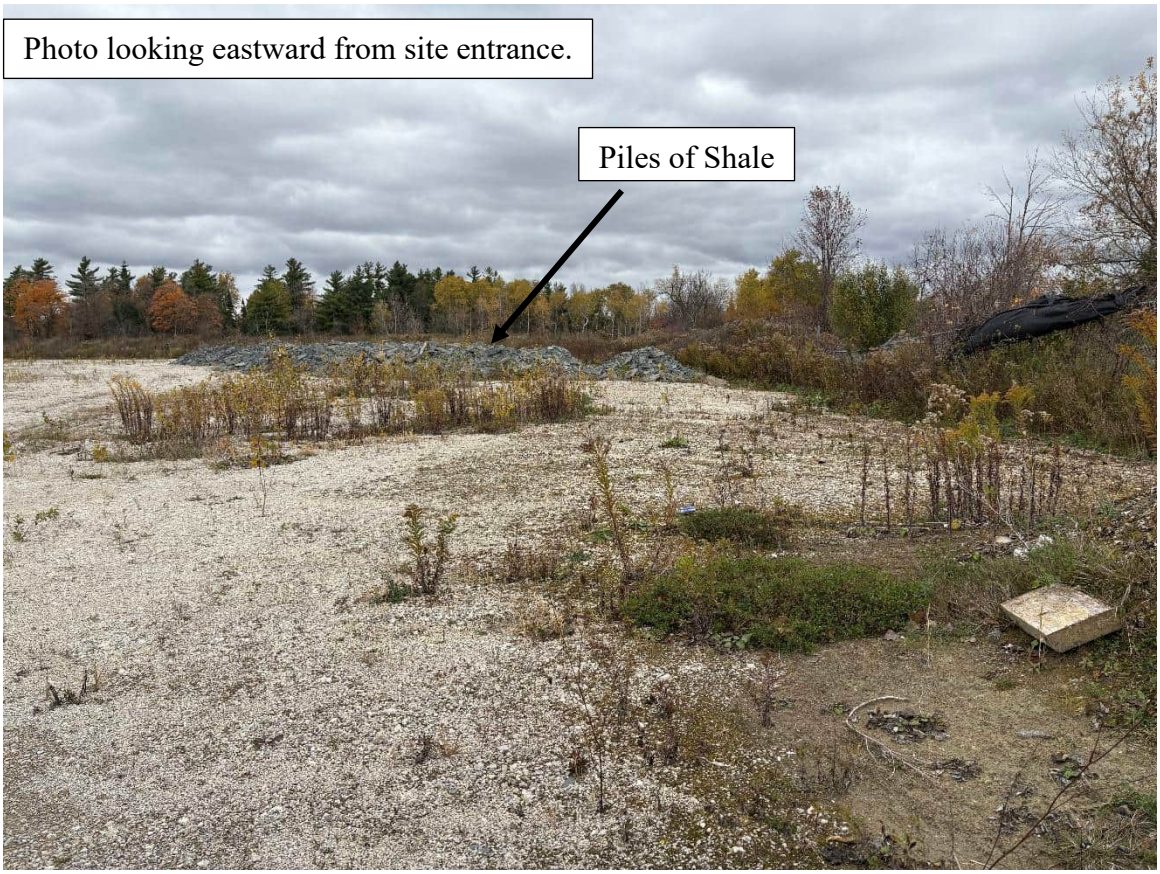
Soil Identification & Characterization Report, 7504 McLean Road, Puslinch Ontario, report #8368 – BVD Puslinch, March 6, 2024 (Note: Should read March 6, 2025).

Small Scale Hydrogeological Assessment, Proposed Commercial Development, 7504 McLean Road, Puslinch, Ontario, Report #8296 – BVD Puslinch HG – Ver 2.0, July 25, 2025

We have the following comments:

Open Access to the Site

We visited the site on October 28, 2025 and found free access to the site. We observed numerous loads of grey shale in the southeast area of the site. This shale is not mentioned in the March 26, 2025 report nor indicated on any of the 81 boreholes drilled at the site. It is also mentioned in Section 1.4.1 of the March 2025 A&A report that no stockpiles were tested. If these loads have not been approved by the site owner then access should be restricted to prevent illegal dumping.



It does not appear from our review that the shale material was considered in the A&A March 2025 report or the May 2025 Scobie Report.

Have other loads been dumped at the site since the March 2025 report? Additional testing of this material is necessary.

Depth to Groundwater

There is inconsistency between the depth of groundwater reported in the Scobie Report and that of the A&A July 2025 Hydrogeology Report. The Scobie report discusses a "minimum depth to groundwater" of 3.77 metres below ground surface (mbgs) whereas the A&A report at MW3(same as MW24-3) gives groundwater elevations 323.004 m AMSL with a top-of-monitor elevation of 323.653 m AMSL. There is no ground elevation provided but the monitor is not a flush mount, thus putting the ground water table within 0.65 metres of the ground surface.

The Scobie report mentions the depth to groundwater as a reason not to pursue additional pathways of impact.

Does the depth of water reported by A&A July 2025 affect this decision?

Potable Groundwater

All the local businesses rely on groundwater for their water supply. The Scobie report suggests a restriction on the installation of potable wells at the site to eliminate the risk from groundwater consumption. This is due to the Hazard Quotient of Cobalt exceeding the recommended value of 0.2 It is also concluded that the fill material is the likely source of exceedances noted in soil and groundwater (Section 2, Scobie, 2025).

Our questions are:

1) The shallow groundwater is not generally targeted as a drinking water supply. The majority of local wells target either the bedrock Guelph Dolostone formation or the Gasport Formation. Should the restriction be that shallow dug wells are not recommended at the site or are all wells (even deep drilled wells) at risk?

2) Given that the area is also a Significant Groundwater Recharge Area, what are the risks associated with the transport of Cobalt to greater depths and being transported via subsurface pathways to other local wells?

July 25, 2025 A&A Groundwater Report

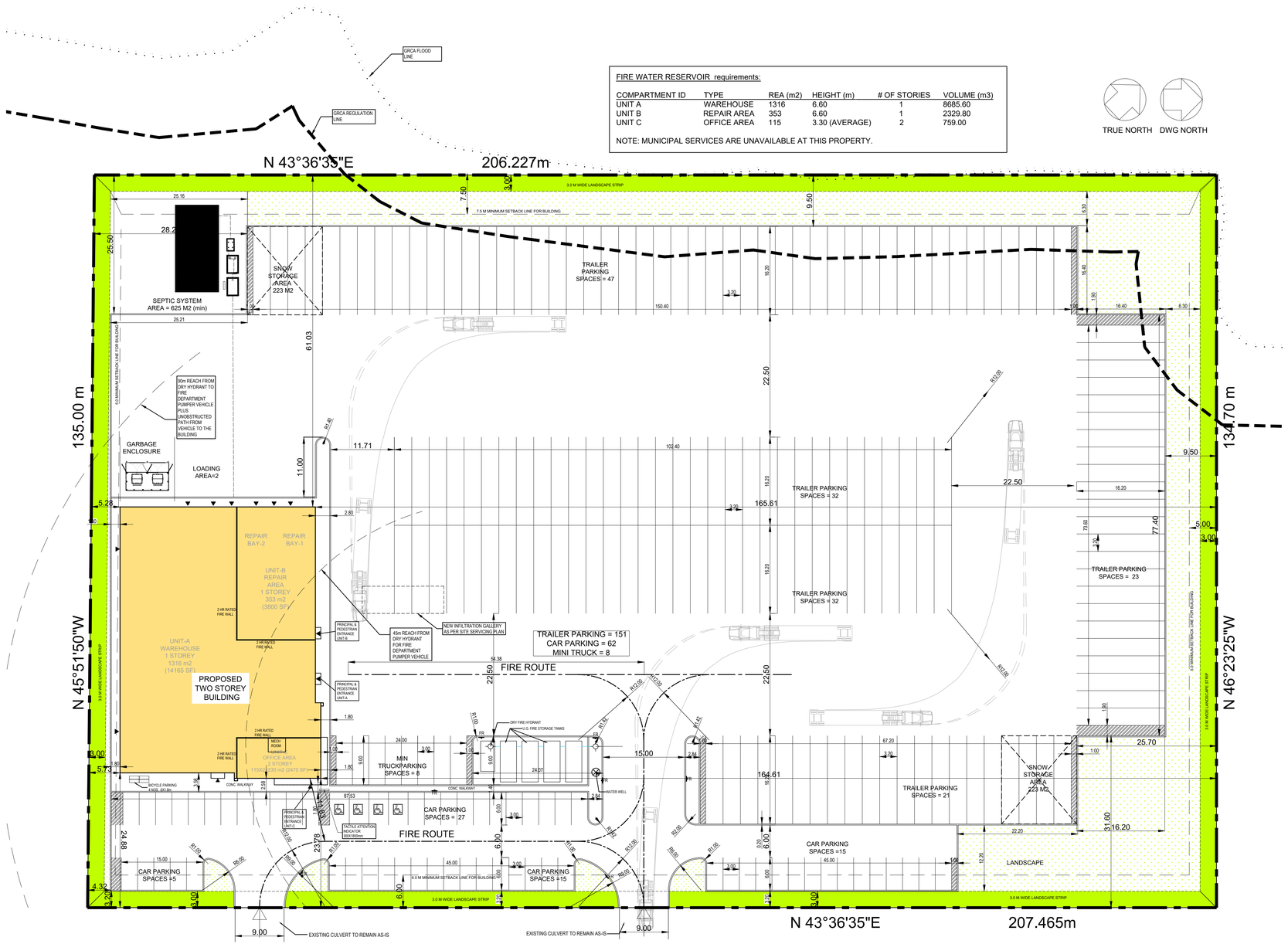
Harden still has concerns with the accuracy of the groundwater characterization at this site as detailed in our September 12, 2025 letter. Included in the September 12, 2025 letter is a request to review the groundwater elevations at the site as a seven-metre water level difference is unlikely to be present at the site.

The A&A July 2025 report also states that arsenic, chromium, lead and manganese exceed Ontario Drinking Water standards at MW3 (based on results from a July 30, 2024 groundwater sample). An earlier sample obtained on June 25, 2024 referenced in the March 6, 2025 A&A report (and used by the Scobie assessment) does not have exceedances of these metals and for example, has a 4.9 ug/L value of cobalt compared to the 28 ug/L value of cobalt listed for the July 2024 sample.

Clarification of the sample results is necessary given that the Scobie report relies on groundwater samples that have markedly lower concentrations than samples containing maximum measured concentrations.

Harden Environmental Services Ltd.

Stan Denhoed, P.Eng., M.Sc.
President and Senior Hydrogeologist
sdenhoed@hardenv.com



TRUE NORTH DWG NORTH

FIRE WATER RESERVOIR requirements:

COMPARTMENT ID	TYPE	REA (m2)	HEIGHT (m)	# OF STORIES	VOLUME (m3)
UNIT A	WAREHOUSE	1316	6.60	1	8685.60
UNIT B	REPAIR AREA	353	6.60	1	2329.80
UNIT C	OFFICE AREA	115	3.30 (AVERAGE)	2	759.00

NOTE: MUNICIPAL SERVICES ARE UNAVAILABLE AT THIS PROPERTY.

1 SP-01 **SITE PLAN**
SCALE 1:400

SITE STATISTICS
7504 McLEAN ROAD, PUSLINCH, ON

ZONE - IND

LOT AREA	MIN. REQD.	AVAILABLE
	0.4 Ha	2.79 Ha

LOT FRONTAGE	MIN. REQD.	AVAILABLE
	30 m	207.46 m

SETBACKS	MIN. REQD.	PROPOSED
FRONT YARD	6.0 m	23.78 m
SIDE YARD - INTERIOR N	5.0 m	165.61 m
SIDE YARD - INTERIOR S	5.0 m	5.28 m
REAR YARD	7.5 m	61.03 m

BUILDING AREA = 1784 M2

LOT COVERAGE	MAX. ALLOWED	PROPOSED
1784 M2	75%	6.36 %

BUILDING HEIGHT	MAX. ALLOWED	PROPOSED
	25.0 m	8.0 m

FLOOR AREA CALCULATION		GROSS AREA m2
GR FL	TRANSPORT REPAIR AREA (UNIT-A)	353
	WARE HOUSE (UNIT-B)	1316
	OFFICE (BUSINESS) (UNIT-C)	100
2ND FL	OFFICE (BUSINESS) (UNIT-C)	100
TOTAL (GR FL+ 2ND FL)		1869 m2

PARKING STATISTICS

CAR PARKING SPACES

USE	GROSS AREA	RATE	REQUIRED	PROVIDED
TRANSPORT	353	1 / 100 m2 3.53		
WAREHOUSE	1316	1 / 200 m2 6.58		
OFFICE	230	1 / 40 m2 5.75		
TOTAL		15.86	16	62

CAR PARKING SPACE DIMENSIONS - 3.0 m X 6.0 m;
MINI-TRCK PARKING SPACE DIMENSION - 3.0mx9.0m
MINI-TRUCK SIZE 7.9m X 2.44m

ACCESSIBLE PARKING SPACES	REQUIRED	PROVIDED
FOR 26- 62 CARS	1+3% of 62= 2.86=3	4

ACCESSIBLE PARKING SPACE DIMENSIONS 3.6X 6.0m

LOADING SPACES	REQUIRED	PROVIDED
FOR NET FLOOR AREA		
- 250 m2 TO 2500 m2	1	2

LOADING SPACE DIMENSIONS - 3.5 m X 10.0 m

BICYCLE PARKING SPACES	REQUIRED	PROVIDED
FOR INDUSTRIAL USE 2/1000m2	4	4

BICYCLE PARKING SPACE DIMENSIONS - 0.6 X1.8m

PARKING SPACES CALCULATIONS

PARKING AREA	TRAILERS	CARS	MINI-TRUCKS
TOTAL	155	62	8

LOT AREA	27923 M2	
BUILDING AREA	1784 M2	
SEPTIC SYSTEM	625 m2	
LANDSCAPE AREA	5946 m2	21.29%
PAVED AREA	19568 m2	
TOTAL	27923 m2	

LEGEND:

- LIGHTING STANDARD- DOUBLE HEADS
- LIGHTING STANDARD - SINGLE HEAD
- WALL PACK LIGHTS

KEY PLAN SCALE N.T.S.

ALL INFORMATION AND DIMENSIONS MUST BE CHECKED AND VERIFIED ON SITE. DO NOT SCALE DRAWINGS. ANY VARIANCES OR DISCREPANCIES MUST BE REPORTED TO THE DESIGNER PRIOR TO COMMENCEMENT OF THE WORK. ALL WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH ALL BY-LAWS AND CODES HAVING JURISDICTION OVER THIS CONSTRUCTION SITE. THE DESIGN AND CONTRACT DOCUMENTS ARE THE COPYRIGHT OF THE DESIGNER AND MAY NOT BE REPRODUCED, REUSED OR ALTERED WITHOUT THE WRITTEN PERMISSION OF THE DESIGNER.

KALP ARCHITECT INC.
1601-21 MARKBROOK LANE,
TORONTO, ON. M9V 5E4
PH: 1-647 967 7937

ONTARIO ASSOCIATION OF ARCHITECTS
EXAMINED M. PATEL
LICENCE 7611

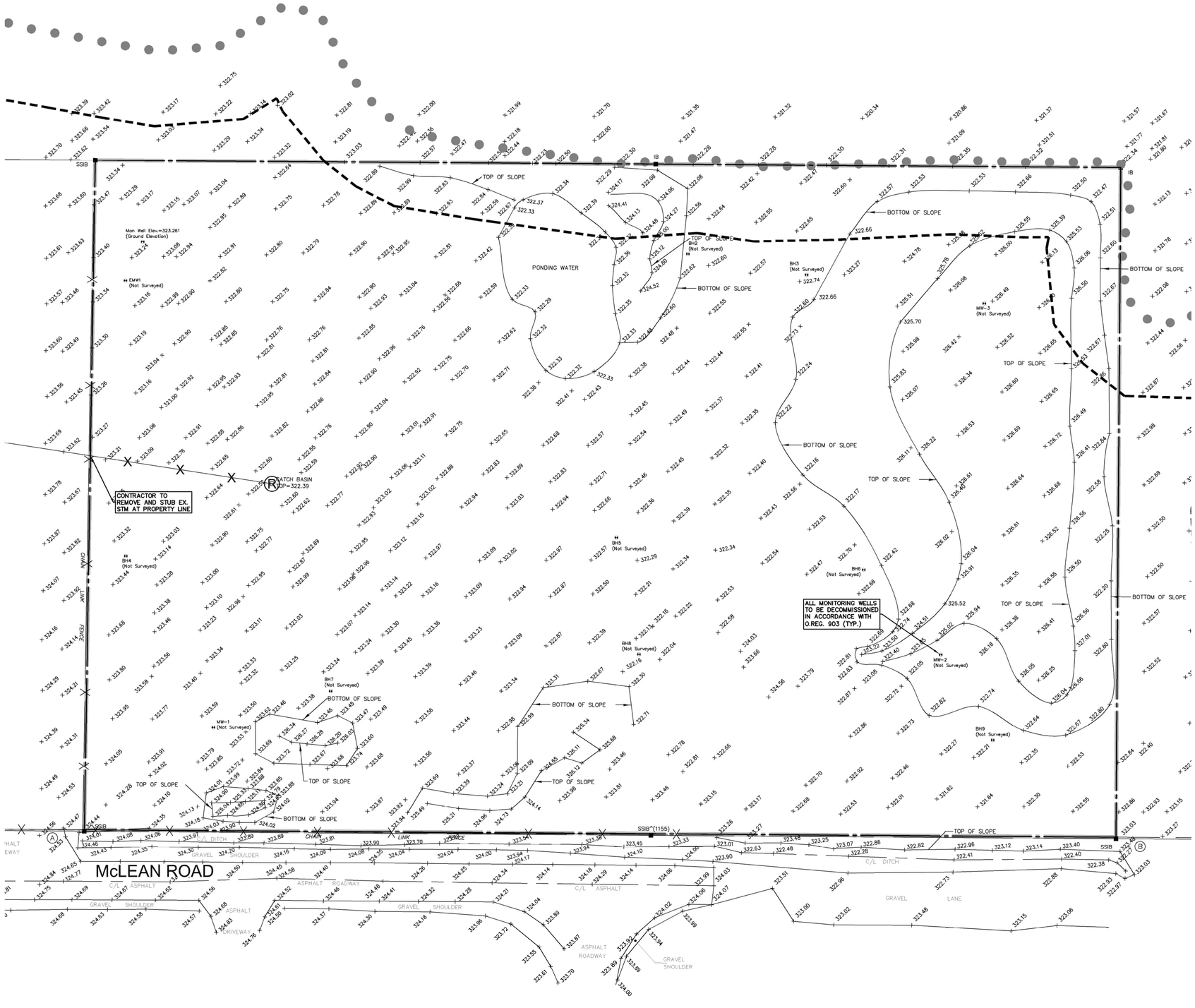
No.	DESCRIPTION	DATE
7	ISSUED FOR SPA Resubmission	20250908
6	ISSUED FOR COORDN - R5	20250722
5	ISSUED FOR COORDN - R4	20250522
4	ISSUED FOR SPA (R3)	20250120
3	ISSUED FOR COORDN - R2	20241209
2	ISSUED FOR COORDN -R1	20240930
1	ISSUED FOR COORDN	20240531

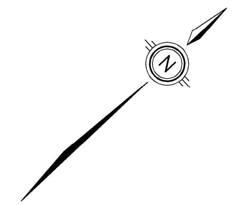
PROJECT:
TRANSPORTATION DEPOT
7504 McLEAN ROAD,
PUSLINCH, ON

DRAWING TITLE:
SITE PLAN
OPTION -2

DEALT:	LP
DATE:	2024.02.22
SCALE:	AS NOTED
PRINT SIZE:	36"X 24"

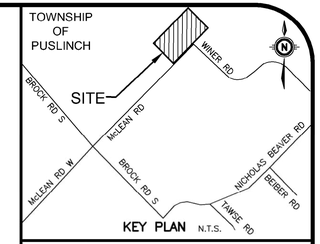
DRAWING No. SP-01 Rev No. R5 Proj. File No. (24-06)





LEGEND OF EXISTING FEATURES

- SITE BOUNDARY (APPROXIMATE ONLY)
- GRCA REGULATION LIMIT
- EXISTING FLOODLINE LIMIT (ELEVATION=322.30)
- EXISTING SPOT ELEVATIONS
- EXISTING FENCE
- EXISTING STORM CULVERT
- EXISTING DITCH
- EXISTING MONITORING WELL



GEODETIC BM ELEV. = m
REFER TO PLAN BY BSR&D LTD. DATED SEPTEMBER 9, 2020.

SITE BENCHMARK ELEV. = m
REFER TO PLAN BY BSR&D LTD. DATED SEPTEMBER 9, 2020.

NOTE TO CONTRACTOR :

DO NOT SCALE DRAWINGS.

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

ALL DRAWINGS REMAIN THE PROPERTY OF THE ENGINEER AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT THE ENGINEER'S WRITTEN PERMISSION.

THE OWNER/ARCHITECT/CONTRACTOR IS ADVISED THAT M.T.E. CONSULTANTS INC. CANNOT CERTIFY ANY COMPONENT OF THE SITE WORKS NOT INSPECTED DURING CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO NOTIFY M.T.E. CONSULTANTS INC. PRIOR TO COMMENCEMENT OF CONSTRUCTION TO ARRANGE FOR INSPECTION.

NOTE:

1. **PROPERTY LINE IS APPROXIMATE ONLY AND SHOULD NOT BE USED FOR DETERMINING SETBACKS OR LAYOUT.**
2. **EXISTING TOPOGRAPHICAL INFORMATION PROVIDED BY BSR&D, DATED SEPTEMBER 9, 2020.**
3. **THIS PLAN IS PART OF A SET OF PLANS WHICH COMPRISE OF THE FOLLOWING: C1.1, C2.1, C2.2, C2.3 AND THE SWM REPORT.**

No.	REVISION	BY	YYYY-MM-DD
8.			
7.			
6.			
5.			
4.			
3.			
2.	Revised per Township Comments	AJS	2025-08-20
1.	ISSUED FOR APPROVAL	AJS	2025-01-22

MTE
Engineers, Scientists, Surveyors
519-743-6500

OWNER
BVD
REAL ESTATE INC.
130 DELTA PARK BOULEVARD BRAMPTON

PROJECT
7504 McLEAN ROAD
PUSLINCH

DRAWING
ORIGINAL CONDITIONS PLAN

Project Manager: A. SLAWICH	Project No.: 55237-100
Design By: AJS	Checked By:
Drawn By: JRS	Checked By: AJS
Surveyed By: MTE	Drawing No.: C1.1
Date: May.14/24	
Scale: 1:400	Sheet 1 of 4

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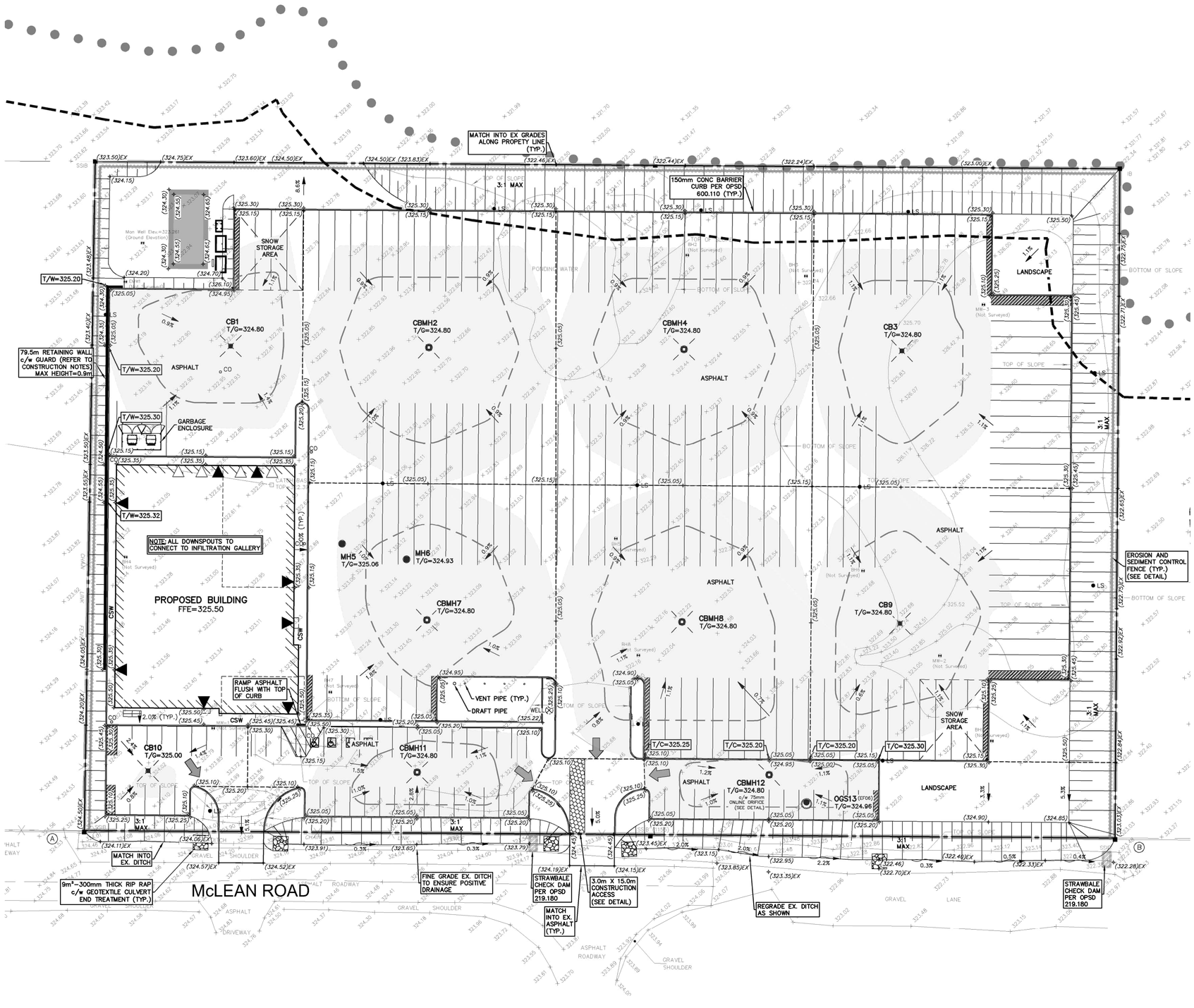


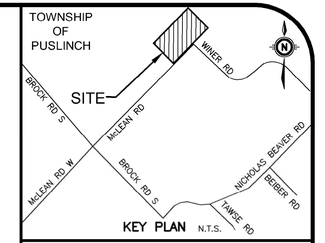
LEGEND OF EXISTING FEATURES

- SITE BOUNDARY (APPROXIMATE ONLY)
- GRCA REGULATION LIMIT
- EXISTING FLOODLINE LIMIT (ELEVATION=322.30)
- EXISTING SPOT ELEVATIONS
- EXISTING FENCE

LEGEND OF PROPOSED FEATURES

- (326.00) / T/G=326.00 / FFE=326.00 — PROPOSED SPOT ELEVATIONS (EX =MAINTAIN EXISTING, T/G =TOP OF CASTING/GRATE, INV =INVERT ELEVATION, FFE =FINISHED FLOOR ELEVATION)
- 1.0% 1.0% — DIRECTION OF DRAINAGE/SWALE
- DRAINAGE SPLIT (RIDGE)
- (TOP) 3:1 (BOTTOM) — EMBANKMENT (SLOPE AS NOTED)
- PROPOSED BUILDING
- OVERHEAD DOOR
- MAN DOOR
- CONCRETE CURB (DROP CURB)
- OVERLAND FLOW ROUTE (MAJOR STORM)
- SEDIMENT CONTROL FENCE (SEE DETAIL)
- CONSTRUCTION ACCESS (SEE DETAIL)
- RIP RAP (SIZE & TYPE AS NOTED)
- 100 YEAR PONDING LIMIT (ELEVATION=325.06)
- 5 YEAR PONDING LIMIT (ELEVATION=324.98)

TOWNSHIP OF PUSLINCH



KEY PLAN N.T.S.

GEODETIC BM ELEV. = m
REFER TO PLAN BY BSR&D LTD. DATED SEPTEMBER 9, 2020.

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No.	REVISION	BY	YYYY-MM-DD
8.			
7.			
6.			
5.			
4.			
3.			
2.	Revised per Township Comments	AJS	2025-08-20
1.	ISSUED FOR APPROVAL	AJS	2025-01-22

MTE
Engineers, Scientists, Surveyors
519-743-6500

OWNER
BVD REAL ESTATE INC.
130 DELTA PARK BOULEVARD BRAMPTON

PROJECT
7504 McLEAN ROAD
PUSLINCH

DRAWING
SITE GRADING, SWM AND EROSION & SEDIMENT CONTROL PLAN

Project Manager: A. SLAWICH	Project No.: 55237-100
Design By: AJS	Checked By:
Drawn By: JRS	Checked By: AJS
Surveyed By: MTE	Drawing No.: C2.1
Date: Oct.11/24	
Scale: 1:400	Sheet 2 of 4

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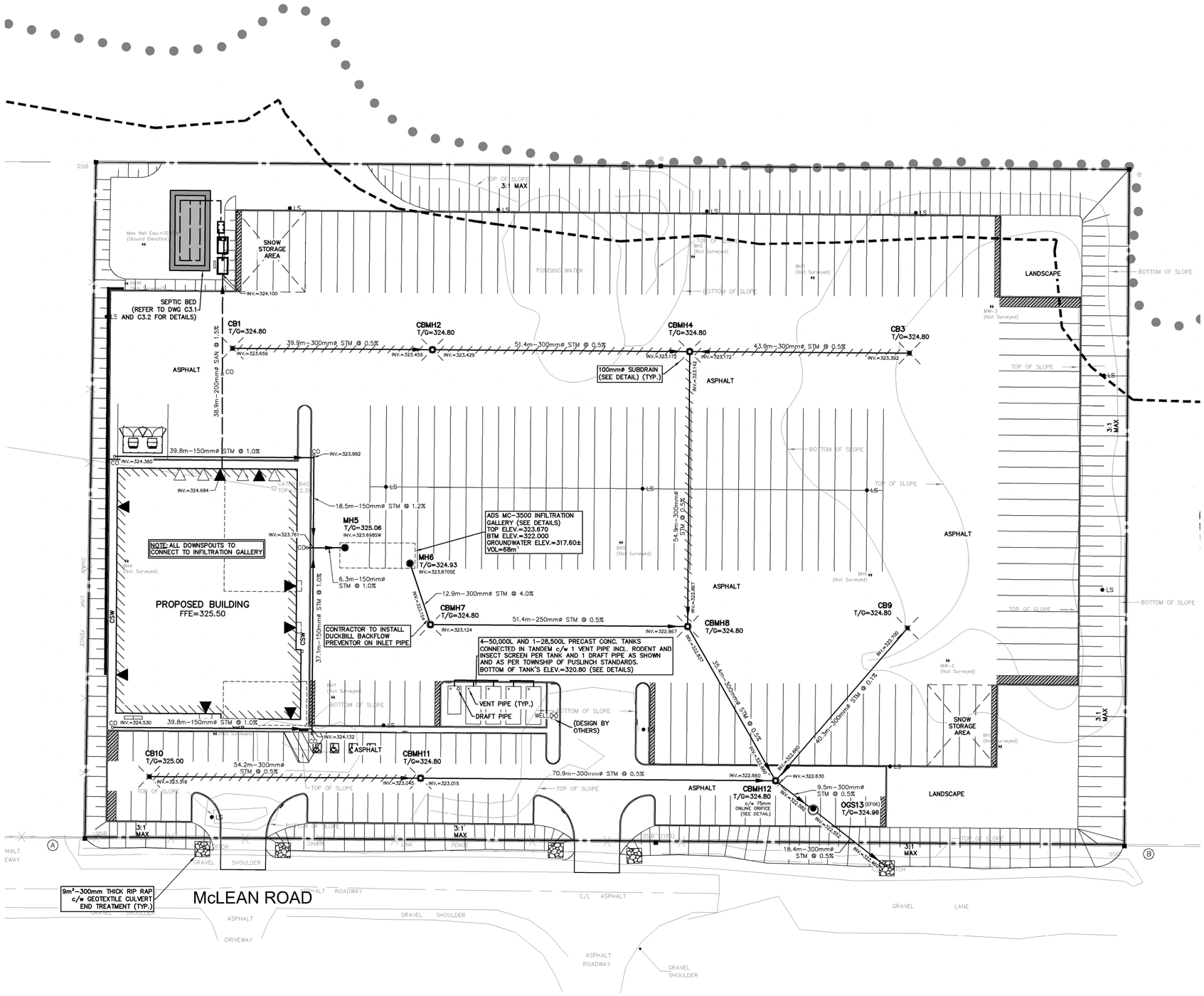
TOP OF SLOPE
3:1 MAX
SNOW STORAGE AREA
Mon Well Elev.=325.00 (Ground Elevation)
INV.=324.100
SEPTIC BED (REFER TO DWG C3.1 AND C3.2 FOR DETAILS)
BH1 (Not Surveyed)
BH2 (Not Surveyed)
BH3 (Not Surveyed)
POND
POND
POND

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August 20, 2025 - 5:23:55 PM - Plotted By: Adam Slawich

CONSTRUCTION NOTES AND SPECIFICATIONS

1. GENERAL

1.1. THESE PLANS ARE NOT FOR CONSTRUCTION UNTIL SIGNED AND SEALED BY ENGINEER AND APPROVED BY THE LOCAL MUNICIPALITY.

1.2. THESE PLANS ARE TO BE USED FOR SERVICING AND GRADING ONLY; ANY OTHER INFORMATION SHOWN IS FOR ILLUSTRATION PURPOSES ONLY. THESE PLANS MUST NOT BE USED TO SITE THE PROPOSED BUILDING.

1.3. NO CHANGES ARE TO BE MADE WITHOUT THE APPROVAL OF THE DESIGN ENGINEER.

1.4. THESE PLANS ARE NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE PERMISSION OF MTE CONSULTANTS INC.

1.5. PRIOR TO CONSTRUCTION, THE CONTRACTOR MUST:

1.5.1. CHECK AND VERIFY ALL EXISTING CONDITIONS, LOCATIONS AND ELEVATIONS WHICH INCLUDES BUT IS NOT LIMITED TO THE BENCHMARK ELEVATIONS, EXISTING SERVICE CONNECTIONS AND EXISTING INVERTS. REPORT ALL DISCREPANCIES TO THE ENGINEER PRIOR TO PROCEEDING.

1.5.2. OBTAIN ALL UTILITY LOCATES AND REQUIRED PERMITS AND LICENSES.

1.5.3. VERIFY THAT THE FINISHED FLOOR ELEVATIONS AND BASEMENT FLOOR ELEVATIONS (WHICH MAY APPEAR ON THIS PLAN) COMPLY WITH THE FINAL ARCHITECTURAL DRAWINGS.

1.5.4. CONFIRM ALL DRAWINGS USED FOR CONSTRUCTION ARE OF THE MOST RECENT REVISION.

1.6. THE CONTRACTOR SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE TO EXISTING WORKS. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY TO LOCAL MUNICIPALITY STANDARDS

1.7. ALL WORKS ON A MUNICIPAL RIGHT-OF-WAY WITH THE EXCEPTION OF WATERMAIN TAPPING, TO BE INSTALLED BY THE OWNER'S CONTRACTOR AT OWNER'S EXPENSE IN ACCORDANCE WITH THE LOCAL MUNICIPALITY'S "PROCEDURE FOR OFF-SITE WORKS BY PRIVATE CONTRACTOR". THE OWNER AND CONTRACTOR ARE TO ENSURE OFF-SITE WORKS PERMIT IS IN PLACE PRIOR TO CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR RESTORING ALL AFFECTED PROPERTY TO ORIGINAL CONDITION. ALL BOULEVARD AREAS SHALL BE RESTORED WITH 150mm TOPSOIL AND SOD.

1.8. ALL UNDERGROUND SERVICES ARE TO BE CONSTRUCTED IN FULL COMPLIANCE WITH THE ONTARIO PROVINCIAL BUILDING CODE (PART 7, PLUMBING), THE ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS) AND THE REQUIREMENTS OF THE LOCAL MUNICIPALITY AND THE REGIONAL MUNICIPALITY OF WATERLOO; WHICH CODES AND REGULATIONS SHALL SUPERSEDE ALL OTHERS.

1.9. CONTRACTOR IS RESPONSIBLE FOR CONTACTING ENGINEER 48 HRS PRIOR TO COMMENCING WORK TO ARRANGE FOR INSPECTION. ENGINEER TO DETERMINE DEGREE OF INSPECTION AND TESTING REQUIRED FOR CERTIFICATION OF UNDERGROUND SERVICE INSTALLATION AS MANDATED BY ONTARIO BUILDING CODE, DIVISION C, PART 1, SECTION 1.2.2, GENERAL REVIEW. FAILURE TO NOTIFY ENGINEER WILL RESULT IN EXTENSIVE POST CONSTRUCTION INSPECTION AT CONTRACTORS EXPENSE.

1.10. SANITARY AND STORM SEWERS AND SERVICES TO HAVE A MINIMUM 1.4m COVER TO TOP OF PIPE. WHERE COVER TO TOP OF PIPE IS DEFICIENT, CONTRACTOR SHALL INSTALL SHALLOW BURIED PIPE IN ACCORDANCE WITH APPLICABLE "SEWER PIPE INSULATION DETAIL" INDICATED IN DRAWING DETAILS. CONTACT DESIGN ENGINEER FOR "SEWER PIPE INSULATION DETAIL" IF REQUIRED.

1.11. PLAN TO BE READ IN CONJUNCTION WITH SWM REPORT AND DRAWING C1.1, C2.1, C2.2 AND C2.3 PREPARED BY MTE CONSULTANTS INC. AND LANDSCAPE PLAN.

1.12. SITE PLAN INFORMATION TAKEN FROM PLAN PREPARED BY KALP ARCHITECT INC. DATED OCTOBER 10, 2024.

1.13. LEGAL INFORMATION TAKEN FROM PLAN PREPARED BY BSR&D, DATED SEPTEMBER 9, 2020.

1.14. EXISTING TOPOGRAPHIC INFORMATION TAKEN FROM PLAN PREPARED BY BSR&D LTD, DATED SEPTEMBER 9, 2020.

1.15. CONTRACTOR TO OBTAIN WRITTEN PERMISSION FROM ADJACENT PROPERTY OWNER PRIOR TO ENTERING UPON NEIGHBOURING LANDS TO UNDERTAKE ANY WORK. COPIES OF THESE LETTERS OF CONSENT SHALL BE SUBMITTED TO THE DEPARTMENT OF PUBLIC WORKS FOR APPROVAL PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT CONTRACTOR'S OWN RISK.

1.16. RETAINING WALLS TO BE DESIGNED BY OTHERS. FOR WALLS EXCEEDING 1.0m IN HEIGHT, SHOP DRAWINGS MUST BE SUBMITTED FOR REVIEW AND APPROVAL AND BUILDING PERMIT MUST BE OBTAINED. WALLS OVER 0.6m IN HEIGHT REQUIRE HIGH SIDE OF RETAINING WALLS TO BE BACKFILLED WITH FREE DRAINING MATERIAL.

1.17. ALL RETAINING WALLS 1.0m IN HEIGHT AND OVER MUST BE APPROVED BY THE CBO. ALL RETAINING WALLS LESS THAN 1.0m IN HEIGHT MUST BE APPROVED BY PLANNING.

1.18. SITE SERVICING CONTRACTOR TO TERMINATE ALL SERVICES 1 METRE FROM FOUNDATION WALL.

1.19. FILTER FABRIC TO BE TERRAFIX 200R OR APPROVED EQUAL.

1.20. MAXIMUM GRASSED SLOPE TO BE 3:1. SLOPES GREATER THAN 3:1 TO BE LANDSCAPED WITH LOW MAINTENANCE GROUND COVER.

1.21. SIDE SLOPES OF ALL STOCKPILES OR EXTRACTION FACES TO BE MAINTAINED AT 70 DEGREES OR LESS BETWEEN EARLY APRIL AND LATE AUGUST TO DETER BANK SWALLOWS FROM NESTING.

1.22. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD INCLUDING THE SUPPLY, INSTALLATION AND REMOVAL OF ALL NECESSARY SIGNALS, DELINEATORS, MARKERS, AND BARRIERS. ALL SIGNS, ETC. SHALL CONFORM TO THE STANDARDS OF THE LOCAL MUNICIPALITY AND THE MTO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

1.23. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

1.24. CONTRACTOR TO MAINTAIN A 'CONFINED TRENCH CONDITION' IN ALL SEWER AND SERVICE TRENCHES.

1.25. FOLLOWING COMPLETION OF PROPOSED WORKS AND PRIOR TO OCCUPANCY INSPECTION, ALL STORM AND SANITARY SEWERS ARE TO BE FLUSHED, AND ALL CATCHBASIN AND CATCHBASIN MANHOLE SUMPS ARE TO BE CLEANED OF DEBRIS AND SILT.

2. STORM SEWERS

2.1. PIPE BEDDING FOR RIGID PIPE TO BE CLASS "B" AS PER OPSD 802.030, 802.031, OR 802.032. PIPE BEDDING FOR FLEXIBLE PIPE TO BE AS PER OPSD 802.010. BEDDING MATERIAL AND COVER MATERIAL TO BE GRANULAR "A". TRENCH BACKFILL TO BE NATIVE MATERIAL REPLACED IN 300mm LIFTS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.

2.2. STORM SEWERS 200mmø TO 375mmø SHALL BE POLYVINYL CHLORIDE (PVC) PIPE DR35 ASTM-D3034 OR RIBBED PVC SEWER PIPE CSA B182.4-M90 ASTM-F794 WITH INTEGRAL BELL AND SPIGOT UTILIZING FLEXIBLE ELASTOMERIC SEALS. RIBBED PVC NOT TO BE USED WITHIN RIGHT-OF-WAY.

2.3. MANHOLES AND MANHOLE CATCHBASINS TO BE 1200mmø PRECAST WITH ALUMINUM STEPS AT 300mm CENTRES AS PER OPSD 701.010 UNLESS OTHERWISE SPECIFIED.

2.4. CATCHBASINS TO BE 600mm SQUARE PRECAST AS PER OPSD 705.010.

2.5. ALL STORM STRUCTURES TO HAVE A MINIMUM 600mm DEEP SUMP. WHEN THE STRUCTURE INCLUDES THE INSTALLATION OF A SNOUT (OR APPROVED EQUIVALENT) THE SUMP DEPTH TO BE MIN 2.5 TIMES THE OUTLET PIPE DIAMETER SIZE.

2.6. MANHOLE AND CATCHBASIN, FRAMES, GRATES, CASTINGS AND LIDS TO BE QUALITY GREY IRON ASTM A48 CLASS 30B.

2.7. STORM MANHOLE LIDS TO BE PER OPSD 401.010 – TYPE 'B' CATCHBASIN AND CATCHBASIN MANHOLE GRATES TO BE PER OPSD 400.100. DITCH INLET CATCHBASIN GRATES TO BE PER OPSD 403.010.

2.8. ADJUSTMENT UNITS FOR STORM STRUCTURES TO BE IN ACCORDANCE WITH OPSD 704.010 OR 704.011.

2.9. STORM SEWERS AND SERVICES TO HAVE MINIMUM 1.4m COVER TO TOP OF PIPE. WHERE COVER TO TOP OF PIPE IS DEFICIENT, CONTRACTOR SHALL INSTALL SHALLOW BURIED SEWER PIPE IN ACCORDANCE WITH APPLICABLE "SEWER PIPE INSULATION DETAIL" INDICATED IN DRAWING DETAILS. INSULATION SHALL BE RIGID EXTRUDED POLYSTYRENE (EPS) BOARD, WITH A THICKNESS SUFFICIENT TO PROVIDE AN RSI-1.76 (R10) INSULATING FACTOR (TYPICALLY 50-65mm). INSULATION BOARD WIDTH SHALL BE 1.8m FOR UP TO 200mm NOMINAL PIPE DIAMETER, 2.4m FOR 201mm-800mm DIAMETER AND 3.0m FOR 801mm-1400mm. ALL JOINTS SHALL BE TIGHTLY BUTTED TOGETHER (TAPE OR OTHERWISE SECURE JOINTS TO RESIST MOVEMENT DURING BACKFILL COVER). RIGID EPS BOARD SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 140kPa (20psi), AND A MAXIMUM WATER ABSORPTION RATE OF 2.0% BY VOLUME. ACCEPTABLE PRODUCTS ARE DOW STYROFOAM-SM OR -HI (FULL LINE), OWENS CORNING FOAMULAR (250, 250, OR HIGHER), PLASTISPAN HID-M28 OR OTHER ENGINEER-APPROVED EQUIVALENT.

2.10. UNDER NO CIRCUMSTANCES SHALL THE BUILDING FOUNDATION DRAINS BE CONNECTED DIRECTLY TO THE STORM SEWER SYSTEM.

2.11. ALL WEEPING TILE DRAINAGE TO BE PUMPED TO THE STORM SEWER SYSTEM.

3. WATERMAINS

3.1. PIPE BEDDING FOR RIGID PIPE TO BE CLASS "B" AS PER OPSD 802.030. PIPE BEDDING FOR FLEXIBLE PIPE TO BE AS PER OPSD 802.010. BEDDING MATERIAL AND COVER MATERIAL TO BE GRANULAR "A". TRENCH BACKFILL TO BE NATIVE MATERIAL REPLACED IN 300mm LIFTS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.

3.2. WATERMAINS 100mmø AND LARGER SHALL BE PVC C900 CLASS 150 INSTALLED WITH MINIMUM 2.0 METRES OF COVER. FITTINGS 100mmø AND LARGER SHALL BE PVC CLASS 150 (DR18) CSA B137.3.

3.3. WATERMAIN FITTINGS TO BE SUPPLIED WITH MECHANICAL JOINT RESTRAINTS. FOR WATERMAIN PIPE SIZES 150mmø OR LESS ALL PIPE JOINTS TO BE RESTRAINED WITHIN 5.0m FROM ALL FITTINGS, IN EACH DIRECTION, UNLESS SHOWN OTHERWISE ON THE CONTRACT DRAWINGS. FOR WATERMAIN PIPE SIZES GREATER THAN 150mmø ALL PIPE JOINTS TO BE RESTRAINED WITHIN 10.0m FROM ALL FITTINGS, IN EACH DIRECTION, UNLESS SHOWN OTHERWISE ON THE CONTRACT DRAWINGS. ALL TEES TO HAVE MINIMUM 2.0m SOLID PIPE LENGTH ON EACH RUN OF THE TEE, OR PROVIDE A THRUST BLOCK PER OPSD 1103.010.

3.4. ALL METALLIC FITTINGS (EXCLUDING CURB/MAIN STOP AND BRASS FITTINGS) AND APPURTENANCES INCLUDING SADDLES, VALVES, TEES, BENDS ETC ARE TO BE WRAPPED WITH AN APPROVED PETROLATUM SYSTEM CONSISTING OF PASTE, MASTIC AND TAPE. PARTICULAR ATTENTION SHALL BE PAID TO ANODE INSTALLATION. CONTRACTOR TO REFER TO THE MOST RECENT EDITION OF THE LOCAL MUNICIPALITY AND AREA MUNICIPALITIES DESIGN GUIDELINES AND SUPPLEMENTAL SPECIFICATIONS FOR MUNICIPAL SERVICES.

3.5. WATERMAIN VALVES 100mmø AND LARGER SHALL BE AS PER AWWA C509 – MUELLER A-2360-23 OR APPROVED EQUIVALENT (OPEN LEFT) INCLUDING VALVE BOX AND 2.2Kg ANODE INCLUDING ANODE PROTECTION INSTALLED PER LOCAL MUNICIPALITY STANDARDS.

3.6. WATER CONNECTIONS MAY BE PLACED IN THE SAME TRENCH WITH A STORM OR SANITARY CONNECTION ONLY IF A MINIMUM VERTICAL SEPARATION OF 500mm IS MAINTAINED BETWEEN THE WATER SERVICE AND ANY OTHER PIPE, IN ACCORDANCE WITH SECTION 7.3.5.7.(2)(a)(i) OF THE ONTARIO BUILDING CODE.

3.7. ALL WATERMAINS AND SERVICES TO HAVE MINIMUM 2.0m COVER ON TOP OF PIPE. WHERE COVER TO TOP OF PIPE IS DEFICIENT, CONTRACTOR SHALL CONTACT DESIGN ENGINEER FOR "WATER PIPE INSULATION DETAIL".

3.8. ALL WATERMAIN TO BE PRESSURE TESTED IN ACCORDANCE WITH OPSS 441. DISINFECT ALL WATERMAIN IN ACCORDANCE WITH AWWA C 651-99 INCLUDING CHLORINATION, BACKFLOW PREVENTOR AND 24 HOUR DUPLICATE SAMPLING. ALL TESTING AND DISINFECTION TO BE COMPLETED UNDER THE SUPERVISION OF THE ENGINEER. **(CONTRACTOR TO SUBMIT WATER COMMISSIONING PLAN IN ACCORDANCE WITH DGSSMS. THIS PLAN MUST BE APPROVED BY THE LOCAL MUNICIPALITY PRIOR TO ANY WATERMAIN WORK).**

3.9. PRIOR TO OCCUPANCY, CONTRACTOR MUST COMMISSION FIRE FLOW TEST FOR PRIVATE ON-SITE HYDRANT. PROVIDE RESULT TO DESIGN ENGINEER.

4. EROSION AND SEDIMENT CONTROL

4.1. CONTRACTOR TO INSTALL EROSION CONTROL MEASURES AS SHOWN PRIOR TO CONSTRUCTION AND MAINTAIN IN GOOD CONDITION UNTIL CONSTRUCTION IS COMPLETED AND ALL DISTURBED GROUND SURFACES HAVE BEEN RESTABILIZED EITHER BY PAVING OR RESTORATION OF VEGETATIVE COVER.

4.2. ALL SEDIMENT CONTROL FENCING TO BE INSTALLED PRIOR TO ANY AREA GRADING, EXCAVATING OR DEMOLITION COMMENCING.

4.3. EROSION CONTROL FENCING TO BE INSTALLED AROUND BASE OF ALL STOCKPILES. ALL STOCKPILES TO BE KEPT 2.5m MINIMUM FROM PROPERTY LINE.

4.4. EROSION PROTECTION TO BE PROVIDED AROUND ALL STORM AND SANITARY MHs AND CBs.

4.5. CONSTRUCTION ACCESS (MUD MAT) TO BE PROVIDED ON-SITE AT ALL LOCATIONS WHERE CONSTRUCTION VEHICLES EXIT THE SITE. CONSTRUCTION ACCESS (MUD MAT) SHALL BE A MINIMUM OF 3.0m WIDE, 15.0m LONG (LENGTH MAY VARY DEPENDING ON SITE LAYOUT) AND 0.3m DEEP AND SHALL CONSIST OF 200mm CLEAR STONE MATERIAL OR APPROVED EQUIVALENT. PROPOSED EROSION FENCING TO TIE INTO MUD MAT. CONTRACTOR TO ENSURE ALL VEHICLES LEAVE THE SITE VIA THE MUD MAT AND THAT THE MAT IS MAINTAINED IN A MANNER TO MAXIMIZE EFFECTIVENESS AT ALL TIMES.

4.6. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AS SITE DEVELOPMENT PROGRESSES. CONTRACTOR TO PROVIDE ALL ADDITIONAL EROSION CONTROL STRUCTURES.

4.7. EROSION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN RESTABILIZED.

4.8. NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THE ENGINEER AND THE LOCAL MUNICIPALITY'S DEPARTMENT OF PUBLIC WORKS.

4.9. CONTRACTOR TO CLEAN ROADWAY AND SIDEWALKS OF SEDIMENTS RESULTING FROM CONSTRUCTION TRAFFIC FROM THE SITE EACH DAY.

4.10. CONTRACTOR MUST REMOVE EROSION AND SEDIMENTATION FENCING PRIOR TO COMPLETION OF PROJECT. CONTRACTOR TO HAVE EROSION AND SEDIMENTATION FENCE INSPECTED WHEN VEGETATION HAS ESTABLISHED, BUT PRIOR TO FENCE BECOMING OVERGROWN. ENGINEER'S REPRESENTATIVE TO DETERMINE IF VEGETATION HAS REACHED THE CRITICAL POINT AND WILL THEN INSTRUCT CONTRACTOR TO REMOVE FENCE.

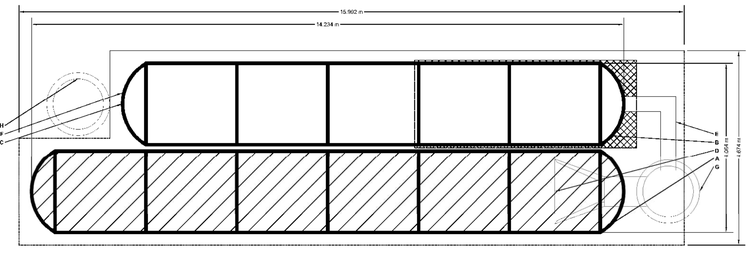
5. MAINTENANCE RECOMMENDATIONS

5.1. DURING THE COURSE OF CONSTRUCTION CONTRACTOR TO REMOVE SEDIMENT AND CONTAMINANTS FROM STORMWATER MANAGEMENT FACILITIES MONTHLY. FOLLOWING CONSTRUCTION CONTRACT COMPLETION, OWNER TO HIRE QUALIFIED CONTRACTOR TO REMOVE SEDIMENT AND CONTAMINANTS ANNUALLY AND REINSTATE STORMWATER MANAGEMENT FACILITIES ACCORDING TO THE DESIGN OUTLINED ON THIS PLAN, AS REQUIRED.

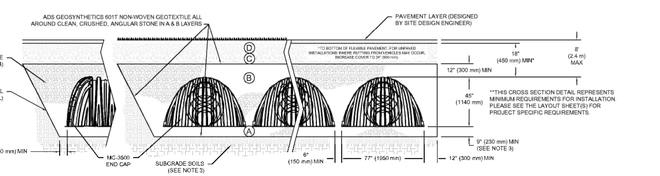
5.2. EROSION CONTROL STRUCTURES TO BE MONITORED REGULARLY AND ANY DAMAGE REPAIRED IMMEDIATELY. SEDIMENTS TO BE REMOVED WHEN ACCUMULATIONS REACH A MAXIMUM OF 1/3 THE HEIGHT OF THE FENCE.

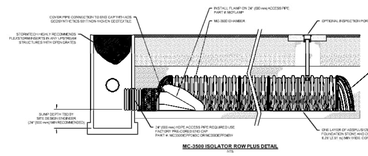
5.3. OWNER'S REPRESENTATIVE TO MONITOR EROSION CONTROL STRUCTURES TO ENSURE FENCING IS INSTALLED AND MAINTENANCE IS PERFORMED TO CITY REQUIREMENTS.

5.4. THE PROPOSED STORMCEPTOR(STC) WILL REQUIRE REGULAR ANNUAL MAINTENANCE. OWNER TO ENTER INTO A MAINTENANCE AGREEMENT WITH A SUITABLE CONTRACTOR TO COMPLETE THIS WORK.

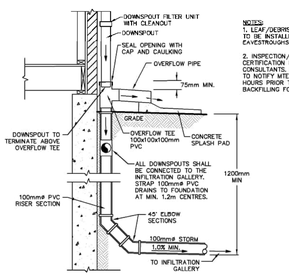


NOTES
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.



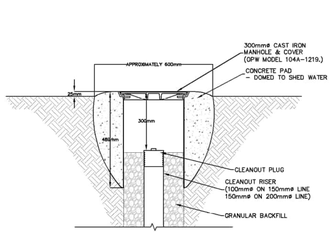


ADS MC-3500 INFILTRATION GALLERY DETAILS
N.T.S.

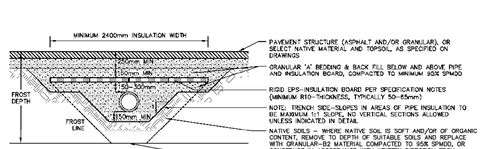


NOTES:
1. LEAF/DEBRIS STRAINS TO BE INSTALLED IN EAVESTROUGHS.
2. INSPECTION / CERTIFICATION BY MTE CONSULTANTS. BUILDER TO NOTIFY MTE 48 HOURS PRIOR TO BACKFILLING FOUNDATION.

DOWNSPOUT RISER DETAIL-BY BUILDER
N.T.S.



INSTALLATION OF CLEANOUTS IN VEHICULAR AREAS
N.T.S.

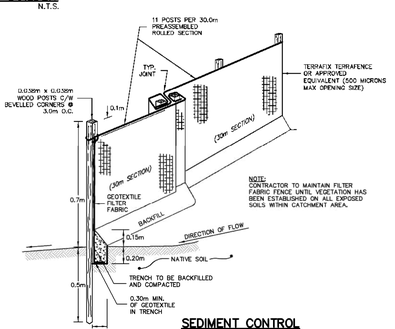


SEWER PIPE INSULATION DETAIL
FOR SEWER PIPES HAVING LESS THAN 1400mm COVER AND MINIMUM 615mm COVER
N.T.S.

PAVEMENT STRUCTURE

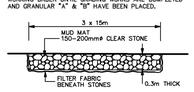
MATERIAL		RECOMMENDED THICKNESS	
		LIGHT DUTY	HEAVY DUTY
ASPHALTIC CONCRETE	HL3	40mm	40mm
	HL8	40mm	80mm
GRANULAR 'A' BASE		150mm	150mm
GRANULAR 'B' SUBBASE		250mm	350mm

BASED ON GEOTECHNICAL INVESTIGATION PREPARED BY M&A ENVIRONMENTAL CONSULTANTS INC. – JULY 3,2024

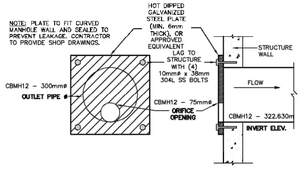


SEDIMENT CONTROL FILTER FABRIC FENCE
N.T.S.

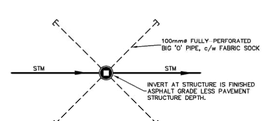
DESIGNATED ACCESS FOR ALL CONSTRUCTION TRAFFIC.
INSTALL "MUD MAT", AS PER DETAIL BELOW, PRIOR TO ANY OTHER CONSTRUCTION. MAT TO BE MAINTAINED IN GOOD WORKING ORDER UNTIL GRADING WORKS ARE COMPLETED AND GRANULAR "A" & "B" HAVE BEEN PLACED.



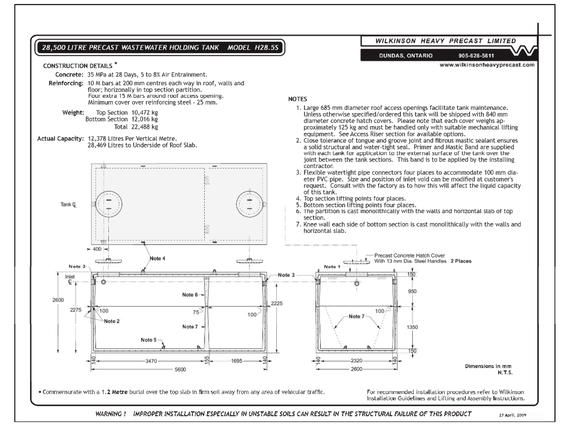
CONSTRUCTION ACCESS DETAIL
N.T.S.

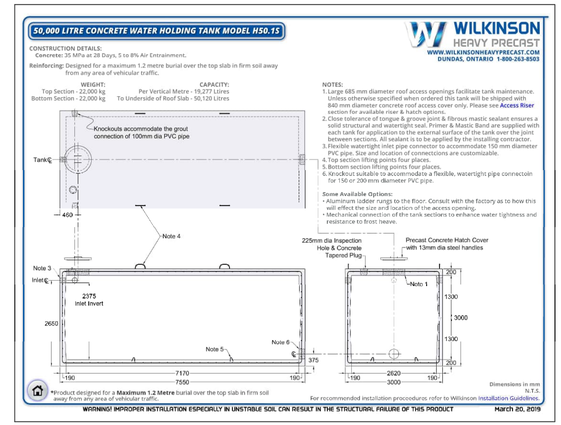


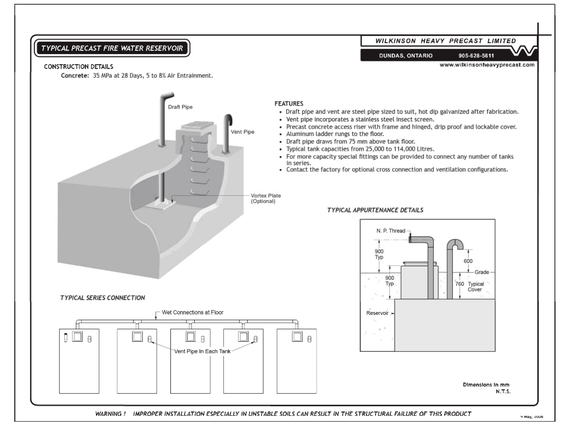
ON-LINE ORIFICE DETAIL
N.T.S.

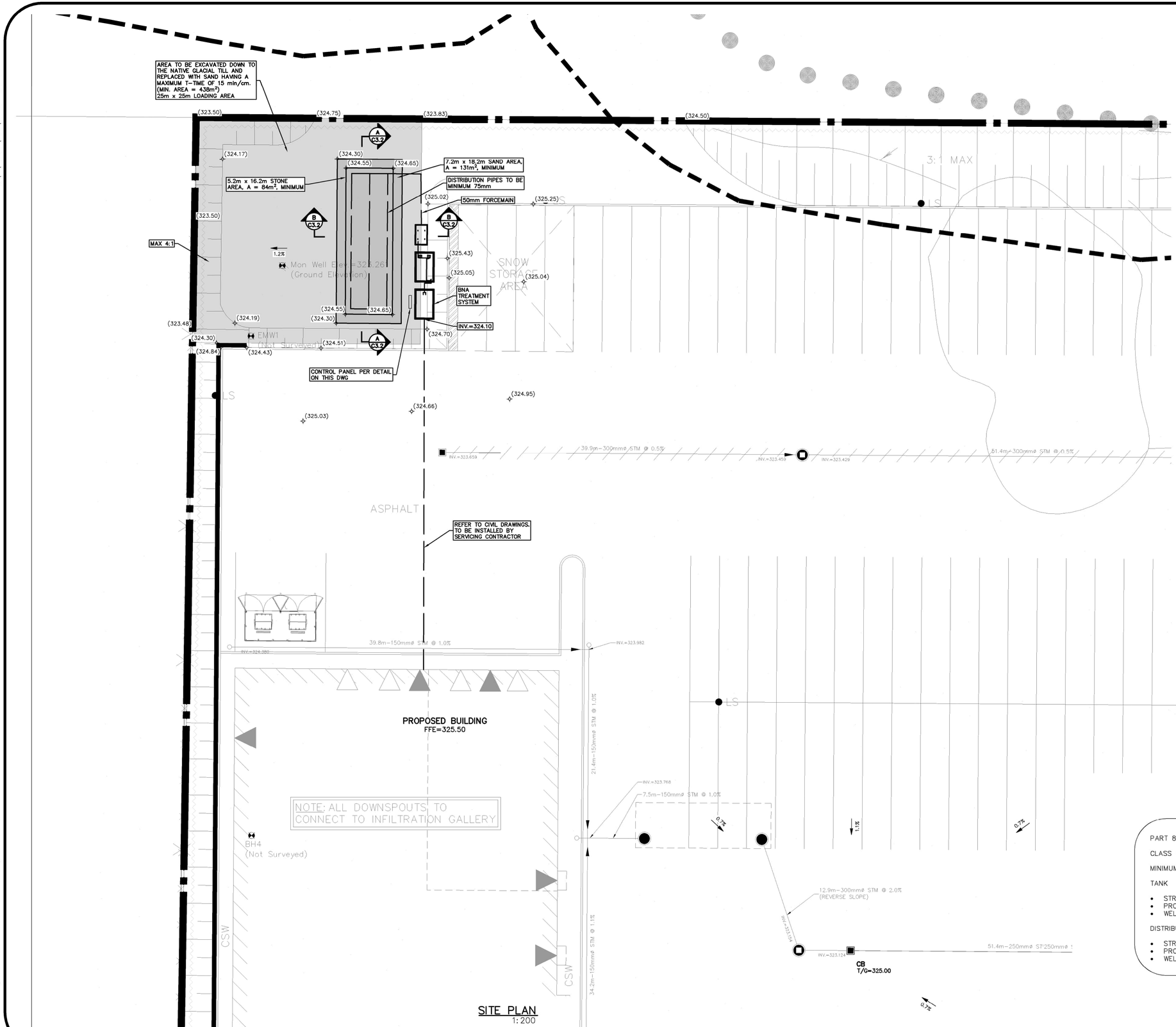


PAVEMENT SUBDRAIN DETAIL TYPICAL PLAN VIEW
N.T.S.






TYPICAL PRECAST FIRE WATER RESERVOIR
WILKINSON HEAVY PRECAST LIMITED
DUNDAS, ONTARIO 905-628-5811
www.wilkinsonheavyprecast.com
CONSTRUCTION DETAILS
Concrete: 35 MPa at 28 Days, 5 to 8% Air Entrainment.
Draft Pipe
Vent Pipe
Vortex Plate (Optional)
FEATURES
• Draft pipe and vent are steel pipe sized to suit, hot dip galvanized after fabrication.
• Vent pipe incorporates a stainless steel insect screen.
• Precast concrete access riser with frame and hinged, drip proof and lockable cover.
• Aluminum ladder rungs to the floor.
• Draft pipe draws from 75 mm above tank floor.
• Typical tank capacities from 25,000 to 114,000 litres.
• For more capacity special fittings can be provided to connect any number of tanks in series.
• Contact the factory for optional cross connection



SITE PLAN
1:200

LEGEND OF EXISTING FEATURES

- SITE BOUNDARY (APPROXIMATE ONLY)
- EXISTING STORM SEWER (Ex. 375mmø STM)
- EXISTING FENCE
- GRCA REGULATION LIMIT
- EXISTING FLOODLINE LIMIT (ELEVATION=322.30)

LEGEND OF PROPOSED FEATURES

- PROPOSED BUILDING
- OVERHEAD DOOR
- MAN DOOR
- CONCRETE CURB (DROP CURB)

PART 8 – ONTARIO BUILDING CODE

CLASS 4 SEPTIC SYSTEM

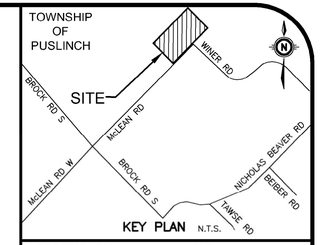
MINIMUM CLEARANCE REQUIREMENTS:

TANK

- STRUCTURE – 1.5m
- PROPERTY LINE – 3m
- WELL – 15m

DISTRIBUTION PIPING

- STRUCTURE – 5m
- PROPERTY LINE – 3m
- WELL – 15m



KEY PLAN N.T.S.

GEODETIC BM ELEV. = m
REFER TO PLAN BY BSR&D LTD. DATED SEPTEMBER 9, 2020.

SITE BENCHMARK ELEV. = m
REFER TO PLAN BY BSR&D LTD. DATED SEPTEMBER 9, 2020.

NOTE TO CONTRACTOR :

DO NOT SCALE DRAWINGS.

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

ALL DRAWINGS REMAIN THE PROPERTY OF THE ENGINEER AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT THE ENGINEER'S WRITTEN PERMISSION.

THE OWNER/ARCHITECT/CONTRACTOR IS ADVISED THAT M.T.E. CONSULTANTS INC. CANNOT CERTIFY ANY COMPONENT OF THE SITE WORKS NOT INSPECTED DURING CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO NOTIFY M.T.E. CONSULTANTS INC. PRIOR TO COMMENCEMENT OF CONSTRUCTION TO ARRANGE FOR INSPECTION.

NOTE:

1. **PROPERTY LINE IS APPROXIMATE ONLY AND SHOULD NOT BE USED FOR DETERMINING SETBACKS OR LAYOUT.**
2. **THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE ONSITE WASTEWATER REPORT DATED AUGUST 2025**

No.	REVISION	BY	YYYY-MM-DD
8.			
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6.			
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3.			
2.	Revised per Township Comments	AJS	2025-08-20
1.	ISSUED FOR APPROVAL	AJS	2025-01-22

MTE
Engineers, Scientists, Surveyors
519-743-6500

OWNER
BVD REAL ESTATE INC.
130 DELTA PARK BOULEVARD BRAMPTON

PROJECT
7504 McLEAN ROAD
PUSLINCH

DRAWING
PROPOSED ONSITE WASTEWATER TREATMENT SYSTEM

Project Manager: A. SLAWICH	Project No.: 55237-100
Design By: MAC/ZIC	Checked By: MAC
Drawn By: ZIC	Checked By: MAC
Surveyed By: MTE	Drawing No.: C3.1
Date: Nov.04/24	
Scale: 1:200	Sheet 2 of 4

MTE FILE PATH: P:\P\55237\100\55237-103-C3
August 20, 2025 – 4:05:07 PM – Plotted By: Zach Chamos

CONSTRUCTION NOTES AND SPECIFICATIONS

1. GENERAL

1.1. THIS PLAN IS NOT FOR CONSTRUCTION UNTIL SIGNED AND SEALED BY ENGINEER AND APPROVED BY THE LOCAL MUNICIPALITY.

1.2. THIS PLAN IS TO BE USED FOR SERVICING AND GRADING ONLY; ANY OTHER INFORMATION SHOWN IS FOR ILLUSTRATION PURPOSES ONLY. THIS/THESE PLAN/S MUST NOT BE USED TO SITE THE PROPOSED BUILDING.

1.3. NO CHANGES ARE TO BE MADE WITHOUT THE APPROVAL OF THE DESIGN ENGINEER.

1.4. THIS PLAN IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE PERMISSION OF MTE CONSULTANTS INC.

1.5. PRIOR TO CONSTRUCTION, THE CONTRACTOR MUST:

1.5.1. CHECK AND VERIFY ALL EXISTING CONDITIONS, LOCATIONS AND ELEVATIONS WHICH INCLUDES BUT IS NOT LIMITED TO THE BENCHMARK ELEVATIONS, EXISTING SERVICE CONNECTIONS AND EXISTING INVERTS. REPORT ALL DISCREPANCIES TO THE ENGINEER PRIOR TO PROCEEDING.

1.5.2. OBTAIN ALL UTILITY LOCATES AND REQUIRED PERMITS AND LICENSES.

1.5.3. VERIFY THAT THE FINISHED FLOOR ELEVATIONS AND BASEMENT FLOOR ELEVATIONS (WHICH MAY APPEAR ON THIS PLAN) COMPLY WITH THE FINAL ARCHITECTURAL DRAWINGS.

1.5.4. CONFIRM ALL DRAWINGS USED FOR CONSTRUCTION ARE OF THE MOST RECENT REVISION.

1.6. THE CONTRACTOR SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE TO EXISTING WORKS. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY TO LOCAL MUNICIPALITY STANDARDS

1.7. ALL WORKS ON A MUNICIPAL RIGHT-OF-WAY WITH THE EXCEPTION OF WATERMAIN TAPPING, TO BE INSTALLED BY THE OWNER'S CONTRACTOR AT OWNER'S EXPENSE IN ACCORDANCE WITH THE LOCAL MUNICIPALITY'S "PROCEDURE FOR OFF-SITE WORKS BY PRIVATE CONTRACTOR". THE OWNER AND CONTRACTOR ARE TO ENSURE OFF-SITE WORKS PERMIT IS IN PLACE PRIOR TO CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL AFFECTED PROPERTY TO ORIGINAL CONDITION. ALL BOULEVARD AREAS SHALL BE RESTORED WITH 150mm TOPSOIL AND SOD.

1.8. ALL UNDERGROUND SERVICES ARE TO BE CONSTRUCTED IN FULL COMPLIANCE WITH THE ONTARIO PROVINCIAL BUILDING CODE (PART 7, PLUMBING), THE ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS) AND THE REQUIREMENTS OF THE LOCAL MUNICIPALITY.

1.9. CONTRACTOR IS RESPONSIBLE FOR CONTACTING ENGINEER 48 HRS PRIOR TO COMMENCING WORK TO ARRANGE FOR INSPECTION. ENGINEER TO DETERMINE DEGREE OF INSPECTION AND TESTING REQUIRED FOR CERTIFICATION OF UNDERGROUND SERVICE INSTALLATION AS MANDATED BY ONTARIO BUILDING CODE, DIVISION C, PART 1, SECTION 1.2.2, GENERAL REVIEW. FAILURE TO NOTIFY ENGINEER WILL RESULT IN EXTENSIVE POST CONSTRUCTION INSPECTION AT CONTRACTORS EXPENSE.

1.10. SANITARY AND STORM SEWERS AND SERVICES TO HAVE A MINIMUM 1.4m COVER TO TOP OF PIPE. WHERE COVER TO TOP OF PIPE IS DEFICIENT, CONTRACTOR SHALL INSTALL SHALLOW BURIED PIPE IN ACCORDANCE WITH APPLICABLE "GRAVITY PIPE INSULATION DETAIL" INDICATED IN DRAWING DETAILS.

1.11. PLAN TO BE READ IN CONJUNCTION WITH DESIGN REPORT, PREPARED BY MTE, DATED JUNE 2022.

1.12. EXISTING TOPOGRAPHIC INFORMATION TAKEN FROM PLAN PREPARED BY MTE, DATED XXXXX, 20XX.

1.13. CONTRACTOR TO OBTAIN WRITTEN PERMISSION FROM ADJACENT PROPERTY OWNER PRIOR TO ENTERING UPON NEIGHBOURING LANDS TO UNDERTAKE ANY WORK. COPIES OF THESE LETTERS OF CONSENT SHALL BE SUBMITTED TO THE DEPARTMENT OF PUBLIC WORKS FOR APPROVAL PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT CONTRACTOR'S OWN RISK.

1.14. FILTER FABRIC TO BE TERRAFIX 200R OR APPROVED EQUAL.

1.15. MAXIMUM GRASSED SLOPE TO BE 3:1. SLOPES GREATER THAN 3:1 TO BE LANDSCAPED WITH LOW MAINTENANCE GROUND COVER.

1.16. SIDE SLOPES OF ALL STOCKPILES OR EXTRACTION FACES TO BE MAINTAINED AT 70 DEGREES OR LESS BETWEEN EARLY APRIL AND LATE AUGUST TO DETER BANK SWALLOWS FROM NESTING.

1.17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD INCLUDING THE SUPPLY, INSTALLATION AND REMOVAL OF ALL NECESSARY SIGNALS, DELINEATORS, MARKERS, AND BARRIERS. ALL SIGNS, ETC. SHALL CONFORM TO THE STANDARDS OF THE LOCAL MUNICIPALITY AND THE MTO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

1.18. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

2. PIPING:

2.1. FORCEMAIN SHALL BE DR-17 HDPE PIPE COMPLETE WITH FUSED JOINTS. APPROVED ALTERNATIVE: SDR26 PVC PIPE WITH BELL AND SPIGOT JOINTS (IPEX CYCLE-TOUGH).

3. TANKS

3.1. PRECAST CONCRETE TANKS, INSTALLED AND LEVELLED AS PER MANUFACTURER'S SPECIFICATIONS, ELEVATION SET TO RECEIVE GRAVITY DRAINAGE (MINIMUM 1.0% SLOPE) FROM BUILDING SEWER.

3.2. EXTEND ALL ACCESS HATCHES TO 150mm ABOVE GRADE WITH 610mm DIAMETER POLYLOK RISERS AND LIDS WITH RISER SAFETY SCREEN INSTALLED IN EACH LID. GROUT SEAL ALL PIPING CONNECTIONS AND RISER JOINTS WITH NON-SHRINK GROUT. MINIMUM DEPTH OF COVER ABOVE TOP OF TANK TO BE 300mm

6. TREATMENT SYSTEM

6.1. PROVIDE BNA BIOFILTER TREATMENT SYSTEM DESIGNED FOR A PEAK DAILY FLOW OF 3,500 L/D. THE SYSTEM HAS BEEN DESIGNED BASED ON TYPICAL RESIDENTIAL STRENGTH DOMESTIC SEWAGE. SEWAGE STRENGTH SHALL BE CONFIRMED WITH BNA PRIOR CONSTRUCTION

6.2. THE CONTRACTOR SHALL INCLUDE THE SUPPLY AND INSTALLATION OF PRE-CAST TANKS IN AREA INDICATED ON MTE DWG C3.1. THE PRE-CAST TANK SUPPLIER SHALL BE APPROVED BY BNA. ALL REQUIRED PUMPS, FILTERS, PIPING, FITTINGS ETC. WITHIN THE TANKS, ALONG WITH THE CONTROL PANEL, SHALL BE SUPPLIED BY BNA AND INSTALLED BY THE CONTRACTOR. PROVIDE COMPLETE TREATMENT SYSTEM AND APPURTENANCES SUCH THAT THE SYSTEM IS FULLY OPERATIONAL.

6.3. PROVIDE ALL DUCTS, CONDUITS AND WIRING TO COMPLETE THE TREATMENT SYSTEM. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS PER ELECTRICAL SAFETY AUTHORITY REQUIREMENTS.

6.4. CONTACT INFORMATION FOR BNA IS AS FOLLOWS:

7-20 STECKLE PLACE,

KITCHENER ON N2E 2C3

PHONE # 519-220-0698

7. ELECTRICAL AND CONTROL NOTES:

7.1. PUMP CONTROL PROGRAMMING AND ELECTRICAL EQUIPMENT BY SEWAGE SYSTEM CONTRACTOR. PROVISION OF ALL CONTROL WIRING AND POWER WIRING BETWEEN AND WITHIN PUMP TANK, JUNCTION BOXES, CONTROL PANEL, AUTOMATIC TRANSFER SWITCH AND UP TO THE MAIN ELECTRICAL FEED DISCONNECT SWITCHES BY SEWAGE SYSTEM CONTRACTOR.

7.2. NO JOINTS PERMITTED FOR THE CONTROL AND POWER WIRING FROM THE CONTROL PANEL INTO THE PUMP TANK. JUNCTION BOXES SHALL BE USED FOR WIRE PULLING ONLY. SEAL CONDUITS CONNECTED TO PUMP TANK WITH EYS FITTINGS.

7.3. CONTRACTOR IS RESPONSIBLE FOR ALL ELECTRICAL APPROVALS AND INSPECTIONS (ESA).

8. EROSION AND SEDIMENT CONTROL

8.1. CONTRACTOR TO INSTALL EROSION CONTROL MEASURES AS SHOWN PRIOR TO CONSTRUCTION AND MAINTAIN IN GOOD CONDITION UNTIL CONSTRUCTION IS COMPLETED AND ALL DISTURBED GROUND SURFACES HAVE BEEN RESTABILIZED EITHER BY PAVING OR RESTORATION OF VEGETATIVE COVER.

8.2. ALL SEDIMENT CONTROL FENCING TO BE INSTALLED PRIOR TO ANY AREA GRADING, EXCAVATING OR DEMOLITION COMMENCING.

8.3. EROSION CONTROL FENCING TO BE INSTALLED AROUND BASE OF ALL STOCKPILES. ALL STOCKPILES TO BE KEPT 2.5m MINIMUM FROM PROPERTY LINE.

8.4. EROSION PROTECTION TO BE PROVIDED AROUND ALL STORM AND SANITARY MHs AND CBs.

8.5. CONSTRUCTION ACCESS (MUD MAT) TO BE PROVIDED ON-SITE AT ALL LOCATIONS WHERE CONSTRUCTION VEHICLES EXIT THE SITE. CONSTRUCTION ACCESS (MUD MAT) SHALL BE A MINIMUM OF 3.0m WIDE, 15.0m LONG (LENGTH MAY VARY DEPENDING ON SITE LAYOUT) AND 0.3m DEEP AND SHALL CONSIST OF 200mm CLEAR STONE MATERIAL OR APPROVED EQUIVALENT. PROPOSED EROSION FENCING TO TIE INTO MUD MAT. CONTRACTOR TO ENSURE ALL VEHICLES LEAVE THE SITE VIA THE MUD MAT AND THAT THE MAT IS MAINTAINED IN A MANNER TO MAXIMIZE EFFECTIVENESS AT ALL TIMES.

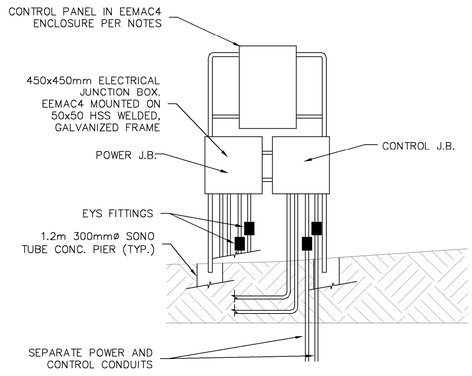
8.6. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AS SITE DEVELOPMENT PROGRESSES. CONTRACTOR TO PROVIDE ALL ADDITIONAL EROSION CONTROL STRUCTURES.

8.7. EROSION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN RESTABILIZED.

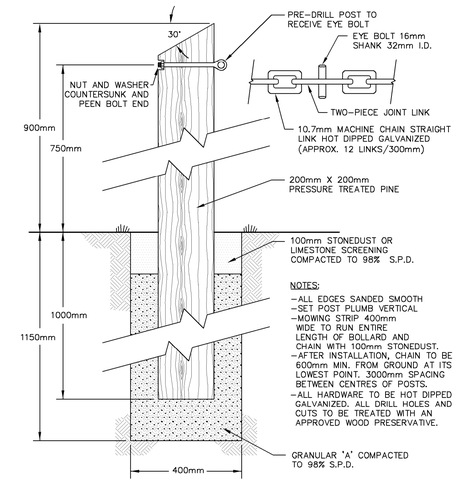
8.8. NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THE ENGINEER AND THE LOCAL MUNICIPALITY'S DEPARTMENT OF PUBLIC WORKS.

8.9. CONTRACTOR TO CLEAN ROADWAY AND SIDEWALKS OF SEDIMENTS RESULTING FROM CONSTRUCTION TRAFFIC FROM THE SITE EACH DAY.

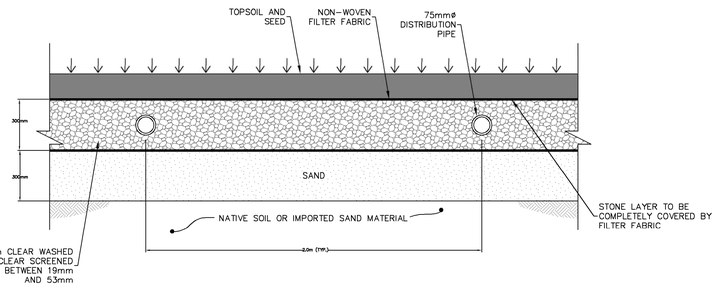
8.10. CONTRACTOR MUST REMOVE EROSION AND SEDIMENTATION FENCING PRIOR TO COMPLETION OF PROJECT. CONTRACTOR TO HAVE EROSION AND SEDIMENTATION FENCE INSPECTED WHEN VEGETATION HAS ESTABLISHED, BUT PRIOR TO FENCE BECOMING OVERGROWN. ENGINEER'S REPRESENTATIVE TO DETERMINE IF VEGETATION HAS REACHED THE CRITICAL POINT AND WILL THEN INSTRUCT CONTRACTOR TO REMOVE FENCE.



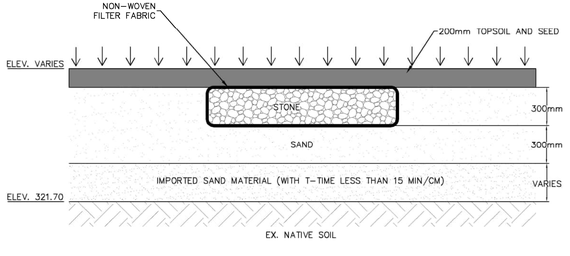
CONTROL PANEL DETAIL
1:25



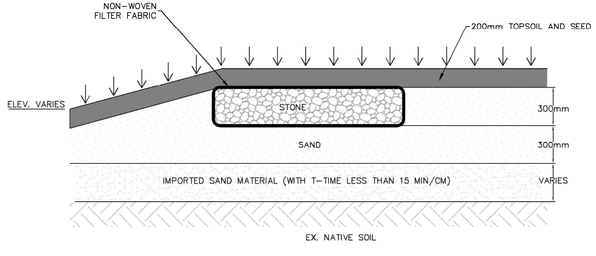
BOLLARD AND CHAIN DETAIL
N.T.S.



TYPICAL AREA BED
DISPERSAL PIPING DETAIL
N.T.S.

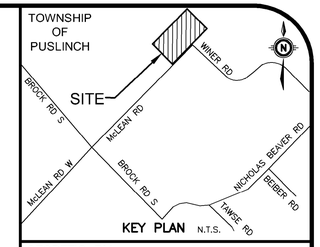


SECTION A-A



SECTION B-B

AREA BED SECTIONS
N.T.S.



KEY PLAN N.T.S.

GEODETIC BM ELEV. = m
REFER TO PLAN BY BSR&D LTD. DATED SEPTEMBER 9, 2020.

SITE BENCHMARK ELEV. = m
REFER TO PLAN BY BSR&D LTD. DATED SEPTEMBER 9, 2020.

NOTE TO CONTRACTOR :

DO NOT SCALE DRAWINGS.

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No.	REVISION	BY	YYYY-MM-DD
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2.	Revised per Township Comments	AJS	2025-08-20
1.	ISSUED FOR APPROVAL	AJS	2025-01-22

MTE
Engineers, Scientists, Surveyors
519-743-6500

OWNER
BVD
REAL ESTATE INC.
130 DELTA PARK BOULEVARD BRAMPTON

PROJECT
7504 McLEAN ROAD
PUSLINCH

DRAWING
DETAILS
AND NOTES

Project Manager: A. SLAWICH	Project No.: 55237-100
Design By: MAC/ZIC	Checked By: MAC
Drawn By: ZIC	Checked By: MAC
Surveyed By: MTE	Drawing No.: C3.2
Date: Nov.04/24	
Scale: 1:200	Sheet 3 of 4

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MTE FILE PATH:
August 20, 2025 - 3:45:10 PM - Plotted By: Zach Chamos

MTE Consultants
520 Bingemans Centre Drive, Kitchener, Ontario N2B 3X9

August 20, 2025

MTE File No.: C55237-100

Kim Funk
Source Protection Coordinator
Wellington Source Water Protection
7444 Wellington Road 21
Elora, Ontario N0B 1S0

Dear Kim:

RE: 7504 McLean Road, Puslinch
Drinking Water Threats Disclosure Report

General Overview

MTE Consultants Inc. was retained by BVD Real Estate Inc. to complete this Drinking Water Threats Disclosure Report for the proposed industrial building to be constructed at 7504 McLean Road in the Township of Puslinch, located in the Township of Centre Wellington.

The Site is located north of the Highway 401 and Brock Road interchange. The property is bounded to the north, west and east by an existing industrial property and to the south by McLean Road. For exact location of the Site refer to the key plan located on the enclosed engineering drawings. An existing wetland is located north and east of the Site; the floodplain extends to the Site's property line with the GRCA Regulated Area covering a small portion of the Site.

The proposed development for the Site is the construction of a building complete with associated parking and driveways.

To our knowledge, no applications for any Provincial Instruments, including Environmental Compliance Approvals, Permits to Take Water and Environmental Activity and Sector Registrations (EASR's) are proposed.

Source Water Protection Vulnerable Areas

The Site is located in a Significant Groundwater Recharge Area; however, is not located in a Wellhead Protection Area (WHPA), Issue Contributing Area (ICA), or any other source protection area.

A wetland is located approximately 100 metres north and east of the property limits, with the GRCA flood limit reaching the property boundary and the GRCA regulated area covering a small portion of the Site.

Disclosure of Drinking Water Threats

There are a number of low and moderate drinking water threat activities for quality that have been identified that could occur on the Site as follows:

a) the establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage;

b) application of road salt; and

c) storage of snow.

Proposed Management Programs

The following summary details the proposed mitigation of the drinking water threats identified in the previous section.

a) The Establishment, Operation or Maintenance of a System that Collects, Stores, Transmits, Treats or Disposes of Sewage

A proposed septic system for the proposed building is designed per Ontario Building Code standards and meets the required separations from existing wells and ponds. Best practice information regarding the installation and maintenance of septic systems has been provided to the Owner.

b) c) Application of road salt, and Storage of snow

The property owner of the proposed development will implement best management practices for the removal of snow and application of salt on this development.

We trust the above meets the requirements of a Threats Disclosure Report. Please contact the undersigned with any questions or concerns.

Yours Truly,

MTE Consultants Inc.

Adam Slawich, P.Eng., C.E.T.
Design Engineer
519-743-6500
aslawich@mte85.com

AJS:dlb

https://mte85.sharepoint.com/sites/55237-100/Shared Documents/Reports/Drinking Water Threats/rpt_2025-08-20_Drinking Water Threats.docx

Memorandum

To: Township of Puslinch Building Department

MTE File No.: C55237-100

Date: August 20, 2025

From: Adam Slawich, P.Eng., C.E.T.

Project Name: 7504 McLean Road

Re: Fire Flow Analysis
7504 McLean Road, Township of Puslinch

Further to the Township's requirement to provide calculations supporting the on-site fire water storage, we respectfully provide the following.

The building will be analyzed for fire water supply requirements using the OBC 2012. The analysis will determine if the theoretical pressure of the proposed on-site fire hydrant is acceptable for firefighting.

Using the OBC 2012:

- Building Classification: Group F, Division 3
- Calculate: Q = KVS_{tot} (Table 1 of OBC 2012 Appendix A-3.2.5.7.(3) & Table 2)
  K = water supply coefficient (A-3.2.5.7 Table 1)
  V = volume of building (m^3)
  S_{tot} = 1 + total spatial coefficients

Table 1 – Water Demand

Building	Building Area (m^2)	Building Volume (m^3)	K	S_{tot}	Required Minimum Water Supply (litres)*
Development	1,756	12,903	12	1.45	224,512

* from Table 2 of OBC 2012 Appendix A-3.2.5.7

Therefore, the required minimum water supply volume is 224,512L for the proposed building. Refer to the attached design sheet for details. To achieve the required on-site storage volume, one 28,500L tank and four 50,000L tanks are proposed for a combined volume of 228,500L provided.

Given the above, there is sufficient on-site storage volume to meet the firefighting demands for the proposed building.

If you have any questions regarding this information, please contact the undersigned.

Yours Truly,

MTE Consultants Inc.

Adam Slawich, P.Eng., C.E.T.
Project Manager
519-743-6500
aslawich@mte85.com

AJS:dlb
Encl.
https://mte85.sharepoint.com/sites/55237-100/Shared Documents/Reports/Fire Flow/memo_2025-08-20_Fire Flow.docx

7504 McLean Road
FIRE FLOW ANALYSIS
Puslinch, Ontario

Project Number: 55237-100
Date: August 27, 2024
Design By: AJS

File: Q:\55237\100\Fire Flow Analysis.xlsx

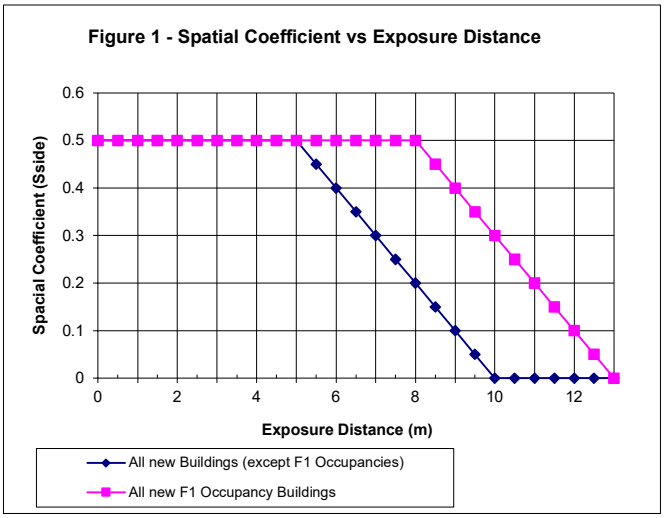
Step 1: Determining Water Supply Coefficient

	Table 1 from OBC 2012 A3.2.5.7												
	Type of Construction	Classification by group or division in Accordance with Table 3.1.2.1 of the Ontario Building Code											
		A2	B1	B2	B3	C	D	A4	F3	A1	A3	E	F2	F1
1	Building is of Noncombustible construction with fire separation and fire-resistance ratings provided in accordance with Subsection 3.2.2 of the OBC, including loadbearing walls, columns and arches						10	12		14		17		23
2	Building is of Noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6 of the OBC. Floor assemblies are fire separations but no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.						16	19		22		27		37
3	Building is of Combustible Construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2 of the OBC, including loadbearing walls, columns and arches. Noncombustible construction may be used in lieu of fire resistance rating where permitted in subsection 3.2.2 of the OBC						18	22		25		31		41
4	Building is of combustible construction. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.						23	28		32		39		53

Type of Construction	Building Classification	Water Supply Coefficient (K)
1	F3	**12**

Step 2: Determine the Spacial Coefficient

	Distance	S_{side}
Exposure Distance 1 (m)	5.50	0.45
Exposure Distance 2 (m)	23.80	0.00
Exposure Distance 3 (m)	61.00	0.00
Exposure Distance 4 (m)	164.60	0.00
Exposure Distance 5 (m)		
	S_{tot}	**1.45**



Step 3: Determine Volume of Building

Building Length(m)	Building Width (m)	Building Height to the underside of roof deck (m)	Volume (m^3)
48.90	35.90	7.35	12903.00

Number of Stories	2

Step 4: Calculate Minimum Water Supply

$$Q = KVS_{tot}$$

Minimum Water Supply (L)	224512.17

7504 McLean Road

Onsite Wastewater Report

Project Location:
7504 McLean Road, Puslinch, ON

Prepared for:
BVD Real Estate Inc.
[redacted]

Prepared by:
MTE Consultants Inc.
520 Bingemans Centre Drive
Kitchener, ON N2B 3X9

January 17, 2025
Revised: August 20, 2025

MTE File No.: 55237-100

Engineers, Scientists, Surveyors.

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3.0 Sewage System Design....2
3.1 Domestic Wastewater....2
3.1.1 Daily Design Sewage Flow....2
3.1.2 Type A Disposal Bed....2
3.1.3 Level IV Treatment System....3
3.2 Clearance Requirements....3
4.0 Conclusions....4
5.0 Recommendations....5

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Table 2 – BNA Treatment System Summary....3
Table 3 – Clearance Requirements....3

Appendices

Appendix A .... Geotechnical Excerpts
Appendix B .... Design Calculations
Appendix C .... BNA Treatment System Details
Appendix D .... On-site Wastewater System Inspections
Appendix E .... OOWA Handout

Drawings

MTE Dwg. No. 55237-100-C3.1 – Onsite Wastewater Treatment System ……Encl.
MTE Dwg. No. 55237-100-C3.2 – Details and Notes ……Encl.

1.0 INTRODUCTION

MTE Consultants Inc. (MTE) was retained by BVD Real Estate Inc (Client) to complete the design of an onsite wastewater treatment and disposal system to service the proposed building, located at 7504 McLean Road in Puslinch, Ontario.

The Site is proposed to be developed into a transportation depot building complete with office space and truck terminals. The main building has a proposed office space with a maximum area of 230 m^2, four truck loading bays, and three water closets.

This Design Brief details the proposed onsite wastewater system design for the domestic wastewater produced at the proposed building and should be submitted to the Township of Puslinch in support of the Site Plan Approval application. A separate application will be made following Site Plan Approval for a Septic Permit application under Division B, Part 8 of the OBC.

2.0 GEOTECHNICAL INVESTIGATION

A geotechnical investigation was undertaken by A & A Environmental Consultants and summarized in the July 3, 2024 report, for two additional boreholes in addition to the nine boreholes completed under Terraprobe Inc.'s previous geotechnical investigation report dated January 29, 2021. A & A Environmental Consultants' two additional boreholes were drilled to a depth of 7.6 m below ground surface (bgs) for both boreholes. The previous nine boreholes were drilled between 4.8 m to 6.6 m bgs.

A further hydrogeological assessment was completed by A & A Consultants and dated January 13, 2025, for monitoring wells at 4 locations, one for each corner of the site. The monitoring wells ranged from 3.8 m to 7.5 m in depth and groundwater depth ranging from 0.6 m to 6.25 m bgs.

These results determine that there will be sufficient separation between the proposed disposal bed piping and the groundwater table to maintain a minimum separation of 0.6 m. In the northwest corner of the property, the groundwater was determined to have an elevation of 315.91 m above mean sea level.

In addition, the soils in the proposed area of the bed were deemed to consist of a surficial layer of fill underlain by a glacial till consisting of silty sand to sand and silt. It is proposed that the overlying fill layer be excavated and replaced with imported sand material.

Based on the grain size and soil classification from the samples taken during the borehole activities, it was concluded that the underlying native soil has an estimated percolation rate (T-time) of 23 min/cm. The native soils are acceptable for a Class 4 sewage system with a Level IV treatment system complete with a Type A dispersal bed installation. Refer to **Appendix A** for the excerpts from the hydrogeological report completed by A & A Environmental Consultants dated July 25, 2025.

The Design Engineer will inspect and certify the contact surface preparation prior to placement of any material. This inspection is intended to confirm that the soils and groundwater conditions are as described above, and the contact surface has been properly prepared.

3.0 SEWAGE SYSTEM DESIGN

3.1 Domestic Wastewater

3.1.1 Daily Design Sewage Flow

An onsite wastewater treatment system under Part 8 of the OBC, with Level IV treatment and a Type A dispersal bed, is proposed for the domestic wastewater generated by the employees and visitors to the Site. **Table 1** provides a summary of the combined design flow calculations for the main office/warehouse building.

Table 1 – Total Daily Sewage Flow

Component	Parameter	OBC Rate	Total Quantity	Daily Flow
Office[1]	Floor area	75 L/day per 9.3 m^2 of office area	230 m^2	1,860 L/day
Warehouse[1]	Water Closets	950 L/d per water closet	1 water closet (total)	950 L/day
	Loading Bays	150 L/d per loading bay	4 loading bays (total)[2]	600 L/day
TOTAL				**3,500 L/day**

[1] The main building contains three water closets. One water closet has been assigned to the warehouse component of the daily design flow calculation. The other two water closets service the office space and are accounted for under the office floor area calculation.
[2] The main building contains four loading bay doors.

It is noted that the onsite wastewater system is not designed to treat any wash water that could be generated at the Site. Only domestic wastewater is to be conveyed to the Level IV treatment system. A separate holding tank would be required for any wash water generated at the Site due to washing activities and floor drains in vehicle/repair bays. The design of such a holding tank has not been included in this report.

3.1.2 Type A Disposal Bed

As discussed above, the design flow for the Facility is 3,500 L/d and can be adequately serviced by a Type A disposal bed. The proposed Type A bed will be installed in the imported sand material. Based on the loading rate of 6 L/m^2/day for the underlying native soils, per Table 8.7.4.1.A. of OBC, the proposed fill contact area must be greater than 583 m^2. The fill contact area is proposed to be 625 m^2 (including the 15 m distance from the centreline of the outer distribution pipe.

The size of the area bed was determined by the following formulas (OBC):

$$A_{Stone} = \frac{Q}{50} \quad When\ Q > 3000\ Lpd$$

$$A_{Sand} = \frac{QT}{850} \quad when\ T < 15\ \ min/cm$$

Where *Q* is the daily sewage design flow (L/d), and *T* is the T-time of the soils. Refer to calculations in **Appendix B**.

From the calculations, the required stone area is 70.0 m^2 and the required sand area is 61.8 m^2. Including a factor of safety, the proposed stone area will be 5.2 wide by 16.2 m long making the stone area 84.2 m^2. The stone area will be complete with 3 runs, 15.0 m long, and spaced 2.0 m apart center to center. The outside distribution pipe runs shall be within 600 mm of the perimeter of the stone layer. The sand area bed is proposed to have dimensions of 7.2 m wide by 18.2 m long making the area of the dispersal bed 131.0 m^2, satisfying the required area. The sizing of the proposed bed is shown on **Drawing C3.1** attached.

3.1.3 Level IV Treatment System

A Level IV treatment system is proposed to treat the domestic wastewater onsite in conjunction with a shallow buried trench disposal bed. This system will conform to the requirements put forth for Level IV treatment systems in Part 8 of the Ontario Building Code. The treatment system and disposal bed are sized to accommodate the daily design flow of 3,500 L/d. A Bergmann North America Inc. (BNA) system is proposed as the Level IV treatment system. **Table 2** provides a summary of the proposed treatment train.

Table 2 – BNA Treatment System Summary

Tank No.	Tank Model	Working Volume (L)	Process Component
1	Porter's TKS1500	6,700	Equalization Tank
2	Porter's TKH2500	4,700	Primary Clarifier
		2,000	Bioreactor
		2,000	Final Clarifier
3	Porter's TKS400	2,200	Effluent Pump Tank

This system will conform with the requirements put forth for Level IV treatment systems in Table 8.6.2.2 of the OBC. Refer to **Appendix C** and the enclosed drawings for additional details regarding the BNA system.

3.2 Clearance Requirements

The following clearances are required for the proposed onsite wastewater treatment and disposal system installation:

Table 3 – Clearance Requirements

Clearance From	Treatment Tank(s) / Unit	To Distribution Piping
Building or Structure	1.5 m	5 m
Potable Water Wells (Drilled)	15 m	15 m
Water Body	15 m	15 m
Property Line	3 m	3 m

The proposed onsite wastewater works will conform to the required clearance distances. The onsite wastewater system location is indicated on the enclosed **MTE Dwg. No. C3.1** in **Appendix D**.

4.0 CONCLUSIONS

Based on the information provided, it is concluded that:

- The underlying native soil has an estimated percolation rate of 23 min/cm. A T-time of the fill material was not completed.
- The existing fill material shall be excavated and replaced with imported sand having a maximum T-time of 15 min/cm.
- The groundwater table on the Site is at sufficient depth to provide the minimum 0.60 m separation below the bottom of the stone layer.
- The daily design flow was calculated based on a maximum office area of 230 m^2, one water closet servicing the warehouse portion of the building, and a total of 4 loading bays on site.
- The daily design flow for the onsite wastewater disposal system is 3,500 L/d based on the OBC.
- A Level IV treatment system and Type A disposal bed installed in the imported sand material is the most suitable wastewater disposal system.

5.0 RECOMMENDATIONS

It is recommended that:

- A T-time of 15 min/cm be used for design purposes.
- The domestic wastewater generated from the proposed building will be serviced by the installation of a BNA System complete with a Type A disposal bed in accordance with **MTE Dwg. No. C3.1**.
- The Level IV system and disposal bed be installed to meet clearance requirements of OBC Section 8.2.1.6.
- The final surface of the Type A disposal bed be graded to shed water and to direct surface drainage around the leaching bed area in accordance with **MTE Dwg. No. C3.1.** The completed leaching bed area be top-soiled and seeded or sodded immediately to protect against erosion.
- This Design Brief be submitted to the Township of Puslinch in support of a Site Plan Approval application and Septic Permit Application.
- The onsite wastewater treatment and disposal system be installed by a Licensed Contractor in accordance with the guidelines of the Ontario Building Code (Division B, Part 8).
- The onsite wastewater disposal system be constructed to the Specifications enclosed and inspected by the Design Engineer in accordance with the enclosed inspection schedule. The onsite wastewater disposal system should be certified by a Professional Engineer licensed in Ontario upon completion.

All of which is respectfully submitted,

MTE Consultants Inc.

Zach Chamas
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Morgan Crane, P.Eng.
Design Engineer
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ZXC:cmb
M:\55237\100\Reports\Onsite Wastewater\55237-100 7504 McLean Road Onsite Wastewater Treatment Design Report.docx

Appendix A

Hydrogeological Report Excerpts

Preliminary Geotechnical Engineering Report
7504 McLean Rd., Puslinch, ON

Report #8296 – BVD Puslinch
July 3, 2024

Prepared for:

[redacted]

Prepared by:
A &A Environmental Consultants Inc.
16 Young Street
Woodstock, ON N4S 3L4
Tel: 519-266-4680
Fax: 519-266-3666
www.aaenvironmental.ca

- Water moisture content per ASTM D2216.
- Grain size analyses per ASTM D422 & D2217.
- Atterberg Limits per ASTM 4318.

The results of the laboratory tests are discussed in the text of this report. The results of laboratory tests are presented in **Appendix C**.

6.0 LABORATORY TESTING AND RESULTS OF INVESTIGATION

6.1 Subsurface Conditions Overview

The borehole logs provided in **Appendix B** summarize the soil types observed during drilling. Explanation of the symbols and terms used to describe the borehole logs are also included in **Appendix B**.

Select bagged samples taken from the boreholes were analyzed for grain size analysis and Atterberg limits. All soil samples tested for natural moisture content.

It should be noted that the boundaries between the strata on the borehole records have been inferred from drilling observations and non-continuous sampling. The boundaries generally represent a transition from one soil type to another and should not be inferred to represent an exact plane of geological change. Further, conditions will vary between and beyond the boreholes.

The two (2) boreholes were advanced to a maximum depth of 7.6 m (mbgl). The strength variations are detailed in the borehole logs in **Appendix B**.

The combination of lab results and standard penetration test N values were used to estimate geotechnical resistance values. This translation was based on generally accepted, recorded correlations from thousands of similar tests. Soil characteristics for each hole may be found in **Appendices B & C**.

6.2 Detailed Summary

Both two (2) boreholes explored in this investigation and the nine (9) boreholes provided in Terraproble Geotechnical Report (Terraprobe Ref.: 1-20-0525-01) revealed underlain the surface to be characterised as follows:

- **Fill**
  Fill materials were encountered in all boreholes (BH24-1 and BH24-5), extending to approximate depths ranging from 1.5 to 2.2 m (mbgl). The explored fill is generally loose to compact and predominantly consists of gravel and sand to gravelly silty sand, with trace of clay, damp to moist, and no odour. In the Terraprobe Geotechnical report, fill was

encountered in BH1 to BH3, BH6, BH8, and BH9, extending to depths ranging from 1.5 to 2.5 m (mbgl). This fill comprised clayey silt to sandy silt/sand, moist to wet, firm to stiff in consistency, and compact. It should be noted that the thickness of fill could vary between boreholes, and this should be considered when estimating fill quantities and associated costs.

- **Glacial Till Deposits**
  Glacial till deposits were encountered in all boreholes beneath the fill material at depths ranging from 1.5 to 2.5 m (mbgl), extending to the maximum explored borehole depth of 7.6 m (mbgl). These deposits comprised gravelly silty sand trace clay to silty sand some gravel trace clay, occasionally rock fragments (grey, flaks), moist to wet, and compact to very dense.

- **Bedrock**
  Auger refusal encountered at BH24-1 at a depth of 7.6 m (mbgl) indicates the possibility of bedrock existence. However, bedrock confirmation by coring was not completed as it is beyond the scope of work.

6.3 Summary of Subsurface Conditions to Anticipated Depths of Construction

In the following tables (**Tables 2-3**), the relevant properties of the various deposits are briefly described. For details of the subsurface conditions, reference should be made to the individual borehole logs. The "Notes on Sample Description" preceding the borehole logs are an integral part of and should be read in conjunction with this report.

Table 2 - Typical Values of Atterberg Limits (%)

BH # / Sample No.	Depth (m)	Soil Description	Atterberg Limits		
			W_L	W_P	I_P
BH24-1 SS2	0.8 – 1.4	Gravel and Sand, some Silt, trace Clay	--		
BH24-4 SS5	3.0 – 3.6	Gravelly Silty Sand, trace Clay	--		

Table 3 - Sieve and Hydrometer Analysis

BH # / Sample No.	Depth (m)	Grain Size Content (%)				Soil Description
		Gravel	Sand	Silt	Clay	
BH24-1 SS2	0.8 – 1.4	44	38	13	5	Gravel and Sand, some Silt, trace Clay
BH24-4 SS5	3.0 – 3.6	28	44	24	4	Gravelly Silty Sand, trace clay

6.4 Groundwater Conditions

Groundwater observations and measurements were obtained in the open boreholes at the completion of drilling and are summarized on the appended borehole logs. The average groundwater level, measured in the recent boreholes, including the installed well BH24-1/MW and existing wells installed by Terraprobe, ranges from 2.1 to 6.5 m (mbgl). Perched groundwater may occur above this depth particularly following heavy rainfall or snowmelt. It should be noted that groundwater levels vary and are subjected to seasonal fluctuations and can respond to major precipitation events. The depth of groundwater table can also be influenced by the presence of underground features such as utility trenches. To obtain further information on groundwater table fluctuations and flow directions, it is highly recommended to conduct a hydrogeological investigation for this project.

7.0 DESIGN DISCUSSION AND RECOMMENDATIONS

7.1 General Considerations

The recommendations presented in the following sections of this report are based on the information available regarding the proposed construction, the results obtained from the Preliminary Geotechnical Investigation, Terraprobe Geotechnical Repot, and A&A's experience with similar projects. Since the investigation only represents a portion of the subsurface conditions, it is possible that soil conditions may be encountered during construction that are substantially different than those encountered during the investigation. If these situations are encountered, adjustments to the design may be necessary. A qualified geotechnical engineer should be on-Site during the foundation preparation to ensure the subsurface conditions are the same/similar to what was observed during the investigation.

Contractors and/or subcontractors bidding on or undertaking the work should seek permission from owners to access the site for their own type of investigations, as well may make their own interpretations of the factual borehole results contained in this report. The following general comments are provided with respect to the conditions encountered and the intended scope of development.

A&A understands that the proposed development (Transportation Depot) includes a two-storey building with a warehouse on the first floor, offices on the second floor, and no basement. The development also comprises truck and trailer parking areas, car parking, roads, a sewer system area, a water pond, and watermains.

7.2 Foundations

In accordance with the 2010 National Building Code of Canada (NBCC), the use of Limit States

Figure 2 - Approximate Geotechnical Borehole Location Plan

A&A ENVIRONMENTAL CONSULTANTS INC.
16 Young St,
Woodstock, ON, N4S 3L4
Tel: 519 266-4680

Satellite Image Indicating Geotechnical Borehole Locations at 7504 McLean Road East, Puslinch, Ontario

0 m — 60 m

Project: 8296
June 2024

N
W E
S

APPENDIX B – Borehole Logs, Explanation of Terms and Symbols, and Cambium Borehole Locations/Logs

LOG OF BOREHOLE BH/MW1

PROJECT: Geotechnical Investigation for Proposed Tansportion Depot Develop.
CLIENT: BVD - Bikram Dhillon
PROJECT LOCATION: 7504 McLean Road, Puslinch ON
DATUM: Geodetic
BH LOCATION: Refer to Borehole Location Plan (Drawing 2) N 4812824 E 570329

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-24-2024

PROJECT NO.: 8296
DRAWING NO.: 1

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION	GR	SA	SI	CL
324.8									
0.0	**Fill:** Gravel and sand to gravelly silty sand, trace clay, damp to moist, no odour, compact.	1	SS	15	324				
		2	SS	19		44	38	13	5
323.3									
1.5	**Glacial Till:** Gravelly silty sand trace clay to silty sand some gravel, trace clay, rock fragments, moist, compact to very dense.	3	SS	52	323				
		4	SS	20	322				
		5	SS	19	321				
		6	SS	27					
		7	SS	31	320				
		8	SS	11	319				
	very dense	9	SS	50/150mm					
		10	SS	50/150mm	318				
317.2									
7.6	**End of Borehole:**								

Notes:
Auger refustal at 7.6 m
Water Levels:
(i) During Drilling : 0
(ii) At Completion: wet bottom

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%): 10 20 30
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)
REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH5

PROJECT: Geotechnical Investigation for Proposed Tansportion Depot Develop.
CLIENT: BVD - Bikram Dhillon
PROJECT LOCATION: 7504 McLean Road, Puslinch ON
DATUM: Geodetic
BH LOCATION: Refer to Borehole Location Plan (Drawing 2) N 4812895 E 570369

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-24-2024

PROJECT NO.: 8296
DRAWING NO.: 5

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
324.6												
0.0	**Fill:** Gravel and sand to silty sand, trace clay, damp to moist, no odour, loose to compact		1	SS	8		324					
1			2	SS	9							
			3	SS	11		323					
2												
322.4												
2.2	**Glacial Till:** Gravelly silty sand, trace clay, rock fragments, moist to wet, compact to very dense.		4	SS	12		322					
3			5	SS	11							28 44 24 4
			6	SS	57		321					
4												
			7	SS	20		320					
5												
			8	SS	27		319					
6	fragments of bedrock (grey, flaks)		9	SS	37	▽						
							W. L. 318.1 m Jun 24, 2024					
7			10	SS	64							
317.0												
7.6	**End of Borehole:**											

Notes:
Water Levels:
(i) During Drilling : 6.5 m

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

Explanation of Terms and Symbols

The terms and symbols used on the borehole logs to summarize the results of field investigation and subsequent laboratory testing are described in these pages.

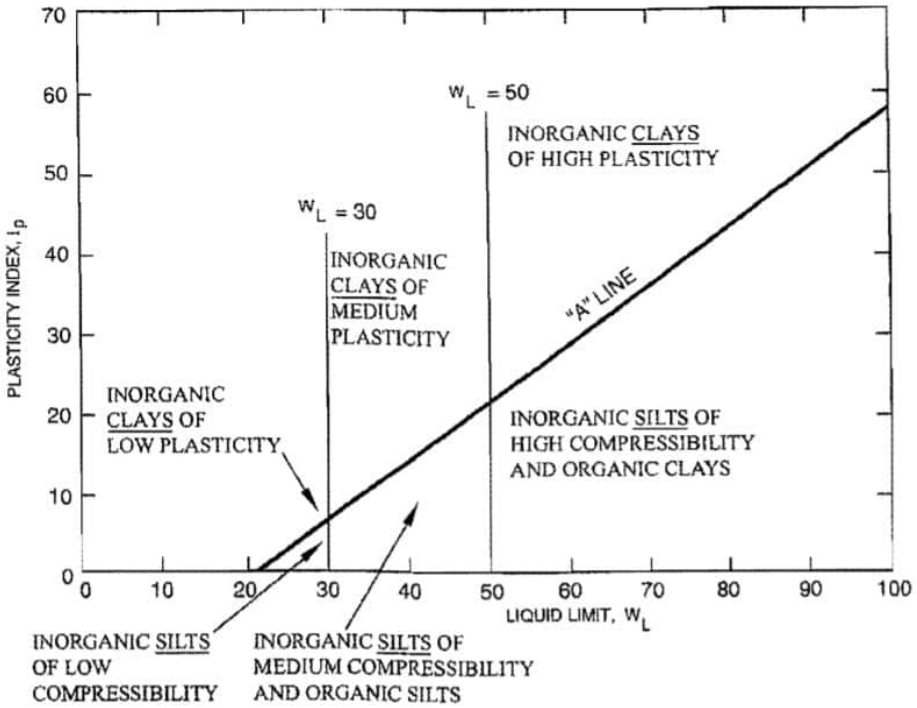
Abbreviations, graphic symbols and relevant test method designations are as follows:

w	Water Content
w_L, LL	Liquid Limit
w_p, PL	Plastic Limit
I_p	Plasticity Index
γ	Soil unit weight
K	Coefficient of Lateral earth pressure
K_s	Module of vertical subgrade reaction
P	Lateral earth pressure
Q	Surcharge load
H	Depth from the ground surface
B	Width of rectangular footing
P	Hydrostatic uplift pressure
d	Depth of structure's base below the design water level
γ_w	Unit weight of water
Φ	Geotechnical resistance factor
ϕ	Internal friction angle of soil
c	Cohesion
c_u, S_u	Undrained shear strength
V_s	Shear wave velocity
SPT-N	Penetration resistance
SPMMD	Standard Proctor Maximum Dry Density
MRD	Marshal Maximum Relative Density

Soils are classified and described according to their engineering properties and behaviours.

Noun	gravel, sand, silt, clay	**> 35 % and main fraction**
"and"	and gravel, and silt, etc.	**>35 %**
Adjective	gravelly, sandy, silty, clayey, etc.	**20 to 35 %**
"some"	some sand, some silt, etc.	**10 to 20%**
"trace"	trace sand, trace silt, etc.	**1 to 10 %**

The plasticity chart (after Casagrande, 1948):



Correlation of soil parameters with uncorrected SPT values for: a) cohesionless soils and b) cohesive soil

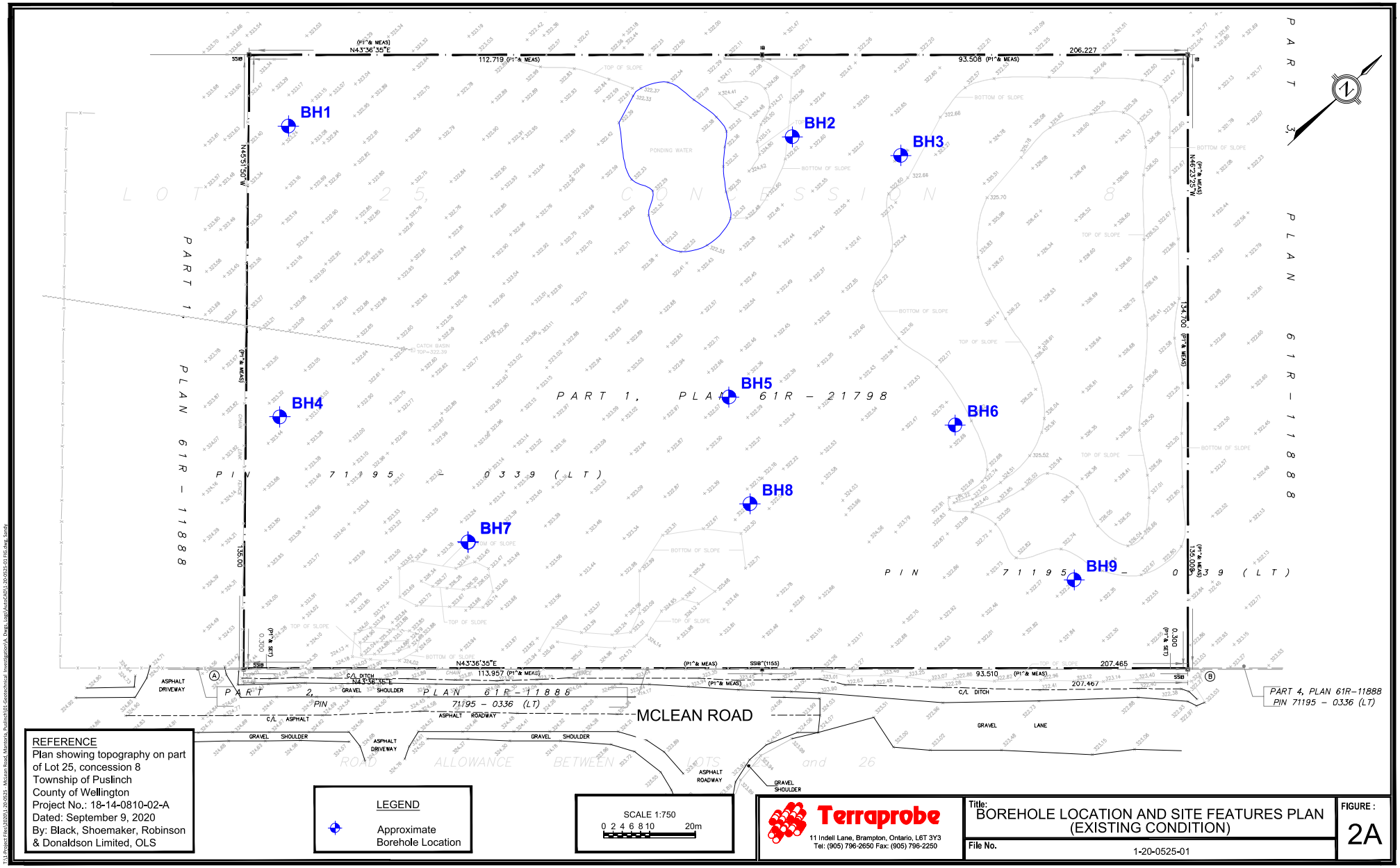
Compactness Condition	SPT N-INDEX (blows per 0.3 m)
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	>50

(a)

Consistency	Undrained Shear Strength (kPa)	SPT N-INDEX (blows per 0.3 m)
Very soft	< 12	0 to 2
Soft	12 - 25	2 to 4
Firm	25-50	4 to 8
Stiff	50 - 100	8 to 15
Very stiff	100 - 200	15 to 30
Hard	>200	>30

(b)

- *Standard Penetration Tests (SPT); followed the methods described in ASTM Standard D1586-08a. The number of blows by a 63.5 kg (140 lb) hammer dropped from 760 mm (30 in.) is recorded for a depth of 460 mm (18"). The last two 150 mm distances (total = 300 mm) are used to calculate the SPT-N index.*



REFERENCE
Plan showing topography on part of Lot 25, concession 8
Township of Puslinch
County of Wellington
Project No.: 18-14-0810-02-A
Dated: September 9, 2020
By: Black, Shoemaker, Robinson & Donaldson Limited, OLS

LEGEND
Approximate Borehole Location

SCALE 1:750
0 2 4 6 8 10 20m

Terraprobe
11 Indell Lane, Brampton, Ontario, L6T 3Y3
Tel: (905) 796-2650 Fax: (905) 796-2250

Title:
BOREHOLE LOCATION AND SITE FEATURES PLAN (EXISTING CONDITION)

File No.
1-20-0525-01

FIGURE :
2A

T:\Project Files\2020\1-20-0525- McLean Road, Morriston, Puslinch\00-Geotechnical Investigation\A_Dwgs (cad)\AutoCAD\1-20-0525-01 BH Key Sketch

LOG OF BOREHOLE 1

Terraprobe

Project No. : 1-20-0525-01	Client : NC Warehouse Inc c/o Reinders + Law Ltd	Originated by : AAS
Date started : January 4, 2021	Project : Mclean Road, Mantoria Warehouse	Compiled by : AAS
Sheet No. : 1 of 1	Location : Puslinch, Ontario	Checked by : AR

Position : E: 570245, N: 4812876 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
	323.2	**GROUND SURFACE**				
0		30mm **TOPSOIL**				
		FILL, sand, some silt, some gravel, trace clay, stone fragments, compact, brown, moist		1	SS	14
1				2	SS	16
	321.7					
	1.5	**SILTY SAND to SAND AND SILT**, some gravel, trace to some clay, compact, brown, moist (GLACIAL TILL)		3	SS	20
2				4	SS	26
3				5	SS	29
4						
		...at 4.6 m, stone fragments, very dense below		6	SS	57
5						
6		...at 6.1 m, wet		7	SS	90 / 175mm
	316.8					
	6.4	**END OF BOREHOLE**				

Elevation Scale (m): 323, 322, 321, 320, 319, 318, 317

Penetration Test Values (Blows / 0.3m): × Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): ○ Unconfined + Field Vane ⊖ Pocket Penetrometer ■ Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit | Natural Water Content | Liquid Limit; PL MC LL; 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR SA SI CL

15 43 33 9

...at 3.4m, auger grinding

...at 4.0m, auger grinding

...at 4.9m, auger grinding

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 8, 2021	dry	n/a
Jan 14, 2021	dry	n/a
Jan 21, 2021	dry	n/a

file: 1-20-0525-01 bh logs.gpj

APPENDIX C – Grain Size Distribution and Test Results

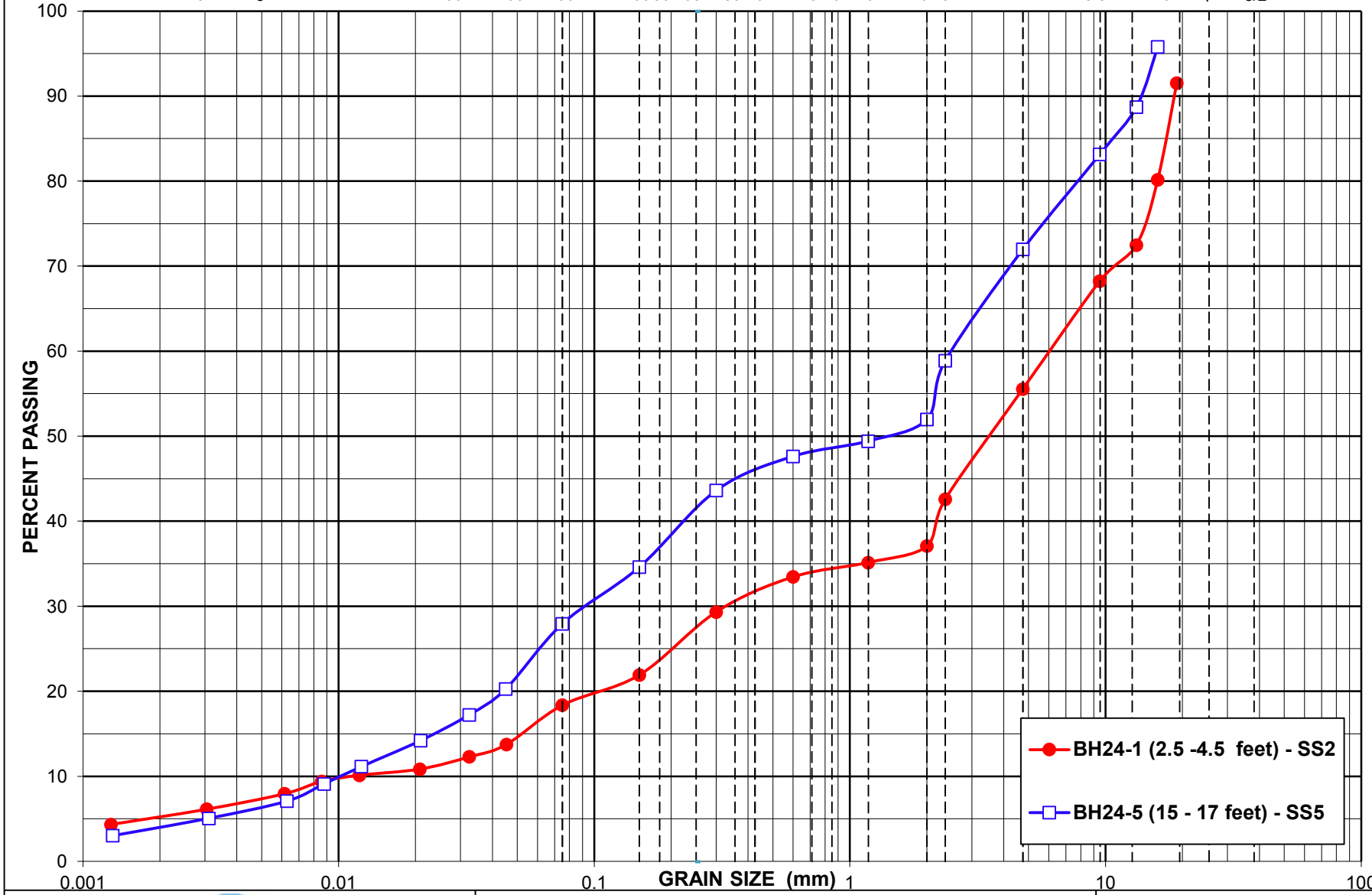
LS 702/D 422

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY AND SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

GRAIN SIZE IN MICROMETERS: 1 3 5 1 30 50 200

SIEVE DESIGNATION NOMBER (Imperial): 100 80 60 50 40 25 20 16 10 8 4 3/8" 1/2" 3/4" 1" 3/2"



GEOTRUST ENGINEERING LIMITED

GRAIN SIZE DISTRIBUTION

Drawing No.: 1	1
PROJECT No. :	GT23001TA
DATE :	July 1, 2024

Small Scale Hydrogeological Assessment
Proposed Commercial Development
7504 McLean Road,
Puslinch, Ontario

Report #8296 – BVD Puslinch HG – VER 2.0
July 25, 2025

Prepared for:
BVD
[redacted]

Prepared by:
A & A Environmental Consultants Inc.
16 Young Street
Woodstock, ON N4S 3L4
Tel: 519 266-4680
Fax: 519 266-3666

A & A ENVIRONMENTAL CONSULTANTS INC.

5.0 HYDROGEOLOGICAL CONDITIONS

5.1 Hydrogeology

Groundwater and surface water are expected to flow towards the natural slope of the ground surface. Although the surface topography typically has great influence on the groundwater flow it has been observed in several areas that lithology also has a significant influence on the flow, in some cases more so than surface topography. In the latter case, this is believed to be due to relatively transmissive bedrock underlying a silt overburden. Based on the regional topography, groundwater flow is inferred to be in a north-northwest direction towards Aberfoyle Creek. After groundwater was monitored, it was found that groundwater flows in a southwest direction. The groundwater flow direction may also be influenced by future developments to the subject site by utility trenches and other subsurface structures.

During the hydrogeological investigation on the site, three groundwater monitoring wells and one existing monitoring well were installed within the annulus of five boreholes (Figure 4). The well was constructed of 38 mm (1.5") PVC risers with a 3.05m long Schedule 40 PVC slotted well screen. The existing monitoring well was constructed with 51 mm (2”) PVC risers. A ‘J-plug’ secure end cap was installed at the top of the riser pipe with a threaded drive-point at the bottom of the well screen. The borehole annulus was backfilled with silica sand to approximately 0.3m above the well screen. A bentonite seal was placed on the sand pack to about 0.3mbgs. The well was fitted with a dedicated low-flow sampling tubing and a protective, a steel well protector was installed around the riser. The wells were installed by A&A Environmental Consultants, licensed well technicians in accordance with Ontario Regulation 903.

These wells are used to determine the direction of groundwater flow and quality of the groundwater. A level survey was conducted at the site, which consisted of measuring the elevation of the top of the well casings, relative to a benchmark. This level survey was conducted to provide information used to calculate the groundwater table elevation, hydraulic gradient and flow direction. Groundwater levels were obtained from each monitoring well during the year-long monitoring as shown in Table 2. They were recorded to the nearest 0.01 m accuracy, using

an electronic water-table level tape. The total depth of each well was measured and recorded. The groundwater elevations are shown in the well logs (see Tables 1-2 below). These show the highest elevation near MW24-3 on the north west corner of the site and the lowest at EMW-1 on the west corner of the subject site.

Groundwater flow direction was determined using the groundwater elevation of the of the site on July 17, 2024 groundwater monitoring event.

Table 1 – Monitoring Well Details July 17, 2024

Project #8296-BVD Puslinch				
7504 McLean Road, Puslinch, Ontario				
Date Logged: July 17, 2024		**Logged by: E. Fulsom**		
Monitoring Well #	**MW24-1**	**MW24-2**	**MW24-3**	**EMW-1**
Location	South Corner of Site	East Corner of Site	North Corner of Site	West Corner of the site
Pipe Size (mm)	38	38	38	51
UTM Zone	17T	17T	17T	17T
Easting	570329	570427	570309	570246
Northing	4812824	4812938	4812988	4812875
Top of Pipe (masl)	323.668	323.656	323.653	322.161
Water Level (m)	Dry	2.938	0.649	6.25
Water Level (masl)	Dry	320.718	323.004	315.911
Total Depth (m)	7.521	5.49	3.773	6.406
BM = 322.90 masl, Culvert at site entrance				

Table 2 – Groundwater Monitoring Program Levels

Monitoring Well	Elevation (masl)	Groundwater Elevations (masl)						
		20-Dec-24	24-Jan-25	20-Feb-25	21-Mar-25	10-Apr-25	25-Apr-25	01-Jun-25
MW24-1	323.668	316.147*	316.147*	316.147*	316.147*	316.147*	316.147*	316.147*
MW24-2	323.656	318.166*	318.232	318.166*	319.638	319.815	318.467	318.275
MW24-3	323.653	322.965	322.377	322.623	322.879	322.965	322.821	322.866
EMW-1	322.161	315.755*	315.755*	315.755*	315.755*	315.755*	315.755*	315.755*

Monitoring Well	Elevation (masl)	Groundwater Elevations (masl)						
		24-Jun-24	17-Jul-24	30-Jul-24	23-Aug-24	20-Sep-24	25-Oct-24	22-Nov-24
MW24-1	323.668	316.147*	316.147*	316.147*	316.147*	316.147*	316.147*	316.147*
MW24-2	323.656	319.076	320.718	319.026	318.322	318.236	318.296	318.388
MW24-3	323.653	322.941	323.004	322.808	322.880	322.378	322.083	322.980
EMW-1	322.161	315.835	315.911	315.946	315.755*	315.952	315.755*	315.755*

*Denotes Dry Measurement, water level inferred to be below bottom elevation of well

The seasonal change in groundwater hydraulic gradient due to rainfall and spring runoff have a significant influence on the groundwater flow velocities. The groundwater flow velocities were calculated using a hydraulic gradient of 0.155 m/m (MW-3 to EMW-1) using July 17, 2024 groundwater elevation and the hydraulic conductivity of 1 x 10^{-5} cm/s for silty sand materials, with an estimated porosity of 35% (Fetter 2001). The average linear velocity can thus be calculated using the following equation:

$$v = \frac{ki}{n}$$

Where "k" is the hydraulic conductivity, "i" is the hydraulic gradient, and "n "the porosity. By using the above information, the average linear velocities for the silty sand materials are estimated to be 1.40 m/year.

A groundwater contour map, shown below in Figure 5, Appendix A, was plotted using Golden Surfer™ (Surfer 8) and the measurements of groundwater levels taken on July 17, 2024 from three monitoring wells installed in the unconfined aquifer. This map shows well EMW-1 being at the lowest water elevation compared with the other wells used. The general direction of groundwater flow was found to be in a southwest direction.

Due to the importation of unknown fill to the subject site, this non-native soil can influence the subject site groundwater in unpredictable ways such as MW24-1 being dry during every water monitoring. The yearly monitoring does confirm that the groundwater does flow southwest.

5.2 Meteorological Conditions

Meteorological conditions, such as precipitation (rainfall and snowfall) and temperature are of particular interest for understanding the existing surface water regime; the amount of water available for groundwater recharge; and for developing a surface water management system at the subject site. Data for 2023 describing the climatic variables was obtained from the Environment Canada meteorological station "Guelph Turfgrass Institute", located in Guelph, Ontario (Table 3). However, climate varies across large area both spatially and temporally with

Based on the site condition, positive dewatering will not be workable at the site for the building footings construction. The construction dewatering (likely by sump pumping) and post construction drainage were evaluated to be in an amount below 50,000 L/day. Therefore, a PTTW or EASR posting will not be required.

5.8 Soil Characteristics for Drainage, Infiltration and Percolation

Using the geotechnical soil sample results from the geotechnical investigation prepared by A&A, the grain size analysis and moisture content can give us details on the soil characteristics for drainage, infiltration and percolation. This report also had details from a previous geotechnical report and a sample analyzed by Terraprobe. Laboratory data can be found in Appendix D.

Table 4 – Soil Characteristics and Grain Size Analysis

BH #	Moisture Content (%)	Grain Size Content (%)				Sample Depth	Sample Description
		Gravel	Sand	Silt	Clay	Ft (m)	
BH24-1 (SS2)	10.7	44	38	13	5	2.6-4.6 (0.8-1.4)	Gravel and sand, some silt, trace clay
BH24-4 (SS5)	9.3	28	44	24	4	9.8-11.8 (3.0-3.6)	Gravelly silty sand, trace clay
Terraprobe BH-1 (SS5)	9.2	15	43	33	9	10.8 (3.3)	Silty Sand, some gravel, trace clay

The soil in this area can be seen as silty sand with some gravel.

Using the laboratory results above, hydraulic conductivity can be calculated using Hazen's empirical formula (Fetter, 2007):

$$K = C(d_{10})^2$$

Where K = hydraulic conductivity (cm/s)

d_{10} = grain size of the 10th percentile (cm)

C = constant according to the following table:

Very fine sand, poorly sorted = 40-80

Fine sand with many fines = 40-80

Medium sand, well sorted = 80-120

Coarse sand, poorly sorted = 80-120

Coarse sand, well sorted = 120-150

If your sample is poorly sorted, you will have relatively equal mass fractions in a variety of different sizes and your histogram will look fairly even. The values for the borehole locations and depth can be seen in Table 5. *C* for this sample will be between 40-80 as they are considered fine sands, silts and clays. The *T-time* or *percolation time* can be calculated from the hydraulic conductivity. This is using the following formulas:

$$Approximate\ infiltration\ rate^{(1)} = \left(\frac{K}{6 \times 10^{-11}}\right)^{\frac{1}{3.7363}} \quad mm/hr$$

$$Percolation\ Time\ = \ (infilration\ rate\ )^{-1} \times (60\ min/hr) \times (10\ mm/cm)\ \ min/cm$$

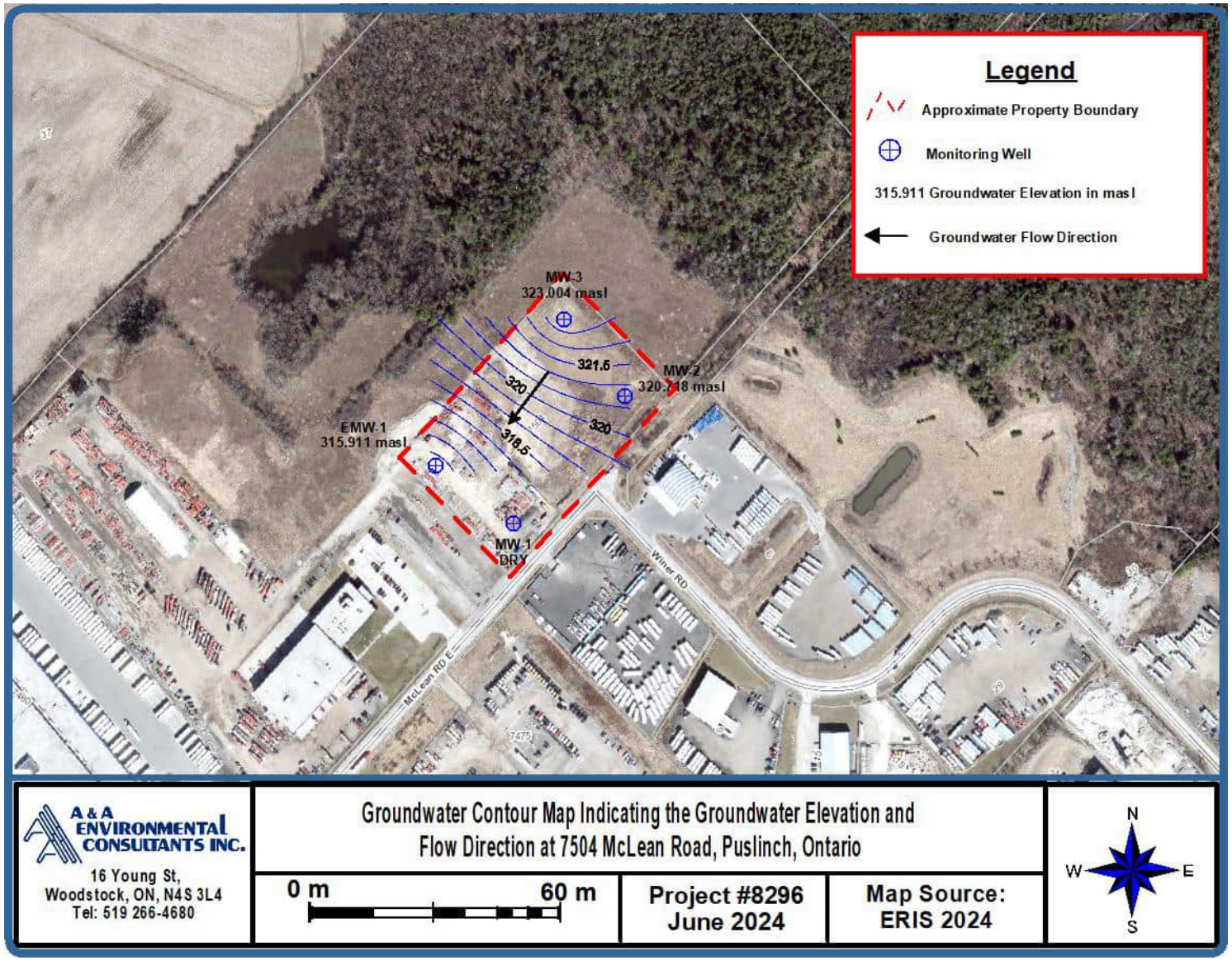
Note (1) Ontario Ministry of Municipal Affairs and Housing (OMMAH). 1997.

Table 5 – Hydraulic Conductivity and Percolation Time

BH #	Depth (m)	D_{10} (cm)	C	K (cm/s)	Approximate Infiltration Rate (mm/hr)	T-time/ Percolation Time (min/cm)	Notes
BH24-1 (SS2)	1.4	0.001	80	$8.0x10^{-5}$	43.581	13.767	Gravel and sand, some silt, trace clay
BH24-4 (SS5)	3.6	0.001	80	$8.0x10^{-5}$	43.581	13.767	Gravelly silty sand, trace clay
Terrap robe BH-1 (SS5)	3.3	0.0035	80	$1.2x10^{-5}$	26.372	22.755	Silty Sand, some gravel, trace clay

The infiltration rate of 26 mm/hr and percolation time of 23 min/cm can be used for design purposes based upon the values above.

Figure 5 – Groundwater Contour Map



APPENDIX F – Geotechnical Testing Report Data

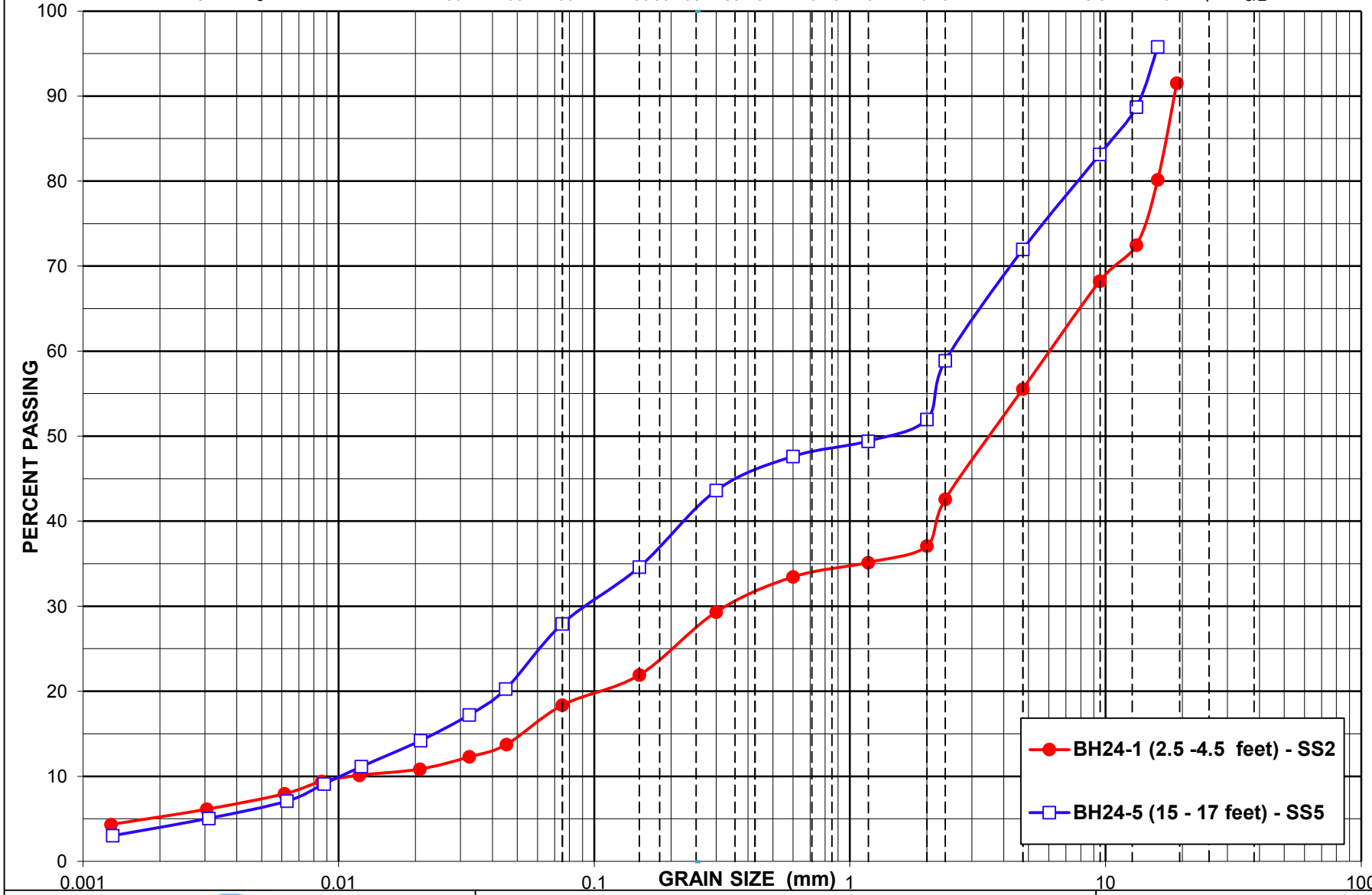
LS 702/D 422

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY AND SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

GRAIN SIZE IN MICROMETERS: 1 3 5 1 30 50 200

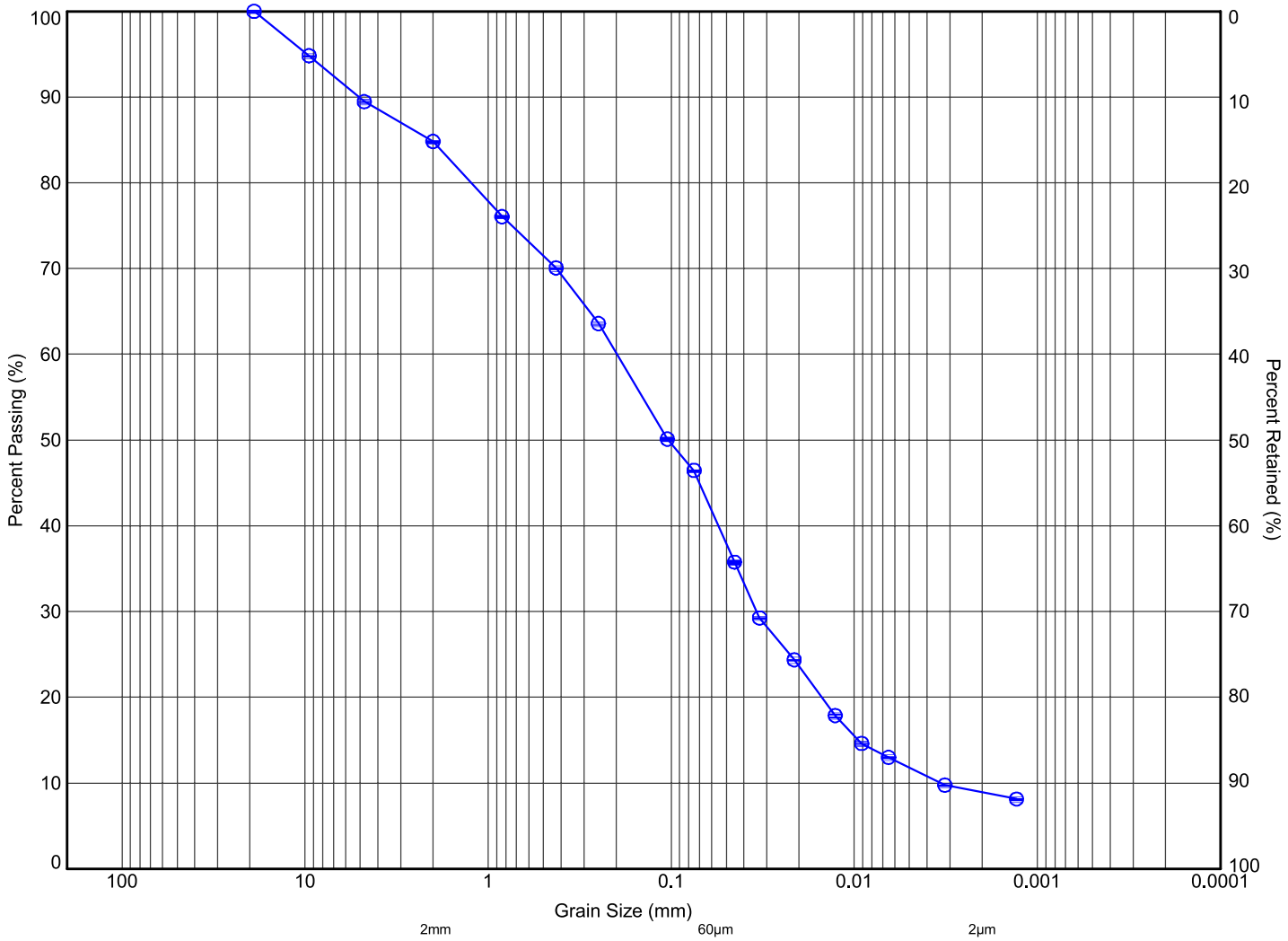
SIEVE DESIGNATION NOMBER (Imperial): 100 80 60 50 40 25 20 16 10 8 4 3/8" 1/2" 3/4" 1" 3/2"



GEOTRUST ENGINEERING LIMITED

GRAIN SIZE DISTRIBUTION

Drawing No.: 1	1
PROJECT No. :	GT23001TA
DATE :	July 1, 2024



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
⊖	**1**	SS5	3.3	319.9	15	43	33	9	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
SILTY SAND, SOME GRAVEL, TRACE CLAY

File No.: **1-20-0525-01**

Appendix B

Design Calculations

7504 McLean Rd Septic Bed Design

ONSITE WASTEWATER TREATMENT SYSTEM DESIGN

Puslinch, Ontario

Project Number:	55237-100
Date:	7/31/2025
Design By:	ZIC
File:	Q:\55237\100\Wastewater\55237-100 Wastewater Treatment System Design_Rev4.xlsm

Ontario Building Code - Division B, Part 8

1) Soil Parameters, T-Time

		min/cm
a)	Native soil (per Geotechnical Engineer's report)	23
b)	Imported Sand Material (maximum)	15

Design Percolation Time ("T" Time)	**T =**	**15**	***min/cm***

2) Daily Design Flow, Q (*L*)

Occupancy	Sizing Requirement	Number of Sizing Requirement	Daily Design Flow (L/day)	Flow (L/day)	OBC Table Reference
Office Building	per employee per 8 hour shift, or	14	75	1050	Table 8.2.1.3.B Reference 15 a)
	per each 9.3 m^2 of floor space	24.8	75	1860	Table 8.2.1.3.B Reference 15 b)
	Floor Space is: 230 m2				
	Office Building Flow			**1860**	
Warehouse	per water closet, and	1	950	950	Table 8.2.1.3.B Reference 26 a)
	per loading bay	4	150	600	Table 8.2.1.3.B Reference 26 b)
	Warehouse Flow			**1550**	

Total Sewage Flow	**Q =**	**3410**	***Lpd***
Total Daily Design Sewage Flow	**Q =**	**3500**	***Lpd***

3) Treatment Unit

Model	Capacity
BNA Treatment System	3500 *L/d*

4) Minimum Contact Area for Imported Sand

Loading Rate:	8	*$L/m^2/day$*
Minimum Contact Area:	437.5	*m^2*
Contact Area Provided:	625.0	*m^2*

5) Type A Bed Sizing

Stone Area	$A_{Stone\ Area}$ =	Q/50	70.00 m^2
Sand Area	$A_{Sand\ Area}$ =	QT/850	61.76 m^2

Number of Runs:	3	
Run Spacing:	2.0	*m*
Run Length:	15.0	*m*
Stone Width	5.2	*m*
Stone Length	16.2	*m*

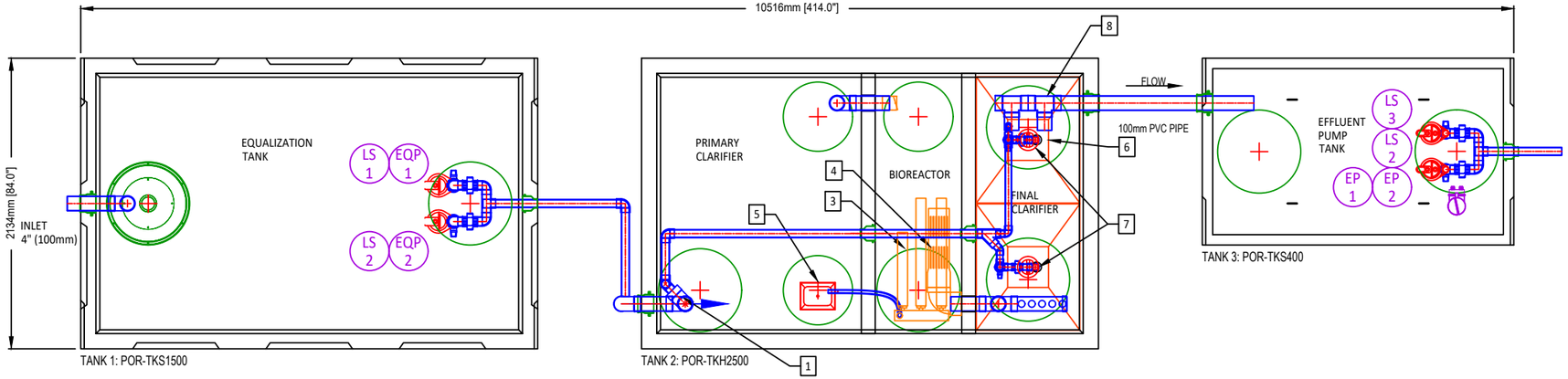
Proposed stone area ($A_{Stone\ Area}$)	**$A_{Stone\ Area}$ =**	**84.2 *m^2***

Sand Width	7.2	*m*
Sand Length	18.2	*m*

Proposed sand area ($A_{Sand\ Area}$)	**$A_{Sand\ Area}$ =**	**131.0 *m^2***

Appendix C

BNA Treatment System Details



NOTES:

1. INLET TEE BAFFLE
2. CARRIER MEDIA (0.85 m³)
3. FINE BUBBLE DIFFUSERS (1 x MRB10, 2 x MRB15)
4. MEDIA RETENTION SCREEN
5. AIR BLOWER (HP150)
6. DUPLEX HOPPER
7. SLUDGE RETURN PUMP (2)
8. OUTLET TEE BAFFLE (SAMPLING PORT)

TANK LIST		
PROCESS NAME	TANK #	~ WORKING VOLUME (m³)
EQUALIZATION TANK	1	6.7
PRIMARY CLARIFIER	2	4.7
BIOREACTOR	3	2.0
FINAL CLARIFIER	4	2.0
EFFLUENT PUMP TANK	5	2.2

PROCESS FLOW
SLUDGE RETURN/RECIRC
AERATION
CHEMICAL DOSING
ELECTRICAL

BL BLOWER
VFD VARIABLE FREQUENCY DRIVE
CDP CHEMICAL DOSING PUMP
SRP SLUDGE RETURN PUMP
FSP FLOATING SLUDGE (SKIMMER) PUMP
EQP FLOW EQUALIZATION PUMP
RCP RECIRCULATION PUMP
EP EFFLUENT PUMP
LS LEVEL SWITCH (FLOAT)

NOTES:

A. ALL WORK, INSTALLATION AND CONNECTIONS IN RELATION TO THE TREATMENT SYSTEM SHALL BE DONE IN ACCORDANCE WITH THE WRITTEN INSTRUCTIONS PROVIDED BY BERGMANN NORTH AMERICA INC. AND IN ACCORDANCE WITH ALL APPLICABLE LOCAL CODES AND REGULATIONS.

B. ALL ACCESS OPENINGS MUST BE INSTALLED TO GRADE AND SECURED TO PREVENT ACCIDENTAL OR UNAUTHORIZED ACCESS.

C. A MAXIMUM OF 1 METRE BURIAL DEPTH IS ALLOWABLE ON TOP OF ANY TANKS IN A NON-TRAFFIC AREA. EXTRA REINFORCEMENT IS REQUIRED FOR USE IN AREAS WITH VEHICULAR TRAFFIC AND BURIAL DEPTHS OVER 1 METRE.

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF BERGMANN NORTH AMERICA INC. ANY REPRODUCTION IN WHOLE OR IN PART WITHOUT WRITTEN CONSENT OF BERGMANN NORTH AMERICA INC. IS PROHIBITED. DESIGN AND INVENTION RIGHTS ARE RESERVED.

BNA
BERGMANN NORTH AMERICA INC.
iQ. MBBR

5537-100-7504 MCLEAN ROAD WWTS

DRAWING: PLAN LAYOUT
FOR PROPOSAL
Rev.0

DRAWN BY: IR
APPROVED BY: MM
SHEET 1 of 1

DATE: 2024/10/30
SCALE: 1:40

BERGMANN NORTH AMERICA INC. © 2024

Appendix D

On-site Wastewater System Inspections

ON-SITE WASTEWATER TREATMENT SYSTEM INSPECTIONS

1.0 Subgrade Preparation

Subgrade must be inspected by Design Engineer and Township Inspector prior to the placement of any imported sand fill. Subgrade shall be level and excavated to the dimensions illustrated on the approved plan. Work includes the removal of all trees, roots, vegetation, topsoil, and other soils until an acceptable subgrade soil is encountered.

2.0 On-site Wastewater System Components

Prior to backfilling the contractor must contact the Design Engineer and Township Inspector to carry out an inspection of all on-site wastewater system components including: tanks, distribution pipes, imported fill, trenches, pump and controls. Approval of the system and its components will not be given until the pump system is connected and the floats can be verified. Contractor to provide Design Engineer with written certification of soil gradation conforming to the specified T-time of the imported sand material.

3.0 Final Grading

Design Engineer to ensure the placement of topsoil and final grading is in accordance with the approved grading plan.

Appendix E

OOWA Handout

MTE

Be sure to hire OOWA professionals to design, install, pump or service your onsite sewage system.

What to look for when hiring an onsite wastewater practitioner:

- Are they an OOWA Member?**
- Are they licensed ? Be sure to ask for their BCIN (Building Code Identification Number).
- Are they going to get a permit?
- Have you checked their references?
- Is the quote comprehensive and detailed?

Remember, the cheapest doesn't always mean the best!

**Why is this important? OOWA is the voice of onsite and decentralized wastewater experts in Ontario. OOWA provides training and skills development opportunities in addition to current industry best practice resources for our members.

Find OOWA members on our member directory at www.oowa.org/business-directory-map/

TIP

The Ontario Building Code mandates that tanks be pumped when scum and sludge levels occupy 1/3 of the tank's capacity. Get to know your usage by talking to your pumper and then pump as required.

Why is maintaining your sewage system so important?

Properly functioning onsite sewage systems can increase the value of your home, prevent costly repairs, stop raw effluent and excessive nutrients from leaching into our waterways and help prevent contamination of aquifers - your source of drinking water!

Clogged effluent filters can lead to sewage back ups.

Have your effluent filter checked and cleaned regularly.

Tank risers ensure safety and accessibility for servicing.

Landscape so that the risers are easily found and accessible.

Photos courtesy of Polylok and R.J. Burnside & Associates

TIP

When buying a house, make sure to ask for the past and present sewage system records, including any maintenance or pump out receipts/reports that have been done. A new sewage system is a major financial investment, so be sure to take that into consideration when purchasing a home.

ESTABLISHED IN 1999

Ontario Onsite Wastewater Association

A Homeowner's Guide to a Healthy Sewage (Septic) System

MTE

MTE Consultants Inc.
520 Bingemans Centre Drive, Kitchener, ON N2B 3X9
519-743-6500 info@mte85.com
Offices in Kitchener, Burlington, Toronto, Stratford and London
https://www.mte85.com

1-855-905-6692
info@oowa.org | www.oowa.org

Sewage System DO's

- Do keep accurate records of maintenance, pump outs and service calls
- Do keep a system diagram for reference
- Do repair leaky plumbing fixtures
- Do replace old toilets with low-flush models
- Do install an effluent filter in your septic tank to protect your leaching bed and to ensure you are in compliance with the Ontario Building Code
- Do keep the access lids easily accessible and securely fastened
- Do ensure that your home insurance policy includes a sewage back-up rider
- Do ensure that the leaching bed has good erosion control on it post installation (grass)
- Do ensure all contractors know the location of your leaching bed, get the required utility locates done and ensure that any landscaping does not impact the bed

Sewage System DON'Ts

- Don't allow vehicles to drive over or park on the leaching bed
- Don't build skating rinks or above ground pools on it
- Don't dig without knowing the location of your sewage system
- Don't plant any trees or shrubs on or near the bed; their roots can clog pipes
- Don't drain downspouts, sump pumps, etc. down or near the tanks or leaching bed
- Don't build over the tank or leaching bed with a hard surface such as asphalt, brick or patio stones
- Don't excessively water the lawn over the leaching bed
- Don't use a garbage disposal/garburator

TIP

Onsite sewage systems should last between 20-30 years or longer if properly maintained. To make sure yours is functioning properly, call your local licensed wastewater professional.

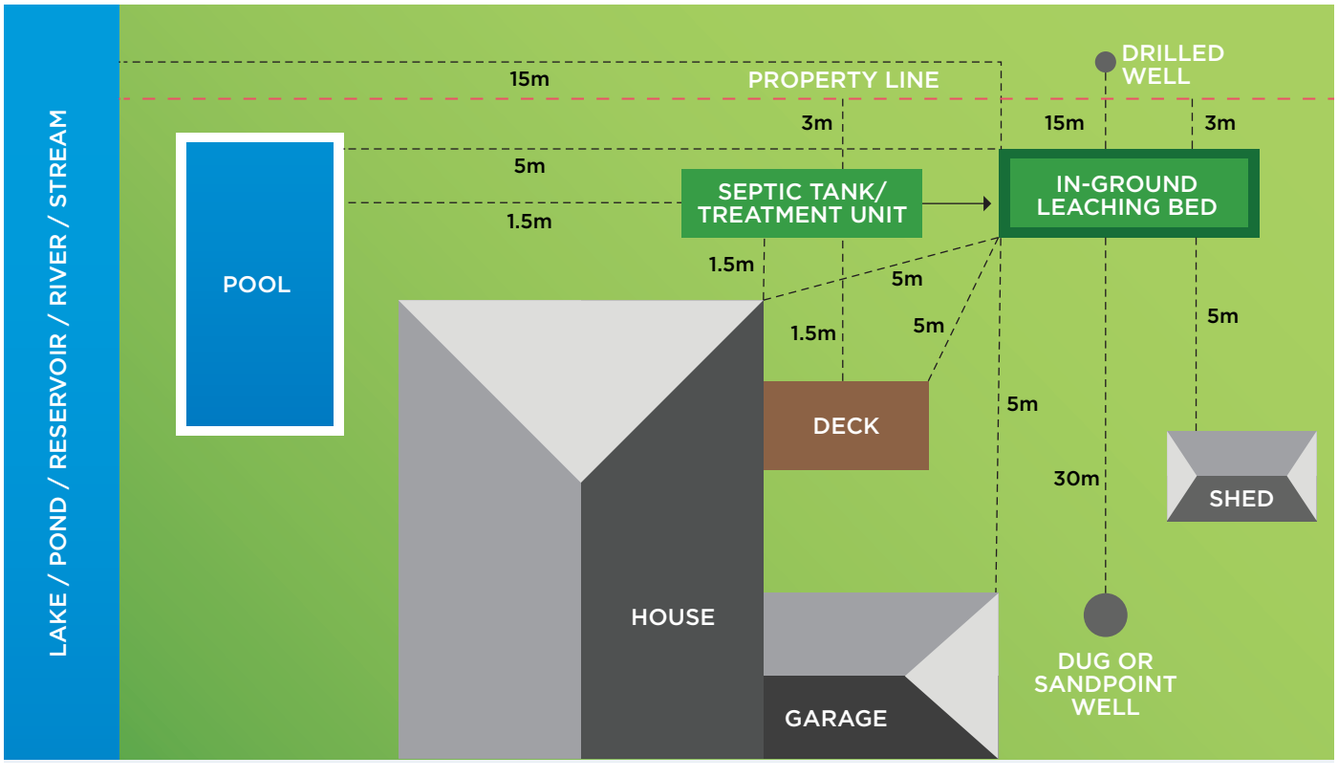
What you should NOT put into your sewage system:

- Anti-bacterial soaps
- Automatic toilet bowl cleaners
- "Flushable" wipes or other sanitary products
- Liquid fabric softeners
- Harsh chemicals
- Food scraps and coffee grounds
- Oils/grease/fats
- Drain de-cloggers
- Pharmaceuticals

Remember to only use natural and biodegradable cleaning products!

Important first steps for installing a sewage system

1. Have a professional help you with your application.
   Qualified installers and designers can be found on OOWA's member directory.
2. Who has permitting authority?
   Call your local municipality or district and ask. Also find out if there are any special requirements for your property.
3. Get a sewage system application form
   As provided by your principal authority.
4. Make sure you have all the required information ready.
   These will be stated on your application form.



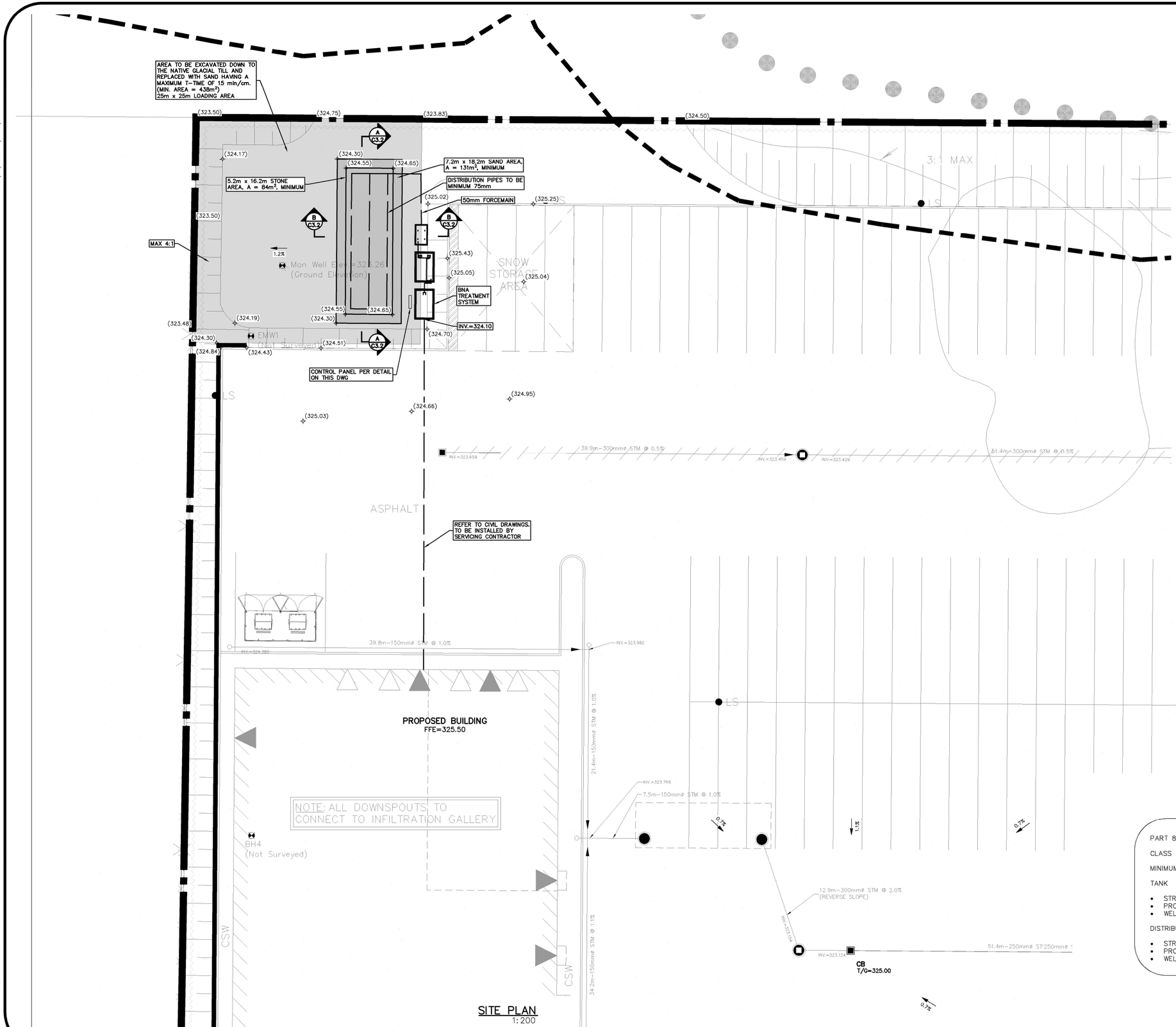
Notes:

1. The distances shown in this plan are minimum requirements from the Ontario Building Code.

2. Set backs may need to be increased depending on site conditions and the type of system.

3. If the distances on this plan cannot be met, you can propose an "alternate solution" that will be considered by the agency reviewing your sewage system application.

Drawings



SITE PLAN
1:200

LEGEND OF EXISTING FEATURES

- SITE BOUNDARY (APPROXIMATE ONLY)
- EXISTING STORM SEWER (Ex. 375mmø STM)
- EXISTING FENCE
- GRCA REGULATION LIMIT
- EXISTING FLOODLINE LIMIT (ELEVATION=322.30)

LEGEND OF PROPOSED FEATURES

- PROPOSED BUILDING
- OVERHEAD DOOR
- MAN DOOR
- CONCRETE CURB (DROP CURB)

PART 8 – ONTARIO BUILDING CODE

CLASS 4 SEPTIC SYSTEM

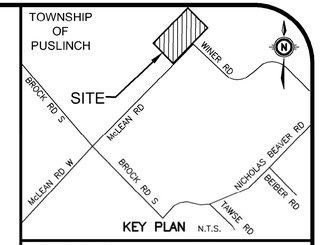
MINIMUM CLEARANCE REQUIREMENTS:

TANK

- STRUCTURE – 1.5m
- PROPERTY LINE – 3m
- WELL – 15m

DISTRIBUTION PIPING

- STRUCTURE – 5m
- PROPERTY LINE – 3m
- WELL – 15m



KEY PLAN N.T.S.

GEODETIC BM ELEV. = m
REFER TO PLAN BY BSR&D LTD. DATED SEPTEMBER 9, 2020.

SITE BENCHMARK ELEV. = m
REFER TO PLAN BY BSR&D LTD. DATED SEPTEMBER 9, 2020.

NOTE TO CONTRACTOR :

DO NOT SCALE DRAWINGS.

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

ALL DRAWINGS REMAIN THE PROPERTY OF THE ENGINEER AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT THE ENGINEER'S WRITTEN PERMISSION.

THE OWNER/ARCHITECT/CONTRACTOR IS ADVISED THAT M.T.E. CONSULTANTS INC. CANNOT CERTIFY ANY COMPONENT OF THE SITE WORKS NOT INSPECTED DURING CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO NOTIFY M.T.E. CONSULTANTS INC. PRIOR TO COMMENCEMENT OF CONSTRUCTION TO ARRANGE FOR INSPECTION.

NOTE:

1. **PROPERTY LINE IS APPROXIMATE ONLY AND SHOULD NOT BE USED FOR DETERMINING SETBACKS OR LAYOUT.**
2. **THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE ONSITE WASTEWATER REPORT DATED AUGUST 2025**

No.	REVISION	BY	YYYY-MM-DD
8.			
7.			
6.			
5.			
4.			
3.			
2.	Revised per Township Comments	AJS	2025-08-20
1.	ISSUED FOR APPROVAL	AJS	2025-01-22

MTE
Engineers, Scientists, Surveyors
519-743-6500

OWNER
BVD REAL ESTATE INC.
130 DELTA PARK BOULEVARD BRAMPTON

PROJECT
7504 McLEAN ROAD
PUSLINCH

DRAWING
PROPOSED ONSITE WASTEWATER TREATMENT SYSTEM

Project Manager: A. SLAWICH	Project No.: 55237-100
Design By: MAC/ZIC	Checked By: MAC
Drawn By: ZIC	Checked By: MAC
Surveyed By: MTE	Drawing No.: C3.1
Date: Nov.04/24	
Scale: 1:200	Sheet 2 of 4

MTE FILE PATH: P:\P\55237\100\55237-103-C3
August 20, 2025 – 4:05:07 PM – Plotted By: Zach Chamos

CONSTRUCTION NOTES AND SPECIFICATIONS

1. GENERAL

1.1. THIS PLAN IS NOT FOR CONSTRUCTION UNTIL SIGNED AND SEALED BY ENGINEER AND APPROVED BY THE LOCAL MUNICIPALITY.

1.2. THIS PLAN IS TO BE USED FOR SERVICING AND GRADING ONLY; ANY OTHER INFORMATION SHOWN IS FOR ILLUSTRATION PURPOSES ONLY. THIS/THESE PLAN/S MUST NOT BE USED TO SITE THE PROPOSED BUILDING.

1.3. NO CHANGES ARE TO BE MADE WITHOUT THE APPROVAL OF THE DESIGN ENGINEER.

1.4. THIS PLAN IS NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE PERMISSION OF MTE CONSULTANTS INC.

1.5. PRIOR TO CONSTRUCTION, THE CONTRACTOR MUST:

1.5.1. CHECK AND VERIFY ALL EXISTING CONDITIONS, LOCATIONS AND ELEVATIONS WHICH INCLUDES BUT IS NOT LIMITED TO THE BENCHMARK ELEVATIONS, EXISTING SERVICE CONNECTIONS AND EXISTING INVERTS. REPORT ALL DISCREPANCIES TO THE ENGINEER PRIOR TO PROCEEDING.

1.5.2. OBTAIN ALL UTILITY LOCATES AND REQUIRED PERMITS AND LICENSES.

1.5.3. VERIFY THAT THE FINISHED FLOOR ELEVATIONS AND BASEMENT FLOOR ELEVATIONS (WHICH MAY APPEAR ON THIS PLAN) COMPLY WITH THE FINAL ARCHITECTURAL DRAWINGS.

1.5.4. CONFIRM ALL DRAWINGS USED FOR CONSTRUCTION ARE OF THE MOST RECENT REVISION.

1.6. THE CONTRACTOR SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE TO EXISTING WORKS. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY TO LOCAL MUNICIPALITY STANDARDS

1.7. ALL WORKS ON A MUNICIPAL RIGHT-OF-WAY WITH THE EXCEPTION OF WATERMAIN TAPPING, TO BE INSTALLED BY THE OWNER'S CONTRACTOR AT OWNER'S EXPENSE IN ACCORDANCE WITH THE LOCAL MUNICIPALITY'S "PROCEDURE FOR OFF-SITE WORKS BY PRIVATE CONTRACTOR". THE OWNER AND CONTRACTOR ARE TO ENSURE OFF-SITE WORKS PERMIT IS IN PLACE PRIOR TO CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ALL AFFECTED PROPERTY TO ORIGINAL CONDITION. ALL BOULEVARD AREAS SHALL BE RESTORED WITH 150mm TOPSOIL AND SOD.

1.8. ALL UNDERGROUND SERVICES ARE TO BE CONSTRUCTED IN FULL COMPLIANCE WITH THE ONTARIO PROVINCIAL BUILDING CODE (PART 7, PLUMBING), THE ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS) AND THE REQUIREMENTS OF THE LOCAL MUNICIPALITY.

1.9. CONTRACTOR IS RESPONSIBLE FOR CONTACTING ENGINEER 48 HRS PRIOR TO COMMENCING WORK TO ARRANGE FOR INSPECTION. ENGINEER TO DETERMINE DEGREE OF INSPECTION AND TESTING REQUIRED FOR CERTIFICATION OF UNDERGROUND SERVICE INSTALLATION AS MANDATED BY ONTARIO BUILDING CODE, DIVISION C, PART 1, SECTION 1.2.2, GENERAL REVIEW. FAILURE TO NOTIFY ENGINEER WILL RESULT IN EXTENSIVE POST CONSTRUCTION INSPECTION AT CONTRACTORS EXPENSE.

1.10. SANITARY AND STORM SEWERS AND SERVICES TO HAVE A MINIMUM 1.4m COVER TO TOP OF PIPE. WHERE COVER TO TOP OF PIPE IS DEFICIENT, CONTRACTOR SHALL INSTALL SHALLOW BURIED PIPE IN ACCORDANCE WITH APPLICABLE "GRAVITY PIPE INSULATION DETAIL" INDICATED IN DRAWING DETAILS.

1.11. PLAN TO BE READ IN CONJUNCTION WITH DESIGN REPORT, PREPARED BY MTE, DATED JUNE 2022.

1.12. EXISTING TOPOGRAPHIC INFORMATION TAKEN FROM PLAN PREPARED BY MTE, DATED XXXXX, 20XX.

1.13. CONTRACTOR TO OBTAIN WRITTEN PERMISSION FROM ADJACENT PROPERTY OWNER PRIOR TO ENTERING UPON NEIGHBOURING LANDS TO UNDERTAKE ANY WORK. COPIES OF THESE LETTERS OF CONSENT SHALL BE SUBMITTED TO THE DEPARTMENT OF PUBLIC WORKS FOR APPROVAL PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT CONTRACTOR'S OWN RISK.

1.14. FILTER FABRIC TO BE TERRAFIX 200R OR APPROVED EQUAL.

1.15. MAXIMUM GRASSED SLOPE TO BE 3:1. SLOPES GREATER THAN 3:1 TO BE LANDSCAPED WITH LOW MAINTENANCE GROUND COVER.

1.16. SIDE SLOPES OF ALL STOCKPILES OR EXTRACTION FACES TO BE MAINTAINED AT 70 DEGREES OR LESS BETWEEN EARLY APRIL AND LATE AUGUST TO DETER BANK SWALLOWS FROM NESTING.

1.17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD INCLUDING THE SUPPLY, INSTALLATION AND REMOVAL OF ALL NECESSARY SIGNALS, DELINEATORS, MARKERS, AND BARRIERS. ALL SIGNS, ETC. SHALL CONFORM TO THE STANDARDS OF THE LOCAL MUNICIPALITY AND THE MTO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

1.18. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

2. PIPING:

2.1. FORCEMAIN SHALL BE DR-17 HDPE PIPE COMPLETE WITH FUSED JOINTS. APPROVED ALTERNATIVE: SDR26 PVC PIPE WITH BELL AND SPIGOT JOINTS (IPEX CYCLE-TOUGH).

3. TANKS

3.1. PRECAST CONCRETE TANKS, INSTALLED AND LEVELLED AS PER MANUFACTURER'S SPECIFICATIONS, ELEVATION SET TO RECEIVE GRAVITY DRAINAGE (MINIMUM 1.0% SLOPE) FROM BUILDING SEWER.

3.2. EXTEND ALL ACCESS HATCHES TO 150mm ABOVE GRADE WITH 610mm DIAMETER POLYLOK RISERS AND LIDS WITH RISER SAFETY SCREEN INSTALLED IN EACH LID. GROUT SEAL ALL PIPING CONNECTIONS AND RISER JOINTS WITH NON-SHRINK GROUT. MINIMUM DEPTH OF COVER ABOVE TOP OF TANK TO BE 300mm

6. TREATMENT SYSTEM

6.1. PROVIDE BNA BIOFILTER TREATMENT SYSTEM DESIGNED FOR A PEAK DAILY FLOW OF 3,500 L/D. THE SYSTEM HAS BEEN DESIGNED BASED ON TYPICAL RESIDENTIAL STRENGTH DOMESTIC SEWAGE. SEWAGE STRENGTH SHALL BE CONFIRMED WITH BNA PRIOR CONSTRUCTION

6.2. THE CONTRACTOR SHALL INCLUDE THE SUPPLY AND INSTALLATION OF PRE-CAST TANKS IN AREA INDICATED ON MTE DWG C3.1. THE PRE-CAST TANK SUPPLIER SHALL BE APPROVED BY BNA. ALL REQUIRED PUMPS, FILTERS, PIPING, FITTINGS ETC. WITHIN THE TANKS, ALONG WITH THE CONTROL PANEL, SHALL BE SUPPLIED BY BNA AND INSTALLED BY THE CONTRACTOR. PROVIDE COMPLETE TREATMENT SYSTEM AND APPURTENANCES SUCH THAT THE SYSTEM IS FULLY OPERATIONAL.

6.3. PROVIDE ALL DUCTS, CONDUITS AND WIRING TO COMPLETE THE TREATMENT SYSTEM. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS PER ELECTRICAL SAFETY AUTHORITY REQUIREMENTS.

6.4. CONTACT INFORMATION FOR BNA IS AS FOLLOWS:

7-20 STECKLE PLACE,

KITCHENER ON N2E 2C3

PHONE # 519-220-0698

7. ELECTRICAL AND CONTROL NOTES:

7.1. PUMP CONTROL PROGRAMMING AND ELECTRICAL EQUIPMENT BY SEWAGE SYSTEM CONTRACTOR. PROVISION OF ALL CONTROL WIRING AND POWER WIRING BETWEEN AND WITHIN PUMP TANK, JUNCTION BOXES, CONTROL PANEL, AUTOMATIC TRANSFER SWITCH AND UP TO THE MAIN ELECTRICAL FEED DISCONNECT SWITCHES BY SEWAGE SYSTEM CONTRACTOR.

7.2. NO JOINTS PERMITTED FOR THE CONTROL AND POWER WIRING FROM THE CONTROL PANEL INTO THE PUMP TANK. JUNCTION BOXES SHALL BE USED FOR WIRE PULLING ONLY. SEAL CONDUITS CONNECTED TO PUMP TANK WITH EYS FITTINGS.

7.3. CONTRACTOR IS RESPONSIBLE FOR ALL ELECTRICAL APPROVALS AND INSPECTIONS (ESA).

8. EROSION AND SEDIMENT CONTROL

8.1. CONTRACTOR TO INSTALL EROSION CONTROL MEASURES AS SHOWN PRIOR TO CONSTRUCTION AND MAINTAIN IN GOOD CONDITION UNTIL CONSTRUCTION IS COMPLETED AND ALL DISTURBED GROUND SURFACES HAVE BEEN RESTABILIZED EITHER BY PAVING OR RESTORATION OF VEGETATIVE COVER.

8.2. ALL SEDIMENT CONTROL FENCING TO BE INSTALLED PRIOR TO ANY AREA GRADING, EXCAVATING OR DEMOLITION COMMENCING.

8.3. EROSION CONTROL FENCING TO BE INSTALLED AROUND BASE OF ALL STOCKPILES. ALL STOCKPILES TO BE KEPT 2.5m MINIMUM FROM PROPERTY LINE.

8.4. EROSION PROTECTION TO BE PROVIDED AROUND ALL STORM AND SANITARY MHs AND CBs.

8.5. CONSTRUCTION ACCESS (MUD MAT) TO BE PROVIDED ON-SITE AT ALL LOCATIONS WHERE CONSTRUCTION VEHICLES EXIT THE SITE. CONSTRUCTION ACCESS (MUD MAT) SHALL BE A MINIMUM OF 3.0m WIDE, 15.0m LONG (LENGTH MAY VARY DEPENDING ON SITE LAYOUT) AND 0.3m DEEP AND SHALL CONSIST OF 200mm CLEAR STONE MATERIAL OR APPROVED EQUIVALENT. PROPOSED EROSION FENCING TO TIE INTO MUD MAT. CONTRACTOR TO ENSURE ALL VEHICLES LEAVE THE SITE VIA THE MUD MAT AND THAT THE MAT IS MAINTAINED IN A MANNER TO MAXIMIZE EFFECTIVENESS AT ALL TIMES.

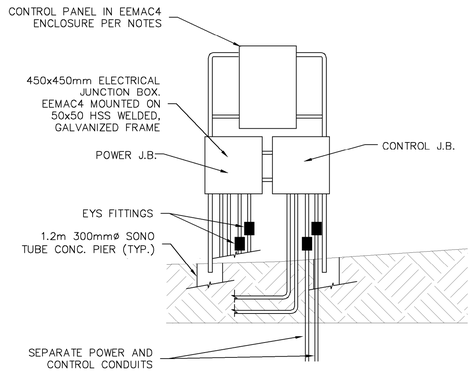
8.6. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AS SITE DEVELOPMENT PROGRESSES. CONTRACTOR TO PROVIDE ALL ADDITIONAL EROSION CONTROL STRUCTURES.

8.7. EROSION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN RESTABILIZED.

8.8. NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THE ENGINEER AND THE LOCAL MUNICIPALITY'S DEPARTMENT OF PUBLIC WORKS.

8.9. CONTRACTOR TO CLEAN ROADWAY AND SIDEWALKS OF SEDIMENTS RESULTING FROM CONSTRUCTION TRAFFIC FROM THE SITE EACH DAY.

8.10. CONTRACTOR MUST REMOVE EROSION AND SEDIMENTATION FENCING PRIOR TO COMPLETION OF PROJECT. CONTRACTOR TO HAVE EROSION AND SEDIMENTATION FENCE INSPECTED WHEN VEGETATION HAS ESTABLISHED, BUT PRIOR TO FENCE BECOMING OVERGROWN. ENGINEER'S REPRESENTATIVE TO DETERMINE IF VEGETATION HAS REACHED THE CRITICAL POINT AND WILL THEN INSTRUCT CONTRACTOR TO REMOVE FENCE.



CONTROL PANEL DETAIL
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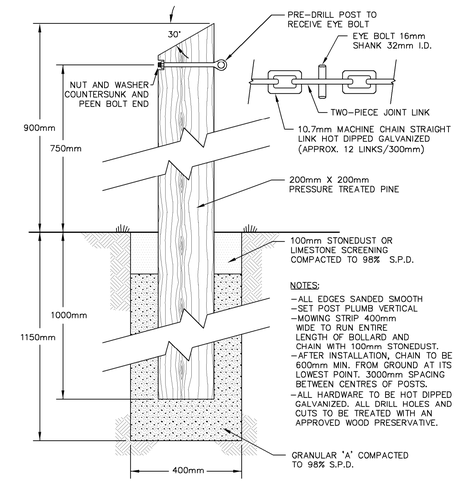
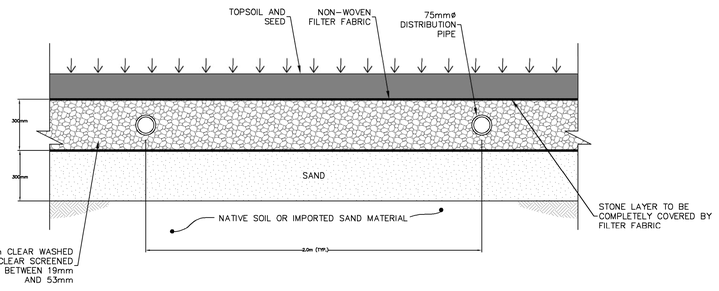
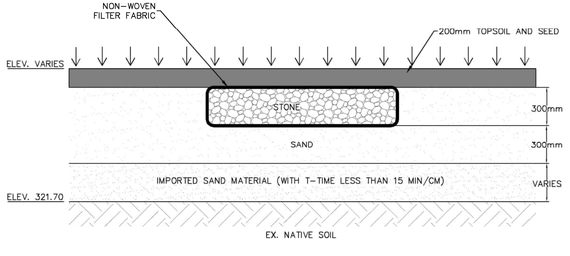


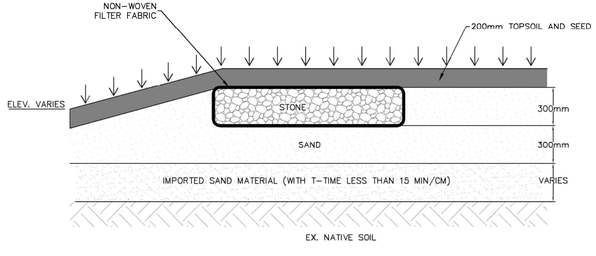
BOLLARD AND CHAIN DETAIL
N.T.S.



TYPICAL AREA BED
DISPERSAL PIPING DETAIL
N.T.S.

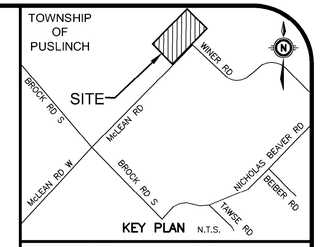


SECTION A-A



SECTION B-B

AREA BED SECTIONS
N.T.S.



KEY PLAN N.T.S.

GEODETIC BM ELEV. = m
REFER TO PLAN BY BSR&D LTD. DATED SEPTEMBER 9, 2020.

SITE BENCHMARK ELEV. = m
REFER TO PLAN BY BSR&D LTD. DATED SEPTEMBER 9, 2020.

NOTE TO CONTRACTOR :

DO NOT SCALE DRAWINGS.

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

ALL DRAWINGS REMAIN THE PROPERTY OF THE ENGINEER AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT THE ENGINEER'S WRITTEN PERMISSION.

THE OWNER/ARCHITECT/CONTRACTOR IS ADVISED THAT M.T.E. CONSULTANTS INC. CANNOT CERTIFY ANY COMPONENT OF THE SITE WORKS NOT INSPECTED DURING CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO NOTIFY M.T.E. CONSULTANTS INC. PRIOR TO COMMENCEMENT OF CONSTRUCTION TO ARRANGE FOR INSPECTION.

NOTE:

1. **PROPERTY LINE IS APPROXIMATE ONLY AND SHOULD NOT BE USED FOR DETERMINING SETBACKS OR LAYOUT.**
2. **THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE ONSITE WASTEWATER REPORT DATED AUGUST 2025**

No.	REVISION	BY	YYYY-MM-DD
8.			
7.			
6.			
5.			
4.			
3.			
2.	Revised per Township Comments	AJS	2025-08-20
1.	ISSUED FOR APPROVAL	AJS	2025-01-22

MTE
Engineers, Scientists, Surveyors
519-743-6500

OWNER
BVD
REAL ESTATE INC.
130 DELTA PARK BOULEVARD BRAMPTON

PROJECT
7504 McLEAN ROAD
PUSLINCH

DRAWING
DETAILS
AND NOTES

Project Manager: A. SLAWICH	Project No.: 55237-100
Design By: MAC/ZIC	Checked By: MAC
Drawn By: ZIC	Checked By: MAC
Surveyed By: MTE	Drawing No.: C3.2
Date: Nov.04/24	
Scale: 1:200	Sheet 3 of 4

P:\P\55237\100\55237-100-C3
MTE FILE PATH:
August 20, 2025 - 3:45:10 PM - Plotted By: Zach Chamos

7504 McLean Road

Stormwater Management Report

Project Location:
7504 McLean Road, Puslinch, ON

Prepared for:
BVD Real Estate Inc.
[redacted]

Prepared by:
MTE Consultants Inc.
520 Bingemans Centre Drive
Kitchener, ON N2B 3X9

December 12, 2024
Revised: January 22, 2025
Revised: August 20, 2025

MTE File No.: 55237-100

Engineers, Scientists, Surveyors.

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Appendix C Water Balance
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Drawings

Original Conditions and Removals Plan
MTE Drawing No. C1.1 .....Appended

Site Grading, SWM and Erosion & Sediment Control Plan
MTE Drawing No. C2.1 .....Appended

Site Servicing Plan
MTE Drawing No. C2.2 .....Appended

Details and Notes Plan
MTE Drawing No. C2.3 .....Appended

Proposed On-Site Wastewater Treatment System
MTE Drawing No. C3.1 .....Appended

1.0 INTRODUCTION

MTE Consultants Inc. was retained by BVD Real Estate Inc. to complete the stormwater management design for the proposed building to be constructed at 7504 McLean Road in the Township of Puslinch.

The Site is located north of the Highway 401 and Brock Road interchange. The property is bounded to the north, west and east by an existing industrial property and to the south by McLean Road. For exact location of the Site refer to the key plan located on the enclosed engineering drawings. An existing wetland is located north and east of the Site; the floodplain extends to the Site's property line with the GRCA Regulated Area covering a small portion of the Site. The floodplain and GRCA Regulated Area are shown in the enclosed engineering drawings.

The proposed development for the Site is the construction of a building complete with associated parking and driveways.

This report addresses the stormwater management requirements set forth by the Township of Puslinch and proposes a design which meets the requirements for the Site. The site grading, servicing and stormwater management details for the Site are illustrated on the enclosed MTE Engineering Drawings C1.1, C2.1, C2.2, C2.3 and C3.1.

2.0 CRITERIA

The stormwater management design criteria for the subject Site, as established by the Township of Puslinch and GRCA, are as follows:

i) Establish a legal outlet for the Site.

ii) Attenuation of the post-development peak flows for the 2- through 100-year storm events to the pre-development (existing) peak flows.

iii) Provide a suitable overland flow route for the Regional Storm.

iv) Implementation of Enhanced (Level 1) water quality controls.

v) Complete a monthly water balance.

vi) Provide Erosion and Sedimentation Controls.

vii) Provide Operation and Maintenance procedures for the proposed stormwater management facilities.

3.0 METHODOLOGY

In order to successfully complete the stormwater management design for this Site, the following specific tasks were undertaken:

i) Calculated the allowable runoff rates using MIDUSS NET.

ii) Determined the percent impervious of the Site and catchment parameters for inclusion in MIDUSS modelling.

iii) Calculated post-development runoff hydrographs using MIDUSS NET.

iv) Revised the site grades to attain the required storage for runoff control.

4.0 STORMWATER MANAGEMENT

4.1 Legal Outlet

In the existing condition (based on the 2020 topographic survey), approximately 19% of the Site (Catchment 101) drained to an existing catchbasin complete with casting orifice which was originally designed and constructed in 2013 as part of the Mammoet development. It is our understanding the subject Site has since been severed from the Mammoet property and there are no easements or drainage agreements in place to maintain the catchbasin and orifice, nor for the subject Site to discharge to the Mammoet storm sewer system.

Based on the Mammoet design drawings, approximately 1.4ha of gravel area (Catchment 101*) was designed to drain to the existing catchbasin wherein flow was controlled with the casting orifice prior to being directed to a Stormceptor SWQ-100 treatment unit and ultimately discharged towards the wetland north of the Site. Of the 1.4ha catchment area, approximately 0.9ha is now included within the subject Site property limits with the remaining 0.5ha retained on the Mammoet property. As part of the development, the catchbasin and orifice will be removed as there are no drainage agreements or easements in place for it to remain. As such, the 0.5ha retaining on the Mammoet property will instead drain overland uncontrolled towards the wetland. However, it is noted that based on the 2020 topographic survey and GRCA mapping that approximately 0.5ha of the 1.4ha originally designed to drain to the catchbasin was already flowing uncontrolled overland to the wetland. As there is no change to the total area flowing uncontrolled towards the wetland, the proposed development will not negatively impact the wetland compared to current conditions. The proposed stormwater management strategy for the Site considers the external drainage area from Mammoet, refer to the following sections and figures for details.

McLean Road terminates with a dead end near the eastern limit of the Site. There are no existing municipal storm sewers on McLean Road; however, there are grassed ditches. The grassed ditch on the north side McLean Road crosses the road via a culvert located at the eastern limit of the subject Site and is ultimately directed to a stormwater management facility (SWMF) known as the Wetland Outlet in the Aberfoyle Business Park SWM Report. The subject Site was not included in the design of this SWMF.

Upon review of the Aberfoyle Business Park SWM Report, it was determined there is sufficient capacity within the SWMF for the Site. Calculations confirming the available capacity and continued function of the SWMF are included in the following sections.

The SWMF was designed to store and release runoff from 27.4ha of development area to pre-development rates for the 2-, 5- and 100-year storm events. The SWMF also requires on-site quantity and quality controls for the lots draining to it, the allowable release rates are summarized below.

Table 4.1 – Allowable Release Rates For Wetland Outlet SWMF

Storm Event	Allowable Flow Rate ($m^3/s/ha$)	Allowable Rate for the Site Area directed to SWMF (2.386ha)
2-Year	0.005	0.012
5-Year	0.015	0.036
100-Year	0.069	0.165

4.2 Catchment Parameters

The following table summarizes the catchments used in the modelling of the Site. The post-development condition was separated into two catchment areas: the controlled area and the uncontrolled area. Figure 1.0 illustrates the limits of the pre-development catchment areas. Figure 2.0 illustrates the limits of the post-development catchment areas.

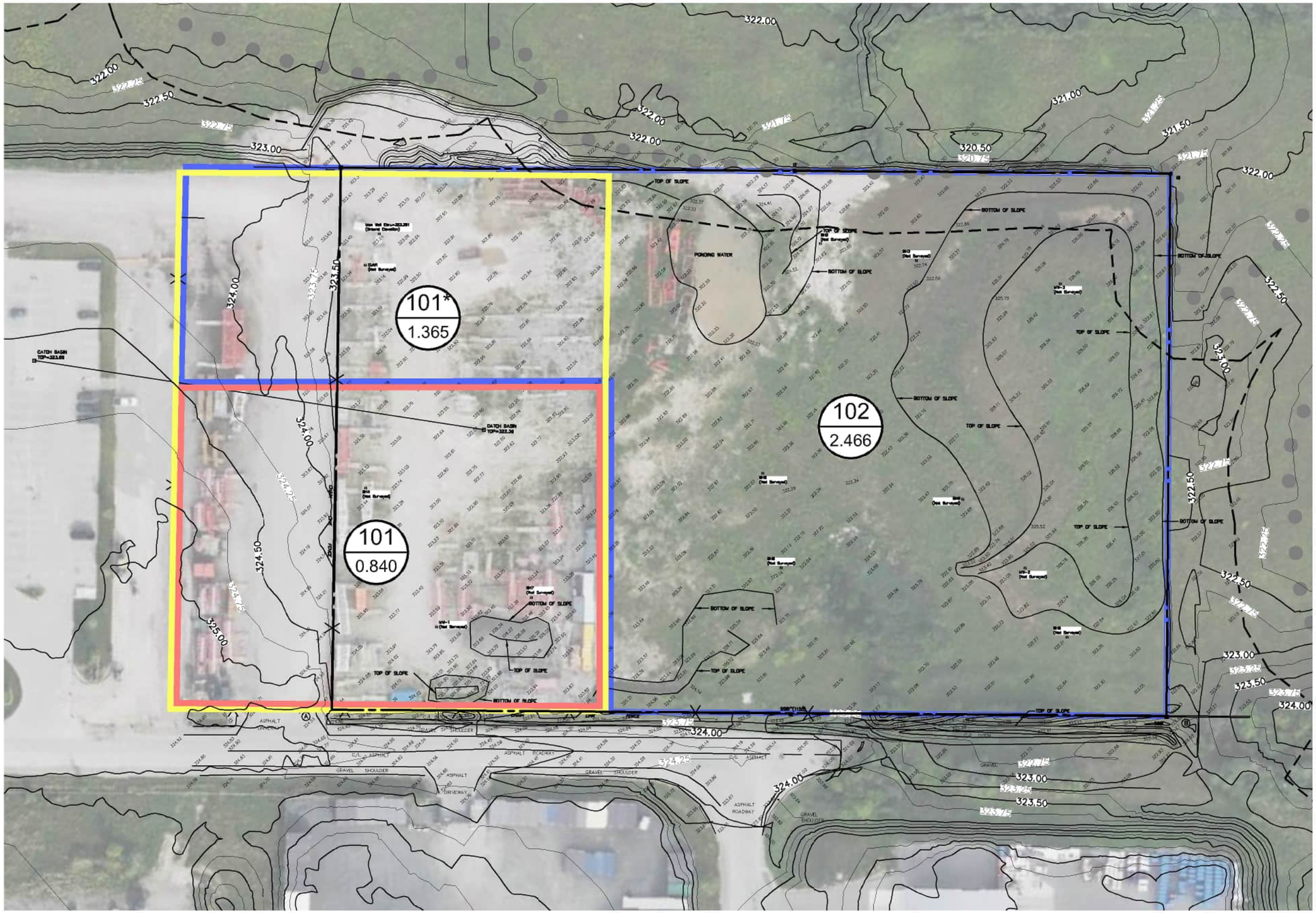
Table 4.2 – Catchment Parameters

#	Catchment	Area (ha)	% Impervious	Pervious CN	Impervious CN	Slope (%)	Flow Length (m)
Pre-Development Catchment Areas							
101	Actual Area to CB	0.840	100	75	98	1.5	70
101*	Designed Area to CB	1.365	100	75	98	1.5	90
102	Rest of Site	2.466	21	75	98	1.3	60
Post-Development Catchment Areas							
201	Uncontrolled to Wetland	0.920	56	75	98	2.0	60
202	Roof	0.178	100	75	98	1.5	10
203	Controlled Area	2.036	98	75	98	1.0	30
204	Uncontrolled to ROW	0.172	22	75	98	10	15

Note: Catchment 101* was not modelled. This catchment is included to clarify the descriptions in Section 4.1 only.

A geotechnical investigation was undertaken by A&A Environmental Consultants Inc. A complete copy of their report is included in the submission package for the Township of Puslinch records. The investigation revealed fill underlain with glacial till deposits. The fill consisted of gravel and sand and sand and gravelly silty sand with trace clay while the glacial till deposits comprised gravelly silty sand trace clay to silty sand some gravel trace clay. Therefore, a pervious CN of 75 for grass areas is appropriate.

As part of the hydrogeological investigation undertaken by A&A Environmental Consultants Inc, three monitoring wells were installed to complement one existing monitoring well on-site. Groundwater ranged from not encountered (below the bottom of casing elevation of 316.147) in the south corner of the Site to 323.004 in the north corner of the Site. The unfactored average infiltration rate at the Site was estimated as 44mm/hr. For design purposes, a 2.5 factor of safety will be utilized which results in a design infiltration rate of 18mm/hr.



LEGEND

- CATCHMENT 101
- CATCHMENT 101*
- CATCHMENT 102

101 / 0.840 — SUB-CATCHMENT NUMBER / AREA (ha.)

321.00 — EXISTING CONTOURS (GENERATED USING GEOSPACIAL DATA PROVIDED BY GRCA)

322.43 — EXISTING SPOT ELEVATIONS (SURVEYED BY BSR&D, DATED SEPTEMBER 9, 2020)

0 10 20 30 40 50m

MTE
Engineers, Scientists, Surveyors

PROJECT
7504 McLEAN ROAD

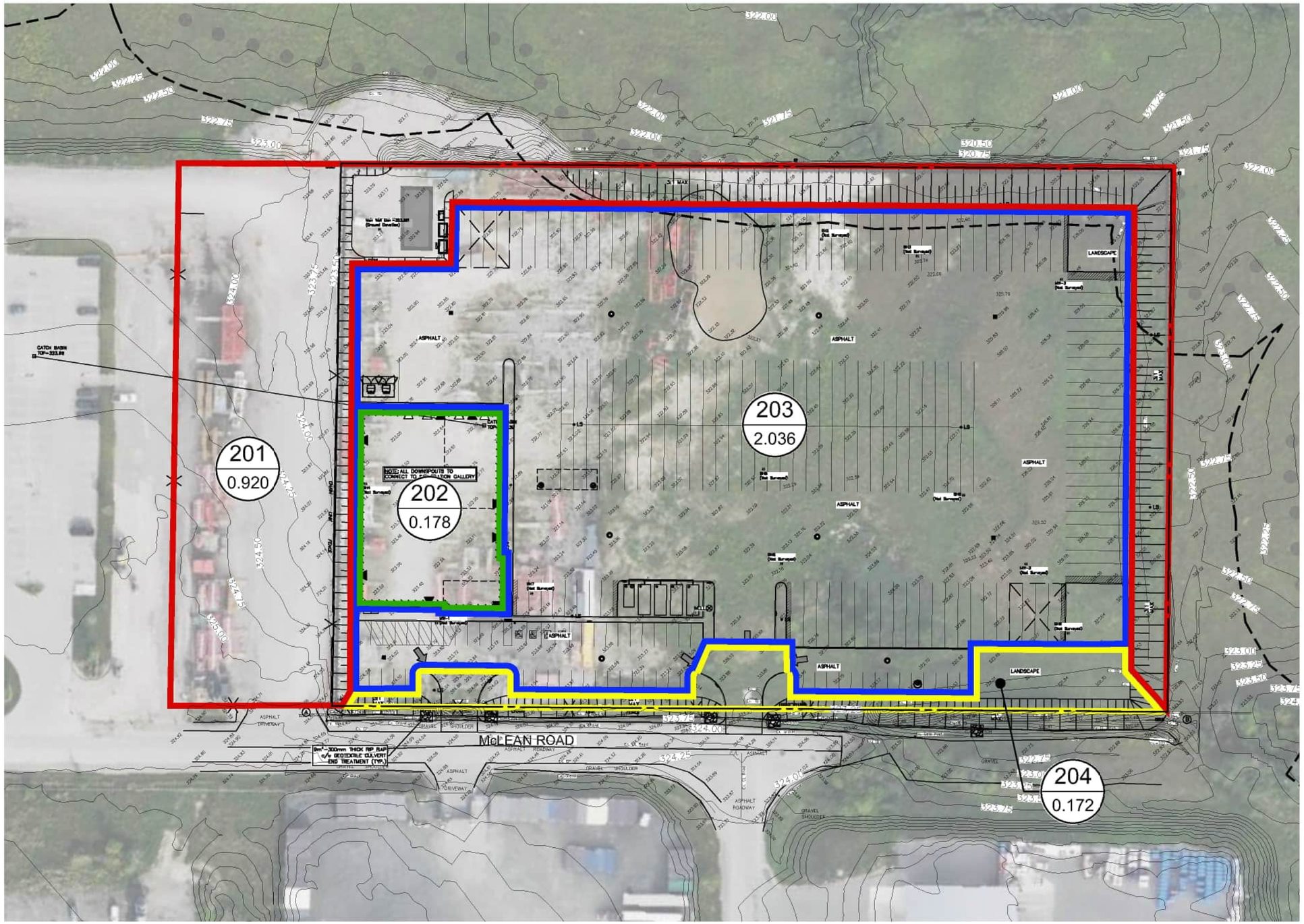
TITLE
PRE-DEVELOPMENT CATCHMENT AREAS

Drawn	Scale	Figure
JRS	1:1000	**1.0**
Checked	Project No.	
AJS	55237-100	
Date (yyyy-mm-dd)	Rev No.	
2024-12-09	0	

CAD: P:\P\55237\100\55237-100-F1.DWG

Plot Date: August 19, 2025 - 2:24 PM

CAD: P:\P\55237\100\55237-100-F1.DWG



LEGEND

- CATCHMENT 201
- CATCHMENT 202
- CATCHMENT 203
- CATCHMENT 204

201 — SUB-CATCHMENT NUMBER
0.920 — AREA (ha.)

EXISTING CONTOURS (GENERATED USING GEOSPACIAL DATA PROVIDED BY GRCA)

EXISTING SPOT ELEVATIONS (SURVEYED BY BSR&D, DATED SEPTEMBER 9, 2020)

0 10 20 30 40 50m

MTE
Engineers, Scientists, Surveyors

PROJECT
7504 McLEAN ROAD

TITLE
POST-DEVELOPMENT CATCHMENT AREAS

Drawn: JRS	Scale: 1:1000	Figure: **2.0**
Checked: AJS	Project No.: 55237-100	
Date (yyyy-mm-dd): 2024-12-09	Rev No.: 0	

Plot Date: August 19, 2025 - 2:25 PM

4.3 Water Quantity – Modelling Results

In order to achieve the stormwater management requirements for the Site, runoff generated from the roof will be directed to an infiltration gallery complete with overflow to the on-site storm sewer system. The gallery was sized for 30mm of runoff complete with a 15% factor of safety to account for some loss of function over time. A backflow preventor will be included on the overflow pipe to ensure contaminated runoff does not enter the gallery.

Runoff generated from the controlled areas will be conveyed to catchbasin-manhole CBMH12, located in the southeasterly area of the parking area, wherein the flow will be controlled with the installation of a 75mm diameter on-line orifice plate on the outlet pipe. Storage volume for the orifice will be provided within the parking areas. The maximum depth of ponding permitted within the parking area by grading is 0.30 metres. Discharge from the orifice will be directed to an oil-grit separator prior to discharging to the McLean Road ditch.

An emergency overflow weir is located within the easterly driveway entrance. A MIDUSS model was completed to confirm the overflow weir is sufficiently sized to convey the Regional Storm towards the right-of-way. It was determined that the weir can convey the Regional Storm with 3.8cm flowing over the weir. Refer to Appendix B for details.

The flow equations for the orifice and weir are included in Appendix A. Refer to Appendix B for the MIDUSS NET output.

The following table illustrates the stage-storage-discharge relationship of the storm system.

Table 4.3 – Stage-Storage-Discharge Information

Elevation (m)	Head (m)	Orifice/Weir Flow (m^3/s)	Volume (m^3)	Remarks
322.630	0	0	0	75mm diameter Orifice invert
324.80	2.170	0.01795	186	Top of grate CB1, CBMH2, CB3, CBMH4, CBMH7, CBMH8, CB9, CBMH11, CBMH12
324.85	2.220	0.01816	213	Contour
324.90	2.270	0.01837	294	Contour
324.95	2.320	0.01857	479	Contour
325.00	2.370	0.01878	817	Top of grate CB10
325.05	2.420	0.01898	1325	Contour
325.10	2.470	0.01918	2021	20.0m Weir
325.15	2.520	0.3624	2400	Contour

With the addition of the 75mm diameter orifice plate, the post-development runoff from the controlled portion of the Site for the 2- through 100-year storm events is controlled to $0.019m^3/s$. The following table summarizes the flows generated by the whole Site.

Table 4.4 – Summary of Site Flows

Modelling Condition	2-Year Storm Event (m^3/s)	5-Year Storm Event (m^3/s)	10-Year Storm Event (m^3/s)	25-Year Storm Event (m^3/s)	50-Year Storm Event (m^3/s)	100-Year Storm Event (m^3/s)
Pre-Development	0.165	0.215	0.262	0.312	0.411	0.533
Post-Development	0.129	0.177	0.221	0.263	0.304	0.347

The following table summarized the maximum ponding elevations and depths for the modelled storm events.

Table 4.5 – Summary of Ponding Depths

Modelling Condition	2-Year Storm Event	5-Year Storm Event	10-Year Storm Event	25-Year Storm Event	50-Year Storm Event	100-Year Storm Event
Ponding elevation (m)	324.941	324.982	325.007	325.032	325.050	325.066
Maximum ponding depth (cm)	14.1	18.2	20.7	23.2	25.0	26.6

The following table summarizes the pre- and post-development flows generated by the Aberfoyle Business Park Wetland Outlet SWMF.

Table 4.6 – Summary of Aberfoyle Business Park SWMF Flows

Modelling Condition	2-Year Storm Event (m^3/s)	5-Year Storm Event (m^3/s)	100-Year Storm Event (m^3/s)
Industrial Subdivision Pre-Development[1]	0.056	0.163	0.762
Industrial Subdivision Post-Development[1]	0.034	0.066	0.595
Industrial Subdivision Post-Development (MTE Model Check)[2]	0.038	0.066	0.593
Allowable Flow Rate[3]	0.012	0.036	0.135
Flow from Site Directed to Industrial Subdivision (Catchments 202, 203 and 204)	0.025	0.033	0.064
Industrial Subdivision Post-Development with Site Included	0.041	0.071	0.620

[1] Taken from Aberfoyle Business Park SWM Report.
[2] The results of MTE's post-development MIDUSS model of the SWMF, without the subject Site included, based on the Aberfoyle Business Park SWM Report.
[3] The allowable flow rate for the subject Site as calculated in Section 4.1.

While the flow from the Site exceeds the allowable rate during the 2-year storm, the smallest possible orifice was utilized and the area directed to the orifice was maximized. There is no exceedance during the 5- or 100-year storm events and, as shown in the table, the post-development rate from the SWMF continues to meet the Industrial Subdivision

Pre-Development Rate demonstrating there is sufficient capacity within the SWMF for the subject Site.

4.4 Water Quality Control

A Stormceptor EF Model EFO6 will be installed on the storm sewer system to provide water quality control. The chosen unit is expected to provide Level 1 (Enhanced) water quality control. (Refer to Appendix A for the sizing output from the Stormceptor Expert program.) The Stormceptor will require regular annual maintenance to ensure it is operating properly. The owner will enter into a maintenance agreement with a suitable contractor to complete this work. In addition, all the storm structures will have a 600mm sump.

4.5 Monthly Water Balance

To analyze the impacts of the development and proposed mitigation measures, a monthly water balance was completed for this Site under the pre- and post-development conditions using the Thornthwaite & Mather Method (1957). The Canadian Climate Normals data (monthly average precipitation and temperature) between 1971 and 2000 for station 'Guelph Arboretum' were applied in the monthly water budget analyses.

The existing property is approximately 30.0% impervious which results in an annual infiltration rate of 6,969m^3/year and an annual runoff rate of 5,702m^3/year, based on soil type, existing ground cover conditions, and existing terrain (Type C soils, urban lawn cover, and flat terrain). The proposed development of the property will result in an imperviousness of approximately 80.1%.In the post-development condition, runoff from the roof will be directed to an infiltration gallery sized to retain 30mm of runoff. As 0.178ha is directed to the gallery, the gallery was sized to retain at least 62m^3 including a 15% factor of safety. The proposed infiltration gallery is 68m^3. Additional passive infiltration will occur within landscaped areas throughout the Site.

With the implementation of the infiltration gallery and the passive infiltration within the landscaped areas, the total annual infiltration rate for the Site in the post-development condition is 2,141m^3/year. This represents a net decrease in annual infiltration of 4,828m^3/year, or a 69.3% decrease.

As a result of the proposed development, the total surface runoff rate for the Site in the post-development condition is 16,212m^3/year. This represents a net increase in annual surface runoff of 10,510m^3/year, or a 184.3% increase.

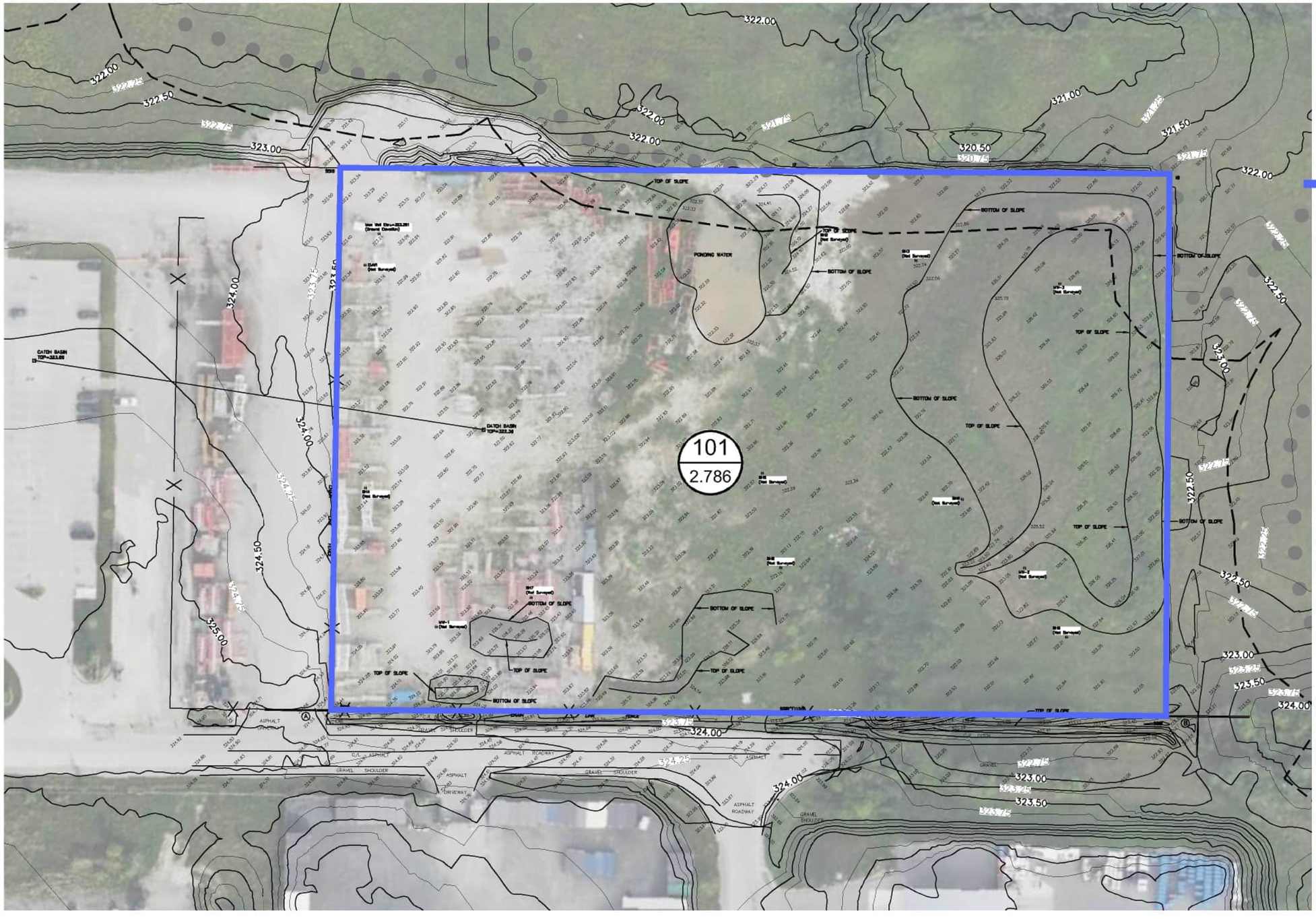
The results of the infiltration and surface runoff water budget analysis using Thornthwaite & Mather Method (1957) are summarized in Tables 4.7 and 4.8, respectively. Detailed calculations of the water budget analyses are provided in Appendix C.

Table 4.7 – Monthly Infiltration Water Balance

Month	Precipitation (mm)	Pre-Development Infiltration (m^3)	Post-Development Infiltration (m^3)	Difference in Infiltration (m^3)
JAN	56.4	132	29	-103
FEB	50.8	66	15	-51
MAR	72.1	33	7	-26
APR	78.3	780	283	-496
MAY	79.9	1,962	606	-1,356
JUN	76.0	1,212	300	-912
JUL	88.5	755	190	-564
AUG	95.9	550	147	-403
SEP	92.1	388	142	-246
OCT	69.2	250	116	-135
NOV	86.3	553	241	-312
DEC	77.7	289	66	-223
Total	**923.2**	**6,969**	**2,141**	**-4,828**

Table 4.8 – Monthly Surface Runoff Water Balance

Month	Precipitation (mm)	Pre-Development Surface Runoff (m^3)	Post-Development Surface Runoff (m^3)	Difference in Surface Runoff (m^3)
JAN	56.4	108	339	231
FEB	50.8	54	169	115
MAR	72.1	27	85	58
APR	78.3	638	1,370	732
MAY	79.9	1,605	3,490	1,885
JUN	76.0	992	2,649	1,658
JUL	88.5	617	1,961	1,344
AUG	95.9	450	1,753	1,303
SEP	92.1	317	1,379	1,062
OCT	69.2	205	941	736
NOV	86.3	453	1,359	906
DEC	77.7	237	717	481
Total	**923.2**	**5,702**	**16,212**	**10,510**



LEGEND

CATCHMENT 101

101 / 2.786 — SUB-CATCHMENT NUMBER / AREA (ha.)

321.00 — EXISTING CONTOURS (GENERATED USING GEOSPACIAL DATA PROVIDED BY GRCA)

322.45 — EXISTING SPOT ELEVATIONS (SURVEYED BY BSR&D, DATED SEPTEMBER 9, 2020)

0 10 20 30 40 50m

MTE
Engineers, Scientists, Surveyors

PROJECT
7504 McLEAN ROAD

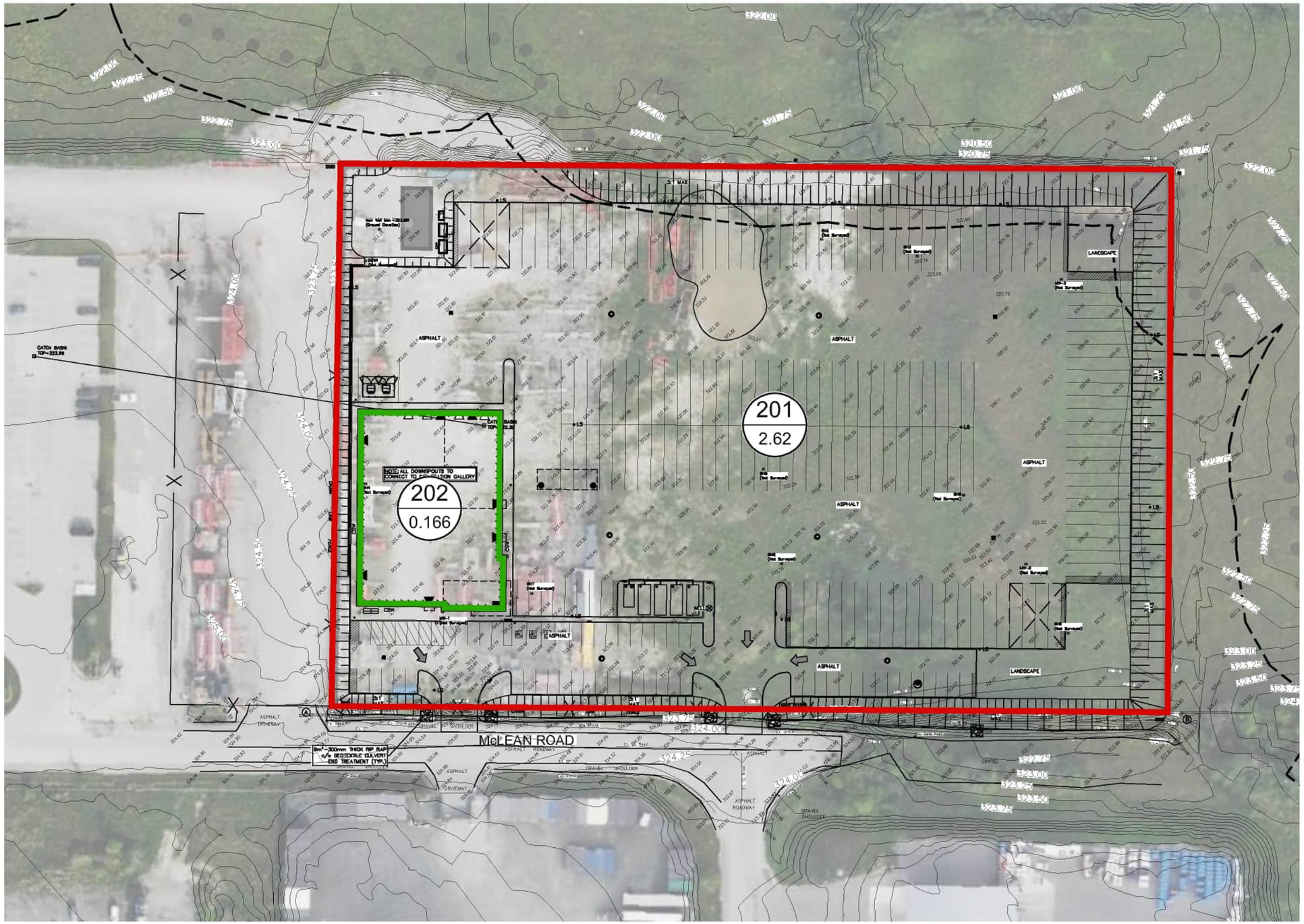
TITLE
PRE-DEVELOPMENT WATER BALANCE CATCHMENT AREAS

Drawn: JRS	Scale: 1:1000	Figure: **3.0**
Checked: AJS	Project No.: 55237-100	
Date (YYYY-MM-DD): 2024-12-09	Rev No.: 0	

CAD: P:\P\55237\100\55237-100-F2.DWG

Plot Date: August 19, 2025 - 2:25 PM

CAD: P:\P\55237\100\55237-100-F2.DWG



LEGEND

CATCHMENT 201

CATCHMENT 202

201 / 2.62 — SUB-CATCHMENT NUMBER / AREA (ha.)

EXISTING CONTOURS (GENERATED USING GEOSPACIAL DATA PROVIDED BY GRCA)

322.45 EXISTING SPOT ELEVATIONS (SURVEYED BY BSR&D, DATED SEPTEMBER 9, 2020)

0 10 20 30 40 50m

MTE
Engineers, Scientists, Surveyors

PROJECT
7504 McLEAN ROAD

TITLE
POST-DEVELOPMENT WATER BALANCE CATCHMENT AREAS

Drawn: JRS	Scale: 1:1000	Figure: **4.0**
Checked: AJS	Project No.: 55237-100	
Date (yyyy-mm-dd): 2024-12-09	Rev No.: 0	

Plot Date: August 19, 2025 - 2:25 PM

4.6 Erosion and Sediment Control

In order to minimize the effects of erosion during the grading of the Site, sediment control fencing will be installed: as shown on the enclosed engineering drawing, around any stockpiles and around the catchbasins during construction. Any sediment that is tracked onto the roadway during the course of construction will be cleaned by the contractor. To help minimize the amount of mud being tracked onto the roadway, a mud mat will be installed at the primary construction entrance.

4.7 Operation and Maintenance

Regular inspection and maintenance is vital to the performance of the stormwater infrastructure and ensuring it continues to meet the Stormwater Management Design Criteria for the Site. This includes, but isn't limited to, maintenance of the OGS unit and infiltration gallery.

The proposed OGS unit, Stormceptor EFO6, should be inspected and cleaned in accordance with manufacturer recommendations. Refer to Appendix D for the Stormceptor EF Owner's Manual which outlines Inspection & Maintenance recommendations. As previously noted, the owner will enter into a maintenance agreement with a suitable contractor to complete this work.

The ADS MC-3500 Stormtech Chamber infiltration gallery should also be inspected and cleaned in accordance with manufacturer recommendations. Considering only roof runoff is directed to the gallery, the sediments entering into the infiltration gallery should be limited. Additionally, the proposed ADS Stormtech units have a higher void ratio and are considered more durable than typical stone galleries. These systems are equipped with inspection ports and isolator rows that are to be used to monitor the system and for ease of maintenance. As per the Stormtech ADS Isolator Row O&M Manual, included in Appendix D, Stormtech recommends annual inspections at a minimum. Specifically, the Isolator Row should be inspected every 6 months for the first year of operation. The inspection frequency should be adjusted based on previous observation. A clean-out should be performed when the average depth of sediment exceeds 3 inches in the Isolator Row.

The manufacturer's recommended inspection and maintenance steps are as follows:

1. Inspect Isolator Row for sediment.
2. Clean out Isolator Row using the JetVac process if sediment exceeds 3 inches.
3. Replace all caps, lids and covers, record observations and actions.
4. Inspect and clean catchbasins and manholes upstream of the StormTech system.

The owner will enter into a maintenance agreement with a suitable contractor to complete this work. Refer to Appendix D for the ADS Inspection and Maintenance steps.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the foregoing analysis, it is concluded that:

i) The Aberfoyle Business Park Wetland Outlet SWMF has sufficient capacity for the Site.

ii) The proposed stormwater management design provides adequate attenuation of the 2- through 100-year storm events, provides a suitable overland flow route for the Regional Storm, and provides adequate water quality control.

iii) A monthly water balance was completed illustrating an increase in runoff and decrease in infiltration. An infiltration gallery sized for 30mm of runoff from the roof is proposed to mitigate infiltration loss, while the parking areas are not permitted to be infiltrated.

iv) Upon completion of construction, the Site will conform to the design criteria specified by the Township of Puslinch.

It is recommended that:

i) The site grading be undertaken according to the proposed elevations, details and erosion control measures shown on the enclosed engineering drawings.

ii) The stormwater management facilities be installed as detailed on the enclosed engineering drawings.

iii) The stormwater management facilities be inspected by MTE Consultants Inc. during construction and certified to the Township of Puslinch upon completion.

All of which is respectfully submitted,

MTE Consultants Inc.

Adam Slawich, P.Eng., C.E.T.
Design Engineer
519-743-6500 ext. 1458
aslawich@mte85.com

AJS:dlb

https://mte85.sharepoint.com/sites/55237-100/Shared Documents/Reports/SWM/rpt_2025-07-09_SWM Report.docx

Appendix A

Calculations

CALCULATIONS

Orifice Equation (MIDUSS NET)

$$Q = C_c \, p/4 \, D5 \, \text{sqrt}(2g(H-2/3D))$$

where,

- C_c coefficient of contraction
- H head relative to the invert of the orifice
- D orifice diameter
- g gravitational acceleration

Weir Equation (MIDUSS NET)

$$Q_{cr} = B \, \text{sqrt}(g) \, y_{cr}^{3/2} \qquad \text{where } y_{cr} = 2/3 \, (H-Z)$$

where,

- B weir breadth
- g gravitational acceleration
- H head relative to the invert of the weir
- Z weir sill elevation

Stormceptor EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

08/20/2025

Province:	Ontario
City:	Puslinch
Nearest Rainfall Station:	WATERLOO WELLINGTON AP
Climate Station Id:	6149387
Years of Rainfall Data:	34

Site Name:	

Drainage Area (ha):	2.214
% Imperviousness:	99.00

Runoff Coefficient 'c': 0.89

Project Name:	7504 McLean Road
Project Number:	66738
Designer Name:	Adam Slawich
Designer Company:	MTE Consultants Inc.
Designer Email:	aslawich@mte85.com
Designer Phone:	519-743-6500
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	74.99
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	19.00
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	2514
Estimated Average Annual Sediment Volume (L/yr):	2044

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	69
EFO5	75
EFO6	82
EFO8	89
EFO10	95
EFO12	99

Recommended Stormceptor EFO Model: EFO6

Estimated Net Annual Sediment (TSS) Load Reduction (%): 82

Water Quality Runoff Volume Capture (%): > 90

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

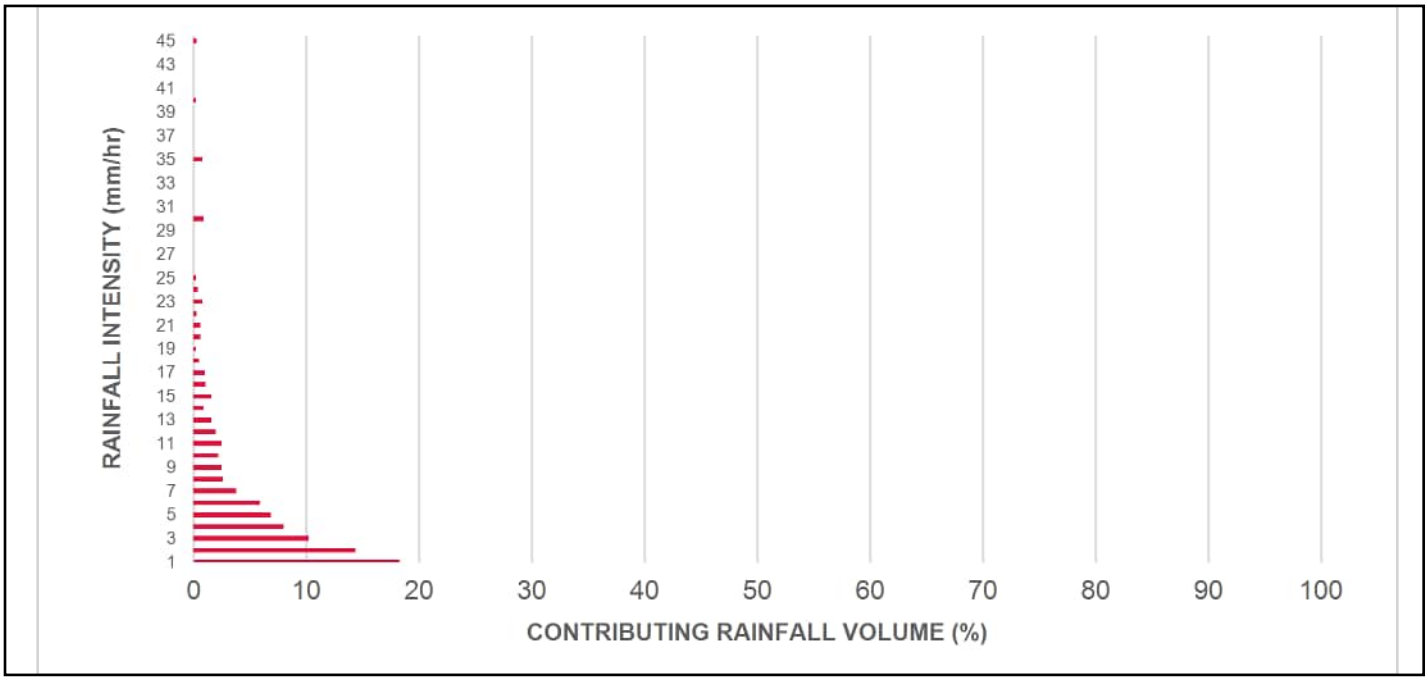
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

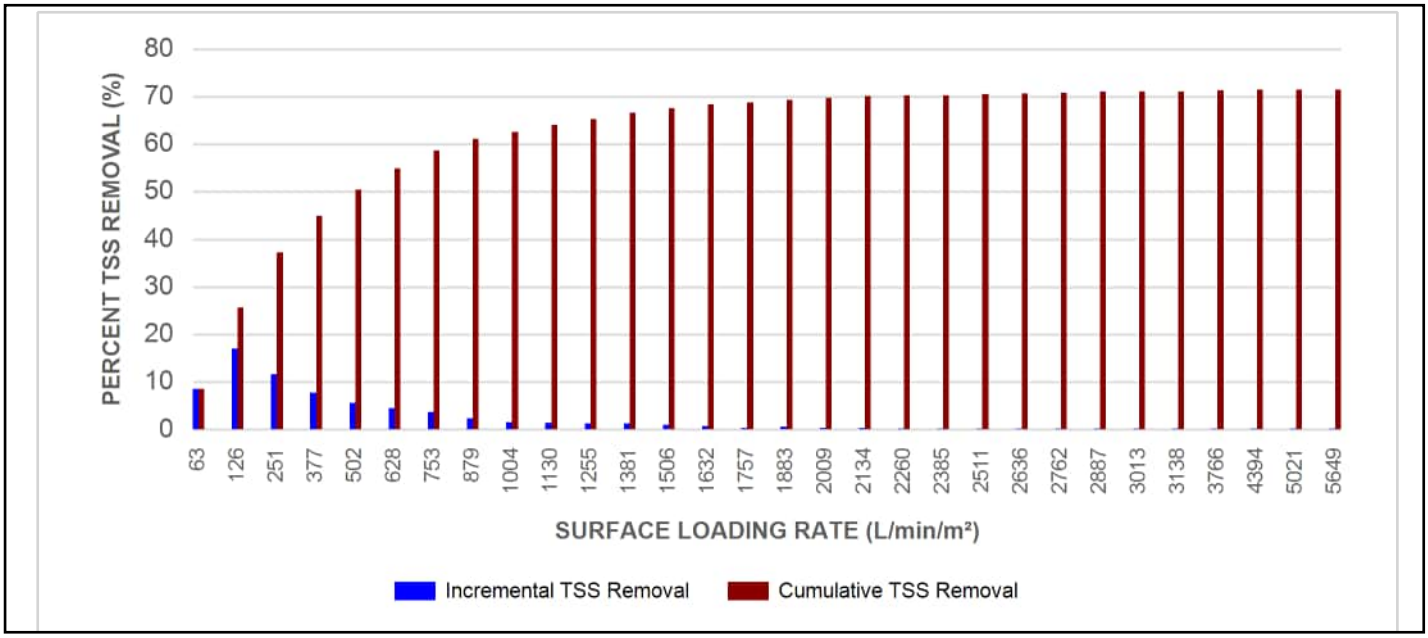
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.5	8.5	2.75	165.0	63.0	100	8.5	8.5
1.00	18.3	26.8	5.50	330.0	126.0	93	17.1	25.6
2.00	14.4	41.3	11.00	660.0	251.0	81	11.7	37.3
3.00	58.7	100.0	16.51	990.0	377.0	75	44.2	81.5
4.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
5.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
6.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
7.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
8.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
9.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
10.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
11.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
12.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
13.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
14.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
15.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
16.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
17.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
18.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
19.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
20.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
21.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
22.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
23.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
24.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
25.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
30.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
35.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
40.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
45.00	0.0	100.0	19.00	1140.0	433.0	72	0.0	81.5
Estimated Net Annual Sediment (TSS) Load Reduction =								**81 %**

Climate Station ID: 6149387 *Years of Rainfall Data*: 34

RAINFALL DATA FROM WATERLOO WELLINGTON AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

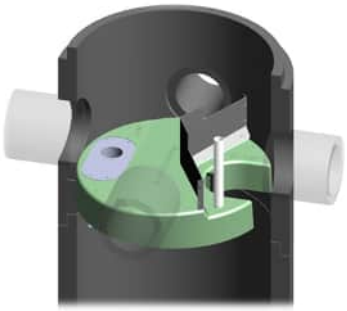
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

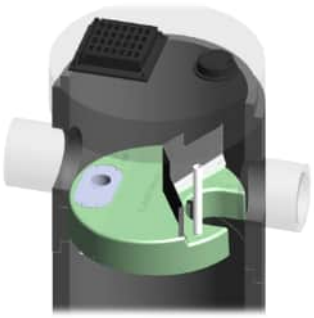
DESIGN FLEXIBILITY

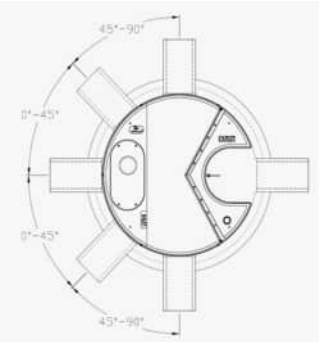
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit** S**eparators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid

Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Appendix B

MIDUSS Output

Pre-Development

```
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11 "        5.000   Time Step"
12 "      180.000   Max. Storm length"
13 "     1500.000   Max. Hydrograph"
14 " 32          STORM Chicago storm"
15 "            1   Chicago storm"
16 "      743.000   Coefficient A"
17 "        6.000   Constant B"
18 "        0.799   Exponent C"
19 "        0.400   Fraction R"
20 "      180.000   Duration"
21 "        1.000   Time step multiplier"
22 "             Maximum intensity          109.374    mm/hr"
23 "             Total depth                 34.259    mm"
24 "           6   002hyd   Hydrograph extension used in this file"
25 " 33          CATCHMENT 101"
26 "            1   Triangular SCS"
27 "            1   Equal length"
28 "            1   SCS method"
29 "          101   Actual Area to CB"
30 "      100.000   % Impervious"
31 "        0.840   Total Area"
32 "       90.000   Flow length"
33 "        1.500   Overland Slope"
34 "        0.000   Pervious Area"
35 "       90.000   Pervious length"
36 "        1.500   Pervious slope"
37 "        0.840   Impervious Area"
38 "       90.000   Impervious length"
39 "        1.500   Impervious slope"
40 "        0.250   Pervious Manning 'n'"
41 "       75.000   Pervious SCS Curve No."
42 "        0.000   Pervious Runoff coefficient"
43 "        0.100   Pervious Ia/S coefficient"
44 "        8.500   Pervious Initial abstraction"
45 "        0.015   Impervious Manning 'n'"
46 "       98.000   Impervious SCS Curve No."
47 "        0.847   Impervious Runoff coefficient"
48 "        0.100   Impervious Ia/S coefficient"
49 "        0.520   Impervious Initial abstraction"
50 "                    0.176     0.000     0.000     0.000 c.m/sec"
51 "             Catchment 101          Pervious   Impervious Total Area "
52 "             Surface Area           0.000      0.840      0.840      hectare"
53 "             Time of concentration  55.523     4.657      4.657      minutes"
54 "             Time to Centroid       0.000      95.038     95.038     minutes"
55 "             Rainfall depth         34.259     34.259     34.259     mm"
56 "             Rainfall volume        0.00       287.77     287.77     c.m"
57 "             Rainfall losses        34.259     5.258      5.258      mm"
58 "             Runoff depth           0.000      29.000     29.000     mm"
59 "             Runoff volume          0.00       243.60     243.60     c.m"
60 "             Runoff coefficient     0.000      0.847      0.847      "
61 "             Maximum flow           0.000      0.176      0.176      c.m/sec"
62 " 40          HYDROGRAPH Add Runoff "
63 "            4   Add Runoff "
64 "                    0.176     0.176     0.000     0.000"
65 " 54          POND DESIGN"
66 "        0.176   Current peak flow    c.m/sec"
67 "        0.088   Target outflow    c.m/sec"
68 "        243.6   Hydrograph volume    c.m"
69 "           5.   Number of stages"
70 "      322.240   Minimum water level    metre"
71 "      322.950   Maximum water level    metre"
```



```
72 "      322.240   Starting water level    metre"
73 "            0   Keep Design Data: 1 = True; 0 = False"
74 "                  Level Discharge    Volume"
75 "                322.240     0.000     0.000"
76 "                322.390   0.03397  1.00E-07"
77 "                322.600   0.05261    11.000"
78 "                322.900   0.07123   200.000"
79 "                322.950    0.2455   294.000"
80 "            1.  WEIRS"
81 "                   Crest      Weir     Crest      Left     Right"
82 "                elevation coefficie   breadth sideslope sideslope"
83 "                  322.900     0.900    10.000     0.000     0.000"
84 "            1.  HOR. ORIFICES"
85 "                  Orifice   Orifice   Orifice Number of"
86 "                   invert coefficie  diameter  orifices"
87 "                  322.240     0.630    0.2000     1.000"
88 "              Peak outflow                  0.059    c.m/sec"
89 "              Maximum level               322.698    metre"
90 "              Maximum storage              72.505    c.m"
91 "              Centroidal lag                1.742   hours"
92 "                   0.176     0.176     0.059     0.000 c.m/sec"
93 " 40          HYDROGRAPH   Combine    1"
94 "            6   Combine "
95 "            1   Node #"
96 "                Total"
97 "              Maximum flow                  0.059    c.m/sec"
98 "              Hydrograph volume           240.757    c.m"
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100 " 40         HYDROGRAPH Start - New Tributary"
101 "            2   Start - New Tributary"
102 "                    0.176     0.000     0.059     0.059"
103 " 33         CATCHMENT 102"
104 "            1   Triangular SCS"
105 "            1   Equal length"
106 "            1   SCS method"
107 "          102   Rest of Site"
108 "       21.000   % Impervious"
109 "        2.466   Total Area"
110 "       60.000   Flow length"
111 "        1.300   Overland Slope"
112 "        1.948   Pervious Area"
113 "       60.000   Pervious length"
114 "        1.300   Pervious slope"
115 "        0.518   Impervious Area"
116 "       60.000   Impervious length"
117 "        1.300   Impervious slope"
118 "        0.250   Pervious Manning 'n'"
119 "       75.000   Pervious SCS Curve No."
120 "        0.176   Pervious Runoff coefficient"
121 "        0.100   Pervious Ia/S coefficient"
122 "        8.467   Pervious Initial abstraction"
123 "        0.015   Impervious Manning 'n'"
124 "       98.000   Impervious SCS Curve No."
125 "        0.838   Impervious Runoff coefficient"
126 "        0.100   Impervious Ia/S coefficient"
127 "        0.518   Impervious Initial abstraction"
128 "                    0.109     0.000     0.059     0.059 c.m/sec"
129 "             Catchment 102          Pervious   Impervious Total Area "
130 "             Surface Area           1.948      0.518      2.466      hectare"
131 "             Time of concentration  45.352     3.811      22.136     minutes"
132 "             Time to Centroid       158.527    93.801     122.354    minutes"
133 "             Rainfall depth         34.259     34.259     34.259     mm"
134 "             Rainfall volume        667.40     177.41     844.82     c.m"
135 "             Rainfall losses        28.238     5.564      23.476     mm"
136 "             Runoff depth           6.021      28.695     10.782     mm"
137 "             Runoff volume          117.30     148.60     265.89     c.m"
138 "             Runoff coefficient     0.176      0.838      0.315      "
139 "             Maximum flow           0.020      0.106      0.109      c.m/sec"
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141 "            4   Add Runoff "
142 "                    0.109     0.109     0.059     0.059"
```

```
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147 "            6   Combine "
148 "            1   Node #"
149 "                Total"
150 "             Maximum flow                 0.165    c.m/sec"
151 "             Hydrograph volume          506.651    c.m"
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52 "             Surface Area           0.000      0.840      0.840      hectare"
53 "             Time of concentration  40.334     4.174      4.174      minutes"
54 "             Time to Centroid       147.983    92.081     92.081     minutes"
55 "             Rainfall depth         47.240     47.240     47.240     mm"
56 "             Rainfall volume        0.00       396.81     396.81     c.m"
57 "             Rainfall losses        35.067     5.659      5.659      mm"
58 "             Runoff depth           12.173     41.581     41.581     mm"
59 "             Runoff volume          0.00       349.28     349.28     c.m"
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61 "             Maximum flow           0.000      0.242      0.242      c.m/sec"
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63 "            4   Add Runoff "
64 "                    0.242     0.242     0.000     0.000"
65 " 54          POND DESIGN"
66 "        0.242   Current peak flow    c.m/sec"
67 "        0.088   Target outflow    c.m/sec"
68 "        349.3   Hydrograph volume    c.m"
69 "           5.   Number of stages"
70 "      322.240   Minimum water level    metre"
71 "      322.950   Maximum water level    metre"
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72 "      322.240   Starting water level    metre"
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74 "                  Level Discharge    Volume"
75 "                322.240     0.000     0.000"
76 "                322.390   0.03397  1.01E-05"
77 "                322.600   0.05261    11.000"
78 "                322.900   0.07123   200.000"
79 "                322.950    0.2455   294.000"
80 "            1.  WEIRS"
81 "                   Crest      Weir     Crest      Left     Right"
82 "                elevation coefficie   breadth sideslope sideslope"
83 "                  322.900     0.900    10.000     0.000     0.000"
84 "            1.  HOR. ORIFICES"
85 "                  Orifice   Orifice   Orifice Number of"
86 "                   invert coefficie  diameter  orifices"
87 "                  322.240     0.630    0.2000     1.000"
88 "              Peak outflow                  0.065    c.m/sec"
89 "              Maximum level               322.796    metre"
90 "              Maximum storage             134.158    c.m"
91 "              Centroidal lag                1.858   hours"
92 "                   0.242     0.242     0.065     0.000 c.m/sec"
93 " 40          HYDROGRAPH   Combine    1"
94 "            6   Combine "
95 "            1   Node #"
96 "                Total"
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98 "              Hydrograph volume           350.282    c.m"
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107 "          102   Rest of Site"
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112 "        1.948   Pervious Area"
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114 "        1.300   Pervious slope"
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130 "             Surface Area           1.948      0.518      2.466      hectare"
131 "             Time of concentration  33.012     3.416      18.992     minutes"
132 "             Time to Centroid       138.943    91.000     116.233    minutes"
133 "             Rainfall depth         47.240     47.240     47.240     mm"
134 "             Rainfall volume        920.30     244.64     1164.94    c.m"
135 "             Rainfall losses        35.063     6.012      28.962     mm"
136 "             Runoff depth           12.177     41.228     18.277     mm"
137 "             Runoff volume          237.22     213.50     450.72     c.m"
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139 "             Maximum flow           0.056      0.143      0.155      c.m/sec"
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141 "            4   Add Runoff "
142 "                    0.155     0.155     0.065     0.065"
```

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145 "                    0.155     0.155     0.155     0.065"
146 " 40          HYDROGRAPH   Combine    1"
147 "            6   Combine "
148 "            1   Node #"
149 "                Total"
150 "             Maximum flow                 0.215    c.m/sec"
151 "             Hydrograph volume          801.003    c.m"
152 "                    0.155     0.155     0.155     0.215"
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"       1   Equal length"
"       1   SCS method"
"     101   Actual Area to CB"
"  100.000   % Impervious"
"    0.840   Total Area"
"   90.000   Flow length"
"    1.500   Overland Slope"
"    0.000   Pervious Area"
"   90.000   Pervious length"
"    1.500   Pervious slope"
"    0.840   Impervious Area"
"   90.000   Impervious length"
"    1.500   Impervious slope"
"    0.250   Pervious Manning 'n'"
"   75.000   Pervious SCS Curve No."
"    0.000   Pervious Runoff coefficient"
"    0.100   Pervious Ia/S coefficient"
"    8.467   Pervious Initial abstraction"
"    0.015   Impervious Manning 'n'"
"   98.000   Impervious SCS Curve No."
"    0.892   Impervious Runoff coefficient"
"    0.100   Impervious Ia/S coefficient"
"    0.518   Impervious Initial abstraction"
"              0.294     0.000     0.000     0.000 c.m/sec"
"         Catchment 101          Pervious   Impervious Total Area "
"         Surface Area           0.000      0.840      0.840      hectare"
"         Time of concentration  33.996     3.839      3.839      minutes"
"         Time to Centroid       138.503    90.619     90.619     minutes"
"         Rainfall depth         56.290     56.290     56.290     mm"
"         Rainfall volume        0.00       472.84     472.84     c.m"
"         Rainfall losses        39.038     6.092      6.092      mm"
"         Runoff depth           17.252     50.198     50.198     mm"
"         Runoff volume          0.00       421.67     421.67     c.m"
"         Runoff coefficient     0.000      0.892      0.892      "
"         Maximum flow           0.000      0.294      0.294      c.m/sec"
" 40      HYDROGRAPH Add Runoff "
"       4   Add Runoff "
"              0.294     0.294     0.000     0.000"
" 54      POND DESIGN"
"    0.294   Current peak flow    c.m/sec"
"    0.088   Target outflow    c.m/sec"
"    421.7   Hydrograph volume    c.m"
"        5.   Number of stages"
"  322.240   Minimum water level    metre"
"  322.950   Maximum water level    metre"
```



```
"  322.240   Starting water level    metre"
"         0   Keep Design Data: 1 = True; 0 = False"
"               Level Discharge    Volume"
"             322.240     0.000     0.000"
"             322.390   0.03397  1.01E-05"
"             322.600   0.05261    11.000"
"             322.900   0.07123   200.000"
"             322.950    0.2455   294.000"
"       1.   WEIRS"
"              Crest      Weir     Crest      Left     Right"
"          elevation coefficie   breadth sideslope sideslope"
"             322.900     0.900    10.000     0.000     0.000"
"       1.   HOR. ORIFICES"
"            Orifice   Orifice   Orifice Number of"
"             invert coefficie  diameter  orifices"
"             322.240     0.630    0.2000     1.000"
"         Peak outflow                 0.069    c.m/sec"
"         Maximum level              322.872    metre"
"         Maximum storage            182.273    c.m"
"         Centroidal lag               1.934   hours"
"              0.294     0.294     0.069     0.000 c.m/sec"
" 40      HYDROGRAPH   Combine    1"
"       6   Combine "
"       1   Node #"
"           Total"
"         Maximum flow                 0.069    c.m/sec"
"         Hydrograph volume          421.462    c.m"
"                0.294     0.294     0.069     0.069"
" 40      HYDROGRAPH Start - New Tributary"
"       2   Start - New Tributary"
"                0.294     0.000     0.069     0.069"
" 33      CATCHMENT 102"
"       1   Triangular SCS"
"       1   Equal length"
"       1   SCS method"
"     102   Rest of Site"
"   21.000   % Impervious"
"    2.466   Total Area"
"   60.000   Flow length"
"    1.300   Overland Slope"
"    1.948   Pervious Area"
"   60.000   Pervious length"
"    1.300   Pervious slope"
"    0.518   Impervious Area"
"   60.000   Impervious length"
"    1.300   Impervious slope"
"    0.250   Pervious Manning 'n'"
"   75.000   Pervious SCS Curve No."
"    0.306   Pervious Runoff coefficient"
"    0.100   Pervious Ia/S coefficient"
"    8.467   Pervious Initial abstraction"
"    0.015   Impervious Manning 'n'"
"   98.000   Impervious SCS Curve No."
"    0.890   Impervious Runoff coefficient"
"    0.100   Impervious Ia/S coefficient"
"    0.518   Impervious Initial abstraction"
"              0.199     0.000     0.069     0.069 c.m/sec"
"         Catchment 102          Pervious   Impervious Total Area "
"         Surface Area           1.948      0.518      2.466      hectare"
"         Time of concentration  27.824     3.142      17.072     minutes"
"         Time to Centroid       130.747    89.578     112.813    minutes"
"         Rainfall depth         56.290     56.290     56.290     mm"
"         Rainfall volume        1096.61    291.50     1388.12    c.m"
"         Rainfall losses        39.038     6.194      32.141     mm"
"         Runoff depth           17.252     50.096     24.150     mm"
"         Runoff volume          336.10     259.43     595.53     c.m"
"         Runoff coefficient     0.306      0.890      0.429      "
"         Maximum flow           0.095      0.177      0.199      c.m/sec"
" 40      HYDROGRAPH Add Runoff "
"       4   Add Runoff "
"              0.199     0.199     0.069     0.069"
```

```
143 " 40          HYDROGRAPH Copy to Outflow"
144 "            8   Copy to Outflow"
145 "                    0.199     0.199     0.199     0.069"
146 " 40          HYDROGRAPH   Combine    1"
147 "            6   Combine "
148 "            1   Node #"
149 "                Total"
150 "             Maximum flow                 0.262    c.m/sec"
151 "             Hydrograph volume          1016.991    c.m"
152 "                    0.199     0.199     0.199     0.262"
```

```
" MIDUSS Output ----------------------------------------------->"
" MIDUSS version                          Version 2.25  rev. 473"
" MIDUSS created                       Sunday, February 7, 2010"
"          10   Units used:                                ie METRIC"
" MIDUSS created                       Sunday, February 7, 2010"
"          10   Units used:                                ie METRIC"
" Job folder:                  Q:\55237\100\SWM\2nd Submission"
" Output filename:                                25 Year Pre.out"
" Licensee name:                                             A"
" Company                                                    "
" Date & Time last used:              7/8/2025 at 6:33:03 PM"
" 31          TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"    3158.000   Coefficient A"
"      15.000   Constant B"
"       0.936   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"            Maximum intensity          191.271    mm/hr"
"            Total depth                 68.087    mm"
"           6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         101   Actual Area to CB"
"     100.000   % Impervious"
"       0.840   Total Area"
"      90.000   Flow length"
"       1.500   Overland Slope"
"       0.000   Pervious Area"
"      90.000   Pervious length"
"       1.500   Pervious slope"
"       0.840   Impervious Area"
"      90.000   Impervious length"
"       1.500   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      75.000   Pervious SCS Curve No."
"       0.000   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       8.467   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.901   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                 0.337     0.000     0.000     0.000 c.m/sec"
"            Catchment 101          Pervious   Impervious Total Area "
"            Surface Area           0.000      0.840      0.840      hectare"
"            Time of concentration  29.813     3.644      3.644      minutes"
"            Time to Centroid       131.762    89.792     89.792     minutes"
"            Rainfall depth         68.087     68.087     68.087     mm"
"            Rainfall volume        0.00       571.93     571.93     c.m"
"            Rainfall losses        43.455     6.726      6.726      mm"
"            Runoff depth           24.631     61.360     61.360     mm"
"            Runoff volume          0.00       515.43     515.43     c.m"
"            Runoff coefficient     0.000      0.901      0.901      "
"            Maximum flow           0.000      0.337      0.337      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                 0.337     0.337     0.000     0.000"
" 54          POND DESIGN"
"       0.337   Current peak flow    c.m/sec"
"       0.088   Target outflow    c.m/sec"
"       515.4   Hydrograph volume    c.m"
"          5.   Number of stages"
"     322.240   Minimum water level    metre"
"     322.950   Maximum water level    metre"
```



```
"     322.240   Starting water level    metre"
"           0   Keep Design Data: 1 = True; 0 = False"
"                 Level Discharge    Volume"
"               322.240     0.000     0.000"
"               322.390   0.03397  1.01E-05"
"               322.600   0.05261    11.000"
"               322.900   0.07123   200.000"
"               322.950    0.2455   294.000"
"          1.   WEIRS"
"                  Crest      Weir     Crest      Left     Right"
"             elevation coefficie   breadth sideslope sideslope"
"               322.900     0.900    10.000     0.000     0.000"
"          1.   HOR. ORIFICES"
"               Orifice   Orifice   Orifice Number of"
"                invert coefficie  diameter  orifices"
"               322.240     0.630    0.2000     1.000"
"            Peak outflow                  0.107    c.m/sec"
"            Maximum level               322.911    metre"
"            Maximum storage             220.205    c.m"
"            Centroidal lag                1.954   hours"
"                 0.337     0.337     0.107     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Total"
"            Maximum flow                  0.107    c.m/sec"
"            Hydrograph volume           512.363    c.m"
"                    0.337     0.337     0.107     0.107"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.337     0.000     0.107     0.107"
" 33          CATCHMENT 102"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         102   Rest of Site"
"      21.000   % Impervious"
"       2.466   Total Area"
"      60.000   Flow length"
"       1.300   Overland Slope"
"       1.948   Pervious Area"
"      60.000   Pervious length"
"       1.300   Pervious slope"
"       0.518   Impervious Area"
"      60.000   Impervious length"
"       1.300   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      75.000   Pervious SCS Curve No."
"       0.362   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       8.467   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.902   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                 0.246     0.000     0.107     0.107 c.m/sec"
"            Catchment 102          Pervious   Impervious Total Area "
"            Surface Area           1.948      0.518      2.466      hectare"
"            Time of concentration  24.401     2.983      15.862     minutes"
"            Time to Centroid       125.008    88.815     110.580    minutes"
"            Rainfall depth         68.087     68.087     68.087     mm"
"            Rainfall volume        1326.42    352.59     1679.01    c.m"
"            Rainfall losses        43.461     6.674      35.736     mm"
"            Runoff depth           24.625     61.413     32.351     mm"
"            Runoff volume          479.73     318.03     797.77     c.m"
"            Runoff coefficient     0.362      0.902      0.475      "
"            Maximum flow           0.150      0.210      0.246      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                 0.246     0.246     0.107     0.107"
```

```
143 " 40          HYDROGRAPH Copy to Outflow"
144 "            8   Copy to Outflow"
145 "                    0.246     0.246     0.246     0.107"
146 " 40          HYDROGRAPH   Combine    1"
147 "            6   Combine "
148 "            1   Node #"
149 "                Total"
150 "             Maximum flow                 0.312    c.m/sec"
151 "             Hydrograph volume         1310.128    c.m"
152 "                    0.246     0.246     0.246     0.312"
```

```
" MIDUSS Output ----------------------------------------------->"
" MIDUSS version                          Version 2.25  rev. 473"
" MIDUSS created                       Sunday, February 7, 2010"
"          10   Units used:                                ie METRIC"
" MIDUSS created                       Sunday, February 7, 2010"
"          10   Units used:                                ie METRIC"
" Job folder:                  Q:\55237\100\SWM\2nd Submission"
" Output filename:                                50 Year Pre.out"
" Licensee name:                                              A"
" Company                                                     "
" Date & Time last used:                 7/8/2025 at 6:33:47 PM"
" 31          TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    1500.000   Max. Hydrograph"
" 32         STORM Chicago storm"
"           1   Chicago storm"
"    3886.000   Coefficient A"
"      16.000   Constant B"
"       0.950   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"            Maximum intensity          215.474    mm/hr"
"            Total depth                 77.443    mm"
"           6   050hyd   Hydrograph extension used in this file"
" 33         CATCHMENT 101"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         101   Actual Area to CB"
"     100.000   % Impervious"
"       0.840   Total Area"
"      90.000   Flow length"
"       1.500   Overland Slope"
"       0.000   Pervious Area"
"      90.000   Pervious length"
"       1.500   Pervious slope"
"       0.840   Impervious Area"
"      90.000   Impervious length"
"       1.500   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      75.000   Pervious SCS Curve No."
"       0.000   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       8.467   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.912   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                0.381     0.000     0.000     0.000 c.m/sec"
"            Catchment 101          Pervious   Impervious Total Area "
"            Surface Area           0.000      0.840      0.840      hectare"
"            Time of concentration  27.048     3.467      3.467      minutes"
"            Time to Centroid       127.456    89.129     89.129     minutes"
"            Rainfall depth         77.443     77.443     77.443     mm"
"            Rainfall volume        0.00       650.52     650.52     c.m"
"            Rainfall losses        46.483     6.800      6.800      mm"
"            Runoff depth           30.960     70.643     70.643     mm"
"            Runoff volume          0.00       593.40     593.40     c.m"
"            Runoff coefficient     0.000      0.912      0.912      "
"            Maximum flow           0.000      0.381      0.381      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                 0.381     0.381     0.000     0.000"
" 54         POND DESIGN"
"       0.381   Current peak flow    c.m/sec"
"       0.088   Target outflow    c.m/sec"
"       593.4   Hydrograph volume    c.m"
"          5.   Number of stages"
"     322.240   Minimum water level    metre"
"     322.950   Maximum water level    metre"
```



```
"     322.240   Starting water level    metre"
"           0   Keep Design Data: 1 = True; 0 = False"
"                 Level Discharge    Volume"
"               322.240     0.000     0.000"
"               322.390   0.03397  1.01E-05"
"               322.600   0.05261    11.000"
"               322.900   0.07123   200.000"
"               322.950    0.2455   294.000"
"           1.  WEIRS"
"                 Crest      Weir     Crest      Left     Right"
"              elevation coefficie   breadth sideslope sideslope"
"               322.900     0.900    10.000     0.000     0.000"
"           1.  HOR. ORIFICES"
"               Orifice   Orifice   Orifice Number of"
"                invert coefficie  diameter  orifices"
"               322.240     0.630    0.2000     1.000"
"            Peak outflow                  0.151    c.m/sec"
"            Maximum level               322.923    metre"
"            Maximum storage             242.979    c.m"
"            Centroidal lag                1.932   hours"
"                 0.381     0.381     0.151     0.000 c.m/sec"
" 40         HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Total"
"            Maximum flow                  0.151    c.m/sec"
"            Hydrograph volume           590.164    c.m"
"                    0.381     0.381     0.151     0.151"
" 40         HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.381     0.000     0.151     0.151"
" 33         CATCHMENT 102"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         102   Rest of Site"
"      21.000   % Impervious"
"       2.466   Total Area"
"      60.000   Flow length"
"       1.300   Overland Slope"
"       1.948   Pervious Area"
"      60.000   Pervious length"
"       1.300   Pervious slope"
"       0.518   Impervious Area"
"      60.000   Impervious length"
"       1.300   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      75.000   Pervious SCS Curve No."
"       0.399   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       8.467   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.909   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                0.295     0.000     0.151     0.151 c.m/sec"
"            Catchment 102          Pervious   Impervious Total Area "
"            Surface Area           1.948      0.518      2.466      hectare"
"            Time of concentration  22.137     2.838      14.859     minutes"
"            Time to Centroid       121.324    88.199     108.831    minutes"
"            Rainfall depth         77.443     77.443     77.443     mm"
"            Rainfall volume        1508.69    401.05     1909.74    c.m"
"            Rainfall losses        46.520     7.012      38.223     mm"
"            Runoff depth           30.922     70.431     39.219     mm"
"            Runoff volume          602.41     364.73     967.15     c.m"
"            Runoff coefficient     0.399      0.909      0.506      "
"            Maximum flow           0.210      0.242      0.295      c.m/sec"
" 40         HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                 0.295     0.295     0.151     0.151"
```

```
143 " 40          HYDROGRAPH Copy to Outflow"
144 "            8   Copy to Outflow"
145 "                    0.295     0.295     0.295     0.151"
146 " 40          HYDROGRAPH   Combine    1"
147 "            6   Combine "
148 "            1   Node #"
149 "                Total"
150 "             Maximum flow                 0.411    c.m/sec"
151 "             Hydrograph volume         1557.310    c.m"
152 "                    0.295     0.295     0.295     0.411"
```

```
" MIDUSS Output ----------------------------------------------->"
" MIDUSS version                          Version 2.25  rev. 473"
" MIDUSS created                       Sunday, February 7, 2010"
"    10   Units used:                                  ie METRIC"
" Job folder:                  Q:\55237\100\SWM\2nd Submission"
" Output filename:                                100 Year Pre.out"
" Licensee name:                                              A"
" Company                                                     "
" Date & Time last used:              7/8/2025 at 6:34:29 PM"
" 31  TIME PARAMETERS"
"  5.000   Time Step"
"  180.000   Max. Storm length"
"  1500.000   Max. Hydrograph"
" 32  STORM Chicago storm"
"    1   Chicago storm"
"  4688.000   Coefficient A"
"  17.000   Constant B"
"  0.962   Exponent C"
"  0.400   Fraction R"
"  180.000   Duration"
"  1.000   Time step multiplier"
"  Maximum intensity          239.650    mm/hr"
"  Total depth                 87.263    mm"
"    6   100hyd   Hydrograph extension used in this file"
" 33  CATCHMENT 101"
"    1   Triangular SCS"
"    1   Equal length"
"    1   SCS method"
"    101   Actual Area to CB"
"  100.000   % Impervious"
"  0.840   Total Area"
"  90.000   Flow length"
"  1.500   Overland Slope"
"  0.000   Pervious Area"
"  90.000   Pervious length"
"  1.500   Pervious slope"
"  0.840   Impervious Area"
"  90.000   Impervious length"
"  1.500   Impervious slope"
"  0.250   Pervious Manning 'n'"
"  75.000   Pervious SCS Curve No."
"  0.000   Pervious Runoff coefficient"
"  0.100   Pervious Ia/S coefficient"
"  8.467   Pervious Initial abstraction"
"  0.015   Impervious Manning 'n'"
"  98.000   Impervious SCS Curve No."
"  0.920   Impervious Runoff coefficient"
"  0.100   Impervious Ia/S coefficient"
"  0.518   Impervious Initial abstraction"
"  0.428  0.000  0.000  0.000 c.m/sec"
"  Catchment 101  Pervious  Impervious Total Area "
"  Surface Area  0.000  0.840  0.840  hectare"
"  Time of concentration  24.865  3.318  3.318  minutes"
"  Time to Centroid  124.029  88.573  88.573  minutes"
"  Rainfall depth  87.263  87.263  87.263  mm"
"  Rainfall volume  0.00  733.01  733.01  c.m"
"  Rainfall losses  49.309  7.008  7.008  mm"
"  Runoff depth  37.955  80.255  80.255  mm"
"  Runoff volume  0.00  674.14  674.14  c.m"
"  Runoff coefficient  0.000  0.920  0.920  "
"  Maximum flow  0.000  0.428  0.428  c.m/sec"
" 40  HYDROGRAPH Add Runoff "
"    4   Add Runoff "
"  0.428  0.428  0.000  0.000"
" 54  POND DESIGN"
"  0.428   Current peak flow    c.m/sec"
"  0.088   Target outflow    c.m/sec"
"  674.1   Hydrograph volume    c.m"
"    5.   Number of stages"
"  322.240   Minimum water level    metre"
"  322.950   Maximum water level    metre"
```



```
"  322.240   Starting water level    metre"
"  0   Keep Design Data: 1 = True; 0 = False"
"  Level Discharge  Volume"
"  322.240  0.000  0.000"
"  322.390  0.03397  1.01E-05"
"  322.600  0.05261  11.000"
"  322.900  0.07123  200.000"
"  322.950  0.2455  294.000"
"  1.  WEIRS"
"  Crest  Weir  Crest  Left  Right"
"  elevation coefficie  breadth sideslope sideslope"
"  322.900  0.900  10.000  0.000  0.000"
"  1.  HOR. ORIFICES"
"  Orifice  Orifice  Orifice Number of"
"  invert coefficie  diameter  orifices"
"  322.240  0.630  0.2000  1.000"
"  Peak outflow  0.194  c.m/sec"
"  Maximum level  322.936  metre"
"  Maximum storage  267.496  c.m"
"  Centroidal lag  1.909  hours"
"  0.428  0.428  0.194  0.000 c.m/sec"
" 40  HYDROGRAPH  Combine  1"
"  6   Combine "
"  1   Node #"
"  Total"
"  Maximum flow  0.194  c.m/sec"
"  Hydrograph volume  674.129  c.m"
"  0.428  0.428  0.194  0.194"
" 40  HYDROGRAPH Start - New Tributary"
"  2   Start - New Tributary"
"  0.428  0.000  0.194  0.194"
" 33  CATCHMENT 102"
"  1   Triangular SCS"
"  1   Equal length"
"  1   SCS method"
"  102   Rest of Site"
"  21.000   % Impervious"
"  2.466   Total Area"
"  60.000   Flow length"
"  1.300   Overland Slope"
"  1.948   Pervious Area"
"  60.000   Pervious length"
"  1.300   Pervious slope"
"  0.518   Impervious Area"
"  60.000   Impervious length"
"  1.300   Impervious slope"
"  0.250   Pervious Manning 'n'"
"  75.000   Pervious SCS Curve No."
"  0.435   Pervious Runoff coefficient"
"  0.100   Pervious Ia/S coefficient"
"  8.467   Pervious Initial abstraction"
"  0.015   Impervious Manning 'n'"
"  98.000   Impervious SCS Curve No."
"  0.917   Impervious Runoff coefficient"
"  0.100   Impervious Ia/S coefficient"
"  0.518   Impervious Initial abstraction"
"  0.352  0.000  0.194  0.194 c.m/sec"
"  Catchment 102  Pervious  Impervious Total Area "
"  Surface Area  1.948  0.518  2.466  hectare"
"  Time of concentration  20.350  2.715  14.014  minutes"
"  Time to Centroid  118.346  87.708  107.338  minutes"
"  Rainfall depth  87.263  87.263  87.263  mm"
"  Rainfall volume  1700.01  451.90  2151.92  c.m"
"  Rainfall losses  49.316  7.209  40.473  mm"
"  Runoff depth  37.948  80.054  46.790  mm"
"  Runoff volume  739.27  414.57  1153.84  c.m"
"  Runoff coefficient  0.435  0.917  0.536  "
"  Maximum flow  0.269  0.275  0.352  c.m/sec"
" 40  HYDROGRAPH Add Runoff "
"  4   Add Runoff "
"  0.352  0.352  0.194  0.194"
```

```
143 " 40          HYDROGRAPH Copy to Outflow"
144 "            8   Copy to Outflow"
145 "                    0.352     0.352     0.352     0.194"
146 " 40          HYDROGRAPH   Combine    1"
147 "            6   Combine "
148 "            1   Node #"
149 "                Total"
150 "             Maximum flow                 0.533    c.m/sec"
151 "             Hydrograph volume         1827.972    c.m"
152 "                    0.352     0.352     0.352     0.533"
```

Post-Development

```
" MIDUSS Output ------------------------------------------------>"
" MIDUSS version                          Version 2.25  rev. 473"
" MIDUSS created                       Sunday, February 7, 2010"
"          10   Units used:                                ie METRIC"
" Job folder:                  Q:\55237\100\SWM\2nd Submission"
" Output filename:                                2 Year Post.out"
" Licensee name:                                              A"
" Company                                                     "
" Date & Time last used:              7/8/2025 at 6:40:08 PM"
" 31          TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"     743.000   Coefficient A"
"       6.000   Constant B"
"       0.799   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"            Maximum intensity          109.374    mm/hr"
"            Total depth                 34.259    mm"
"           6   002hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         201   Uncontrolled to Wetland"
"      56.000   % Impervious"
"       0.920   Total Area"
"      60.000   Flow length"
"       2.000   Overland Slope"
"       0.405   Pervious Area"
"      60.000   Pervious length"
"       2.000   Pervious slope"
"       0.515   Impervious Area"
"      60.000   Impervious length"
"       2.000   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      75.000   Pervious SCS Curve No."
"       0.176   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       8.467   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.839   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                 0.104     0.000     0.000     0.000 c.m/sec"
"            Catchment 201          Pervious   Impervious Total Area "
"            Surface Area           0.405      0.515      0.920      hectare"
"            Time of concentration  39.854     3.349      8.509      minutes"
"            Time to Centroid       151.831    93.076     101.381    minutes"
"            Rainfall depth         34.259     34.259     34.259     mm"
"            Rainfall volume        138.68     176.50     315.18     c.m"
"            Rainfall losses        28.238     5.525      15.518     mm"
"            Runoff depth           6.021      28.734     18.740     mm"
"            Runoff volume          24.37      148.04     172.41     c.m"
"            Runoff coefficient     0.176      0.839      0.547      "
"            Maximum flow           0.005      0.103      0.104      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                 0.104     0.104     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                 0.104     0.104     0.104     0.000"
" 40          HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Site"
```



```
"            Maximum flow                0.104    c.m/sec"
"            Hydrograph volume         172.409    c.m"
"                  0.104     0.104     0.104     0.104"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                 0.104     0.000     0.104     0.104"
" 33          CATCHMENT 202"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         202   Roof"
"     100.000   % Impervious"
"       0.178   Total Area"
"      10.000   Flow length"
"       1.500   Overland Slope"
"       0.000   Pervious Area"
"      10.000   Pervious length"
"       1.500   Pervious slope"
"       0.178   Impervious Area"
"      10.000   Impervious length"
"       1.500   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      75.000   Pervious SCS Curve No."
"       0.000   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       8.467   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.835   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                 0.042     0.000     0.104     0.104 c.m/sec"
"            Catchment 202          Pervious   Impervious Total Area "
"            Surface Area           0.000      0.178      0.178      hectare"
"            Time of concentration  14.827     1.246      1.246      minutes"
"            Time to Centroid       121.398    89.765     89.765     minutes"
"            Rainfall depth         34.259     34.259     34.259     mm"
"            Rainfall volume        0.00       60.98      60.98      c.m"
"            Rainfall losses        28.251     5.641      5.641      mm"
"            Runoff depth           6.008      28.618     28.618     mm"
"            Runoff volume          0.00       50.94      50.94      c.m"
"            Runoff coefficient     0.000      0.835      0.835      "
"            Maximum flow           0.000      0.042      0.042      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                 0.042     0.042     0.104     0.104"
" 57          TRENCH Design d/s of 202"
"       0.042   Peak inflow"
"      50.939   Hydrograph volume"
"     324.950   Ground elevation"
"     322.000   Downstream trench invert"
"       1.670   Trench height"
"     319.000   Water table elevation"
"       4.700   Trench top width"
"       4.700   Trench bottom width"
"      53.000   Voids ratio (%)"
"      18.000   Hydraulic conductivity"
"       0.000   Trench gradient (%)"
"      16.000   Trench length"
"       1.000   Include base width"
"         21.   Number of stages"
"                 Level Discharge    Volume"
"               322.000     0.000       0.0"
"               322.147     0.000       5.9"
"               322.295     0.000      11.8"
"               322.443     0.000      17.6"
"               322.590     0.000      23.5"
"               322.737     0.000      29.4"
"               322.885     0.000      35.3"
"               323.033     0.000      41.2"
"               323.180     0.000      47.0"
```

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"                323.328     0.000      52.9"
"                323.475     0.000      58.8"
"                323.622     0.000      64.7"
"                323.770     0.005      66.7"
"                323.918     0.026      66.8"
"                324.065     0.054      67.0"
"                324.212     0.080      67.2"
"                324.360     0.101      67.3"
"                324.508     0.118      67.5"
"                324.655     0.133      67.7"
"                324.803     0.147      67.8"
"                324.950     0.159      68.0"
"           1.   TRENCH PIPES"
"             Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                 Invert    length     diam.    grade%     0=Yes  distance"
"                323.670    12.900     0.000     1.008     1.000     0.000"
"           1.   MANHOLE"
"                 Access"
"               diameter"
"                  1.200"
"           1.   OUTFLOW PIPE"
"           0.   Inflow at upstream end of trench: 1=True; 0=False"
"               Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                  invert    invert    Length  Diameter       'n'   loss Ke"
"                323.670   323.540    12.900     0.300     0.013     0.500"
"             Peak outflow                 0.000    c.m/sec"
"             Outflow volume               0.009    c.m"
"             Peak exfiltration            0.001    c.m/sec"
"             Exfiltration volume         45.807    c.m"
"             Maximum level              323.158    metre"
"             Maximum storage             46.156    c.m"
"             Centroidal lag              12.988   hours"
"             Infiltration area 2 sides   37.061   sq.metre"
"             Infiltration Base area      75.200   sq.metre"
"                  0.042     0.042     0.000     0.001 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                   0.042     0.000     0.000     0.001"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Controlled Area"
"       98.000   % Impervious"
"        2.036   Total Area"
"       30.000   Flow length"
"        1.000   Overland Slope"
"        0.041   Pervious Area"
"       30.000   Pervious length"
"        1.000   Pervious slope"
"        1.995   Impervious Area"
"       30.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.176   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.840   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                   0.410     0.000     0.000     0.001 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.041      1.995      2.036      hectare"
"             Time of concentration  32.371     2.720      2.846      minutes"
"             Time to Centroid       142.731    92.068     92.283     minutes"
"             Rainfall depth         34.259     34.259     34.259     mm"
"             Rainfall volume        13.95      683.55     697.50     c.m"
"             Rainfall losses        28.239     5.484      5.939      mm"
```



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"             Runoff depth           6.019      28.775     28.320     mm"
"             Runoff volume          2.45       574.14     576.59     c.m"
"             Runoff coefficient     0.176      0.840      0.827      "
"             Maximum flow           0.001      0.410      0.410      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                   0.410     0.410     0.000     0.001"
" 54          POND DESIGN"
"         0.410   Current peak flow    c.m/sec"
"         0.551   Target outflow    c.m/sec"
"         576.6   Hydrograph volume    c.m"
"            9.   Number of stages"
"       322.630   Minimum water level    metre"
"       325.150   Maximum water level    metre"
"       322.630   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                 322.630     0.000     0.000"
"                 324.800   0.01795   186.000"
"                 324.850   0.01816   213.000"
"                 324.900   0.01837   294.000"
"                 324.950   0.01857   479.000"
"                 325.000   0.01878   817.000"
"                 325.050   0.01898  1325.000"
"                 325.100   0.01918  2021.000"
"                 325.150   0.01938  2400.000"
"           1.   ORIFICES"
"                Orifice   Orifice   Orifice Number of"
"                 invert coefficie  diameter  orifices"
"                 322.630     0.630     0.0750     1.000"
"             Peak outflow                 0.019    c.m/sec"
"             Maximum level              324.941    metre"
"             Maximum storage            446.065    c.m"
"             Centroidal lag               5.973   hours"
"                  0.410     0.410     0.019     0.001 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                Flow to SWMF"
"             Maximum flow                 0.019    c.m/sec"
"             Hydrograph volume          576.107    c.m"
"                    0.410     0.410     0.019     0.019"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.410     0.000     0.019     0.019"
" 33          CATCHMENT 204"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          204   Uncontrolled to ROW"
"       22.000   % Impervious"
"        0.172   Total Area"
"       15.000   Flow length"
"       10.000   Overland Slope"
"        0.134   Pervious Area"
"       15.000   Pervious length"
"       10.000   Pervious slope"
"        0.038   Impervious Area"
"       15.000   Impervious length"
"       10.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.175   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.819   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                   0.010     0.000     0.019     0.019 c.m/sec"
```

```
285 "             Catchment 204          Pervious   Impervious Total Area "
286 "             Surface Area           0.134      0.038      0.172      hectare"
287 "             Time of concentration  10.704     0.899      5.131      minutes"
288 "             Time to Centroid       116.350    89.183     100.909    minutes"
289 "             Rainfall depth         34.259     34.259     34.259     mm"
290 "             Rainfall volume        45.96      12.96      58.92      c.m"
291 "             Rainfall losses        28.250     6.208      23.401     mm"
292 "             Runoff depth           6.008      28.050     10.858     mm"
293 "             Runoff volume          8.06       10.61      18.68      c.m"
294 "             Runoff coefficient     0.175      0.819      0.317      "
295 "             Maximum flow           0.003      0.009      0.010      c.m/sec"
296 " 40          HYDROGRAPH Add Runoff "
297 "            4   Add Runoff "
298 "                    0.010     0.010     0.019     0.019"
299 " 40          HYDROGRAPH Copy to Outflow"
300 "            8   Copy to Outflow"
301 "                    0.010     0.010     0.010     0.019"
302 " 40          HYDROGRAPH   Combine    2"
303 "            6   Combine "
304 "            2   Node #"
305 "                Flow to SWMF"
306 "             Maximum flow                  0.025    c.m/sec"
307 "             Hydrograph volume           594.782    c.m"
308 "                    0.010     0.010     0.010     0.025"
309 " 40          HYDROGRAPH   Confluence    2"
310 "            7   Confluence "
311 "            2   Node #"
312 "                Flow to SWMF"
313 "             Maximum flow                  0.025    c.m/sec"
314 "             Hydrograph volume           594.782    c.m"
315 "                    0.010     0.025     0.010     0.000"
316 " 40          HYDROGRAPH Copy to Outflow"
317 "            8   Copy to Outflow"
318 "                    0.010     0.025     0.025     0.000"
319 " 40          HYDROGRAPH   Combine    1"
320 "            6   Combine "
321 "            1   Node #"
322 "                Site"
323 "             Maximum flow                  0.129    c.m/sec"
324 "             Hydrograph volume           767.190    c.m"
325 "                    0.010     0.025     0.025     0.129"
326 " 40          HYDROGRAPH   Confluence    1"
327 "            7   Confluence "
328 "            1   Node #"
329 "                Site"
330 "             Maximum flow                  0.129    c.m/sec"
331 "             Hydrograph volume           767.190    c.m"
332 "                    0.010     0.129     0.025     0.000"
```

```
" MIDUSS Output ----------------------------------------------->"
" MIDUSS version                          Version 2.25  rev. 473"
" MIDUSS created                       Sunday, February 7, 2010"
"          10   Units used:                                ie METRIC"
" MIDUSS created                       Sunday, February 7, 2010"
"          10   Units used:                                ie METRIC"
" Job folder:                  Q:\55237\100\SWM\2nd Submission"
" Output filename:                                5 Year Post.out"
" Licensee name:                                              A"
" Company                                                     "
" Date & Time last used:                 7/8/2025 at 6:42:55 PM"
" 31          TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"    1593.000   Coefficient A"
"      11.000   Constant B"
"       0.879   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"            Maximum intensity          139.250    mm/hr"
"            Total depth                 47.240    mm"
"           6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         201   Uncontrolled to Wetland"
"      56.000   % Impervious"
"       0.920   Total Area"
"      60.000   Flow length"
"       2.000   Overland Slope"
"       0.405   Pervious Area"
"      60.000   Pervious length"
"       2.000   Pervious slope"
"       0.515   Impervious Area"
"      60.000   Impervious length"
"       2.000   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      75.000   Pervious SCS Curve No."
"       0.257   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       8.467   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.874   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                0.145     0.000     0.000     0.000 c.m/sec"
"            Catchment 201          Pervious   Impervious Total Area "
"            Surface Area           0.405      0.515      0.920      hectare"
"            Time of concentration  29.009     3.002      7.891      minutes"
"            Time to Centroid       133.998    90.350     98.555     minutes"
"            Rainfall depth         47.240     47.240     47.240     mm"
"            Rainfall volume        191.23     243.38     434.61     c.m"
"            Rainfall losses        35.077     5.955      18.769     mm"
"            Runoff depth           12.163     41.285     28.471     mm"
"            Runoff volume          49.24      212.70     261.94     c.m"
"            Runoff coefficient     0.257      0.874      0.603      "
"            Maximum flow           0.013      0.144      0.145      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                 0.145     0.145     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                 0.145     0.145     0.145     0.000"
" 40          HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Site"
```



```
"            Maximum flow                0.145    c.m/sec"
"            Hydrograph volume         261.935    c.m"
"                  0.145     0.145     0.145     0.145"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                 0.145     0.000     0.145     0.145"
" 33          CATCHMENT 202"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         202   Roof"
"      100.000   % Impervious"
"       0.178   Total Area"
"      10.000   Flow length"
"       1.500   Overland Slope"
"       0.000   Pervious Area"
"      10.000   Pervious length"
"       1.500   Pervious slope"
"       0.178   Impervious Area"
"      10.000   Impervious length"
"       1.500   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      75.000   Pervious SCS Curve No."
"       0.000   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       8.467   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.867   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                0.057     0.000     0.145     0.145 c.m/sec"
"            Catchment 202          Pervious   Impervious Total Area "
"            Surface Area           0.000      0.178      0.178      hectare"
"            Time of concentration  10.793     1.117      1.117      minutes"
"            Time to Centroid       111.498    87.558     87.558     minutes"
"            Rainfall depth         47.240     47.240     47.240     mm"
"            Rainfall volume        0.00       84.09      84.09      c.m"
"            Rainfall losses        35.086     6.266      6.266      mm"
"            Runoff depth           12.153     40.974     40.974     mm"
"            Runoff volume          0.00       72.93      72.93      c.m"
"            Runoff coefficient     0.000      0.867      0.867      "
"            Maximum flow           0.000      0.057      0.057      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                 0.057     0.057     0.145     0.145"
" 57          TRENCH Design d/s of 202"
"       0.057   Peak inflow"
"      72.933   Hydrograph volume"
"     324.950   Ground elevation"
"     322.000   Downstream trench invert"
"       1.670   Trench height"
"     319.000   Water table elevation"
"       4.700   Trench top width"
"       4.700   Trench bottom width"
"      53.000   Voids ratio (%)"
"      18.000   Hydraulic conductivity"
"       0.000   Trench gradient (%)"
"      16.000   Trench length"
"       1.000   Include base width"
"         21.   Number of stages"
"                 Level Discharge    Volume"
"               322.000     0.000       0.0"
"               322.147     0.000       5.9"
"               322.295     0.000      11.8"
"               322.443     0.000      17.6"
"               322.590     0.000      23.5"
"               322.737     0.000      29.4"
"               322.885     0.000      35.3"
"               323.033     0.000      41.2"
"               323.180     0.000      47.0"
```

```
"                323.328     0.000      52.9"
"                323.475     0.000      58.8"
"                323.622     0.000      64.7"
"                323.770     0.005      66.7"
"                323.918     0.026      66.8"
"                324.065     0.054      67.0"
"                324.212     0.080      67.2"
"                324.360     0.101      67.3"
"                324.508     0.118      67.5"
"                324.655     0.133      67.7"
"                324.803     0.147      67.8"
"                324.950     0.159      68.0"
"           1.   TRENCH PIPES"
"             Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                 Invert    length     diam.    grade%     0=Yes  distance"
"                323.670    12.900     0.000     1.008     1.000     0.000"
"           1.   MANHOLE"
"                 Access"
"               diameter"
"                  1.200"
"           1.   OUTFLOW PIPE"
"           0.   Inflow at upstream end of trench: 1=True; 0=False"
"               Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                  invert    invert    Length  Diameter       'n'   loss Ke"
"                323.670   323.540    12.900     0.300     0.013     0.500"
"             Peak outflow                 0.001    c.m/sec"
"             Outflow volume               2.316    c.m"
"             Peak exfiltration            0.001    c.m/sec"
"             Exfiltration volume         54.501    c.m"
"             Maximum level              323.654    metre"
"             Maximum storage             65.103    c.m"
"             Centroidal lag               2.772   hours"
"             Infiltration area 2 sides   52.936   sq.metre"
"             Infiltration Base area      75.200   sq.metre"
"                  0.057     0.057     0.001     0.001 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                   0.057     0.001     0.001     0.001"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Controlled Area"
"       98.000   % Impervious"
"        2.036   Total Area"
"       30.000   Flow length"
"        1.000   Overland Slope"
"        0.041   Pervious Area"
"       30.000   Pervious length"
"        1.000   Pervious slope"
"        1.995   Impervious Area"
"       30.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.258   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.875   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                   0.584     0.001     0.001     0.001 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.041      1.995      2.036      hectare"
"             Time of concentration  23.563     2.438      2.565      minutes"
"             Time to Centroid       127.276    89.497     89.723     minutes"
"             Rainfall depth         47.240     47.240     47.240     mm"
"             Rainfall volume        19.24      942.57     961.80     c.m"
"             Rainfall losses        35.070     5.921      6.504      mm"
```



```
"             Runoff depth           12.170     41.319     40.736     mm"
"             Runoff volume          4.96       824.43     829.38     c.m"
"             Runoff coefficient     0.258      0.875      0.862      "
"             Maximum flow           0.001      0.583      0.584      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                   0.584     0.584     0.001     0.001"
" 54          POND DESIGN"
"         0.584   Current peak flow    c.m/sec"
"         0.551   Target outflow    c.m/sec"
"         831.7   Hydrograph volume    c.m"
"            9.   Number of stages"
"       322.630   Minimum water level    metre"
"       325.150   Maximum water level    metre"
"       322.630   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                322.630     0.000     0.000"
"                324.800   0.01795   186.000"
"                324.850   0.01816   213.000"
"                324.900   0.01837   294.000"
"                324.950   0.01857   479.000"
"                325.000   0.01878   817.000"
"                325.050   0.01898  1325.000"
"                325.100   0.01918  2021.000"
"                325.150   0.01938  2400.000"
"           1.   ORIFICES"
"                Orifice   Orifice   Orifice Number of"
"                 invert coefficie  diameter  orifices"
"                322.630     0.630     0.0750     1.000"
"             Peak outflow                 0.019    c.m/sec"
"             Maximum level              324.982    metre"
"             Maximum storage            693.542    c.m"
"             Centroidal lag               7.624   hours"
"                  0.584     0.584     0.019     0.001 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                Flow to SWMF"
"             Maximum flow                 0.019    c.m/sec"
"             Hydrograph volume          830.446    c.m"
"                    0.584     0.584     0.019     0.019"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.584     0.000     0.019     0.019"
" 33          CATCHMENT 204"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          204   Uncontrolled to ROW"
"       22.000   % Impervious"
"        0.172   Total Area"
"       15.000   Flow length"
"       10.000   Overland Slope"
"        0.134   Pervious Area"
"       15.000   Pervious length"
"       10.000   Pervious slope"
"        0.038   Impervious Area"
"       15.000   Impervious length"
"       10.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.257   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.845   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.015     0.000     0.019     0.019 c.m/sec"
```

```
285 "             Catchment 204          Pervious   Impervious Total Area "
286 "             Surface Area           0.134      0.038      0.172      hectare"
287 "             Time of concentration  7.791      0.806      4.429      minutes"
288 "             Time to Centroid       107.839    87.178     97.893     minutes"
289 "             Rainfall depth         47.240     47.240     47.240     mm"
290 "             Rainfall volume        63.38      17.88      81.25      c.m"
291 "             Rainfall losses        35.105     7.306      28.989     mm"
292 "             Runoff depth           12.135     39.934     18.251     mm"
293 "             Runoff volume          16.28      15.11      31.39      c.m"
294 "             Runoff coefficient     0.257      0.845      0.386      "
295 "             Maximum flow           0.008      0.012      0.015      c.m/sec"
296 " 40          HYDROGRAPH Add Runoff "
297 "            4   Add Runoff "
298 "                    0.015     0.015     0.019     0.019"
299 " 40          HYDROGRAPH Copy to Outflow"
300 "            8   Copy to Outflow"
301 "                    0.015     0.015     0.015     0.019"
302 " 40          HYDROGRAPH   Combine    2"
303 "            6   Combine "
304 "            2   Node #"
305 "                Flow to SWMF"
306 "             Maximum flow                  0.033    c.m/sec"
307 "             Hydrograph volume           861.838    c.m"
308 "                    0.015     0.015     0.015     0.033"
309 " 40          HYDROGRAPH   Confluence    2"
310 "            7   Confluence "
311 "            2   Node #"
312 "                Flow to SWMF"
313 "             Maximum flow                  0.033    c.m/sec"
314 "             Hydrograph volume           861.838    c.m"
315 "                    0.015     0.033     0.015     0.000"
316 " 40          HYDROGRAPH Copy to Outflow"
317 "            8   Copy to Outflow"
318 "                    0.015     0.033     0.033     0.000"
319 " 40          HYDROGRAPH   Combine    1"
320 "            6   Combine "
321 "            1   Node #"
322 "                Site"
323 "             Maximum flow                  0.177    c.m/sec"
324 "             Hydrograph volume          1123.773    c.m"
325 "                    0.015     0.033     0.033     0.177"
326 " 40          HYDROGRAPH   Confluence    1"
327 "            7   Confluence "
328 "            1   Node #"
329 "                Site"
330 "             Maximum flow                  0.177    c.m/sec"
331 "             Hydrograph volume          1123.773    c.m"
332 "                    0.015     0.177     0.033     0.000"
```

```
" MIDUSS Output ----------------------------------------------->"
" MIDUSS version                          Version 2.25  rev. 473"
" MIDUSS created                       Sunday, February 7, 2010"
"          10   Units used:                                ie METRIC"
" Job folder:                  Q:\55237\100\SWM\2nd Submission"
" Output filename:                                10 Year Post.out"
" Licensee name:                                              A"
" Company                                                     "
" Date & Time last used:              7/8/2025 at 6:44:16 PM"
" 31          TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"    2221.000   Coefficient A"
"      12.000   Constant B"
"       0.908   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"            Maximum intensity          169.551    mm/hr"
"            Total depth                 56.290    mm"
"           6   010hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         201   Uncontrolled to Wetland"
"      56.000   % Impervious"
"       0.920   Total Area"
"      60.000   Flow length"
"       2.000   Overland Slope"
"       0.405   Pervious Area"
"      60.000   Pervious length"
"       2.000   Pervious slope"
"       0.515   Impervious Area"
"      60.000   Impervious length"
"       2.000   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      75.000   Pervious SCS Curve No."
"       0.307   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       8.467   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.887   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                 0.184     0.000     0.000     0.000 c.m/sec"
"            Catchment 201          Pervious   Impervious Total Area "
"            Surface Area           0.405      0.515      0.920      hectare"
"            Time of concentration  24.451     2.761      7.393      minutes"
"            Time to Centroid       126.518    89.008     97.018     minutes"
"            Rainfall depth         56.290     56.290     56.290     mm"
"            Rainfall volume        227.86     290.01     517.87     c.m"
"            Rainfall losses        39.035     6.356      20.734     mm"
"            Runoff depth           17.256     49.935     35.556     mm"
"            Runoff volume          69.85      257.26     327.11     c.m"
"            Runoff coefficient     0.307      0.887      0.632      "
"            Maximum flow           0.021      0.182      0.184      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                 0.184     0.184     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                 0.184     0.184     0.184     0.000"
" 40          HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Site"
```



```
"            Maximum flow                0.184    c.m/sec"
"            Hydrograph volume         327.113    c.m"
"                  0.184     0.184     0.184     0.184"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                 0.184     0.000     0.184     0.184"
" 33          CATCHMENT 202"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         202   Roof"
"     100.000   % Impervious"
"       0.178   Total Area"
"      10.000   Flow length"
"       1.500   Overland Slope"
"       0.000   Pervious Area"
"      10.000   Pervious length"
"       1.500   Pervious slope"
"       0.178   Impervious Area"
"      10.000   Impervious length"
"       1.500   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      75.000   Pervious SCS Curve No."
"       0.000   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       8.467   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.878   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                 0.070     0.000     0.184     0.184 c.m/sec"
"            Catchment 202          Pervious   Impervious Total Area "
"            Surface Area           0.000      0.178      0.178      hectare"
"            Time of concentration  9.097      1.027      1.027      minutes"
"            Time to Centroid       107.210    86.487     86.487     minutes"
"            Rainfall depth         56.290     56.290     56.290     mm"
"            Rainfall volume        0.00       100.20     100.20     c.m"
"            Rainfall losses        39.113     6.851      6.851      mm"
"            Runoff depth           17.177     49.440     49.440     mm"
"            Runoff volume          0.00       88.00      88.00      c.m"
"            Runoff coefficient     0.000      0.878      0.878      "
"            Maximum flow           0.000      0.070      0.070      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                 0.070     0.070     0.184     0.184"
" 57          TRENCH Design d/s of 202"
"       0.070   Peak inflow"
"      88.002   Hydrograph volume"
"     324.950   Ground elevation"
"     322.000   Downstream trench invert"
"       1.670   Trench height"
"     319.000   Water table elevation"
"       4.700   Trench top width"
"       4.700   Trench bottom width"
"      53.000   Voids ratio (%)"
"      18.000   Hydraulic conductivity"
"       0.000   Trench gradient (%)"
"      16.000   Trench length"
"       1.000   Include base width"
"         21.   Number of stages"
"                 Level Discharge    Volume"
"               322.000     0.000       0.0"
"               322.147     0.000       5.9"
"               322.295     0.000      11.8"
"               322.443     0.000      17.6"
"               322.590     0.000      23.5"
"               322.737     0.000      29.4"
"               322.885     0.000      35.3"
"               323.033     0.000      41.2"
"               323.180     0.000      47.0"
```

```
"                323.328     0.000      52.9"
"                323.475     0.000      58.8"
"                323.622     0.000      64.7"
"                323.770     0.005      66.7"
"                323.918     0.026      66.8"
"                324.065     0.054      67.0"
"                324.212     0.080      67.2"
"                324.360     0.101      67.3"
"                324.508     0.118      67.5"
"                324.655     0.133      67.7"
"                324.803     0.147      67.8"
"                324.950     0.159      68.0"
"           1.   TRENCH PIPES"
"             Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                 Invert    length     diam.    grade%     0=Yes  distance"
"                323.670    12.900     0.000     1.008     1.000     0.000"
"           1.   MANHOLE"
"                 Access"
"               diameter"
"                  1.200"
"           1.   OUTFLOW PIPE"
"           0.   Inflow at upstream end of trench: 1=True; 0=False"
"               Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                  invert    invert    Length  Diameter       'n'   loss Ke"
"                323.670   323.540    12.900     0.300     0.013     0.500"
"             Peak outflow                  0.009    c.m/sec"
"             Outflow volume               16.537    c.m"
"             Peak exfiltration             0.001    c.m/sec"
"             Exfiltration volume          54.793    c.m"
"             Maximum level               323.813    metre"
"             Maximum storage              66.721    c.m"
"             Centroidal lag                2.041   hours"
"             Infiltration area 2 sides    53.440   sq.metre"
"             Infiltration Base area       75.200   sq.metre"
"                  0.070     0.070     0.009     0.001 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                   0.070     0.009     0.009     0.001"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Controlled Area"
"       98.000   % Impervious"
"        2.036   Total Area"
"       30.000   Flow length"
"        1.000   Overland Slope"
"        0.041   Pervious Area"
"       30.000   Pervious length"
"        1.000   Pervious slope"
"        1.995   Impervious Area"
"       30.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.306   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.892   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                   0.734     0.009     0.009     0.001 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.041      1.995      2.036      hectare"
"             Time of concentration  19.860     2.243      2.365      minutes"
"             Time to Centroid       120.734    88.191     88.418     minutes"
"             Rainfall depth         56.290     56.290     56.290     mm"
"             Rainfall volume        22.92      1123.15    1146.07    c.m"
"             Rainfall losses        39.058     6.072      6.732      mm"
```



```
"             Runoff depth           17.232     50.218     49.559     mm"
"             Runoff volume          7.02       1001.99    1009.01    c.m"
"             Runoff coefficient     0.306      0.892      0.880      "
"             Maximum flow           0.002      0.733      0.734      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                   0.734     0.734     0.009     0.001"
" 54          POND DESIGN"
"         0.734   Current peak flow    c.m/sec"
"         0.551   Target outflow    c.m/sec"
"        1025.5   Hydrograph volume    c.m"
"            9.   Number of stages"
"       322.630   Minimum water level    metre"
"       325.150   Maximum water level    metre"
"       322.630   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                322.630     0.000     0.000"
"                324.800   0.01795   186.000"
"                324.850   0.01816   213.000"
"                324.900   0.01837   294.000"
"                324.950   0.01857   479.000"
"                325.000   0.01878   817.000"
"                325.050   0.01898  1325.000"
"                325.100   0.01918  2021.000"
"                325.150   0.01938  2400.000"
"           1.   ORIFICES"
"                Orifice   Orifice   Orifice Number of"
"                 invert coefficie  diameter  orifices"
"                322.630     0.630     0.0750     1.000"
"             Peak outflow                  0.019    c.m/sec"
"             Maximum level               325.007    metre"
"             Maximum storage             884.006    c.m"
"             Centroidal lag                8.916   hours"
"                  0.734     0.734     0.019     0.001 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                Flow to SWMF"
"             Maximum flow                  0.019    c.m/sec"
"             Hydrograph volume          1021.788    c.m"
"                    0.734     0.734     0.019     0.019"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.734     0.000     0.019     0.019"
" 33          CATCHMENT 204"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          204   Uncontrolled to ROW"
"       22.000   % Impervious"
"        0.172   Total Area"
"       15.000   Flow length"
"       10.000   Overland Slope"
"        0.134   Pervious Area"
"       15.000   Pervious length"
"       10.000   Pervious slope"
"        0.038   Impervious Area"
"       15.000   Impervious length"
"       10.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.303   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.853   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                   0.021     0.000     0.019     0.019 c.m/sec"
```

```
285 "             Catchment 204          Pervious   Impervious Total Area "
286 "             Surface Area           0.134      0.038      0.172      hectare"
287 "             Time of concentration  6.567      0.742      3.991      minutes"
288 "             Time to Centroid       104.180    86.174     96.218     minutes"
289 "             Rainfall depth         56.290     56.290     56.290     mm"
290 "             Rainfall volume        75.52      21.30      96.82      c.m"
291 "             Rainfall losses        39.212     8.294      32.410     mm"
292 "             Runoff depth           17.078     47.996     23.880     mm"
293 "             Runoff volume          22.91      18.16      41.07      c.m"
294 "             Runoff coefficient     0.303      0.853      0.424      "
295 "             Maximum flow           0.013      0.015      0.021      c.m/sec"
296 " 40          HYDROGRAPH Add Runoff "
297 "            4   Add Runoff "
298 "                    0.021     0.021     0.019     0.019"
299 " 40          HYDROGRAPH Copy to Outflow"
300 "            8   Copy to Outflow"
301 "                    0.021     0.021     0.021     0.019"
302 " 40          HYDROGRAPH   Combine    2"
303 "            6   Combine "
304 "            2   Node #"
305 "                Flow to SWMF"
306 "             Maximum flow                  0.039    c.m/sec"
307 "             Hydrograph volume          1062.862    c.m"
308 "                    0.021     0.021     0.021     0.039"
309 " 40          HYDROGRAPH   Confluence    2"
310 "            7   Confluence "
311 "            2   Node #"
312 "                Flow to SWMF"
313 "             Maximum flow                  0.039    c.m/sec"
314 "             Hydrograph volume          1062.862    c.m"
315 "                    0.021     0.039     0.021     0.000"
316 " 40          HYDROGRAPH Copy to Outflow"
317 "            8   Copy to Outflow"
318 "                    0.021     0.039     0.039     0.000"
319 " 40          HYDROGRAPH   Combine    1"
320 "            6   Combine "
321 "            1   Node #"
322 "                Site"
323 "             Maximum flow                  0.221    c.m/sec"
324 "             Hydrograph volume          1389.975    c.m"
325 "                    0.021     0.039     0.039     0.221"
326 " 40          HYDROGRAPH   Confluence    1"
327 "            7   Confluence "
328 "            1   Node #"
329 "                Site"
330 "             Maximum flow                  0.221    c.m/sec"
331 "             Hydrograph volume          1389.975    c.m"
332 "                    0.021     0.221     0.039     0.000"
```

```
" MIDUSS Output ----------------------------------------------->"
" MIDUSS version                          Version 2.25  rev. 473"
" MIDUSS created                       Sunday, February 7, 2010"
"          10   Units used:                                ie METRIC"
"               Job folder:                 Q:\55237\100\SWM\2nd Submission"
"               Output filename:                        25 Year Post.out"
"               Licensee name:                                        A"
"               Company                                               "
"               Date & Time last used:             7/8/2025 at 6:45:04 PM"
" 31          TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"    3158.000   Coefficient A"
"      15.000   Constant B"
"       0.936   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"            Maximum intensity          191.271    mm/hr"
"            Total depth                 68.087    mm"
"           6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         201   Uncontrolled to Wetland"
"      56.000   % Impervious"
"       0.920   Total Area"
"      60.000   Flow length"
"       2.000   Overland Slope"
"       0.405   Pervious Area"
"      60.000   Pervious length"
"       2.000   Pervious slope"
"       0.515   Impervious Area"
"      60.000   Impervious length"
"       2.000   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      75.000   Pervious SCS Curve No."
"       0.362   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       8.467   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.903   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.219     0.000     0.000     0.000 c.m/sec"
"            Catchment 201          Pervious   Impervious Total Area "
"            Surface Area           0.405      0.515      0.920      hectare"
"            Time of concentration  21.442     2.621      7.126      minutes"
"            Time to Centroid       121.315    88.265     96.175     minutes"
"            Rainfall depth         68.087     68.087     68.087     mm"
"            Rainfall volume        275.61     350.78     626.40     c.m"
"            Rainfall losses        43.470     6.619      22.834     mm"
"            Runoff depth           24.616     61.467     45.253     mm"
"            Runoff volume          99.65      316.68     416.33     c.m"
"            Runoff coefficient     0.362      0.903      0.665      "
"            Maximum flow           0.035      0.215      0.219      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.219     0.219     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                   0.219     0.219     0.219     0.000"
" 40          HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Site"
```



```
"            Maximum flow                0.219    c.m/sec"
"            Hydrograph volume         416.326    c.m"
"                  0.219     0.219     0.219     0.219"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                  0.219     0.000     0.219     0.219"
" 33          CATCHMENT 202"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         202   Roof"
"     100.000   % Impervious"
"       0.178   Total Area"
"      10.000   Flow length"
"       1.500   Overland Slope"
"       0.000   Pervious Area"
"      10.000   Pervious length"
"       1.500   Pervious slope"
"       0.178   Impervious Area"
"      10.000   Impervious length"
"       1.500   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      75.000   Pervious SCS Curve No."
"       0.000   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       8.467   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.890   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                   0.081     0.000     0.219     0.219 c.m/sec"
"            Catchment 202          Pervious   Impervious Total Area "
"            Surface Area           0.000      0.178      0.178      hectare"
"            Time of concentration  7.977      0.975      0.975      minutes"
"            Time to Centroid       104.568    85.949     85.949     minutes"
"            Rainfall depth         68.087     68.087     68.087     mm"
"            Rainfall volume        0.00       121.19     121.19     c.m"
"            Rainfall losses        43.516     7.514      7.514      mm"
"            Runoff depth           24.571     60.573     60.573     mm"
"            Runoff volume          0.00       107.82     107.82     c.m"
"            Runoff coefficient     0.000      0.890      0.890      "
"            Maximum flow           0.000      0.081      0.081      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   0.081     0.081     0.219     0.219"
" 57          TRENCH Design d/s of 202"
"       0.081   Peak inflow"
"     107.819   Hydrograph volume"
"     324.950   Ground elevation"
"     322.000   Downstream trench invert"
"       1.670   Trench height"
"     319.000   Water table elevation"
"       4.700   Trench top width"
"       4.700   Trench bottom width"
"      53.000   Voids ratio (%)"
"      18.000   Hydraulic conductivity"
"       0.000   Trench gradient (%)"
"      16.000   Trench length"
"       1.000   Include base width"
"         21.   Number of stages"
"                 Level Discharge    Volume"
"               322.000     0.000       0.0"
"               322.147     0.000       5.9"
"               322.295     0.000      11.8"
"               322.443     0.000      17.6"
"               322.590     0.000      23.5"
"               322.737     0.000      29.4"
"               322.885     0.000      35.3"
"               323.033     0.000      41.2"
"               323.180     0.000      47.0"
```

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"                323.328     0.000      52.9"
"                323.475     0.000      58.8"
"                323.622     0.000      64.7"
"                323.770     0.005      66.7"
"                323.918     0.026      66.8"
"                324.065     0.054      67.0"
"                324.212     0.080      67.2"
"                324.360     0.101      67.3"
"                324.508     0.118      67.5"
"                324.655     0.133      67.7"
"                324.803     0.147      67.8"
"                324.950     0.159      68.0"
"           1.   TRENCH PIPES"
"             Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                 Invert    length     diam.    grade%     0=Yes  distance"
"                323.670    12.900     0.000     1.008     1.000     0.000"
"           1.   MANHOLE"
"                 Access"
"               diameter"
"                  1.200"
"           1.   OUTFLOW PIPE"
"           0.   Inflow at upstream end of trench: 1=True; 0=False"
"               Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                  invert    invert    Length  Diameter       'n'    loss Ke"
"                323.670   323.540    12.900     0.300     0.013     0.500"
"             Peak outflow                 0.032    c.m/sec"
"             Outflow volume              39.768    c.m"
"             Peak exfiltration            0.001    c.m/sec"
"             Exfiltration volume         55.011    c.m"
"             Maximum level              323.961    metre"
"             Maximum storage             66.888    c.m"
"             Centroidal lag               1.766   hours"
"             Infiltration area 2 sides   53.440   sq.metre"
"             Infiltration Base area      75.200   sq.metre"
"                  0.081     0.081     0.032     0.001 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.081     0.032     0.032     0.001"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Controlled Area"
"       98.000   % Impervious"
"        2.036   Total Area"
"       30.000   Flow length"
"        1.000   Overland Slope"
"        0.041   Pervious Area"
"       30.000   Pervious length"
"        1.000   Pervious slope"
"        1.995   Impervious Area"
"       30.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.361   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.908   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.856     0.032     0.032     0.001 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.041      1.995      2.036      hectare"
"             Time of concentration  17.417     2.129      2.252      minutes"
"             Time to Centroid       116.293    87.505     87.737     minutes"
"             Rainfall depth         68.087     68.087     68.087     mm"
"             Rainfall volume        27.72      1358.52    1386.24    c.m"
"             Rainfall losses        43.488     6.237      6.982      mm"
```



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"             Runoff depth           24.599     61.849     61.104     mm"
"             Runoff volume          10.02      1234.06    1244.08    c.m"
"             Runoff coefficient     0.361      0.908      0.897      "
"             Maximum flow           0.004      0.855      0.856      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.856     0.856     0.032     0.001"
" 54          POND DESIGN"
"         0.856   Current peak flow    c.m/sec"
"         0.551   Target outflow    c.m/sec"
"        1283.8   Hydrograph volume    c.m"
"           9.   Number of stages"
"       322.630   Minimum water level    metre"
"       325.150   Maximum water level    metre"
"       322.630   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                 322.630     0.000     0.000"
"                 324.800   0.01795   186.000"
"                 324.850   0.01816   213.000"
"                 324.900   0.01837   294.000"
"                 324.950   0.01857   479.000"
"                 325.000   0.01878   817.000"
"                 325.050   0.01898  1325.000"
"                 325.100   0.01918  2021.000"
"                 325.150   0.01938  2400.000"
"           1.   ORIFICES"
"                Orifice   Orifice   Orifice Number of"
"                 invert coefficie  diameter  orifices"
"                 322.630     0.630     0.0750     1.000"
"             Peak outflow                  0.019    c.m/sec"
"             Maximum level               325.032    metre"
"             Maximum storage            1137.396    c.m"
"             Centroidal lag               10.744   hours"
"                  0.856     0.856     0.019     0.001 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                Flow to SWMF"
"             Maximum flow                  0.019    c.m/sec"
"             Hydrograph volume          1271.029    c.m"
"                    0.856     0.856     0.019     0.019"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.856     0.000     0.019     0.019"
" 33          CATCHMENT 204"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          204   Uncontrolled to ROW"
"       22.000   % Impervious"
"        0.172   Total Area"
"       15.000   Flow length"
"       10.000   Overland Slope"
"        0.134   Pervious Area"
"       15.000   Pervious length"
"       10.000   Pervious slope"
"        0.038   Impervious Area"
"       15.000   Impervious length"
"       10.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.359   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.861   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.029     0.000     0.019     0.019 c.m/sec"
```

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285 "             Catchment 204          Pervious   Impervious Total Area "
286 "             Surface Area           0.134      0.038      0.172      hectare"
287 "             Time of concentration  5.759      0.704      3.718      minutes"
288 "             Time to Centroid       101.821    85.719     95.320     minutes"
289 "             Rainfall depth         68.087     68.087     68.087     mm"
290 "             Rainfall volume        91.34      25.76      117.11     c.m"
291 "             Rainfall losses        43.653     9.431      36.125     mm"
292 "             Runoff depth           24.433     58.655     31.962     mm"
293 "             Runoff volume          32.78      22.20      54.97      c.m"
294 "             Runoff coefficient     0.359      0.861      0.469      "
295 "             Maximum flow           0.019      0.017      0.029      c.m/sec"
296 " 40          HYDROGRAPH Add Runoff "
297 "            4   Add Runoff "
298 "                    0.029     0.029     0.019     0.019"
299 " 40          HYDROGRAPH Copy to Outflow"
300 "            8   Copy to Outflow"
301 "                    0.029     0.029     0.029     0.019"
302 " 40          HYDROGRAPH   Combine    2"
303 "            6   Combine "
304 "            2   Node #"
305 "                Flow to SWMF"
306 "             Maximum flow                  0.048    c.m/sec"
307 "             Hydrograph volume          1326.004    c.m"
308 "                    0.029     0.029     0.029     0.048"
309 " 40          HYDROGRAPH   Confluence    2"
310 "            7   Confluence "
311 "            2   Node #"
312 "                Flow to SWMF"
313 "             Maximum flow                  0.048    c.m/sec"
314 "             Hydrograph volume          1326.004    c.m"
315 "                    0.029     0.048     0.029     0.000"
316 " 40          HYDROGRAPH Copy to Outflow"
317 "            8   Copy to Outflow"
318 "                    0.029     0.048     0.048     0.000"
319 " 40          HYDROGRAPH   Combine    1"
320 "            6   Combine "
321 "            1   Node #"
322 "                Site"
323 "             Maximum flow                  0.263    c.m/sec"
324 "             Hydrograph volume          1742.330    c.m"
325 "                    0.029     0.048     0.048     0.263"
326 " 40          HYDROGRAPH   Confluence    1"
327 "            7   Confluence "
328 "            1   Node #"
329 "                Site"
330 "             Maximum flow                  0.263    c.m/sec"
331 "             Hydrograph volume          1742.330    c.m"
332 "                    0.029     0.263     0.048     0.000"
```

```
" MIDUSS Output ------------------------------------------------>"
" MIDUSS version                          Version 2.25  rev. 473"
" MIDUSS created                       Sunday, February 7, 2010"
"          10   Units used:                                ie METRIC"
" MIDUSS created                       Sunday, February 7, 2010"
" Job folder:                  Q:\55237\100\SWM\2nd Submission"
" Output filename:                                50 Year Post.out"
" Licensee name:                                              A"
" Company                                                     "
" Date & Time last used:                 7/8/2025 at 6:46:21 PM"
" 31          TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"    3886.000   Coefficient A"
"      16.000   Constant B"
"       0.950   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"            Maximum intensity          215.474    mm/hr"
"            Total depth                 77.443    mm"
"           6   050hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         201   Uncontrolled to Wetland"
"      56.000   % Impervious"
"       0.920   Total Area"
"      60.000   Flow length"
"       2.000   Overland Slope"
"       0.405   Pervious Area"
"      60.000   Pervious length"
"       2.000   Pervious slope"
"       0.515   Impervious Area"
"      60.000   Impervious length"
"       2.000   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      75.000   Pervious SCS Curve No."
"       0.399   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       8.467   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.913   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                  0.253     0.000     0.000     0.000 c.m/sec"
"            Catchment 201          Pervious   Impervious Total Area "
"            Surface Area           0.405      0.515      0.920      hectare"
"            Time of concentration  19.453     2.494      6.827      minutes"
"            Time to Centroid       117.947    87.669     95.405     minutes"
"            Rainfall depth         77.443     77.443     77.443     mm"
"            Rainfall volume        313.49     398.99     712.47     c.m"
"            Rainfall losses        46.543     6.700      24.230     mm"
"            Runoff depth           30.900     70.743     53.212     mm"
"            Runoff volume          125.08     364.47     489.55     c.m"
"            Runoff coefficient     0.399      0.913      0.687      "
"            Maximum flow           0.046      0.247      0.253      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  0.253     0.253     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                  0.253     0.253     0.253     0.000"
" 40          HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               Site"
```



```
"            Maximum flow                0.253    c.m/sec"
"            Hydrograph volume         489.553    c.m"
"                  0.253     0.253     0.253     0.253"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                  0.253     0.000     0.253     0.253"
" 33          CATCHMENT 202"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         202   Roof"
"     100.000   % Impervious"
"       0.178   Total Area"
"      10.000   Flow length"
"       1.500   Overland Slope"
"       0.000   Pervious Area"
"      10.000   Pervious length"
"       1.500   Pervious slope"
"       0.178   Impervious Area"
"      10.000   Impervious length"
"       1.500   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      75.000   Pervious SCS Curve No."
"       0.000   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       8.467   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.895   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                  0.092     0.000     0.253     0.253 c.m/sec"
"            Catchment 202          Pervious   Impervious Total Area "
"            Surface Area           0.000      0.178      0.178      hectare"
"            Time of concentration  7.237      0.928      0.928      minutes"
"            Time to Centroid       102.777    85.510     85.510     minutes"
"            Rainfall depth         77.443     77.443     77.443     mm"
"            Rainfall volume        0.00       137.85     137.85     c.m"
"            Rainfall losses        46.674     8.166      8.166      mm"
"            Runoff depth           30.768     69.277     69.277     mm"
"            Runoff volume          0.00       123.31     123.31     c.m"
"            Runoff coefficient     0.000      0.895      0.895      "
"            Maximum flow           0.000      0.092      0.092      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  0.092     0.092     0.253     0.253"
" 57          TRENCH Design d/s of 202"
"       0.092   Peak inflow"
"     123.313   Hydrograph volume"
"     324.950   Ground elevation"
"     322.000   Downstream trench invert"
"       1.670   Trench height"
"     319.000   Water table elevation"
"       4.700   Trench top width"
"       4.700   Trench bottom width"
"      53.000   Voids ratio (%)"
"      18.000   Hydraulic conductivity"
"       0.000   Trench gradient (%)"
"      16.000   Trench length"
"       1.000   Include base width"
"         21.   Number of stages"
"                 Level Discharge    Volume"
"               322.000     0.000       0.0"
"               322.147     0.000       5.9"
"               322.295     0.000      11.8"
"               322.443     0.000      17.6"
"               322.590     0.000      23.5"
"               322.737     0.000      29.4"
"               322.885     0.000      35.3"
"               323.033     0.000      41.2"
"               323.180     0.000      47.0"
```

```
"                323.328     0.000      52.9"
"                323.475     0.000      58.8"
"                323.622     0.000      64.7"
"                323.770     0.005      66.7"
"                323.918     0.026      66.8"
"                324.065     0.054      67.0"
"                324.212     0.080      67.2"
"                324.360     0.101      67.3"
"                324.508     0.118      67.5"
"                324.655     0.133      67.7"
"                324.803     0.147      67.8"
"                324.950     0.159      68.0"
"           1.   TRENCH PIPES"
"             Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                 Invert    length     diam.    grade%     0=Yes  distance"
"                323.670    12.900     0.000     1.008     1.000     0.000"
"           1.   MANHOLE"
"                 Access"
"               diameter"
"                  1.200"
"           1.   OUTFLOW PIPE"
"           0.   Inflow at upstream end of trench: 1=True; 0=False"
"               Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                  invert    invert    Length  Diameter       'n'    loss Ke"
"                323.670   323.540    12.900     0.300     0.013     0.500"
"             Peak outflow                  0.037    c.m/sec"
"             Outflow volume               45.598    c.m"
"             Peak exfiltration             0.001    c.m/sec"
"             Exfiltration volume          55.122    c.m"
"             Maximum level               324.068    metre"
"             Maximum storage              67.009    c.m"
"             Centroidal lag                1.763   hours"
"             Infiltration area 2 sides    53.440   sq.metre"
"             Infiltration Base area       75.200   sq.metre"
"                  0.092     0.092     0.037     0.001 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.092     0.037     0.037     0.001"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Controlled Area"
"       98.000   % Impervious"
"        2.036   Total Area"
"       30.000   Flow length"
"        1.000   Overland Slope"
"        0.041   Pervious Area"
"       30.000   Pervious length"
"        1.000   Pervious slope"
"        1.995   Impervious Area"
"       30.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.399   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.917   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.975     0.037     0.037     0.001 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.041      1.995      2.036      hectare"
"             Time of concentration  15.801     2.026      2.147      minutes"
"             Time to Centroid       113.406    86.963     87.196     minutes"
"             Rainfall depth         77.443     77.443     77.443     mm"
"             Rainfall volume        31.53      1545.20    1576.73    c.m"
"             Rainfall losses        46.525     6.439      7.241      mm"
```



```
"             Runoff depth           30.918     71.003     70.202     mm"
"             Runoff volume          12.59      1416.72    1429.31    c.m"
"             Runoff coefficient     0.399      0.917      0.906      "
"             Maximum flow           0.005      0.974      0.975      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.975     0.975     0.037     0.001"
" 54          POND DESIGN"
"         0.975   Current peak flow    c.m/sec"
"         0.551   Target outflow    c.m/sec"
"        1474.9   Hydrograph volume    c.m"
"            9.   Number of stages"
"       322.630   Minimum water level    metre"
"       325.150   Maximum water level    metre"
"       322.630   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                 322.630     0.000     0.000"
"                 324.800   0.01795   186.000"
"                 324.850   0.01816   213.000"
"                 324.900   0.01837   294.000"
"                 324.950   0.01857   479.000"
"                 325.000   0.01878   817.000"
"                 325.050   0.01898  1325.000"
"                 325.100   0.01918  2021.000"
"                 325.150   0.01938  2400.000"
"           1.   ORIFICES"
"                Orifice   Orifice   Orifice Number of"
"                 invert coefficie  diameter  orifices"
"                 322.630     0.630     0.0750     1.000"
"              Peak outflow                  0.019    c.m/sec"
"              Maximum level               325.050    metre"
"              Maximum storage            1325.598    c.m"
"              Centroidal lag               12.059   hours"
"                   0.975     0.975     0.019     0.001 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                Flow to SWMF"
"              Maximum flow                  0.019    c.m/sec"
"              Hydrograph volume          1441.135    c.m"
"                     0.975     0.975     0.019     0.019"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.975     0.000     0.019     0.019"
" 33          CATCHMENT 204"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          204   Uncontrolled to ROW"
"       22.000   % Impervious"
"        0.172   Total Area"
"       15.000   Flow length"
"       10.000   Overland Slope"
"        0.134   Pervious Area"
"       15.000   Pervious length"
"       10.000   Pervious slope"
"        0.038   Impervious Area"
"       15.000   Impervious length"
"       10.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.398   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.864   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.037     0.000     0.019     0.019 c.m/sec"
```

```
285 "             Catchment 204          Pervious   Impervious Total Area "
286 "             Surface Area           0.134      0.038      0.172      hectare"
287 "             Time of concentration  5.225      0.670      3.493      minutes"
288 "             Time to Centroid       100.172    85.320     94.527     minutes"
289 "             Rainfall depth         77.443     77.443     77.443     mm"
290 "             Rainfall volume        103.90     29.30      133.20     c.m"
291 "             Rainfall losses        46.653     10.512     38.702     mm"
292 "             Runoff depth           30.789     66.931     38.741     mm"
293 "             Runoff volume          41.31      25.33      66.63      c.m"
294 "             Runoff coefficient     0.398      0.864      0.500      "
295 "             Maximum flow           0.026      0.019      0.037      c.m/sec"
296 " 40          HYDROGRAPH Add Runoff "
297 "            4   Add Runoff "
298 "                    0.037     0.037     0.019     0.019"
299 " 40          HYDROGRAPH Copy to Outflow"
300 "            8   Copy to Outflow"
301 "                    0.037     0.037     0.037     0.019"
302 " 40          HYDROGRAPH   Combine    2"
303 "            6   Combine "
304 "            2   Node #"
305 "                Flow to SWMF"
306 "             Maximum flow                  0.056    c.m/sec"
307 "             Hydrograph volume          1507.769    c.m"
308 "                    0.037     0.037     0.037     0.056"
309 " 40          HYDROGRAPH   Confluence    2"
310 "            7   Confluence "
311 "            2   Node #"
312 "                Flow to SWMF"
313 "             Maximum flow                  0.056    c.m/sec"
314 "             Hydrograph volume          1507.769    c.m"
315 "                    0.037     0.056     0.037     0.000"
316 " 40          HYDROGRAPH Copy to Outflow"
317 "            8   Copy to Outflow"
318 "                    0.037     0.056     0.056     0.000"
319 " 40          HYDROGRAPH   Combine    1"
320 "            6   Combine "
321 "            1   Node #"
322 "                Site"
323 "             Maximum flow                  0.304    c.m/sec"
324 "             Hydrograph volume          1997.323    c.m"
325 "                    0.037     0.056     0.056     0.304"
326 " 40          HYDROGRAPH   Confluence    1"
327 "            7   Confluence "
328 "            1   Node #"
329 "                Site"
330 "             Maximum flow                  0.304    c.m/sec"
331 "             Hydrograph volume          1997.323    c.m"
332 "                    0.037     0.304     0.056     0.000"
```

```
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" MIDUSS created                       Sunday, February 7, 2010"
"          10   Units used:                                ie METRIC"
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" Output filename:                              100 Year Post.out"
" Licensee name:                                                A"
" Company                                                       "
" Date & Time last used:              7/8/2025 at 6:47:41 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     4688.000   Coefficient A"
"       17.000   Constant B"
"        0.962   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          239.650    mm/hr"
"             Total depth                 87.263    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          201   Uncontrolled to Wetland"
"       56.000   % Impervious"
"        0.920   Total Area"
"       60.000   Flow length"
"        2.000   Overland Slope"
"        0.405   Pervious Area"
"       60.000   Pervious length"
"        2.000   Pervious slope"
"        0.515   Impervious Area"
"       60.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.435   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.921   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                  0.288     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.405      0.515      0.920      hectare"
"             Time of concentration  17.883     2.386      6.579      minutes"
"             Time to Centroid       115.239    87.187     94.776     minutes"
"             Rainfall depth         87.263     87.263     87.263     mm"
"             Rainfall volume        353.24     449.58     802.82     c.m"
"             Rainfall losses        49.312     6.863      25.540     mm"
"             Runoff depth           37.951     80.401     61.723     mm"
"             Runoff volume          153.63     414.22     567.85     c.m"
"             Runoff coefficient     0.435      0.921      0.707      "
"             Maximum flow           0.060      0.279      0.288      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                  0.288     0.288     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                  0.288     0.288     0.288     0.000"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                Site"
```



```
"             Maximum flow                 0.288    c.m/sec"
"             Hydrograph volume          567.852    c.m"
"                   0.288     0.288     0.288     0.288"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                  0.288     0.000     0.288     0.288"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          202   Roof"
"      100.000   % Impervious"
"        0.178   Total Area"
"       10.000   Flow length"
"        1.500   Overland Slope"
"        0.000   Pervious Area"
"       10.000   Pervious length"
"        1.500   Pervious slope"
"        0.178   Impervious Area"
"       10.000   Impervious length"
"        1.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.000   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.898   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                  0.103     0.000     0.288     0.288 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.000      0.178      0.178      hectare"
"             Time of concentration  6.653      0.888      0.888      minutes"
"             Time to Centroid       101.295    85.170     85.170     minutes"
"             Rainfall depth         87.263     87.263     87.263     mm"
"             Rainfall volume        0.00       155.33     155.33     c.m"
"             Rainfall losses        49.676     8.903      8.903      mm"
"             Runoff depth           37.587     78.361     78.361     mm"
"             Runoff volume          0.00       139.48     139.48     c.m"
"             Runoff coefficient     0.000      0.898      0.898      "
"             Maximum flow           0.000      0.103      0.103      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                  0.103     0.103     0.288     0.288"
" 57          TRENCH Design d/s of 202"
"        0.103   Peak inflow"
"      139.482   Hydrograph volume"
"      324.950   Ground elevation"
"      322.000   Downstream trench invert"
"        1.670   Trench height"
"      319.000   Water table elevation"
"        4.700   Trench top width"
"        4.700   Trench bottom width"
"       53.000   Voids ratio (%)"
"       18.000   Hydraulic conductivity"
"        0.000   Trench gradient (%)"
"       16.000   Trench length"
"        1.000   Include base width"
"          21.   Number of stages"
"                  Level Discharge    Volume"
"                322.000     0.000       0.0"
"                322.147     0.000       5.9"
"                322.295     0.000      11.8"
"                322.443     0.000      17.6"
"                322.590     0.000      23.5"
"                322.737     0.000      29.4"
"                322.885     0.000      35.3"
"                323.033     0.000      41.2"
"                323.180     0.000      47.0"
```

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"                323.328     0.000      52.9"
"                323.475     0.000      58.8"
"                323.622     0.000      64.7"
"                323.770     0.005      66.7"
"                323.918     0.026      66.8"
"                324.065     0.054      67.0"
"                324.212     0.080      67.2"
"                324.360     0.101      67.3"
"                324.508     0.118      67.5"
"                324.655     0.133      67.7"
"                324.803     0.147      67.8"
"                324.950     0.159      68.0"
"           1.   TRENCH PIPES"
"             Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                 Invert    length     diam.    grade%     0=Yes  distance"
"                323.670    12.900     0.000     1.008     1.000     0.000"
"           1.   MANHOLE"
"                 Access"
"               diameter"
"                  1.200"
"           1.   OUTFLOW PIPE"
"           0.   Inflow at upstream end of trench: 1=True; 0=False"
"               Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                  invert    invert    Length  Diameter       'n'   loss Ke"
"                323.670   323.540    12.900     0.300     0.013     0.500"
"             Peak outflow                 0.066    c.m/sec"
"             Outflow volume              71.365    c.m"
"             Peak exfiltration            0.001    c.m/sec"
"             Exfiltration volume         55.237    c.m"
"             Maximum level              324.180    metre"
"             Maximum storage             67.137    c.m"
"             Centroidal lag               1.643   hours"
"             Infiltration area 2 sides   53.440   sq.metre"
"             Infiltration Base area      75.200   sq.metre"
"                  0.103     0.103     0.066     0.001 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.103     0.066     0.066     0.001"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          203   Controlled Area"
"       98.000   % Impervious"
"        2.036   Total Area"
"       30.000   Flow length"
"        1.000   Overland Slope"
"        0.041   Pervious Area"
"       30.000   Pervious length"
"        1.000   Pervious slope"
"        1.995   Impervious Area"
"       30.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.434   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.925   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    1.102     0.066     0.066     0.001 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.041      1.995      2.036      hectare"
"             Time of concentration  14.526     1.938      2.058      minutes"
"             Time to Centroid       111.048    86.528     86.760     minutes"
"             Rainfall depth         87.263     87.263     87.263     mm"
"             Rainfall volume        35.53      1741.15    1776.68    c.m"
"             Rainfall losses        49.383     6.526      7.383      mm"
```



```
"             Runoff depth           37.881     80.737     79.880     mm"
"             Runoff volume          15.42      1610.93    1626.36    c.m"
"             Runoff coefficient     0.434      0.925      0.915      "
"             Maximum flow           0.007      1.101      1.102      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    1.102     1.102     0.066     0.001"
" 54          POND DESIGN"
"         1.102   Current peak flow    c.m/sec"
"         0.551   Target outflow    c.m/sec"
"        1697.7   Hydrograph volume    c.m"
"            9.   Number of stages"
"       322.630   Minimum water level    metre"
"       325.150   Maximum water level    metre"
"       322.630   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                 322.630     0.000     0.000"
"                 324.800   0.01795   186.000"
"                 324.850   0.01816   213.000"
"                 324.900   0.01837   294.000"
"                 324.950   0.01857   479.000"
"                 325.000   0.01878   817.000"
"                 325.050   0.01898  1325.000"
"                 325.100   0.01918  2021.000"
"                 325.150   0.01938  2400.000"
"           1.   ORIFICES"
"                Orifice   Orifice   Orifice Number of"
"                 invert coefficie  diameter  orifices"
"                 322.630     0.630     0.0750     1.000"
"              Peak outflow                 0.019    c.m/sec"
"              Maximum level              325.066    metre"
"              Maximum storage           1545.567    c.m"
"              Centroidal lag              13.575   hours"
"                   1.102     1.102     0.019     0.001 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                Flow to SWMF"
"              Maximum flow                 0.019    c.m/sec"
"              Hydrograph volume         1594.138    c.m"
"                     1.102     1.102     0.019     0.019"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     1.102     0.000     0.019     0.019"
" 33          CATCHMENT 204"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          204   Uncontrolled to ROW"
"       22.000   % Impervious"
"        0.172   Total Area"
"       15.000   Flow length"
"       10.000   Overland Slope"
"        0.134   Pervious Area"
"       15.000   Pervious length"
"       10.000   Pervious slope"
"        0.038   Impervious Area"
"       15.000   Impervious length"
"       10.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       75.000   Pervious SCS Curve No."
"        0.433   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        8.467   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.866   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.045     0.000     0.019     0.019 c.m/sec"
```

```
285 "             Catchment 204          Pervious   Impervious Total Area "
286 "             Surface Area           0.134      0.038      0.172      hectare"
287 "             Time of concentration  4.803      0.641      3.302      minutes"
288 "             Time to Centroid       98.884     85.007     93.879     minutes"
289 "             Rainfall depth         87.263     87.263     87.263     mm"
290 "             Rainfall volume        117.07     33.02      150.09     c.m"
291 "             Rainfall losses        49.489     11.700     41.176     mm"
292 "             Runoff depth           37.774     75.563     46.088     mm"
293 "             Runoff volume          50.68      28.59      79.27      c.m"
294 "             Runoff coefficient     0.433      0.866      0.528      "
295 "             Maximum flow           0.033      0.022      0.045      c.m/sec"
296 " 40          HYDROGRAPH Add Runoff "
297 "            4   Add Runoff "
298 "                    0.045     0.045     0.019     0.019"
299 " 40          HYDROGRAPH Copy to Outflow"
300 "            8   Copy to Outflow"
301 "                    0.045     0.045     0.045     0.019"
302 " 40          HYDROGRAPH   Combine    2"
303 "            6   Combine "
304 "            2   Node #"
305 "                Flow to SWMF"
306 "             Maximum flow                 0.064    c.m/sec"
307 "             Hydrograph volume         1673.409    c.m"
308 "                    0.045     0.045     0.045     0.064"
309 " 40          HYDROGRAPH   Confluence    2"
310 "            7   Confluence "
311 "            2   Node #"
312 "                Flow to SWMF"
313 "             Maximum flow                 0.064    c.m/sec"
314 "             Hydrograph volume         1673.409    c.m"
315 "                    0.045     0.064     0.045     0.000"
316 " 40          HYDROGRAPH Copy to Outflow"
317 "            8   Copy to Outflow"
318 "                    0.045     0.064     0.064     0.000"
319 " 40          HYDROGRAPH   Combine    1"
320 "            6   Combine "
321 "            1   Node #"
322 "                Site"
323 "             Maximum flow                 0.347    c.m/sec"
324 "             Hydrograph volume         2241.260    c.m"
325 "                    0.045     0.064     0.064     0.347"
326 " 40          HYDROGRAPH   Confluence    1"
327 "            7   Confluence "
328 "            1   Node #"
329 "                Site"
330 "             Maximum flow                 0.347    c.m/sec"
331 "             Hydrograph volume         2241.260    c.m"
332 "                    0.045     0.347     0.064     0.000"
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 3 "               MIDUSS created                       Sunday, February 7, 2010"
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 5 "               Job folder:                  Q:\55237\100\SWM\2nd Submission\"
 6 "                                                                    Site Post"
 7 "               Output filename:                            Regional Post.out"
 8 "               Licensee name:                                              A"
 9 "               Company                                                     "
10 "               Date & Time last used:               8/20/2025 at 5:51:28 PM"
11 " 31         TIME PARAMETERS"
12 "       5.000   Time Step"
13 "    2880.000   Max. Storm length"
14 "    2880.000   Max. Hydrograph"
15 " 32         STORM Mass Curve"
16 "           3   Mass Curve"
17 "     284.000   Rainfall depth"
18 "    2880.000   Duration"
19 "          38   Q:\TOOLS\SWM\Hazel entire 48 hours.mrd   Hurricane Hazel (entire 48 h)"
20 "            Maximum intensity           52.826    mm/hr"
21 "            Total depth                284.000    mm"
22 "           6   250hyd   Hydrograph extension used in this file"
23 " 33         CATCHMENT 202"
24 "           1   Triangular SCS"
25 "           1   Equal length"
26 "           1   SCS method"
27 "         202   Roof"
28 "     100.000   % Impervious"
29 "       0.178   Total Area"
30 "      10.000   Flow length"
31 "       1.500   Overland Slope"
32 "       0.000   Pervious Area"
33 "      10.000   Pervious length"
34 "       1.500   Pervious slope"
35 "       0.178   Impervious Area"
36 "      10.000   Impervious length"
37 "       1.500   Impervious slope"
38 "       0.250   Pervious Manning 'n'"
39 "      75.000   Pervious SCS Curve No."
40 "       0.000   Pervious Runoff coefficient"
41 "       0.100   Pervious Ia/S coefficient"
42 "       8.467   Pervious Initial abstraction"
43 "       0.015   Impervious Manning 'n'"
44 "      98.000   Impervious SCS Curve No."
45 "       0.967   Impervious Runoff coefficient"
46 "       0.100   Impervious Ia/S coefficient"
47 "       0.518   Impervious Initial abstraction"
48 "                   0.026     0.000     0.000     0.000 c.m/sec"
49 "            Catchment 202          Pervious   Impervious Total Area "
50 "            Surface Area           0.000      0.178      0.178      hectare"
51 "            Time of concentration  9.015      1.615      1.615      minutes"
52 "            Time to Centroid       2487.248   2267.988   2267.988   minutes"
53 "            Rainfall depth         284.000    284.000    284.000    mm"
54 "            Rainfall volume        0.00       505.52     505.52     c.m"
55 "            Rainfall losses        76.919     9.423      9.423      mm"
56 "            Runoff depth           207.081    274.577    274.577    mm"
57 "            Runoff volume          0.00       488.75     488.75     c.m"
58 "            Runoff coefficient     0.000      0.967      0.967      "
59 "            Maximum flow           0.000      0.026      0.026      c.m/sec"
60 " 40         HYDROGRAPH Add Runoff "
61 "           4   Add Runoff "
62 "                   0.026     0.026     0.000     0.000"
63 " 57         TRENCH Design d/s of 202"
64 "       0.026   Peak inflow"
65 "     488.746   Hydrograph volume"
66 "     324.950   Ground elevation"
67 "     322.000   Downstream trench invert"
68 "       1.670   Trench height"
69 "       9.000   Water table elevation"
70 "       4.700   Trench top width"
71 "       4.700   Trench bottom width"
```



```
72 "      53.000   Voids ratio (%)"
73 "      18.000   Hydraulic conductivity"
74 "       0.000   Trench gradient (%)"
75 "      16.000   Trench length"
76 "       1.000   Include base width"
77 "         21.   Number of stages"
78 "                 Level Discharge    Volume"
79 "               322.000     0.000       0.0"
80 "               322.147     0.000       5.9"
81 "               322.295     0.000      11.8"
82 "               322.443     0.000      17.6"
83 "               322.590     0.000      23.5"
84 "               322.737     0.000      29.4"
85 "               322.885     0.000      35.3"
86 "               323.033     0.000      41.2"
87 "               323.180     0.000      47.0"
88 "               323.328     0.000      52.9"
89 "               323.475     0.000      58.8"
90 "               323.622     0.000      64.7"
91 "               323.770     0.005      66.7"
92 "               323.918     0.026      66.8"
93 "               324.065     0.054      67.0"
94 "               324.212     0.080      67.2"
95 "               324.360     0.101      67.3"
96 "               324.508     0.118      67.5"
97 "               324.655     0.133      67.7"
98 "               324.803     0.147      67.8"
99 "               324.950     0.159      68.0"
100 "          1.   TRENCH PIPES"
101 "            Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
102 "                Invert    length     diam.    grade%     0=Yes  distance"
103 "               323.670    12.900     0.000     1.008     1.000     0.000"
104 "          1.   MANHOLE"
105 "                Access"
106 "              diameter"
107 "                 1.200"
108 "          1.   OUTFLOW PIPE"
109 "          0.   Inflow at upstream end of trench: 1=True; 0=False"
110 "              Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
111 "                invert    invert    Length  Diameter       'n'   loss Ke"
112 "               323.670   323.540    12.900     0.300     0.013     0.500"
113 "            Peak outflow                 0.025    c.m/sec"
114 "            Outflow volume             333.611    c.m"
115 "            Peak exfiltration            0.001    c.m/sec"
116 "            Exfiltration volume         88.405    c.m"
117 "            Maximum level              323.915    metre"
118 "            Maximum storage             66.836    c.m"
119 "            Centroidal lag              44.078   hours"
120 "            Infiltration area 2 sides   53.440   sq.metre"
121 "            Infiltration Base area      75.200   sq.metre"
122 "                 0.026     0.026     0.025     0.001 c.m/sec"
123 " 40         HYDROGRAPH Next link "
124 "          5   Next link "
125 "                   0.026     0.025     0.025     0.001"
126 " 33         CATCHMENT 203"
127 "           1   Triangular SCS"
128 "           1   Equal length"
129 "           1   SCS method"
130 "         203   Controlled Area"
131 "      98.000   % Impervious"
132 "       2.036   Total Area"
133 "      30.000   Flow length"
134 "       1.000   Overland Slope"
135 "       0.041   Pervious Area"
136 "      30.000   Pervious length"
137 "       1.000   Pervious slope"
138 "       1.995   Impervious Area"
139 "      30.000   Impervious length"
140 "       1.000   Impervious slope"
141 "       0.250   Pervious Manning 'n'"
142 "      75.000   Pervious SCS Curve No."
```

```
143 "        0.722   Pervious Runoff coefficient"
144 "        0.100   Pervious Ia/S coefficient"
145 "        8.467   Pervious Initial abstraction"
146 "        0.015   Impervious Manning 'n'"
147 "       98.000   Impervious SCS Curve No."
148 "        0.955   Impervious Runoff coefficient"
149 "        0.100   Impervious Ia/S coefficient"
150 "        0.518   Impervious Initial abstraction"
151 "                    0.295     0.025     0.025     0.001 c.m/sec"
152 "             Catchment 203          Pervious   Impervious Total Area "
153 "             Surface Area           0.041      1.995      2.036      hectare"
154 "             Time of concentration  19.681     3.526      3.772      minutes"
155 "             Time to Centroid       2497.687   2262.590   2266.160   minutes"
156 "             Rainfall depth         284.000    284.000    284.000    mm"
157 "             Rainfall volume        115.64     5666.60    5782.24    c.m"
158 "             Rainfall losses        78.897     12.698     14.022     mm"
159 "             Runoff depth           205.103    271.302    269.978    mm"
160 "             Runoff volume          83.52      5413.24    5496.77    c.m"
161 "             Runoff coefficient     0.722      0.955      0.951      "
162 "             Maximum flow           0.006      0.293      0.295      c.m/sec"
163 " 40          HYDROGRAPH Add Runoff "
164 "            4   Add Runoff "
165 "                    0.295     0.320     0.025     0.001"
166 " 54          POND DESIGN"
167 "        0.320   Current peak flow    c.m/sec"
168 "        0.160   Target outflow    c.m/sec"
169 "       5830.4   Hydrograph volume    c.m"
170 "           9.   Number of stages"
171 "      322.630   Minimum water level    metre"
172 "      325.150   Maximum water level    metre"
173 "      322.630   Starting water level    metre"
174 "            0   Keep Design Data: 1 = True; 0 = False"
175 "                  Level Discharge    Volume"
176 "                322.630     0.000     0.000"
177 "                324.800   0.01795   186.000"
178 "                324.850   0.01816   213.000"
179 "                324.900   0.01837   294.000"
180 "                324.950   0.01857   479.000"
181 "                325.000   0.01878   817.000"
182 "                325.050   0.01898  1325.000"
183 "                325.100   0.01918  2021.000"
184 "                325.150    0.3624  2400.000"
185 "           1.   WEIRS"
186 "                  Crest      Weir     Crest      Left     Right"
187 "              elevation coefficie   breadth sideslope sideslope"
188 "                325.100     0.900    20.000     0.000     0.000"
189 "           1.   ORIFICES"
190 "                Orifice   Orifice   Orifice Number of"
191 "                 invert coefficie  diameter  orifices"
192 "                322.630     0.630    0.0750     1.000"
193 "             Peak outflow                  0.282    c.m/sec"
194 "             Maximum level               325.138    metre"
195 "             Maximum storage            2312.726    c.m"
196 "             Centroidal lag               42.648   hours"
197 "                  0.295     0.320     0.282     0.001 c.m/sec"
198 " 40          HYDROGRAPH   Combine    1"
199 "            6   Combine "
200 "            1   Node #"
201 "                Site Overflow"
202 "             Maximum flow                  0.282    c.m/sec"
203 "             Hydrograph volume          3736.143    c.m"
204 "                    0.295     0.320     0.282     0.282"
```

Aberfoyle Business Park SWMF
Model Check

```
" MIDUSS Output ---------------------------------------------->"
" MIDUSS version                          Version 2.25  rev. 473"
" MIDUSS created                       Sunday, February 7, 2010"
"          10   Units used:                                ie METRIC"
" MIDUSS created                       Sunday, February 7, 2010"
"          10   Units used:                                ie METRIC"
" Job folder:                  Q:\55237\100\SWM\2nd Submission\"
"                                                      SWMF Base Model"
" Output filename:                                     2 Year Post.out"
" Licensee name:                                                     A"
" Company                                                            "
" Date & Time last used:                7/8/2025 at 2:20:12 PM"
" 31          TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"     743.000   Coefficient A"
"       6.000   Constant B"
"       0.799   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"            Maximum intensity          109.374    mm/hr"
"            Total depth                 34.259    mm"
"           6   002hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 200"
"           1   Triangular SCS"
"           1   Equal length"
"           2   Horton equation"
"         200   Wetland Outlet"
"      85.000   % Impervious"
"      27.353   Total Area"
"     737.000   Flow length"
"       1.000   Overland Slope"
"       4.103   Pervious Area"
"     737.000   Pervious length"
"       1.000   Pervious slope"
"      23.250   Impervious Area"
"     737.000   Impervious length"
"       1.000   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      76.000   Pervious Max.infiltration"
"      13.000   Pervious Min.infiltration"
"       0.250   Pervious Lag constant (hours)"
"       5.000   Pervious Depression storage"
"       0.015   Impervious Manning 'n'"
"       0.000   Impervious Max.infiltration"
"       0.000   Impervious Min.infiltration"
"       0.001   Impervious Lag constant (hours)"
"       1.500   Impervious Depression storage"
"                   3.058     0.000     0.000     0.000 c.m/sec"
"            Catchment 200          Pervious   Impervious Total Area "
"            Surface Area           4.103      23.250     27.353     hectare"
"            Time of concentration  224.136    17.988     20.096     minutes"
"            Time to Centroid       253.482    112.266    113.710    minutes"
"            Rainfall depth         34.259     34.259     34.259     mm"
"            Rainfall volume        1405.61    7965.13    9370.75    c.m"
"            Rainfall losses        32.342     1.525      6.148      mm"
"            Runoff depth           1.916      32.733     28.111     mm"
"            Runoff volume          78.63      7610.50    7689.13    c.m"
"            Runoff coefficient     0.056      0.955      0.821      "
"            Maximum flow           0.007      3.057      3.058      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"          4   Add Runoff "
"                   3.058     3.058     0.000     0.000"
" 54          POND DESIGN"
"       3.058   Current peak flow    c.m/sec"
"       5.003   Target outflow    c.m/sec"
"      7689.1   Hydrograph volume    c.m"
"          3.   Number of stages"
"       0.000   Minimum water level    metre"
```



```
"       2.000   Maximum water level    metre"
"       0.000   Starting water level    metre"
"           0   Keep Design Data: 1 = True; 0 = False"
"                 Level Discharge    Volume"
"                 0.000     0.000     0.000"
"                 1.000    0.1370  6010.000"
"                 2.000    0.1590  6950.000"
"            Peak outflow                  0.145    c.m/sec"
"            Maximum level                 1.383    metre"
"            Maximum storage            6369.806    c.m"
"            Centroidal lag               13.460   hours"
"                 3.058     3.058     0.145     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"           5   Next link "
"                    3.058     0.145     0.145     0.000"
" 54          POND DESIGN"
"       0.145   Current peak flow    c.m/sec"
"       5.003   Target outflow    c.m/sec"
"      6536.6   Hydrograph volume    c.m"
"          8.   Number of stages"
"       0.000   Minimum water level    metre"
"       0.700   Maximum water level    metre"
"       0.000   Starting water level    metre"
"           0   Keep Design Data: 1 = True; 0 = False"
"                 Level Discharge    Volume"
"                 0.000     0.000     0.000"
"                 0.1000   0.02600  2916.000"
"                 0.2000   0.05300  5858.000"
"                 0.3000   0.07500  8827.000"
"                 0.4000   0.09100  11822.00"
"                 0.5000    0.6560  14844.00"
"                 0.6000    0.7540  17893.00"
"                 0.7000     5.845  20968.00"
"            Peak outflow                  0.038    c.m/sec"
"            Maximum level                 0.143    metre"
"            Maximum storage            4195.388    c.m"
"            Centroidal lag               34.419   hours"
"                 3.058     0.145     0.038     0.000 c.m/sec"
```

```
" MIDUSS Output ----------------------------------------------->"
" MIDUSS version                          Version 2.25  rev. 473"
" MIDUSS created                       Sunday, February 7, 2010"
"          10   Units used:                                ie METRIC"
" Job folder:                  Q:\55237\100\SWM\2nd Submission\"
                                                    SWMF Base Model"
" Output filename:                                  5 Year Post.out"
" Licensee name:                                                 A"
" Company                                                        "
" Date & Time last used:                7/8/2025 at 2:17:52 PM"
" 31          TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"    1593.000   Coefficient A"
"      11.000   Constant B"
"       0.879   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"            Maximum intensity          139.250    mm/hr"
"            Total depth                 47.240    mm"
"           6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 200"
"           1   Triangular SCS"
"           1   Equal length"
"           2   Horton equation"
"         200   Wetland Outlet"
"      85.000   % Impervious"
"      27.353   Total Area"
"     737.000   Flow length"
"       1.000   Overland Slope"
"       4.103   Pervious Area"
"     737.000   Pervious length"
"       1.000   Pervious slope"
"      23.250   Impervious Area"
"     737.000   Impervious length"
"       1.000   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      76.000   Pervious Max.infiltration"
"      13.000   Pervious Min.infiltration"
"       0.250   Pervious Lag constant (hours)"
"       5.000   Pervious Depression storage"
"       0.015   Impervious Manning 'n'"
"       0.000   Impervious Max.infiltration"
"       0.000   Impervious Min.infiltration"
"       0.001   Impervious Lag constant (hours)"
"       1.500   Impervious Depression storage"
"                   4.978     0.000     0.000     0.000 c.m/sec"
"            Catchment 200          Pervious   Impervious Total Area "
"            Surface Area           4.103      23.250     27.353     hectare"
"            Time of concentration  120.037    16.332     20.447     minutes"
"            Time to Centroid       188.382    107.276    110.494    minutes"
"            Rainfall depth         47.240     47.240     47.240     mm"
"            Rainfall volume        0.1938     1.0983     1.2922     ha-m"
"            Rainfall losses        36.559     1.621      6.862      mm"
"            Runoff depth           10.681     45.619     40.378     mm"
"            Runoff volume          0.0438     1.0606     1.1045     ha-m"
"            Runoff coefficient     0.226      0.966      0.855      "
"            Maximum flow           0.056      4.970      4.978      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                   4.978     4.978     0.000     0.000"
" 54          POND DESIGN"
"       4.978   Current peak flow    c.m/sec"
"       5.003   Target outflow    c.m/sec"
"    11044.7    Hydrograph volume    c.m"
"           3.   Number of stages"
"       0.000   Minimum water level    metre"
```



```
"       2.000   Maximum water level    metre"
"       0.000   Starting water level    metre"
"           0   Keep Design Data: 1 = True; 0 = False"
"                 Level Discharge    Volume"
"                 0.000     0.000     0.000"
"                 1.000    0.4100  8140.000"
"                 2.000    0.5580  11100.00"
"            Peak outflow                  0.407    c.m/sec"
"            Maximum level                 0.994    metre"
"            Maximum storage            8090.025    c.m"
"            Centroidal lag                7.328   hours"
"                 4.978     4.978     0.407     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"           5   Next link "
"                  4.978     0.407     0.407     0.000"
" 54          POND DESIGN"
"       0.407   Current peak flow    c.m/sec"
"       5.003   Target outflow    c.m/sec"
"    10878.6    Hydrograph volume    c.m"
"           8.   Number of stages"
"       0.000   Minimum water level    metre"
"       0.700   Maximum water level    metre"
"       0.000   Starting water level    metre"
"           0   Keep Design Data: 1 = True; 0 = False"
"                 Level Discharge    Volume"
"                 0.000     0.000     0.000"
"                 0.1000   0.02600  2916.000"
"                 0.2000   0.05300  5858.000"
"                 0.3000   0.07500  8827.000"
"                 0.4000   0.09100  11822.00"
"                 0.5000    0.6560  14844.00"
"                 0.6000    0.7540  17893.00"
"                 0.7000     5.845  20968.00"
"            Peak outflow                  0.066    c.m/sec"
"            Maximum level                 0.259    metre"
"            Maximum storage            7620.198    c.m"
"            Centroidal lag               32.325   hours"
"                 4.978     0.407     0.066     0.000 c.m/sec"
```

```
" MIDUSS Output ---------------------------------------------->"
" MIDUSS version                          Version 2.25  rev. 473"
" MIDUSS created                       Sunday, February 7, 2010"
"          10   Units used:                              ie METRIC"
" Job folder:                  Q:\55237\100\SWM\2nd Submission\"
"                                                  SWMF Base Model"
" Output filename:                              100 Year Post.out"
" Licensee name:                                              A"
" Company                                                     "
" Date & Time last used:               7/8/2025 at 2:15:01 PM"
" 31          TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"    4688.000   Coefficient A"
"      17.000   Constant B"
"       0.962   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"            Maximum intensity          239.650    mm/hr"
"            Total depth                 87.263    mm"
"           6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 200"
"           1   Triangular SCS"
"           1   Equal length"
"           2   Horton equation"
"         200   Wetland Outlet"
"      85.000   % Impervious"
"      27.353   Total Area"
"     737.000   Flow length"
"       1.000   Overland Slope"
"       4.103   Pervious Area"
"     737.000   Pervious length"
"       1.000   Pervious slope"
"      23.250   Impervious Area"
"     737.000   Impervious length"
"       1.000   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      76.000   Pervious Max.infiltration"
"      13.000   Pervious Min.infiltration"
"       0.250   Pervious Lag constant (hours)"
"       5.000   Pervious Depression storage"
"       0.015   Impervious Manning 'n'"
"       0.000   Impervious Max.infiltration"
"       0.000   Impervious Min.infiltration"
"       0.001   Impervious Lag constant (hours)"
"       1.500   Impervious Depression storage"
"                  10.005     0.000     0.000     0.000 c.m/sec"
"            Catchment 200          Pervious   Impervious Total Area "
"            Surface Area           4.103      23.250     27.353     hectare"
"            Time of concentration  74.257     13.144     18.295     minutes"
"            Time to Centroid       161.267    100.646    105.756    minutes"
"            Rainfall depth         87.263     87.263     87.263     mm"
"            Rainfall volume        0.3580     2.0289     2.3869     ha-m"
"            Rainfall losses        42.697     1.831      7.961      mm"
"            Runoff depth           44.566     85.432     79.302     mm"
"            Runoff volume          0.1829     1.9863     2.1692     ha-m"
"            Runoff coefficient     0.511      0.979      0.909      "
"            Maximum flow           0.301      9.935      10.005     c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                  10.005    10.005     0.000     0.000"
" 54          POND DESIGN"
"      10.005   Current peak flow    c.m/sec"
"       5.003   Target outflow    c.m/sec"
"     21691.5   Hydrograph volume    c.m"
"          3.   Number of stages"
"       0.000   Minimum water level    metre"
```



```
"       2.000   Maximum water level    metre"
"       0.000   Starting water level    metre"
"           0   Keep Design Data: 1 = True; 0 = False"
"                 Level Discharge    Volume"
"                 0.000     0.000     0.000"
"                 1.000     1.890  13100.00"
"                 2.000     3.140  21800.00"
"            Peak outflow                  1.876    c.m/sec"
"            Maximum level                 0.993    metre"
"            Maximum storage           13010.855    c.m"
"            Centroidal lag                3.688   hours"
"                10.005    10.005     1.876     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"           5   Next link "
"                  10.005     1.876     1.876     0.000"
" 54          POND DESIGN"
"       1.876   Current peak flow    c.m/sec"
"       5.003   Target outflow    c.m/sec"
"     21691.4   Hydrograph volume    c.m"
"          8.   Number of stages"
"       0.000   Minimum water level    metre"
"       0.700   Maximum water level    metre"
"       0.000   Starting water level    metre"
"           0   Keep Design Data: 1 = True; 0 = False"
"                 Level Discharge    Volume"
"                 0.000     0.000     0.000"
"                 0.1000   0.02600  2916.000"
"                 0.2000   0.05300  5858.000"
"                 0.3000   0.07500  8827.000"
"                 0.4000   0.09100  11822.00"
"                 0.5000    0.6560  14844.00"
"                 0.6000    0.7540  17893.00"
"                 0.7000     5.845  20968.00"
"            Peak outflow                  0.593    c.m/sec"
"            Maximum level                 0.489    metre"
"            Maximum storage           14504.675    c.m"
"            Centroidal lag               23.065   hours"
"                10.005     1.876     0.593     0.000 c.m/sec"
```

Aberfoyle Business Park SWMF
Post-Development

```
" MIDUSS Output ---------------------------------------------->"
" MIDUSS version                          Version 2.25  rev. 473"
" MIDUSS created                        Sunday, February 7, 2010"
"    10   Units used:                                  ie METRIC"
" Job folder:                  Q:\55237\100\SWM\2nd Submission\"
                                                    Site to SWMF"
" Output filename:                              2 Year Post.out"
" Licensee name:                                             A"
" Company                                                    "
" Date & Time last used:                7/8/2025 at 2:40:28 PM"
" 31          TIME PARAMETERS"
"      5.000   Time Step"
"    180.000   Max. Storm length"
"   1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"      1   Chicago storm"
"    743.000   Coefficient A"
"      6.000   Constant B"
"      0.799   Exponent C"
"      0.400   Fraction R"
"    180.000   Duration"
"      1.000   Time step multiplier"
"           Maximum intensity          109.374    mm/hr"
"           Total depth                 34.259    mm"
"         6   002hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 202"
"         1   Triangular SCS"
"         1   Equal length"
"         1   SCS method"
"       202   Roof"
"    100.000   % Impervious"
"      0.178   Total Area"
"     10.000   Flow length"
"      1.500   Overland Slope"
"      0.000   Pervious Area"
"     10.000   Pervious length"
"      1.500   Pervious slope"
"      0.178   Impervious Area"
"     10.000   Impervious length"
"      1.500   Impervious slope"
"      0.250   Pervious Manning 'n'"
"     75.000   Pervious SCS Curve No."
"      0.000   Pervious Runoff coefficient"
"      0.100   Pervious Ia/S coefficient"
"      8.467   Pervious Initial abstraction"
"      0.015   Impervious Manning 'n'"
"     98.000   Impervious SCS Curve No."
"      0.835   Impervious Runoff coefficient"
"      0.100   Impervious Ia/S coefficient"
"      0.518   Impervious Initial abstraction"
"              0.042     0.000     0.000     0.000 c.m/sec"
"           Catchment 202          Pervious   Impervious Total Area "
"           Surface Area           0.000      0.178      0.178      hectare"
"           Time of concentration  14.827     1.246      1.246      minutes"
"           Time to Centroid       121.398    89.765     89.765     minutes"
"           Rainfall depth         34.259     34.259     34.259     mm"
"           Rainfall volume        0.00       60.98      60.98      c.m"
"           Rainfall losses        28.251     5.641      5.641      mm"
"           Runoff depth           6.008      28.618     28.618     mm"
"           Runoff volume          0.00       50.94      50.94      c.m"
"           Runoff coefficient     0.000      0.835      0.835      "
"           Maximum flow           0.000      0.042      0.042      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"         4   Add Runoff "
"              0.042     0.042     0.000     0.000"
" 57          TRENCH Design d/s of 202"
"      0.042   Peak inflow"
"     50.939   Hydrograph volume"
"    324.950   Ground elevation"
"    322.000   Downstream trench invert"
"      1.670   Trench height"
```



```
"    319.000   Water table elevation"
"      4.700   Trench top width"
"      4.700   Trench bottom width"
"     53.000   Voids ratio (%)"
"     18.000   Hydraulic conductivity"
"      0.000   Trench gradient (%)"
"     16.000   Trench length"
"      1.000   Include base width"
"        21.   Number of stages"
"              Level Discharge    Volume"
"            322.000     0.000       0.0"
"            322.147     0.000       5.9"
"            322.295     0.000      11.8"
"            322.443     0.000      17.6"
"            322.590     0.000      23.5"
"            322.737     0.000      29.4"
"            322.885     0.000      35.3"
"            323.033     0.000      41.2"
"            323.180     0.000      47.0"
"            323.328     0.000      52.9"
"            323.475     0.000      58.8"
"            323.622     0.000      64.7"
"            323.770     0.005      66.7"
"            323.918     0.026      66.8"
"            324.065     0.054      67.0"
"            324.212     0.080      67.2"
"            324.360     0.101      67.3"
"            324.508     0.118      67.5"
"            324.655     0.133      67.7"
"            324.803     0.147      67.8"
"            324.950     0.159      68.0"
"        1.   TRENCH PIPES"
"          Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"              Invert    length     diam.    grade%     0=Yes  distance"
"            323.670    12.900     0.000     1.008     1.000     0.000"
"        1.   MANHOLE"
"             Access"
"            diameter"
"               1.200"
"        1.   OUTFLOW PIPE"
"        0.   Inflow at upstream end of trench: 1=True; 0=False"
"           Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"             invert    invert    Length  Diameter       'n'   loss Ke"
"            323.670   323.540    12.900     0.300     0.013     0.500"
"          Peak outflow                0.000    c.m/sec"
"          Outflow volume              0.009    c.m"
"          Peak exfiltration           0.001    c.m/sec"
"          Exfiltration volume        45.807    c.m"
"          Maximum level             323.158    metre"
"          Maximum storage            46.156    c.m"
"          Centroidal lag             12.988   hours"
"          Infiltration area 2 sides  37.061   sq.metre"
"          Infiltration Base area     75.200   sq.metre"
"              0.042     0.042     0.000     0.001 c.m/sec"
" 40          HYDROGRAPH Next link "
"         5   Next link "
"              0.042     0.000     0.000     0.001"
" 33          CATCHMENT 203"
"         1   Triangular SCS"
"         1   Equal length"
"         1   SCS method"
"       203   Controlled Area"
"    98.000   % Impervious"
"     2.036   Total Area"
"    30.000   Flow length"
"     1.000   Overland Slope"
"     0.041   Pervious Area"
"    30.000   Pervious length"
"     1.000   Pervious slope"
"     1.995   Impervious Area"
"    30.000   Impervious length"
```

```
143 "        1.000   Impervious slope"
144 "        0.250   Pervious Manning 'n'"
145 "       75.000   Pervious SCS Curve No."
146 "        0.176   Pervious Runoff coefficient"
147 "        0.100   Pervious Ia/S coefficient"
148 "        8.467   Pervious Initial abstraction"
149 "        0.015   Impervious Manning 'n'"
150 "       98.000   Impervious SCS Curve No."
151 "        0.840   Impervious Runoff coefficient"
152 "        0.100   Impervious Ia/S coefficient"
153 "        0.518   Impervious Initial abstraction"
154 "                    0.410     0.000     0.000     0.001 c.m/sec"
155 "             Catchment 203          Pervious   Impervious Total Area "
156 "             Surface Area           0.041      1.995      2.036      hectare"
157 "             Time of concentration  32.371     2.720      2.846      minutes"
158 "             Time to Centroid       142.731    92.068     92.283     minutes"
159 "             Rainfall depth         34.259     34.259     34.259     mm"
160 "             Rainfall volume        13.95      683.55     697.50     c.m"
161 "             Rainfall losses        28.239     5.484      5.939      mm"
162 "             Runoff depth           6.019      28.775     28.320     mm"
163 "             Runoff volume          2.45       574.14     576.59     c.m"
164 "             Runoff coefficient     0.176      0.840      0.827      "
165 "             Maximum flow           0.001      0.410      0.410      c.m/sec"
166 " 40          HYDROGRAPH Add Runoff "
167 "           4   Add Runoff "
168 "                   0.410     0.410     0.000     0.001"
169 " 54          POND DESIGN"
170 "        0.410   Current peak flow    c.m/sec"
171 "        0.551   Target outflow    c.m/sec"
172 "        576.6   Hydrograph volume    c.m"
173 "           9.   Number of stages"
174 "      322.630   Minimum water level    metre"
175 "      325.150   Maximum water level    metre"
176 "      322.630   Starting water level    metre"
177 "            0   Keep Design Data: 1 = True; 0 = False"
178 "                  Level Discharge    Volume"
179 "                322.630     0.000     0.000"
180 "                324.800   0.01795   186.000"
181 "                324.850   0.01816   213.000"
182 "                324.900   0.01837   294.000"
183 "                324.950   0.01857   479.000"
184 "                325.000   0.01878   817.000"
185 "                325.050   0.01898  1325.000"
186 "                325.100   0.01918  2021.000"
187 "                325.150   0.01938  2400.000"
188 "          1.   ORIFICES"
189 "               Orifice   Orifice   Orifice Number of"
190 "                invert coefficie  diameter  orifices"
191 "                322.630     0.630    0.0750     1.000"
192 "             Peak outflow                 0.019    c.m/sec"
193 "             Maximum level              324.941    metre"
194 "             Maximum storage            446.065    c.m"
195 "             Centroidal lag               5.973   hours"
196 "                  0.410     0.410     0.019     0.001 c.m/sec"
197 " 40          HYDROGRAPH   Combine    1"
198 "           6   Combine "
199 "           1   Node #"
200 "               Flow From Site"
201 "             Maximum flow                 0.019    c.m/sec"
202 "             Hydrograph volume          576.107    c.m"
203 "                    0.410     0.410     0.019     0.019"
204 " 40          HYDROGRAPH Start - New Tributary"
205 "           2   Start - New Tributary"
206 "                    0.410     0.000     0.019     0.019"
207 " 33          CATCHMENT 204"
208 "           1   Triangular SCS"
209 "           1   Equal length"
210 "           1   SCS method"
211 "         204   Uncontrolled to ROW"
212 "       22.000   % Impervious"
213 "        0.172   Total Area"
```



```
214 "       15.000   Flow length"
215 "       10.000   Overland Slope"
216 "        0.134   Pervious Area"
217 "       15.000   Pervious length"
218 "       10.000   Pervious slope"
219 "        0.038   Impervious Area"
220 "       15.000   Impervious length"
221 "       10.000   Impervious slope"
222 "        0.250   Pervious Manning 'n'"
223 "       75.000   Pervious SCS Curve No."
224 "        0.175   Pervious Runoff coefficient"
225 "        0.100   Pervious Ia/S coefficient"
226 "        8.467   Pervious Initial abstraction"
227 "        0.015   Impervious Manning 'n'"
228 "       98.000   Impervious SCS Curve No."
229 "        0.819   Impervious Runoff coefficient"
230 "        0.100   Impervious Ia/S coefficient"
231 "        0.518   Impervious Initial abstraction"
232 "                    0.010     0.000     0.019     0.019 c.m/sec"
233 "             Catchment 204          Pervious   Impervious Total Area "
234 "             Surface Area           0.134      0.038      0.172      hectare"
235 "             Time of concentration  10.704     0.899      5.131      minutes"
236 "             Time to Centroid       116.350    89.183     100.909    minutes"
237 "             Rainfall depth         34.259     34.259     34.259     mm"
238 "             Rainfall volume        45.96      12.96      58.92      c.m"
239 "             Rainfall losses        28.250     6.208      23.401     mm"
240 "             Runoff depth           6.008      28.050     10.858     mm"
241 "             Runoff volume          8.06       10.61      18.68      c.m"
242 "             Runoff coefficient     0.175      0.819      0.317      "
243 "             Maximum flow           0.003      0.009      0.010      c.m/sec"
244 " 40          HYDROGRAPH Add Runoff "
245 "           4   Add Runoff "
246 "                   0.010     0.010     0.019     0.019"
247 " 40          HYDROGRAPH Copy to Outflow"
248 "           8   Copy to Outflow"
249 "                   0.010     0.010     0.010     0.019"
250 " 40          HYDROGRAPH   Combine    1"
251 "           6   Combine "
252 "           1   Node #"
253 "               Flow From Site"
254 "             Maximum flow                 0.025    c.m/sec"
255 "             Hydrograph volume          594.782    c.m"
256 "                    0.010     0.010     0.010     0.025"
257 " 40          HYDROGRAPH Start - New Tributary"
258 "           2   Start - New Tributary"
259 "                   0.010     0.000     0.010     0.025"
260 " 33          CATCHMENT 200"
261 "           1   Triangular SCS"
262 "           1   Equal length"
263 "           2   Horton equation"
264 "         200   Industrial Subdivision"
265 "       85.000   % Impervious"
266 "       27.353   Total Area"
267 "      737.000   Flow length"
268 "        1.000   Overland Slope"
269 "        4.103   Pervious Area"
270 "      737.000   Pervious length"
271 "        1.000   Pervious slope"
272 "       23.250   Impervious Area"
273 "      737.000   Impervious length"
274 "        1.000   Impervious slope"
275 "        0.250   Pervious Manning 'n'"
276 "       76.000   Pervious Max.infiltration"
277 "       13.000   Pervious Min.infiltration"
278 "        0.250   Pervious Lag constant (hours)"
279 "        5.000   Pervious Depression storage"
280 "        0.015   Impervious Manning 'n'"
281 "        0.000   Impervious Max.infiltration"
282 "        0.000   Impervious Min.infiltration"
283 "        0.001   Impervious Lag constant (hours)"
284 "        1.500   Impervious Depression storage"
```

```
"                    3.058     0.000     0.010     0.025 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           4.103      23.250     27.353     hectare"
"             Time of concentration  224.136    17.988     20.096     minutes"
"             Time to Centroid       253.482    112.266    113.710    minutes"
"             Rainfall depth         34.259     34.259     34.259     mm"
"             Rainfall volume        1405.61    7965.13    9370.75    c.m"
"             Rainfall losses        32.342     1.525      6.148      mm"
"             Runoff depth           1.916      32.733     28.111     mm"
"             Runoff volume          78.63      7610.50    7689.13    c.m"
"             Runoff coefficient     0.056      0.955      0.821      "
"             Maximum flow           0.007      3.057      3.058      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    3.058     3.058     0.010     0.025"
" 54          POND DESIGN"
"        3.058   Current peak flow    c.m/sec"
"        0.551   Target outflow    c.m/sec"
"       7689.1   Hydrograph volume    c.m"
"           3.   Number of stages"
"        0.000   Minimum water level    metre"
"        2.000   Maximum water level    metre"
"        0.000   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                  0.000     0.000     0.000"
"                  1.000    0.1370  6010.000"
"                  2.000    0.1590  6950.000"
"             Peak outflow                0.145    c.m/sec"
"             Maximum level               1.383    metre"
"             Maximum storage          6369.806    c.m"
"             Centroidal lag             13.460   hours"
"                  3.058     3.058     0.145     0.025 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Flow From Industrial Subdivision"
"             Maximum flow                0.145    c.m/sec"
"             Hydrograph volume        6536.644    c.m"
"                    3.058     3.058     0.145     0.145"
" 40          HYDROGRAPH   Confluence    1"
"           7   Confluence "
"           1   Node #"
"               Flow From Site"
"             Maximum flow                0.025    c.m/sec"
"             Hydrograph volume         594.782    c.m"
"                    3.058     0.025     0.145     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    3.058     0.025     0.025     0.000"
" 40          HYDROGRAPH   Combine    3"
"           6   Combine "
"           3   Node #"
"               Flow through SWMF"
"             Maximum flow                0.025    c.m/sec"
"             Hydrograph volume         594.782    c.m"
"                    3.058     0.025     0.025     0.025"
" 40          HYDROGRAPH   Confluence    2"
"           7   Confluence "
"           2   Node #"
"               Flow From Industrial Subdivision"
"             Maximum flow                0.145    c.m/sec"
"             Hydrograph volume        6536.645    c.m"
"                    3.058     0.145     0.025     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    3.058     0.145     0.145     0.000"
" 40          HYDROGRAPH   Combine    3"
"           6   Combine "
"           3   Node #"
"               Flow through SWMF"
```



```
"             Maximum flow                0.164    c.m/sec"
"             Hydrograph volume        7131.419    c.m"
"                    3.058     0.145     0.145     0.164"
" 40          HYDROGRAPH   Confluence    3"
"           7   Confluence "
"           3   Node #"
"               Flow through SWMF"
"             Maximum flow                0.164    c.m/sec"
"             Hydrograph volume        7131.420    c.m"
"                    3.058     0.164     0.145     0.000"
" 54          POND DESIGN"
"        0.164   Current peak flow    c.m/sec"
"        0.551   Target outflow    c.m/sec"
"       7131.4   Hydrograph volume    c.m"
"           8.   Number of stages"
"      322.100   Minimum water level    metre"
"      322.800   Maximum water level    metre"
"      322.100   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                  322.100     0.000     0.000"
"                  322.200   0.02600  2916.000"
"                  322.300   0.05300  5858.000"
"                  322.400   0.07500  8827.000"
"                  322.500   0.09100  11822.00"
"                  322.600    0.6560  14844.00"
"                  322.700    0.7540  17893.00"
"                  322.800     6.095  20968.00"
"             Peak outflow                0.041    c.m/sec"
"             Maximum level             322.256    metre"
"             Maximum storage          4568.104    c.m"
"             Centroidal lag             34.112   hours"
"                  3.058     0.164     0.041     0.000 c.m/sec"
```

```
" MIDUSS Output ---------------------------------------------->"
" MIDUSS version                          Version 2.25  rev. 473"
" MIDUSS created                        Sunday, February 7, 2010"
"      10   Units used:                                  ie METRIC"
" MIDUSS created                        Sunday, February 7, 2010"
"      10   Units used:                                  ie METRIC"
" Job folder:                  Q:\55237\100\SWM\2nd Submission\"
"                                                      Site to SWMF"
" Output filename:                              5 Year Post.out"
" Licensee name:                                               A"
" Company                                                      "
" Date & Time last used:                 7/8/2025 at 2:42:29 PM"
" 31   TIME PARAMETERS"
"    5.000   Time Step"
"  180.000   Max. Storm length"
" 1500.000   Max. Hydrograph"
" 32   STORM Chicago storm"
"       1   Chicago storm"
" 1593.000   Coefficient A"
"   11.000   Constant B"
"    0.879   Exponent C"
"    0.400   Fraction R"
"  180.000   Duration"
"    1.000   Time step multiplier"
"       Maximum intensity          139.250    mm/hr"
"       Total depth                 47.240    mm"
"      6   005hyd   Hydrograph extension used in this file"
" 33   CATCHMENT 202"
"       1   Triangular SCS"
"       1   Equal length"
"       1   SCS method"
"     202   Roof"
"  100.000   % Impervious"
"    0.178   Total Area"
"   10.000   Flow length"
"    1.500   Overland Slope"
"    0.000   Pervious Area"
"   10.000   Pervious length"
"    1.500   Pervious slope"
"    0.178   Impervious Area"
"   10.000   Impervious length"
"    1.500   Impervious slope"
"    0.250   Pervious Manning 'n'"
"   75.000   Pervious SCS Curve No."
"    0.000   Pervious Runoff coefficient"
"    0.100   Pervious Ia/S coefficient"
"    8.467   Pervious Initial abstraction"
"    0.015   Impervious Manning 'n'"
"   98.000   Impervious SCS Curve No."
"    0.867   Impervious Runoff coefficient"
"    0.100   Impervious Ia/S coefficient"
"    0.518   Impervious Initial abstraction"
"            0.057     0.000     0.000     0.000 c.m/sec"
"       Catchment 202          Pervious   Impervious Total Area "
"       Surface Area           0.000      0.178      0.178      hectare"
"       Time of concentration  10.793     1.117      1.117      minutes"
"       Time to Centroid       111.498    87.558     87.558     minutes"
"       Rainfall depth         47.240     47.240     47.240     mm"
"       Rainfall volume        0.00       84.09      84.09      c.m"
"       Rainfall losses        35.086     6.266      6.266      mm"
"       Runoff depth           12.153     40.974     40.974     mm"
"       Runoff volume          0.00       72.93      72.93      c.m"
"       Runoff coefficient     0.000      0.867      0.867      "
"       Maximum flow           0.000      0.057      0.057      c.m/sec"
" 40   HYDROGRAPH Add Runoff "
"      4   Add Runoff "
"            0.057     0.057     0.000     0.000"
" 57   TRENCH Design d/s of 202"
"    0.057   Peak inflow"
"   72.933   Hydrograph volume"
"  324.950   Ground elevation"
"  322.000   Downstream trench invert"
"    1.670   Trench height"
```



```
" 319.000   Water table elevation"
"    4.700   Trench top width"
"    4.700   Trench bottom width"
"   53.000   Voids ratio (%)"
"   18.000   Hydraulic conductivity"
"    0.000   Trench gradient (%)"
"   16.000   Trench length"
"    1.000   Include base width"
"      21.   Number of stages"
"        Level Discharge    Volume"
"      322.000     0.000       0.0"
"      322.147     0.000       5.9"
"      322.295     0.000      11.8"
"      322.443     0.000      17.6"
"      322.590     0.000      23.5"
"      322.737     0.000      29.4"
"      322.885     0.000      35.3"
"      323.033     0.000      41.2"
"      323.180     0.000      47.0"
"      323.328     0.000      52.9"
"      323.475     0.000      58.8"
"      323.622     0.000      64.7"
"      323.770     0.005      66.7"
"      323.918     0.026      66.8"
"      324.065     0.054      67.0"
"      324.212     0.080      67.2"
"      324.360     0.101      67.3"
"      324.508     0.118      67.5"
"      324.655     0.133      67.7"
"      324.803     0.147      67.8"
"      324.950     0.159      68.0"
"    1.   TRENCH PIPES"
"      Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"          Invert    length     diam.    grade%     0=Yes  distance"
"      323.670    12.900     0.000     1.008     1.000     0.000"
"    1.   MANHOLE"
"         Access"
"      diameter"
"        1.200"
"    1.   OUTFLOW PIPE"
"    0.   Inflow at upstream end of trench: 1=True; 0=False"
"       Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"         invert    invert    Length  Diameter       'n'   loss Ke"
"      323.670   323.540    12.900     0.300     0.013     0.500"
"      Peak outflow                0.001    c.m/sec"
"      Outflow volume              2.316    c.m"
"      Peak exfiltration           0.001    c.m/sec"
"      Exfiltration volume        54.501    c.m"
"      Maximum level             323.654    metre"
"      Maximum storage            65.103    c.m"
"      Centroidal lag              2.772   hours"
"      Infiltration area 2 sides  52.936   sq.metre"
"      Infiltration Base area     75.200   sq.metre"
"           0.057     0.057     0.001     0.001 c.m/sec"
" 40   HYDROGRAPH Next link "
"     5   Next link "
"            0.057     0.001     0.001     0.001"
" 33   CATCHMENT 203"
"      1   Triangular SCS"
"      1   Equal length"
"      1   SCS method"
"    203   Controlled Area"
"   98.000   % Impervious"
"    2.036   Total Area"
"   30.000   Flow length"
"    1.000   Overland Slope"
"    0.041   Pervious Area"
"   30.000   Pervious length"
"    1.000   Pervious slope"
"    1.995   Impervious Area"
"   30.000   Impervious length"
```

```
143 "        1.000   Impervious slope"
144 "        0.250   Pervious Manning 'n'"
145 "       75.000   Pervious SCS Curve No."
146 "        0.258   Pervious Runoff coefficient"
147 "        0.100   Pervious Ia/S coefficient"
148 "        8.467   Pervious Initial abstraction"
149 "        0.015   Impervious Manning 'n'"
150 "       98.000   Impervious SCS Curve No."
151 "        0.875   Impervious Runoff coefficient"
152 "        0.100   Impervious Ia/S coefficient"
153 "        0.518   Impervious Initial abstraction"
154 "                    0.584     0.001     0.001     0.001 c.m/sec"
155 "             Catchment 203          Pervious   Impervious Total Area "
156 "             Surface Area           0.041      1.995      2.036      hectare"
157 "             Time of concentration  23.563     2.438      2.565      minutes"
158 "             Time to Centroid       127.276    89.497     89.723     minutes"
159 "             Rainfall depth         47.240     47.240     47.240     mm"
160 "             Rainfall volume        19.24      942.57     961.80     c.m"
161 "             Rainfall losses        35.070     5.921      6.504      mm"
162 "             Runoff depth           12.170     41.319     40.736     mm"
163 "             Runoff volume          4.96       824.43     829.38     c.m"
164 "             Runoff coefficient     0.258      0.875      0.862      "
165 "             Maximum flow           0.001      0.583      0.584      c.m/sec"
166 " 40          HYDROGRAPH Add Runoff "
167 "           4   Add Runoff "
168 "                   0.584     0.584     0.001     0.001"
169 " 54          POND DESIGN"
170 "        0.584   Current peak flow    c.m/sec"
171 "        0.551   Target outflow    c.m/sec"
172 "        831.7   Hydrograph volume    c.m"
173 "           9.   Number of stages"
174 "      322.630   Minimum water level    metre"
175 "      325.150   Maximum water level    metre"
176 "      322.630   Starting water level    metre"
177 "            0   Keep Design Data: 1 = True; 0 = False"
178 "                  Level Discharge    Volume"
179 "                322.630     0.000     0.000"
180 "                324.800   0.01795   186.000"
181 "                324.850   0.01816   213.000"
182 "                324.900   0.01837   294.000"
183 "                324.950   0.01857   479.000"
184 "                325.000   0.01878   817.000"
185 "                325.050   0.01898  1325.000"
186 "                325.100   0.01918  2021.000"
187 "                325.150   0.01938  2400.000"
188 "          1.   ORIFICES"
189 "               Orifice   Orifice   Orifice Number of"
190 "                invert coefficie  diameter  orifices"
191 "                322.630     0.630    0.0750     1.000"
192 "             Peak outflow                  0.019    c.m/sec"
193 "             Maximum level              324.982    metre"
194 "             Maximum storage            693.542    c.m"
195 "             Centroidal lag               7.624   hours"
196 "                  0.584     0.584     0.019     0.001 c.m/sec"
197 " 40          HYDROGRAPH   Combine    1"
198 "           6   Combine "
199 "           1   Node #"
200 "               Flow From Site"
201 "             Maximum flow                  0.019    c.m/sec"
202 "             Hydrograph volume          830.446    c.m"
203 "                    0.584     0.584     0.019     0.019"
204 " 40          HYDROGRAPH Start - New Tributary"
205 "           2   Start - New Tributary"
206 "                    0.584     0.000     0.019     0.019"
207 " 33          CATCHMENT 204"
208 "           1   Triangular SCS"
209 "           1   Equal length"
210 "           1   SCS method"
211 "         204   Uncontrolled to ROW"
212 "       22.000   % Impervious"
213 "        0.172   Total Area"
```



```
214 "       15.000   Flow length"
215 "       10.000   Overland Slope"
216 "        0.134   Pervious Area"
217 "       15.000   Pervious length"
218 "       10.000   Pervious slope"
219 "        0.038   Impervious Area"
220 "       15.000   Impervious length"
221 "       10.000   Impervious slope"
222 "        0.250   Pervious Manning 'n'"
223 "       75.000   Pervious SCS Curve No."
224 "        0.257   Pervious Runoff coefficient"
225 "        0.100   Pervious Ia/S coefficient"
226 "        8.467   Pervious Initial abstraction"
227 "        0.015   Impervious Manning 'n'"
228 "       98.000   Impervious SCS Curve No."
229 "        0.845   Impervious Runoff coefficient"
230 "        0.100   Impervious Ia/S coefficient"
231 "        0.518   Impervious Initial abstraction"
232 "                    0.015     0.000     0.019     0.019 c.m/sec"
233 "             Catchment 204          Pervious   Impervious Total Area "
234 "             Surface Area           0.134      0.038      0.172      hectare"
235 "             Time of concentration  7.791      0.806      4.429      minutes"
236 "             Time to Centroid       107.839    87.178     97.893     minutes"
237 "             Rainfall depth         47.240     47.240     47.240     mm"
238 "             Rainfall volume        63.38      17.88      81.25      c.m"
239 "             Rainfall losses        35.105     7.306      28.989     mm"
240 "             Runoff depth           12.135     39.934     18.251     mm"
241 "             Runoff volume          16.28      15.11      31.39      c.m"
242 "             Runoff coefficient     0.257      0.845      0.386      "
243 "             Maximum flow           0.008      0.012      0.015      c.m/sec"
244 " 40          HYDROGRAPH Add Runoff "
245 "           4   Add Runoff "
246 "                   0.015     0.015     0.019     0.019"
247 " 40          HYDROGRAPH Copy to Outflow"
248 "           8   Copy to Outflow"
249 "                   0.015     0.015     0.015     0.019"
250 " 40          HYDROGRAPH   Combine    1"
251 "           6   Combine "
252 "           1   Node #"
253 "               Flow From Site"
254 "             Maximum flow                  0.033    c.m/sec"
255 "             Hydrograph volume          861.838    c.m"
256 "                   0.015     0.015     0.015     0.033"
257 " 40          HYDROGRAPH Start - New Tributary"
258 "           2   Start - New Tributary"
259 "                   0.015     0.000     0.015     0.033"
260 " 33          CATCHMENT 200"
261 "           1   Triangular SCS"
262 "           1   Equal length"
263 "           2   Horton equation"
264 "         200   Industrial Subdivision"
265 "       85.000   % Impervious"
266 "       27.353   Total Area"
267 "      737.000   Flow length"
268 "        1.000   Overland Slope"
269 "        4.103   Pervious Area"
270 "      737.000   Pervious length"
271 "        1.000   Pervious slope"
272 "       23.250   Impervious Area"
273 "      737.000   Impervious length"
274 "        1.000   Impervious slope"
275 "        0.250   Pervious Manning 'n'"
276 "       76.000   Pervious Max.infiltration"
277 "       13.000   Pervious Min.infiltration"
278 "        0.250   Pervious Lag constant (hours)"
279 "        5.000   Pervious Depression storage"
280 "        0.015   Impervious Manning 'n'"
281 "        0.000   Impervious Max.infiltration"
282 "        0.000   Impervious Min.infiltration"
283 "        0.001   Impervious Lag constant (hours)"
284 "        1.500   Impervious Depression storage"
```

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"                    4.978     0.000     0.015     0.033 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           4.103      23.250     27.353     hectare"
"             Time of concentration  120.037    16.332     20.447     minutes"
"             Time to Centroid       188.382    107.276    110.494    minutes"
"             Rainfall depth         47.240     47.240     47.240     mm"
"             Rainfall volume        0.1938     1.0983     1.2922     ha-m"
"             Rainfall losses        36.559     1.621      6.862      mm"
"             Runoff depth           10.681     45.619     40.378     mm"
"             Runoff volume          0.0438     1.0606     1.1045     ha-m"
"             Runoff coefficient     0.226      0.966      0.855      "
"             Maximum flow           0.056      4.970      4.978      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    4.978     4.978     0.015     0.033"
" 54          POND DESIGN"
"        4.978   Current peak flow    c.m/sec"
"        0.551   Target outflow    c.m/sec"
"     11044.7   Hydrograph volume    c.m"
"           3.   Number of stages"
"       0.000   Minimum water level    metre"
"       2.000   Maximum water level    metre"
"       0.000   Starting water level    metre"
"           0   Keep Design Data: 1 = True; 0 = False"
"                 Level Discharge    Volume"
"                 0.000     0.000     0.000"
"                 1.000    0.4100  8140.000"
"                 2.000    0.5580  11100.00"
"             Peak outflow                0.407    c.m/sec"
"             Maximum level               0.994    metre"
"             Maximum storage          8090.025    c.m"
"             Centroidal lag              7.328   hours"
"                 4.978     4.978     0.407     0.033 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               Flow From Industrial Subdivision"
"             Maximum flow                0.407    c.m/sec"
"             Hydrograph volume       10878.636    c.m"
"                    4.978     4.978     0.407     0.407"
" 40          HYDROGRAPH   Confluence    1"
"           7   Confluence "
"           1   Node #"
"               Flow From Site"
"             Maximum flow                0.033    c.m/sec"
"             Hydrograph volume         861.838    c.m"
"                    4.978     0.033     0.407     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    4.978     0.033     0.033     0.000"
" 40          HYDROGRAPH   Combine    3"
"           6   Combine "
"           3   Node #"
"               Flow through SWMF"
"             Maximum flow                0.033    c.m/sec"
"             Hydrograph volume         861.838    c.m"
"                    4.978     0.033     0.033     0.033"
" 40          HYDROGRAPH   Confluence    2"
"           7   Confluence "
"           2   Node #"
"               Flow From Industrial Subdivision"
"             Maximum flow                0.407    c.m/sec"
"             Hydrograph volume       10878.636    c.m"
"                    4.978     0.407     0.033     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                    4.978     0.407     0.407     0.000"
" 40          HYDROGRAPH   Combine    3"
"           6   Combine "
"           3   Node #"
"               Flow through SWMF"
```



```
"             Maximum flow                0.427    c.m/sec"
"             Hydrograph volume       11740.477    c.m"
"                    4.978     0.407     0.407     0.427"
" 40          HYDROGRAPH   Confluence    3"
"           7   Confluence "
"           3   Node #"
"               Flow through SWMF"
"             Maximum flow                0.427    c.m/sec"
"             Hydrograph volume       11740.476    c.m"
"                    4.978     0.427     0.407     0.000"
" 54          POND DESIGN"
"        0.427   Current peak flow    c.m/sec"
"        0.551   Target outflow    c.m/sec"
"     11740.5   Hydrograph volume    c.m"
"           8.   Number of stages"
"      322.100   Minimum water level    metre"
"      322.800   Maximum water level    metre"
"      322.100   Starting water level    metre"
"           0   Keep Design Data: 1 = True; 0 = False"
"                 Level Discharge    Volume"
"                 322.100     0.000     0.000"
"                 322.200   0.02600  2916.000"
"                 322.300   0.05300  5858.000"
"                 322.400   0.07500  8827.000"
"                 322.500   0.09100  11822.00"
"                 322.600    0.6560  14844.00"
"                 322.700    0.7540  17893.00"
"                 322.800     6.095  20968.00"
"             Peak outflow                0.071    c.m/sec"
"             Maximum level             322.381    metre"
"             Maximum storage          8277.351    c.m"
"             Centroidal lag             32.620   hours"
"                 4.978     0.427     0.071     0.000 c.m/sec"
```

```
" MIDUSS Output ---------------------------------------------->"
" MIDUSS version                          Version 2.25  rev. 473"
" MIDUSS created                        Sunday, February 7, 2010"
"          10   Units used:                                ie METRIC"
" MIDUSS created                        Sunday, February 7, 2010"
"          10   Units used:                                ie METRIC"
" Job folder:                  Q:\55237\100\SWM\2nd Submission\"
"                                                        Site to SWMF"
" Output filename:                            100 Year Post.out"
" Licensee name:                                              A"
" Company                                                     "
" Date & Time last used:                7/8/2025 at 2:03:16 PM"
" 31          TIME PARAMETERS"
"       5.000   Time Step"
"     180.000   Max. Storm length"
"    1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"           1   Chicago storm"
"    4688.000   Coefficient A"
"      17.000   Constant B"
"       0.962   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"            Maximum intensity          239.650    mm/hr"
"            Total depth                 87.263    mm"
"           6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 202"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         202   Roof"
"     100.000   % Impervious"
"       0.178   Total Area"
"      10.000   Flow length"
"       1.500   Overland Slope"
"       0.000   Pervious Area"
"      10.000   Pervious length"
"       1.500   Pervious slope"
"       0.178   Impervious Area"
"      10.000   Impervious length"
"       1.500   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      75.000   Pervious SCS Curve No."
"       0.000   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       8.500   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.898   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.520   Impervious Initial abstraction"
"                 0.103     0.000     0.000     0.000 c.m/sec"
"            Catchment 202          Pervious   Impervious Total Area "
"            Surface Area           0.000      0.178      0.178      hectare"
"            Time of concentration  6.655      0.888      0.888      minutes"
"            Time to Centroid       0.000      85.171     85.171     minutes"
"            Rainfall depth         87.263     87.263     87.263     mm"
"            Rainfall volume        0.00       155.33     155.33     c.m"
"            Rainfall losses        87.263     8.904      8.904      mm"
"            Runoff depth           0.000      78.359     78.359     mm"
"            Runoff volume          0.00       139.48     139.48     c.m"
"            Runoff coefficient     0.000      0.898      0.898      "
"            Maximum flow           0.000      0.103      0.103      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                 0.103     0.103     0.000     0.000"
" 57          TRENCH Design d/s of 202"
"       0.103   Peak inflow"
"     139.480   Hydrograph volume"
"     324.950   Ground elevation"
"     322.000   Downstream trench invert"
"       1.670   Trench height"
```



```
"     319.000   Water table elevation"
"       4.700   Trench top width"
"       4.700   Trench bottom width"
"      53.000   Voids ratio (%)"
"      18.000   Hydraulic conductivity"
"       0.000   Trench gradient (%)"
"      16.000   Trench length"
"       1.000   Include base width"
"         21.   Number of stages"
"               Level Discharge    Volume"
"             322.000     0.000       0.0"
"             322.147     0.000       5.9"
"             322.295     0.000      11.8"
"             322.443     0.000      17.6"
"             322.590     0.000      23.5"
"             322.737     0.000      29.4"
"             322.885     0.000      35.3"
"             323.033     0.000      41.2"
"             323.180     0.000      47.0"
"             323.328     0.000      52.9"
"             323.475     0.000      58.8"
"             323.622     0.000      64.7"
"             323.770     0.005      66.7"
"             323.918     0.026      66.8"
"             324.065     0.054      67.0"
"             324.212     0.080      67.2"
"             324.360     0.101      67.3"
"             324.508     0.118      67.5"
"             324.655     0.133      67.7"
"             324.803     0.147      67.8"
"             324.950     0.159      68.0"
"          1.   TRENCH PIPES"
"            Downstream      Pipe      Pipe      Pipe Perf'ted?    Offset"
"                Invert    length     diam.    grade%     0=Yes  distance"
"               323.670    12.900     0.000     1.008     1.000     2.200"
"          1.   MANHOLE"
"               Access"
"              diameter"
"                 1.200"
"          1.   OUTFLOW PIPE"
"          0.   Inflow at upstream end of trench: 1=True; 0=False"
"              Upstream Downstr'm      Pipe      Pipe   Manning     Entry"
"                invert    invert    Length  Diameter       'n'   loss Ke"
"               323.670   323.540    12.900     0.300     0.013     0.500"
"            Peak outflow                 0.066    c.m/sec"
"            Outflow volume              71.365    c.m"
"            Peak exfiltration            0.001    c.m/sec"
"            Exfiltration volume         55.237    c.m"
"            Maximum level              324.180    metre"
"            Maximum storage             67.137    c.m"
"            Centroidal lag               1.643   hours"
"            Infiltration area 2 sides   53.440   sq.metre"
"            Infiltration Base area      75.200   sq.metre"
"                 0.103     0.103     0.066     0.001 c.m/sec"
" 40          HYDROGRAPH Next link "
"           5   Next link "
"                 0.103     0.066     0.066     0.001"
" 33          CATCHMENT 203"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         203   Controlled Area"
"      98.000   % Impervious"
"       2.036   Total Area"
"      30.000   Flow length"
"       1.000   Overland Slope"
"       0.041   Pervious Area"
"      30.000   Pervious length"
"       1.000   Pervious slope"
"       1.995   Impervious Area"
"      30.000   Impervious length"
```

```
143 "        1.000   Impervious slope"
144 "        0.250   Pervious Manning 'n'"
145 "       75.000   Pervious SCS Curve No."
146 "        0.434   Pervious Runoff coefficient"
147 "        0.100   Pervious Ia/S coefficient"
148 "        8.467   Pervious Initial abstraction"
149 "        0.015   Impervious Manning 'n'"
150 "       98.000   Impervious SCS Curve No."
151 "        0.925   Impervious Runoff coefficient"
152 "        0.100   Impervious Ia/S coefficient"
153 "        0.518   Impervious Initial abstraction"
154 "                    1.102     0.066     0.066     0.001 c.m/sec"
155 "             Catchment 203           Pervious   Impervious Total Area "
156 "             Surface Area           0.041      1.995      2.036      hectare"
157 "             Time of concentration  14.526     1.938      2.058      minutes"
158 "             Time to Centroid       111.048    86.528     86.760     minutes"
159 "             Rainfall depth         87.263     87.263     87.263     mm"
160 "             Rainfall volume        35.53      1741.15    1776.68    c.m"
161 "             Rainfall losses        49.383     6.526      7.383      mm"
162 "             Runoff depth           37.881     80.737     79.880     mm"
163 "             Runoff volume          15.42      1610.93    1626.36    c.m"
164 "             Runoff coefficient     0.434      0.925      0.915      "
165 "             Maximum flow           0.007      1.101      1.102      c.m/sec"
166 " 40          HYDROGRAPH Add Runoff "
167 "            4   Add Runoff "
168 "                    1.102     1.102     0.066     0.001"
169 " 54          POND DESIGN"
170 "        1.102   Current peak flow    c.m/sec"
171 "        0.551   Target outflow    c.m/sec"
172 "       1697.7   Hydrograph volume    c.m"
173 "           9.   Number of stages"
174 "      322.630   Minimum water level    metre"
175 "      325.150   Maximum water level    metre"
176 "      322.630   Starting water level    metre"
177 "            0   Keep Design Data: 1 = True; 0 = False"
178 "                  Level Discharge    Volume"
179 "                322.630     0.000     0.000"
180 "                324.800   0.01795   186.000"
181 "                324.850   0.01816   213.000"
182 "                324.900   0.01837   294.000"
183 "                324.950   0.01857   479.000"
184 "                325.000   0.01878   817.000"
185 "                325.050   0.01898  1325.000"
186 "                325.100   0.01918  2021.000"
187 "                325.150   0.01938  2400.000"
188 "           1.   ORIFICES"
189 "                Orifice   Orifice   Orifice Number of"
190 "                 invert coefficie  diameter  orifices"
191 "                322.630     0.630    0.0750     1.000"
192 "             Peak outflow                  0.019    c.m/sec"
193 "             Maximum level              325.066    metre"
194 "             Maximum storage           1545.567    c.m"
195 "             Centroidal lag              13.575   hours"
196 "                  1.102     1.102     0.019     0.001 c.m/sec"
197 " 40          HYDROGRAPH   Combine    1"
198 "            6   Combine "
199 "            1   Node #"
200 "                Flow From Site"
201 "             Maximum flow                  0.019    c.m/sec"
202 "             Hydrograph volume          1594.138    c.m"
203 "                    1.102     1.102     0.019     0.019"
204 " 40          HYDROGRAPH Start - New Tributary"
205 "            2   Start - New Tributary"
206 "                    1.102     0.000     0.019     0.019"
207 " 33          CATCHMENT 204"
208 "            1   Triangular SCS"
209 "            1   Equal length"
210 "            1   SCS method"
211 "          204   Uncontrolled to ROW"
212 "       22.000   % Impervious"
213 "        0.172   Total Area"
```



```
214 "       15.000   Flow length"
215 "       10.000   Overland Slope"
216 "        0.134   Pervious Area"
217 "       15.000   Pervious length"
218 "       10.000   Pervious slope"
219 "        0.038   Impervious Area"
220 "       15.000   Impervious length"
221 "       10.000   Impervious slope"
222 "        0.250   Pervious Manning 'n'"
223 "       75.000   Pervious SCS Curve No."
224 "        0.433   Pervious Runoff coefficient"
225 "        0.100   Pervious Ia/S coefficient"
226 "        8.467   Pervious Initial abstraction"
227 "        0.015   Impervious Manning 'n'"
228 "       98.000   Impervious SCS Curve No."
229 "        0.866   Impervious Runoff coefficient"
230 "        0.100   Impervious Ia/S coefficient"
231 "        0.518   Impervious Initial abstraction"
232 "                    0.045     0.000     0.019     0.019 c.m/sec"
233 "             Catchment 204           Pervious   Impervious Total Area "
234 "             Surface Area           0.134      0.038      0.172      hectare"
235 "             Time of concentration  4.803      0.641      3.302      minutes"
236 "             Time to Centroid       98.884     85.007     93.879     minutes"
237 "             Rainfall depth         87.263     87.263     87.263     mm"
238 "             Rainfall volume        117.07     33.02      150.09     c.m"
239 "             Rainfall losses        49.489     11.700     41.176     mm"
240 "             Runoff depth           37.774     75.563     46.088     mm"
241 "             Runoff volume          50.68      28.59      79.27      c.m"
242 "             Runoff coefficient     0.433      0.866      0.528      "
243 "             Maximum flow           0.033      0.022      0.045      c.m/sec"
244 " 40          HYDROGRAPH Add Runoff "
245 "            4   Add Runoff "
246 "                    0.045     0.045     0.019     0.019"
247 " 40          HYDROGRAPH Copy to Outflow"
248 "            8   Copy to Outflow"
249 "                    0.045     0.045     0.045     0.019"
250 " 40          HYDROGRAPH   Combine    1"
251 "            6   Combine "
252 "            1   Node #"
253 "                Flow From Site"
254 "             Maximum flow                  0.064    c.m/sec"
255 "             Hydrograph volume          1673.409    c.m"
256 "                    0.045     0.045     0.045     0.064"
257 " 40          HYDROGRAPH Start - New Tributary"
258 "            2   Start - New Tributary"
259 "                    0.045     0.000     0.045     0.064"
260 " 33          CATCHMENT 200"
261 "            1   Triangular SCS"
262 "            1   Equal length"
263 "            2   Horton equation"
264 "          200   Industrial Subdivision"
265 "       85.000   % Impervious"
266 "       27.353   Total Area"
267 "      737.000   Flow length"
268 "        1.000   Overland Slope"
269 "        4.103   Pervious Area"
270 "      737.000   Pervious length"
271 "        1.000   Pervious slope"
272 "       23.250   Impervious Area"
273 "      737.000   Impervious length"
274 "        1.000   Impervious slope"
275 "        0.250   Pervious Manning 'n'"
276 "       76.000   Pervious Max.infiltration"
277 "       13.000   Pervious Min.infiltration"
278 "        0.250   Pervious Lag constant (hours)"
279 "        5.000   Pervious Depression storage"
280 "        0.015   Impervious Manning 'n'"
281 "        0.000   Impervious Max.infiltration"
282 "        0.000   Impervious Min.infiltration"
283 "        0.001   Impervious Lag constant (hours)"
284 "        1.500   Impervious Depression storage"
```

```
"                    10.005     0.000     0.045     0.064 c.m/sec"
"              Catchment 200          Pervious   Impervious Total Area "
"              Surface Area           4.103      23.250     27.353     hectare"
"              Time of concentration  74.257     13.144     18.295     minutes"
"              Time to Centroid       161.267    100.646    105.756    minutes"
"              Rainfall depth         87.263     87.263     87.263     mm"
"              Rainfall volume        0.3580     2.0289     2.3869     ha-m"
"              Rainfall losses        42.697     1.831      7.961      mm"
"              Runoff depth           44.566     85.432     79.302     mm"
"              Runoff volume          0.1829     1.9863     2.1692     ha-m"
"              Runoff coefficient     0.511      0.979      0.909      "
"              Maximum flow           0.301      9.935      10.005     c.m/sec"
" 40           HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                    10.005    10.005     0.045     0.064"
" 54           POND DESIGN"
"        10.005   Current peak flow    c.m/sec"
"         0.551   Target outflow    c.m/sec"
"       21691.5   Hydrograph volume    c.m"
"            3.   Number of stages"
"         0.000   Minimum water level    metre"
"         2.000   Maximum water level    metre"
"         0.000   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                   0.000     0.000     0.000"
"                   1.000     1.890  13100.00"
"                   2.000     3.140  21800.00"
"              Peak outflow                  1.876    c.m/sec"
"              Maximum level                 0.993    metre"
"              Maximum storage           13010.855    c.m"
"              Centroidal lag                3.688   hours"
"                 10.005    10.005     1.876     0.064 c.m/sec"
" 40           HYDROGRAPH   Combine    2"
"             6   Combine "
"             2   Node #"
"                 Flow From Industrial Subdivision"
"              Maximum flow                  1.876    c.m/sec"
"              Hydrograph volume         21691.395    c.m"
"                    10.005    10.005     1.876     1.876"
" 40           HYDROGRAPH   Confluence    1"
"             7   Confluence "
"             1   Node #"
"                 Flow From Site"
"              Maximum flow                  0.064    c.m/sec"
"              Hydrograph volume          1673.409    c.m"
"                    10.005     0.064     1.876     0.000"
" 40           HYDROGRAPH Copy to Outflow"
"             8   Copy to Outflow"
"                    10.005     0.064     0.064     0.000"
" 40           HYDROGRAPH   Combine    3"
"             6   Combine "
"             3   Node #"
"                 Flow through SWMF"
"              Maximum flow                  0.064    c.m/sec"
"              Hydrograph volume          1673.409    c.m"
"                    10.005     0.064     0.064     0.064"
" 40           HYDROGRAPH   Confluence    2"
"             7   Confluence "
"             2   Node #"
"                 Flow From Industrial Subdivision"
"              Maximum flow                  1.876    c.m/sec"
"              Hydrograph volume         21691.395    c.m"
"                    10.005     1.876     0.064     0.000"
" 40           HYDROGRAPH Copy to Outflow"
"             8   Copy to Outflow"
"                    10.005     1.876     1.876     0.000"
" 40           HYDROGRAPH   Combine    3"
"             6   Combine "
"             3   Node #"
"                 Flow through SWMF"
```



```
"              Maximum flow                  1.901    c.m/sec"
"              Hydrograph volume         23364.787    c.m"
"                    10.005     1.876     1.876     1.901"
" 40           HYDROGRAPH   Confluence    3"
"             7   Confluence "
"             3   Node #"
"                 Flow through SWMF"
"              Maximum flow                  1.901    c.m/sec"
"              Hydrograph volume         23364.787    c.m"
"                    10.005     1.901     1.876     0.000"
" 54           POND DESIGN"
"          1.901   Current peak flow    c.m/sec"
"          0.551   Target outflow    c.m/sec"
"        23364.8   Hydrograph volume    c.m"
"             8.   Number of stages"
"        322.100   Minimum water level    metre"
"        322.800   Maximum water level    metre"
"        322.100   Starting water level    metre"
"              0   Keep Design Data: 1 = True; 0 = False"
"                    Level Discharge    Volume"
"                   322.100     0.000     0.000"
"                   322.200   0.02600  2916.000"
"                   322.300   0.05300  5858.000"
"                   322.400   0.07500  8827.000"
"                   322.500   0.09100  11822.00"
"                   322.600    0.6560  14844.00"
"                   322.700    0.7540  17893.00"
"                   322.800     6.095  20968.00"
"              Peak outflow                  0.620    c.m/sec"
"              Maximum level               322.594    metre"
"              Maximum storage           14651.217    c.m"
"              Centroidal lag               23.546   hours"
"                  10.005     1.901     0.620     0.000 c.m/sec"
```

Appendix C

Water Balance

7504 McLean Road
SITE WATER BUDGET ANALYSIS
Puslinch, Ontario

Project Number: 55237-100
Date: July 10, 2025
Design By: DXN
Checked By: JNJ
File: \\mte85.local\mte\DES\55237\100\Water Balance\2025-07-10_Water Balance (Thornthwaite-Mather).xlsx

PRE-DEVELOPMENT WATER BALANCE CONDITION

Contributing Catchments: *Total Site*
Contributing Area (ha): *2.786 ha*
Percent Impervious *30.0 %*
Weather Station: *Guelph Arboretum*
Soil Type: *Silt Loam*
Vegetation: *Urban Lawn*
Topography: *Flat*
Soil Moisture Retention Capacity: *125 mm*
Runoff Factor: *0.45*
Evapotranspiration factor for Impervious Surfaces: *0.33*

Month	Daily Average Temperature	Monthly Heat Index	Unadjusted Daily PE	Correction Factor	Adjusted PE	Average Precipitation	P-PE	Accum. Pot. Water Loss	Storage	ΔS	Pervious ET	Actual ET	Moisture Surplus	Water Runoff	Snow Melt Runoff	Total Recharge & Runoff	Total Recharge & Runoff	Total Infiltration Depth	Total Infiltration	Actual Runoff	Runoff Volume
	(C°)		(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(m^3)	(mm)	(m^3)	(mm)	(m^3)
Jan	-7.6	0.00	0.0	24.3	0.0	56.4	56.4	0.0	259.1	0.0	0.0	0.0	0.0	8.6	0.0	8.6	240	4.7	132	3.9	108
Feb	-6.9	0.00	0.0	24.4	0.0	50.8	50.8	0.0	309.9	0.0	0.0	0.0	0.0	4.3	0.0	4.3	120	2.4	66	1.9	54
Mar	-1.3	0.00	0.0	30.6	0.0	72.1	72.1	0.0	382.0	0.0	0.0	0.0	0.0	2.2	0.0	2.2	60	1.2	33	1.0	27
Apr	5.9	1.28	0.9	33.6	31.8	78.3	46.5	0.0	125.0	0.0	31.8	25.4	52.9	27.5	23.4	50.9	1,417	28.0	780	22.9	638
May	12.3	3.91	2.0	38.0	77.1	79.9	2.8	0.0	125.0	0.0	77.1	61.6	18.3	22.9	105.1	128.0	3,567	70.4	1,962	57.6	1,605
Jun	16.9	6.32	2.8	38.6	108.9	76	-32.9	-32.9	51.0	-74.0	150.0	119.9	30.2	26.5	52.6	79.1	2,204	43.5	1,212	35.6	992
Jul	19.7	7.97	3.3	38.9	128.7	88.5	-40.2	-73.1	43.0	-8.0	96.5	77.1	19.4	23.0	26.3	49.2	1,372	27.1	755	22.2	617
Aug	18.6	7.31	3.1	36.0	112.3	95.9	-16.4	-89.5	50.0	7.0	112.3	89.7	22.6	22.8	13.1	35.9	1,000	19.7	550	16.2	450
Sep	14.1	4.80	2.3	31.2	73.0	92.1	19.1	0.0	69.1	19.1	73.0	58.3	14.7	18.7	6.6	25.3	705	13.9	388	11.4	317
Oct	7.9	2.00	1.3	28.5	36.5	69.2	32.7	0.0	101.8	32.7	36.5	29.2	7.3	13.0	3.3	16.3	455	9.0	250	7.3	205
Nov	2.4	0.33	0.4	24.1	9.0	86.3	77.3	0.0	125.0	23.2	9.0	7.2	55.9	34.5	1.6	36.1	1,006	19.9	553	16.2	453
Dec	-4.0	0.00	0.0	22.9	0.0	77.7	77.7	0.0	202.7	0.0	0.0	0.0	0.0	17.2	1.6	18.9	526	10.4	289	8.5	237
Total		**33.9**	**16.2**		**577.3**	**923.2**	**345.9**					**468.4**	**221.2**	**221.2**	**233.6**	**454.8**	**12,671**	**250.1**	**6,969**	**204.7**	**5,702**

Note: P - Precipitation, PE - Potential Evapotranspiration, ΔS- Change in Soil Moisture Storage, ET - Evapotranspiration

Data taken from Canadian Climate Normals for Guelph Arboretum, 1971 to 2000
Guelph Arboretum Lat: 43°33'0"N

a= 1.037962188
n= 3.24 0.00

7504 McLean Road
SITE WATER BUDGET ANALYSIS - INFILTRATION AND PERVIOUS RUNOFF
Puslinch, Ontario

Project Number: 55237-100
Date: July 10, 2025
Design By: DXN
Checked By: JNJ
File: \\mte85.local\mte\DES\55237\100\Water Balance\2025-07-10_Water Balance (Thornthwaite-Mather).xlsx

POST-DEVELOPMENT WATER BALANCE CONDITION*

Contributing Area Description: ***Infiltrated Areas on Site***
Contributing Area (ha): ***0.554 ha + 0.178ha of roof to infiltration gallery***
Percent Impervious ***0.0 %***
Weather Station: ***Guelph Arboretum***

Soil Type: *Fine sandy loam*
Vegetation: *Urban Lawn*
Topography: *Hilly land*
Soil Moisture Retention Capacity: *75 mm*

Runoff Factor: *0.55*
Evapotranspiration Factor for Impervious Surfaces: *0.33*

Month	Daily Average Temperature	Monthly Heat Index	Unadjusted Daily PE	Correction Factor	Adjusted PE	Average Precipitation	P-PE	Accum. Pot. Water Loss	Storage	ΔS	Pervious ET	Actual ET	Moisture Surplus	Water Runoff	Snow Melt Runoff	Total Recharge & Runoff		Pervious Runoff	Passive/Pervious Infiltration	Total Enhanced Infiltration	Total Infiltration
	(C°)		(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Jan	-7.6	0.00	0.0	24.3	0.0	56.4	56.4	0.0	209.1	0.0	0.0	0.0	0.0	11.7	0.0	11.7	65	36	29	0	29
Feb	-6.9	0.00	0.0	24.4	0.0	50.8	50.8	0.0	259.9	0.0	0.0	0.0	0.0	5.9	0.0	5.9	33	18	15	0	15
Mar	-1.3	0.00	0.0	30.6	0.0	72.1	72.1	0.0	332.0	0.0	0.0	0.0	0.0	2.9	0.0	2.9	16	9	7	0	7
Apr	5.9	1.28	0.9	33.6	31.8	78.3	46.5	0.0	75.0	0.0	31.8	31.8	46.5	24.7	23.8	48.5	268	148	121	163	283
May	12.3	3.91	2.0	38.0	77.1	79.9	2.8	0.0	75.0	0.0	77.1	77.1	2.8	13.8	106.9	120.7	669	368	301	305	606
Jun	16.9	6.32	2.8	38.6	108.9	76	-32.9	-32.9	17.0	-58.0	134.0	134.0	0.0	0.9	53.5	54.4	301	166	136	164	300
Jul	19.7	7.97	3.3	38.9	128.7	88.5	-40.2	-73.1	13.0	-4.0	92.5	92.5	0.0	0.5	26.7	27.2	151	83	68	122	190
Aug	18.6	7.31	3.1	36.0	112.3	95.9	-16.4	-89.5	16.0	3.0	112.3	112.3	0.0	0.2	13.4	13.6	75	41	34	113	147
Sep	14.1	4.80	2.3	31.2	73.0	92.1	19.1	0.0	35.1	19.1	73.0	73.0	0.0	0.1	6.7	6.8	38	21	17	125	142
Oct	7.9	2.00	1.3	28.5	36.5	69.2	32.7	0.0	67.8	32.7	36.5	36.5	0.0	0.1	3.3	3.4	19	10	8	107	116
Nov	2.4	0.33	0.4	24.1	9.0	86.3	77.3	0.0	75.0	7.2	9.0	9.0	70.1	35.1	1.7	36.7	203	112	92	149	241
Dec	-4	0.00	0.0	22.9	0.0	77.7	77.7	0.0	152.7	0.0	0.0	0.0	0.0	23.5	1.7	25.1	139	77	63	3	66
Total		**33.9**	**16.2**		**577.3**	**923.2**	**345.9**					**566.2**	**119.3**	**119.3**	**237.6**	**357.0**	**1,978**	**1,088**	**890**	**1,251**	**2,141**

Note: P - Precipitation, PE - Potential Evapotranspiration, ΔS- Change in Soil Moisture Storage, ET - Evapotranspiration

*The contributing area considered in this sheet consists of the areas that will infiltrate on site, including the rooftop area which will be actively infiltrated by the site, as well as all landscaped areas on site which will be passively infiltrated. Furthermore, this sheet accounts for any surface runoff which will occur on the pervious areas of the site, in addition to the passive infiltration by these pervious areas.

Data taken from Canadian Climate Normals for Guelph Arboretum, 1971 to 2000
Guelph Arboretum Lat: 43°33'0"N

a= 1.037962188
n= 2.99 Diference= 0.00

7504 McLean Road
SITE WATER BUDGET ANALYSIS - IMPERVIOUS RUNOFF
Puslinch, Ontario

Project Number: 55237-100
Date: July 10, 2025
Design By: DXN
Checked By: JNJ
File: \\mte85.local\mte\DES\55237\100\Water Balance\2025-07-10_Water Balance (Thornthwaite-Mather).xlsx

POST-DEVELOPMENT WATER BALANCE CONDITION*

Contributing Area Description: *Surface Runoff*
Contributing Area (ha): *2.054 ha (Impervious Areas)*
Percent Impervious *100.0 %*
Weather Station: *Guelph Arboretum*

Soil Type: *Fine sandy loam*
Vegetation: *Urban Lawn*
Topography: *Flat*
Soil Moisture Retention Capacity: *75 mm*

Runoff Factor:
Evapotranspiration Factor for Impervious Surfaces: *0.33*

Month	Daily Average Temperature	Monthly Heat Index	Unadjusted Daily PE	Correction Factor	Adjusted PE	Average Precipitation	P-PE	Accum. Pot. Water Loss	Storage	ΔS	Pervious ET	Actual ET	Moisture Surplus	Water Runoff	Snow Melt Runoff	Total Runoff	
	(C°)		(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(m^3)
Jan	-7.6	0.00	0.0	24.3	0.0	56.4	56.4	0.0	209.1	0.0	0.0	0.0	0.0	14.8	0.0	14.8	303
Feb	-6.9	0.00	0.0	24.4	0.0	50.8	50.8	0.0	259.9	0.0	0.0	0.0	0.0	7.4	0.0	7.4	152
Mar	-1.3	0.00	0.0	30.6	0.0	72.1	72.1	0.0	332.0	0.0	0.0	0.0	0.0	3.7	0.0	3.7	76
Apr	5.9	1.28	0.9	33.6	31.8	78.3	46.5	0.0	75.0	0.0	31.8	10.5	67.8	35.7	23.8	59.5	1,222
May	12.3	3.91	2.0	38.0	77.1	79.9	2.8	0.0	75.0	0.0	77.1	25.4	54.5	45.1	106.9	152.0	3,123
Jun	16.9	6.32	2.8	38.6	108.9	76	-32.9	-32.9	17.0	-58.0	134.0	44.2	89.8	67.4	53.5	120.9	2,483
Jul	19.7	7.97	3.3	38.9	128.7	88.5	-40.2	-73.1	13.0	-4.0	92.5	30.5	62.0	64.7	26.7	91.4	1,878
Aug	18.6	7.31	3.1	36.0	112.3	95.9	-16.4	-89.5	16.0	3.0	112.3	37.1	75.2	70.0	13.4	83.3	1,712
Sep	14.1	4.80	2.3	31.2	73.0	92.1	19.1	0.0	35.1	19.1	73.0	24.1	48.9	59.4	6.7	66.1	1,358
Oct	7.9	2.00	1.3	28.5	36.5	69.2	32.7	0.0	67.8	32.7	36.5	12.1	24.5	42.0	3.3	45.3	931
Nov	2.4	0.33	0.4	24.1	9.0	86.3	77.3	0.0	75.0	7.2	9.0	3.0	76.1	59.0	1.7	60.7	1,247
Dec	-4	0.00	0.0	22.9	0.0	77.7	77.7	0.0	152.7	0.0	0.0	0.0	0.0	29.5	1.7	31.2	641
Total		**33.9**	**16.2**		**577.3**	**923.2**	**345.9**					**186.9**	**498.7**	**498.7**	**237.6**	**736.3**	**15,124**

Note: P - Precipitation, PE - Potential Evapotranspiration, ΔS- Change in Soil Moisture Storage, ET - Evapotranspiration

*The contributing area considered in this sheet consists of the impervious areas (internal drive aisles and parking spaces) which will be treated for water quality and directly outletted as surface runoff.

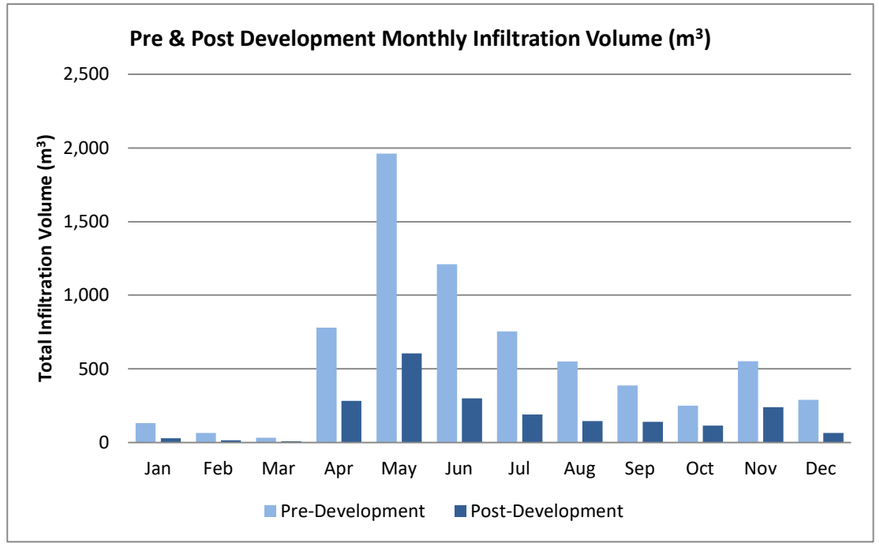
Data taken from Canadian Climate Normals for Guelph Arboretum, 1971 to 2000
Guelph Arboretum Lat: 43°33'0"N

a= 1.037962188
n= 2.58 Diference= 0.00

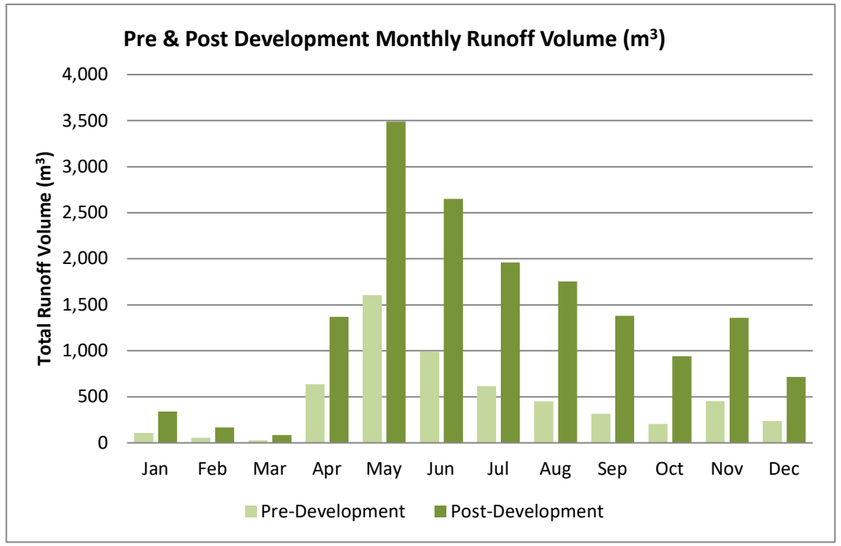
7504 McLean Road
SITE WATER BUDGET ANALYSIS
Puslinch, Ontario

Project Number: 55237-100
Date: July 15, 2025
Design By: DXN
Checked By: JNJ
File: \\mte85.local\mte\DES\55237\100\Water Balance\2025-07-10_Water Balance (Thornthwaite-Mather).xlsx

Month	Total Infiltration Volume (m^3)			
	Pre-development	Post-development	Difference	Change %
Jan	132	29	-103	-77.8
Feb	66	15	-51	-77.8
Mar	33	7	-26	-77.8
Apr	780	283	-496	-63.6
May	1,962	606	-1,356	-69.1
Jun	1,212	300	-912	-75.3
Jul	755	190	-564	-74.8
Aug	550	147	-403	-73.3
Sep	388	142	-246	-63.4
Oct	250	116	-135	-53.8
Nov	553	241	-312	-56.5
Dec	289	66	-223	-77.2
	6,969	**2,141**	**-4,828**	**-69.3**



Month	Total Runoff Volume (m^3)			
	Pre-development	Post-development	Difference	Change %
Jan	108	339	231	213.8
Feb	54	169	115	213.8
Mar	27	85	58	213.8
Apr	638	1,370	732	114.8
May	1,605	3,490	1,885	117.4
Jun	992	2,649	1,658	167.2
Jul	617	1,961	1,344	217.6
Aug	450	1,753	1,303	289.4
Sep	317	1,379	1,062	334.9
Oct	205	941	736	359.9
Nov	453	1,359	906	200.2
Dec	237	717	481	203.1
	5,702	**16,212**	**10,510**	**184.3**

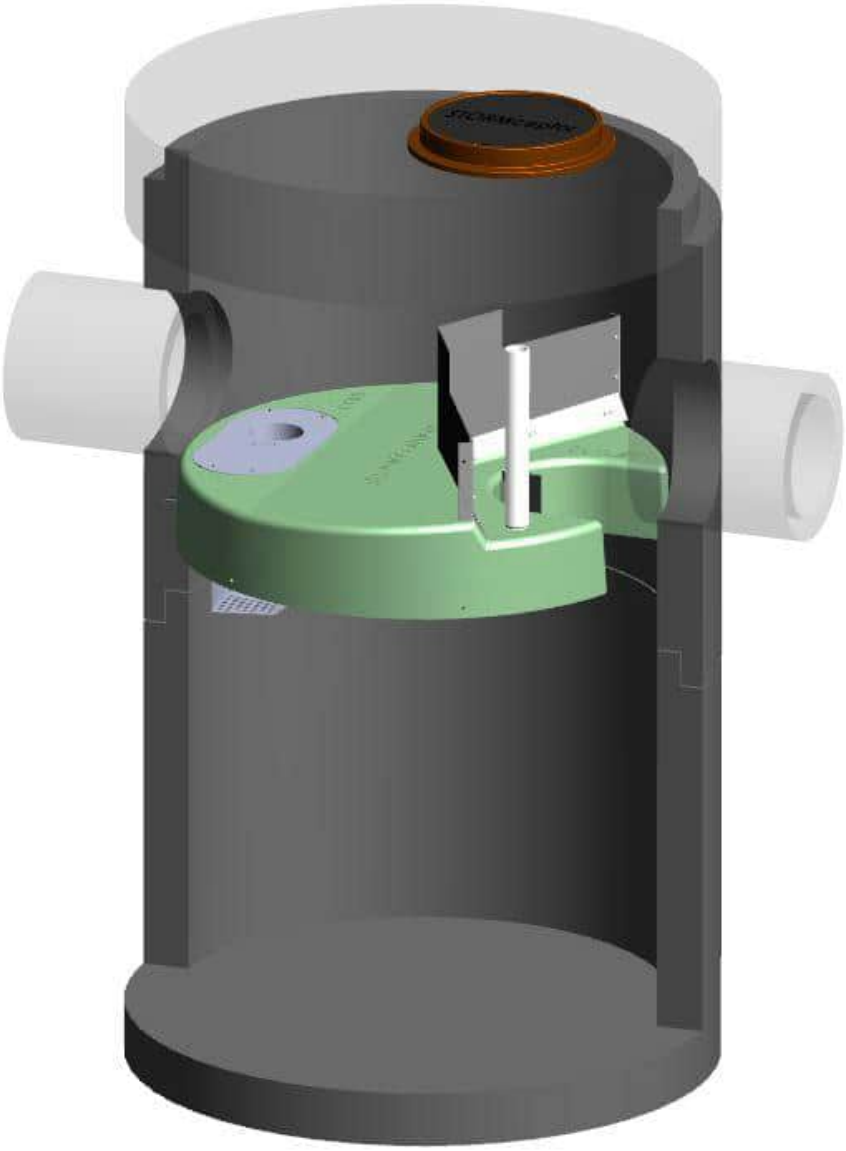


Appendix D

Operation & Maintenance Procedures

Stormceptor® EF

Owner's Manual



Stormceptor is protected by one or more of the following patents:

Canadian Patent No. 2,137,942
Canadian Patent No. 2,180,305
Canadian Patent No. 2,327,768
Canadian Patent No. 2,694,159
Canadian Patent No. 2,697,287
U.S. Patent No. 6,068,765
U.S. Patent No. 6,371,690
U.S. Patent No. 7,582,216
U.S. Patent No. 7,666,303
Australia Patent No. 693.164
Australia Patent No. 729,096
Australia Patent No. 2008,279,378
Australia Patent No. 2008,288,900
Japanese Patent No. 5,997,750
Japanese Patent No. 5,555,160
Korean Patent No. 0519212
Korean Patent No. 1451593
New Zealand Patent No. 583,008
New Zealand Patent No. 583,583
South African Patent No. 2010/00682
South African Patent No. 2010/01796
Patent pending

Table of Contents:

1 - Stormceptor EF Overview

2 - Stormceptor EF Operation, Components

3 - Stormceptor EF Model Details

4 - Stormceptor EF Identification

5 - Stormceptor EF Inspection & Maintenance

6 – Stormceptor Contacts

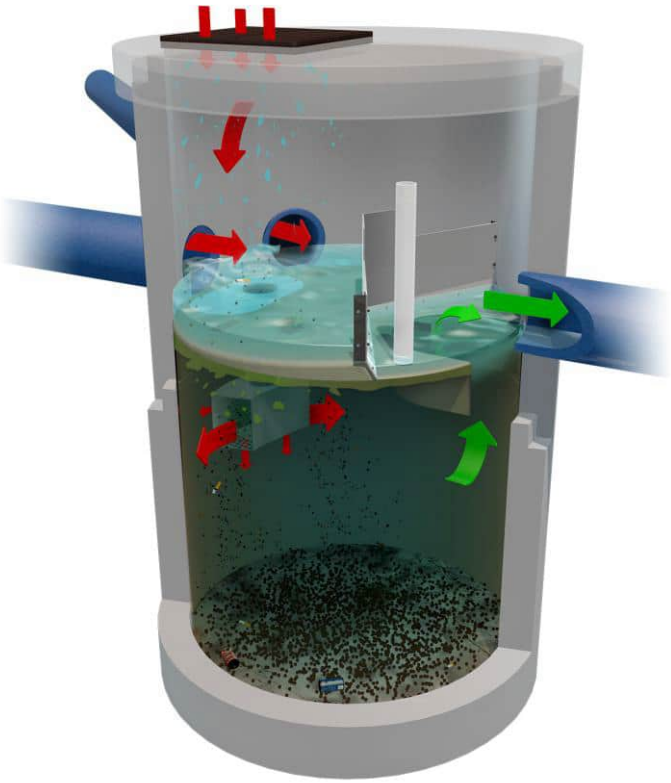
OVERVIEW

Stormceptor® EF is a continuation and evolution of the most globally recognized oil grit separator (OGS) stormwater treatment technology - ***Stormceptor®***. Also known as a hydrodynamic separator, the enhanced flow Stormceptor EF is a high performing oil grit separator that effectively removes a wide variety of pollutants from stormwater and snowmelt runoff at flow rates higher than the original Stormceptor. Stormceptor EF captures and retains sediment (TSS), free oils, gross pollutants and other pollutants that attach to particles, such as nutrients and metals. Stormceptor EF's patent-pending treatment and scour prevention platform ensures sediment is retained during all rainfall events.

Stormceptor EF offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe, multiple inlet pipes, and/or from the surface through an inlet grate. Stormceptor EF can also serve as a junction structure, accommodate a 90-degree inlet to outlet bend angle, and be modified to ensure performance in submerged conditions. With its scour prevention and internal bypass, Stormceptor EF can be installed online, eliminating the need for costly additional bypass structures.

OPERATION

- Stormwater enters the Stormceptor upper chamber through the inlet pipe(s) or a surface inlet grate. A specially designed insert reduces the influent velocity by creating a pond upstream of the insert's weir. Sediment particles immediately begin to settle. Swirling flow sweeps water, sediment, and floatables across the sloped surface of the insert to the inlet opening of the drop pipe, where a strong vortex draws water, sediment, oil, and debris down the drop pipe cone.
- Influent exits the cone into the drop pipe duct. The duct has two large rectangular outlet openings as well as perforations in the backside and floor of the duct. Influent is diffused through these various opening in multiple directions and at low velocity into the lower chamber.
- Free oils and other floatables rise up within the channel surrounding the central riser pipe and are trapped beneath the insert, while sediment settles to the sump. Pollutants are retained for later removal during maintenance cleaning.
- Treated effluent enters the outlet riser, moves upward, and discharges to the top side of the insert downstream of the weir, where it flows out the outlet pipe.
- During intense storm events with very high influent flow rates, the pond height on the upstream side of the weir may exceed the height of the weir, and the excess flow passes over the top of the weir to the downstream side of the insert, and exits through the outlet pipe. This internal bypass feature allows for in-line installation, avoiding the cost of additional bypass structures. During bypass, the pond separates sediment from all incoming flows, while full treatment in the lower chamber continues at the maximum flow rate.
- Stormceptor EF's patent-pending enhanced flow and scour prevention technology ensures pollutants are captured and retained, allowing excess flows to bypass during infrequent, high intensity storms.



COMPONENTS

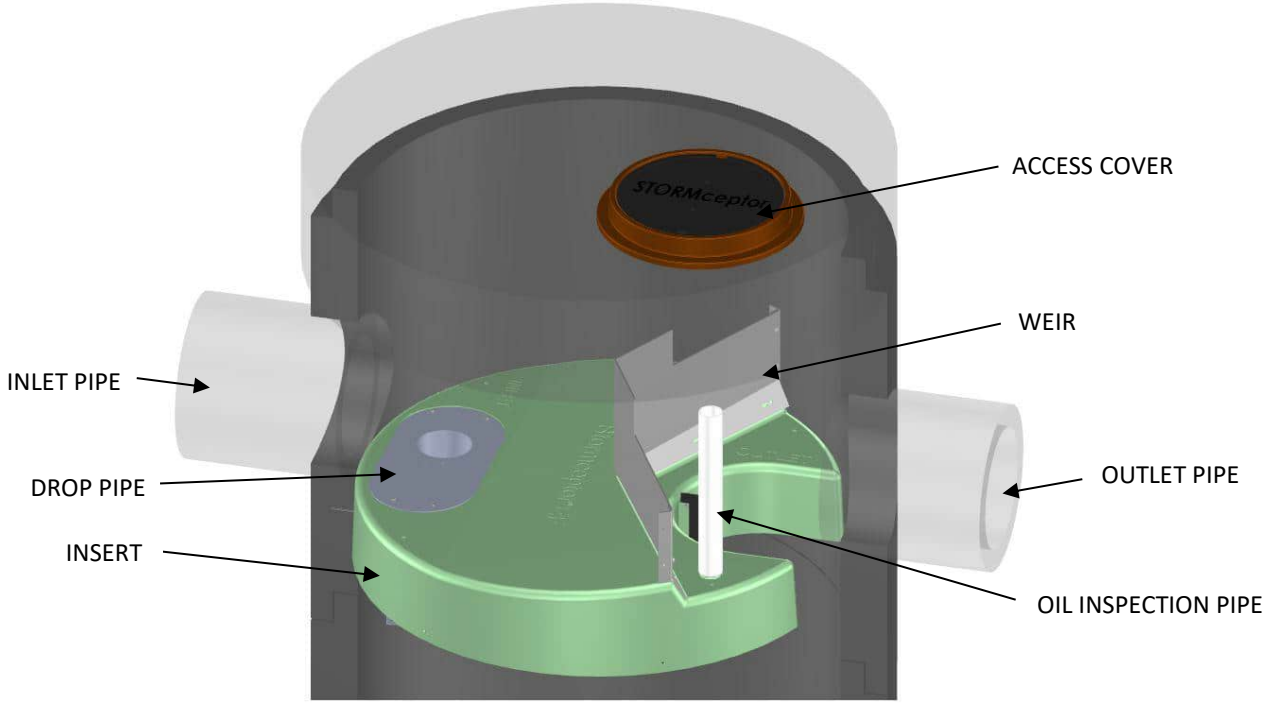


Figure 1

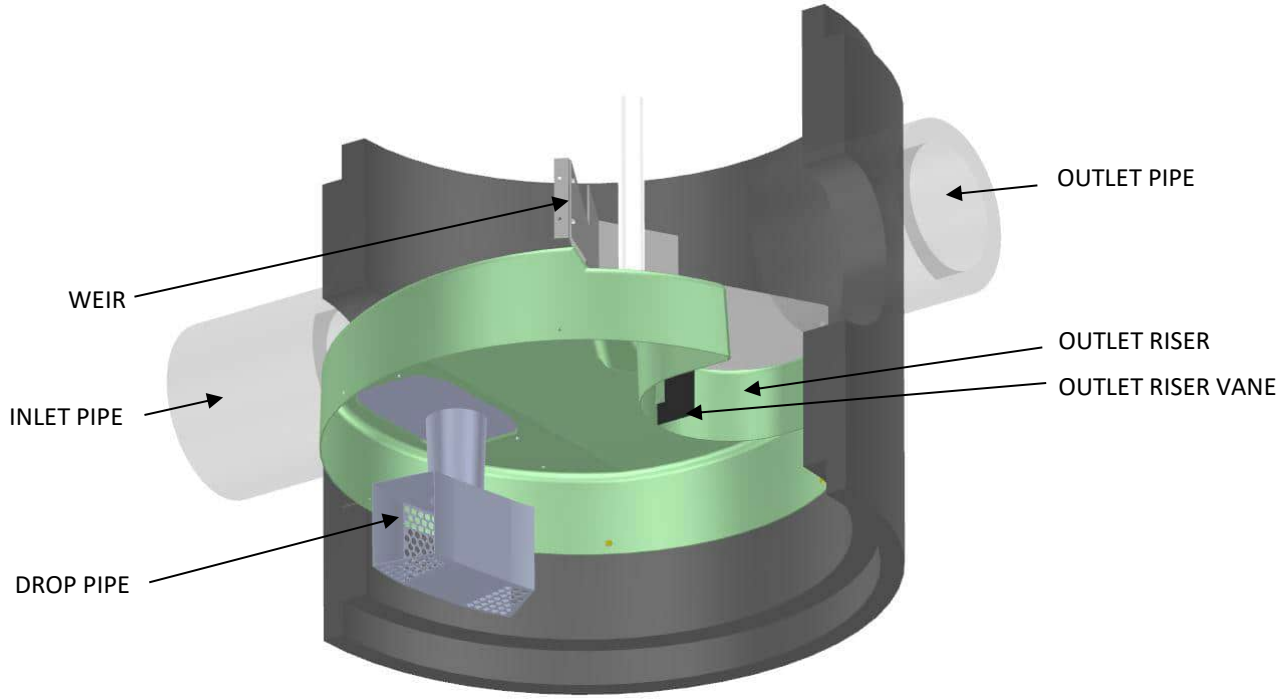


Figure 2

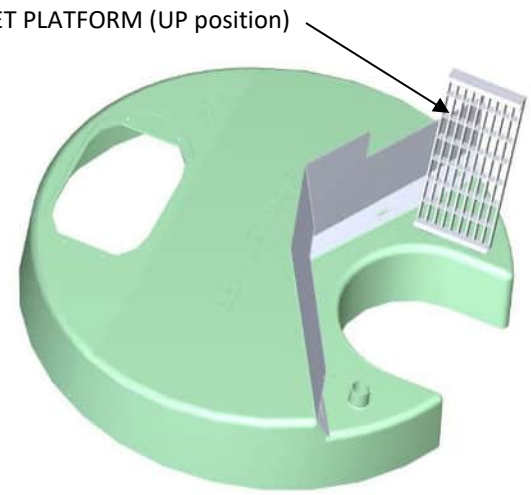


Figure 3A

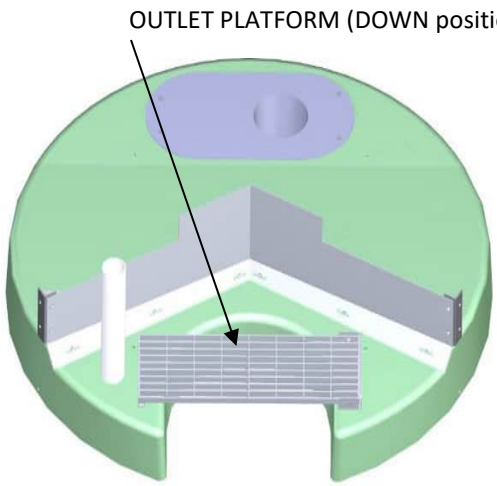


Figure 3B

- **Insert** – separates vessel into upper and lower chambers, and provides double-wall containment of hydrocarbons
- **Weir** – creates stormwater ponding and driving head on top side of insert
- **Drop pipe** – conveys stormwater and pollutants into the lower chamber
- **Outlet riser** – conveys treated stormwater from the lower chamber to the outlet pipe, and provides primary inspection and maintenance access into the lower chamber
- **Outlet riser vane** – prevents formation of a vortex in the outlet riser during high flow rate conditions
- **Outlet platform (optional)** – safety platform in the event of manned entry into the unit
- **Oil inspection pipe** – primary access for measuring oil depth

PRODUCT DETAILS

METRIC DIMENSIONS AND CAPACITIES

Table 1

Stormceptor Model	Inside Diameter (m)	Minimum Surface to Outlet Invert Depth (mm)	Depth Below Outlet Pipe Invert (mm)	Wet Volume (L)	Sediment Capacity [1] (m^3)	Hydrocarbon Storage Capacity [2] (L)	Maximum Flow Rate into Lower Chamber [3] (L/s)	Peak Conveyance Flow Rate [4] (L/s)
EF4 / EFO4	1.22	1219/914	1524	1780	1.19	265	22.1 / 10.4	425
EF5/EFO5	1.52	1219	1626	3150	1.95	420	34.6 / 16.2	708
EF6 / EFO6	1.83	1219	1930	5070	3.47	610	49.6 / 23.4	990
EF8 / EFO8	2.44	1219	2591	12090	8.78	1070	88.3 / 41.6	1700
EF10 / EFO10	3.05	1219	3251	23700	17.79	1670	138 / 65	2830
EF12 / EFO12	3.66	1219	3886	40800	31.22	2475	198.7 / 93.7	2830

[1] Sediment Capacity is measured from the floor to the bottom of the drop pipe duct. Sediment Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
[2] Hydrocarbon Storage Capacity is measured from the bottom of the outlet riser to the underside of the insert. Hydrocarbon Storage Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
[3] EF Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 1135 L/min/m^2.
EFO Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 535 L/min/m^2.
[4] Peak Conveyance Flow Rate is limited by a maximum velocity of 1.5 m/s.

U.S. DIMENSIONS AND CAPACITIES

Table 2

Stormceptor Model	Inside Diameter (ft)	Minimum Surface to Outlet Invert Depth (in)	Depth Below Outlet Pipe Invert (in)	Wet Volume (gal)	Sediment Capacity [1] (ft^3)	Hydrocarbon Storage Capacity [2] (gal)	Maximum Flow Rate into Lower Chamber [3] (cfs)	Peak Conveyance Flow Rate [4] (cfs)
EF4 / EFO4	4	48 / 36	60	471	42	70	0.78 / 0.37	15
EF5 / EFO5	5	48	64	833	75	111	1.22 / 0.57	25
EF6 / EFO6	6	48	76	1339	123	160	1.75 / 0.83	35
EF8 / EFO8	8	48	102	3194	310	280	3.12 / 1.47	60
EF10 / EFO10	10	48	128	6261	628	440	4.87 / 2.30	100
EF12 / EFO12	12	48	153	10779	1103	655	7.02 / 3.31	100

[1] Sediment Capacity is measured from the floor to the bottom of the drop pipe duct. Sediment Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
[2] Hydrocarbon Storage Capacity is measured from the bottom of the outlet riser to the underside of the insert. Hydrocarbon Storage Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
[3] EF Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 27.9 gpm/ft^2.
EFO Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 13.1 gpm/ft^2.
[4] Peak Conveyance Flow Rate is limited by a maximum velocity of 5 fps.

IDENTIFICATION

Each Stormceptor EF/EFO unit is easily identifiable by the trade name ***Stormceptor***® embossed on the access cover at grade as shown in **Figure 3**. The tradename ***Stormceptor***® is also embossed on the top of the insert upstream of the weir as shown in **Figure 3**.

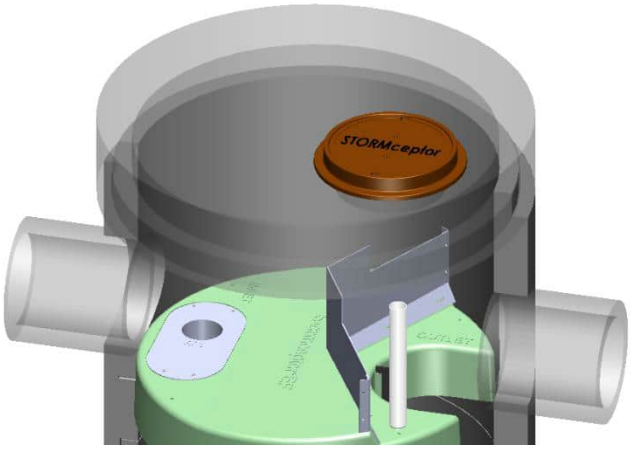


Figure 4

The specific Stormceptor EF/EFO model number is identified on the top of the aluminum Drop Pipe as shown in **Figure 4**. The unit serial number is identified on the top of the insert upstream of the weir as shown in **Figure 4**.

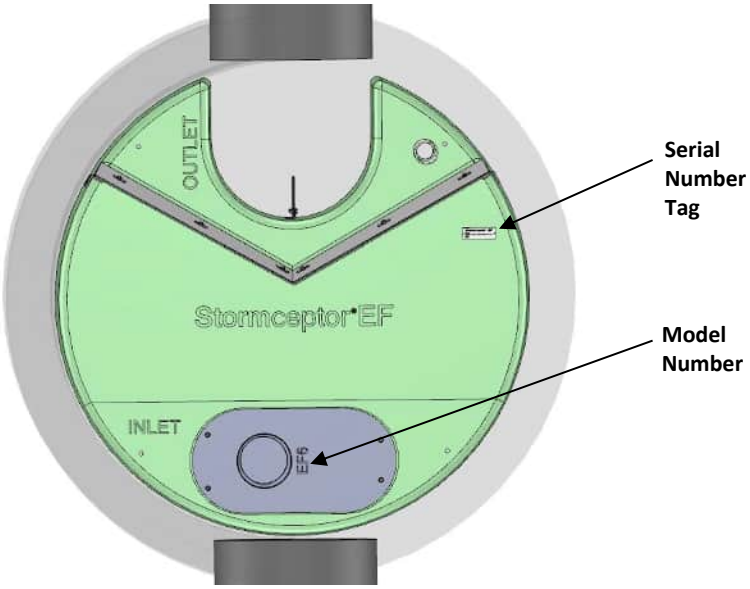


Figure 5

INSPECTION AND MAINTENANCE

It is very important to perform regular inspection and maintenance. Regular inspection and maintenance ensures maximum operation efficiency, keeps maintenance costs low, and provides continued of natural waterways.

Quick Reference

- Typical inspection and maintenance is performed from grade
- Remove manhole **cover(s)** or **inlet grate** to access insert and lower chamber
  NOTE: EF4/EFO4 & EF5/EFO5 require the removal of a **flow deflector** beneath inlet grate
- Use Sludge Judge® or similar sediment probe to check sediment depth through the **outlet riser**
- Oil dipstick can be inserted through the **oil inspection pipe**
- Visually inspect the **insert** for debris, remove debris if present
- Visually inspect the **drop pipe** opening for blockage, remove blockage if present
- Visually inspect **insert** and **weir** for damage, schedule repair if needed
- Insert vacuum hose and jetting wand through the outlet riser and extract sediment and floatables
- Replace flow deflector (EF4/EFO4 & EF5/EFO5), inlet grate, and cover(s)
- **NOTE:** If the unit has an **outlet platform**, the outlet platform is typically in the UP position (see Figure 3A) for normal treatment conditions, and for inspection and maintenance. If manned entry into the unit is required, the outlet platform must first be placed in the DOWN position (see Figure 3B). After manned entry is completed, return the outlet platform to the UP position for treatment.

When is inspection needed?

- Post-construction inspection is required prior to putting the Stormceptor into service.
- Routine inspections are recommended during the first year of operation to accurately assess pollutant accumulation.
- Inspection frequency in subsequent years is based on the maintenance plan developed in the first year.
- Inspections should also be performed immediately after oil, fuel, or other chemical spills.

What equipment is typically required for inspection?

- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones and caution tape
- Hard hat, safety shoes, safety glasses, and chemical-resistant gloves

When is maintenance cleaning needed?

- If the post-construction inspection indicates presence of construction sediment of a depth greater than a few inches, maintenance is recommended at that time.
- For optimum performance and normal operation the unit should be cleaned out once the sediment depth reaches the recommended maintenance sediment depth, see **Table 3**.
- Maintain immediately after an oil, fuel, or other chemical spill.

Table 3

Recommended Sediment Depths for Maintenance Service*	
MODEL	Sediment Depth (in/mm)
EF4 / EFO4	8 / 203
EF5 / EFO5	12 /305
EF6 / EFO6	12 /305
EF8 / EFO8	24 / 610
EF10 / EFO10	24 / 610
EF12 / EFO12	24 / 610

* Based on a minimum distance of 41 inches (1,041 mm) from bottom of outlet riser to top of sediment bed

The frequency of inspection and maintenance may need to be adjusted based on site conditions to ensure the unit is operating and performing as intended. Maintenance costs will vary based on the size of the unit, site conditions, local requirements, disposal costs, and transportation distance.

What equipment is typically required for maintenance?

- Vacuum truck equipped with water hose and jet nozzle
- Small pump and tubing for oil removal
- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones
- Hard hats, safety shoes, safety glasses, chemical-resistant gloves, and hearing protection for service providers
- Gas analyzer, respiratory gear, and safety harness for specially trained personnel if confined space entry is required (adhere to all OSHA / CCOSH standards)

What conditions can compromise Stormceptor performance?

- Presence of construction sediment and debris in the unit prior to activation
- Excessive sediment depth beyond the recommended maintenance depth
- Oil spill in excess of the oil storage capacity
- Clogging or restriction of the drop pipe inlet opening with debris
- Downstream blockage that results in a backwater condition

Maintenance Procedures

- Maintenance should be conducted during dry weather conditions when no flow is entering the unit.
- Stormceptor is maintained from grade through a standard surface manhole access cover or inlet grate.
- In the case of submerged or tailwater conditions, extra measures are likely required, such as plugging the inlet and outlet pipes prior to conducting maintenance.
- Inspection and maintenance of upstream catch basins and other stormwater conveyance structures is also recommended to extend the time between future maintenance cycles.

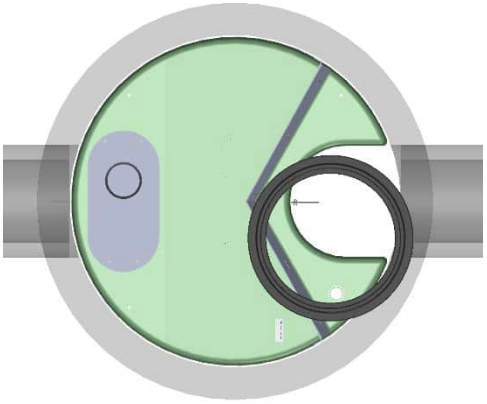


Figure 6

- Sediment depth inspections are performed through the **Outlet Riser** and oil presence can be determined through the **Oil Inspection Pipe**.
- Oil presence and sediment depth are determined by inserting a Sludge Judge® or measuring stick to quantify the pollutant depths.

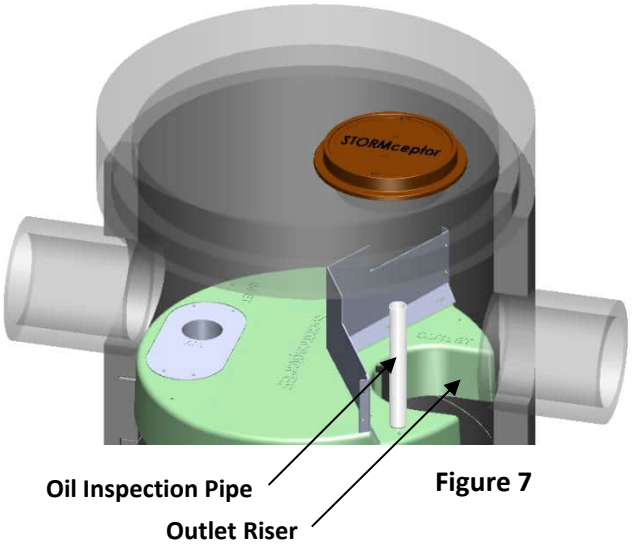


Figure 7

Figure 8

- Visually inspect the insert, weir, and drop pipe inlet opening to ensure there is no damage or blockage.
- **NOTE:** If the unit has an **outlet platform**, the outlet platform is typically in the UP position (see Figure 3A) for normal treatment conditions, and for inspection and maintenance. If manned entry into the unit is required, the outlet platform must first be placed in the DOWN position (see Figure 3B). After manned entry is completed, return the outlet platform to the UP position for treatment.

- When maintenance is required, a standard vacuum truck is used to remove the pollutants from the lower chamber of the unit through the **Outlet Riser**.

Figure 9

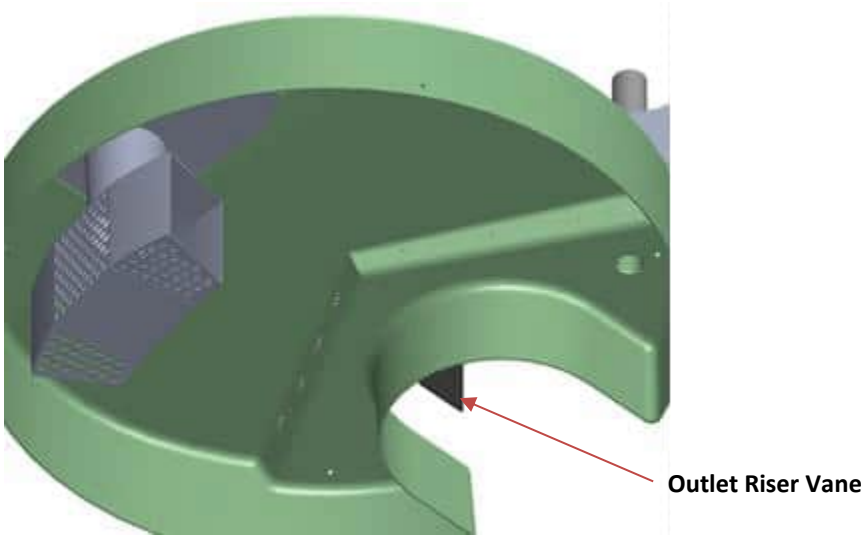


Figure 10

NOTE: The Outlet Riser Vane is durable and flexible and designed to allow maintenance activities with minimal, if any, interference.

Removable Flow Deflector

- Top grated inlets for the Stormceptor EF4/EFO4 & EF5/EFO5 models require a removable flow deflector staged underneath a 24-inch x 24-inch (600 mm x 600 mm) square inlet grate to direct flow towards the inlet side of the insert, and avoid flow and pollutants from entering the outlet side of the insert from grade. The EF6/EFO6 and larger models do not require the flow deflector.

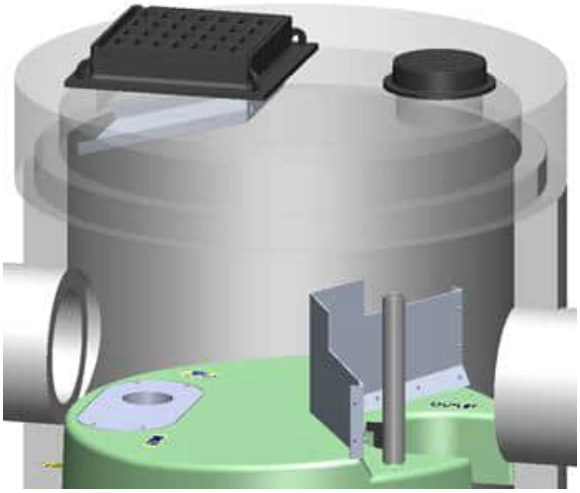
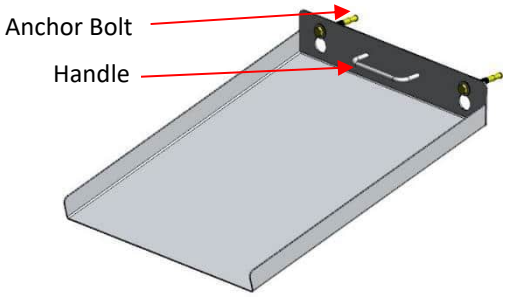


Figure 11

How to Remove:

1. Loosen anchor bolts
2. Pull up and out using the handle



Removable Flow Deflector

Hydrocarbon Spills

Stormceptor is often installed on high pollutant load hotspot sites with vehicular traffic where hydrocarbon spill potential exists. Should a spill occur, or presence of oil be identified within a Stormceptor EF/EFO, it should be cleaned immediately by a licensed liquid waste hauler.

Disposal

Maintenance providers are to follow all federal, state/ provincial, and local requirements for disposal of material.

Oil Sheens

When oil is present in stormwater runoff, a sheen may be noticeable at the Stormceptor outlet. An oil rainbow or sheen can be noticeable at very low oil concentrations (< 10 mg/L). Despite the appearance of a sheen, Stormceptor EF/EFO may still be functioning as intended.

Oil Level Alarm

To mitigate spill liability with 24/7 detection, an electronic monitoring system can be employed to trigger a visual and audible alarm when a pre-set level of oil is captured within the lower chamber or when an oil spill occurs. The oil level alarm is available as an optional feature to include with Stormceptor EF/EFO as shown in **Figure 11**. For additional details about the Oil Level Alarm please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-systems.

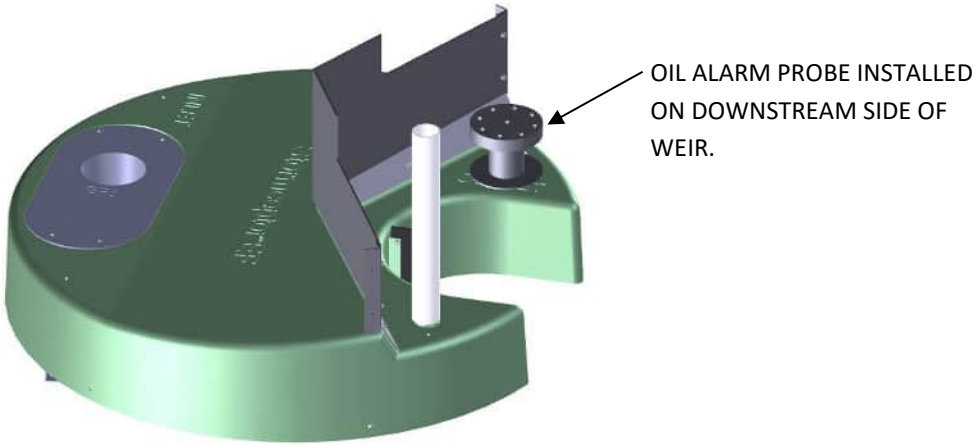


Figure 12

Replacement Parts

Stormceptor has no moving parts to wear out. Therefore inspection and maintenance activities are generally focused on pollutant removal. Since there are no moving parts during operation in a Stormceptor, broken, damaged, or worn parts are not typically encountered. However, if replacement parts are necessary, they may be purchased by contacting your local Stormceptor representative.

Stormceptor Inspection and Maintenance Log

Stormceptor Model No: _____

Serial Number: _____

Installation Date: _____

Location Description of Unit: _____

Recommended Sediment Maintenance Depth: _____

DATE	SEDIMENT DEPTH (inch or mm)	OIL DEPTH (inch or mm)	SERVICE REQUIRED (Yes / No)	MAINTENANCE PERFORMED	MAINTENANCE PROVIDER	COMMENTS

Other Comments:

Contact Information

Questions regarding Stormceptor EF/EFO can be addressed by contacting your local Imbrium representative or by visiting our website at www.imbriumsystems.com**.**

Imbrium Systems Inc. & Imbrium Systems LLC

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United States	1-301-279-8827 / 1-888-279-8826
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info@imbriumsystems.com

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH INSTALLATION INSTRUCTIONS VISIT OUR WEBSITE

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 500 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
10. MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECHNICAL NOTE 6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
11. ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE; AASHTO M43 #3, 357, 4, 467, 5, 56, OR 57.
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
10. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

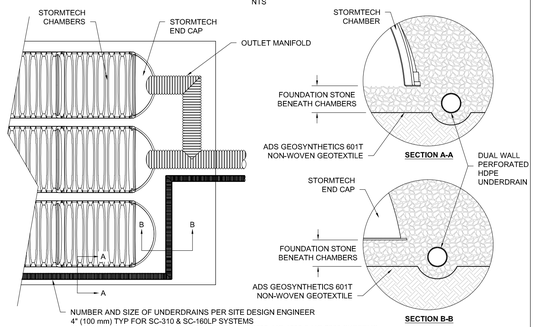
NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

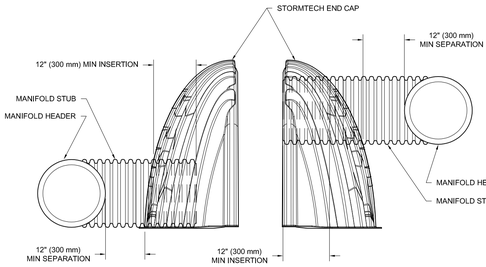
CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

UNDERDRAIN DETAIL
NTS



5 UNDERDRAIN DETAIL

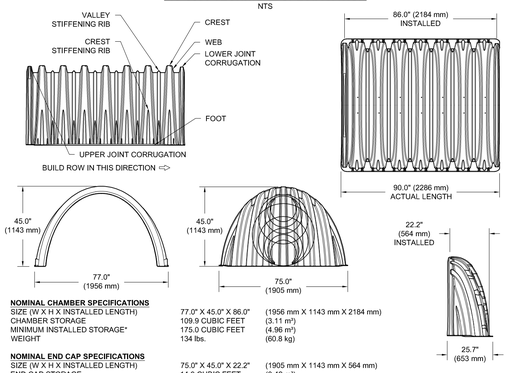
MC-SERIES END CAP INSERTION DETAIL
NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

6 MC-SERIES END CAP INSERTION DETAIL

MC-3500 TECHNICAL SPECIFICATION
NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m³)
MINIMUM INSTALLED STORAGE*	175.0 CUBIC FEET	(4.96 m³)
WEIGHT	134 lbs.	(60.8 kg)

NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m³)
WEIGHT	49 lbs.	(22.2 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" (152 mm) STONE BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

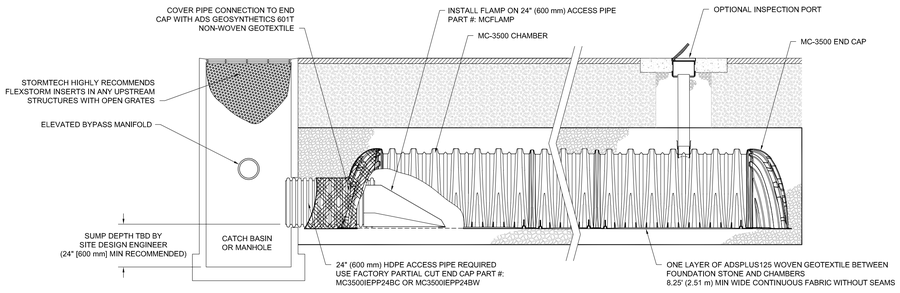
PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"
END CAPS WITH A WELDED CROWN PLATE END WITH "C"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18TW			
MC3500IEPP18BC		---	1.77" (45 mm)
MC3500IEPP18BW			
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24TW			
MC3500IEPP24BC		---	2.06" (52 mm)
MC3500IEPP24BW			
MC3500IEPP30BC	30" (750 mm)	---	2.75" (70 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL

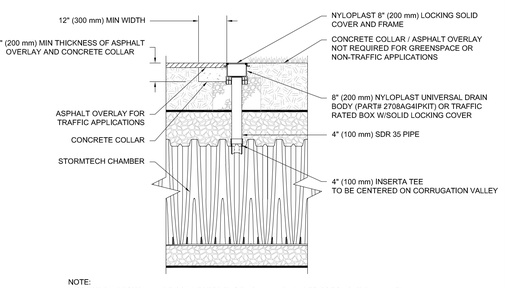
CUSTOM PARTIAL CUT INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

2 MC-3500 TECHNICAL SPECIFICATIONS



MC-3500 ISOLATOR ROW PLUS DETAIL
NTS

3 MC-3500 ISOLATOR ROW PLUS DETAIL



NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION VALLEY.

4" PVC INSPECTION PORT DETAIL (MC SERIES CHAMBER)
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

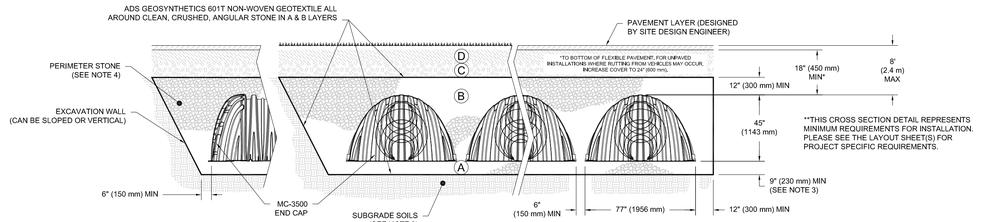
1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

4 4" PVC INSPECTION PORT DETAIL (MC SERIES CHAMBER)

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

	MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 18" (450 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



**THIS CROSS SECTION DETAIL REPRESENTS MINIMUM REQUIREMENTS FOR INSTALLATION. PLEASE SEE THE LAYOUT SHEET(S) FOR PROJECT SPECIFIC REQUIREMENTS.

NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

1 MC-3500 CROSS SECTION DETAIL

DRAWN: SMW | DATE: 02/17/2025
REVIEWED: JLM | PROJECT NO: 724-390
REV: | NOT TO SCALE

MC-3500 STANDARD DETAILS

StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026

Advanced Drainage Systems, Inc.

SHEET 1

ADVANCED DRAINAGE SYSTEMS, INC. ("ADS") HAS PREPARED THIS DETAIL BASED ON REFERENCED STANDARDS. ADS HAS NOT PERFORMED ANY ENGINEERING OR DESIGN SERVICES FOR THIS PROJECT, NOR HAS ADS INDEPENDENTLY VERIFIED THE INFORMATION SUPPLIED. THE INSTALLATION DETAILS PROVIDED HEREIN ARE GENERAL RECOMMENDATIONS AND ARE NOT SPECIFIC FOR THIS PROJECT. UNLESS THE PLANS ARE SIGNED AND SEALED BY THE SITE DESIGN ENGINEER, THE SITE DESIGN ENGINEER'S RESPONSIBILITY TO ENSURE THE DETAILS PROVIDED HEREIN MEETS OR EXCEEDS THE APPLICABLE NATIONAL, STATE, OR LOCAL REQUIREMENTS AND TO ENSURE THAT THE DETAILS PROVIDED HEREIN ARE ACCEPTABLE FOR THIS PROJECT.

MC-3500 & MC-7200
Design Manual

StormTech® Chamber Systems for Stormwater Management

ADS StormTech™

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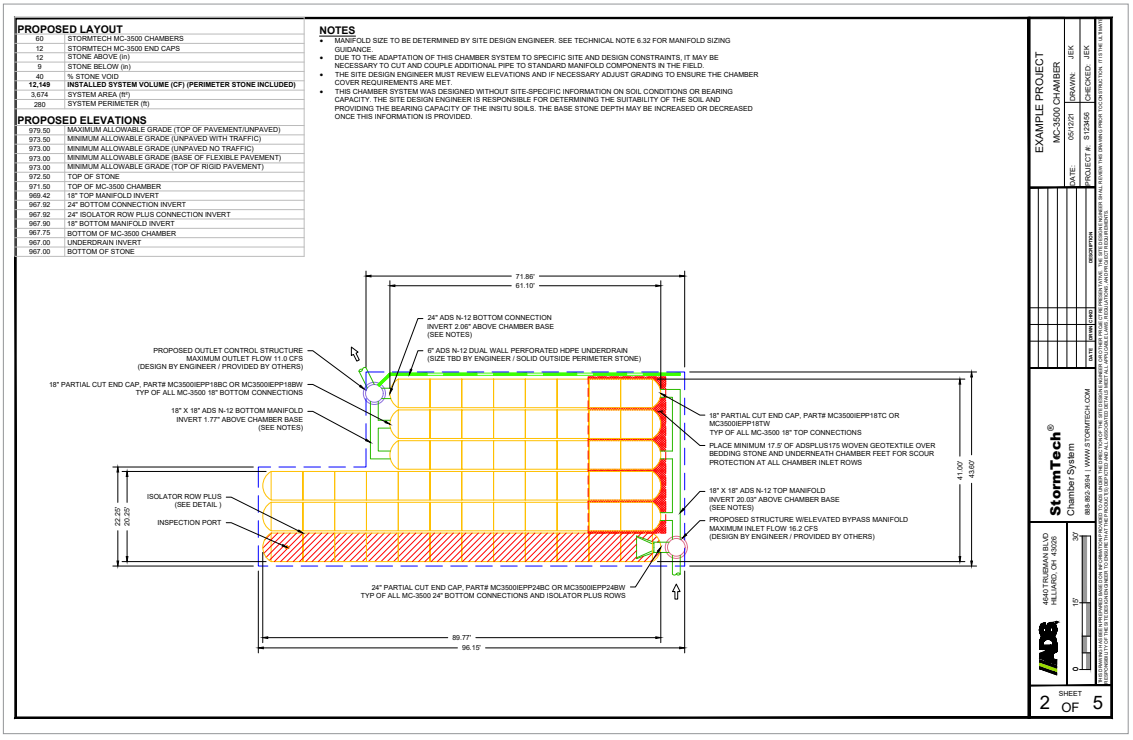
*For SC-160LP, SC-310, DC-780 & SC-800 designs, please refer to the SC-160LP/SC-310/DC-780/SC-800 Design Manuals.

StormTech Engineering Services assists design professionals in specifying StormTech stormwater systems. This assistance includes the layout of chambers to meet the engineer's volume requirements and the connections to and from the chambers. They can also assist converting and cost engineering projects currently specified with ponds, pipe, concrete vaults and other manufactured stormwater detention/ retention products. Please note that it is the responsibility of the site design engineer to ensure that the chamber bed layout meets all design requirements and is in compliance with applicable laws and regulations governing a project.



This manual is exclusively intended to assist engineers in the design of subsurface stormwater systems using StormTech chambers.

StormTech MC-3500 Chamber

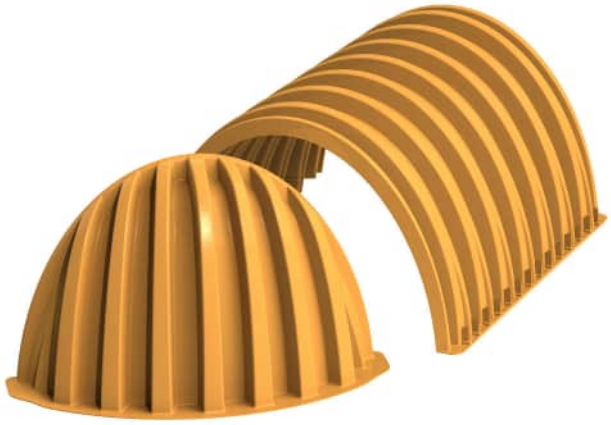
Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

MC-3500 Chamber (not to scale)

Nominal Specifications

Size (LxWxH)	90” x 77” x 45” (2286 x 1956 x 1143 mm)
Chamber Storage	109.9 ft³ (3.11 m³)
Min. Installed Storage*	175.0 ft³ (4.96 m³)
Weight	134 lbs (60.8 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below chambers, 6” (150 mm) of stone between chambers/end caps and 40% stone porosity.

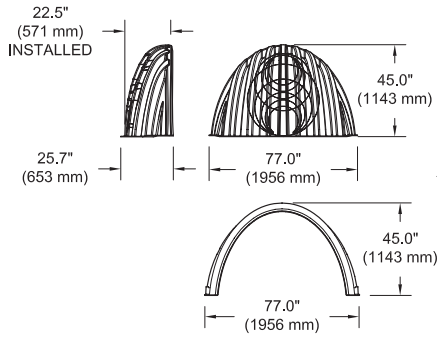


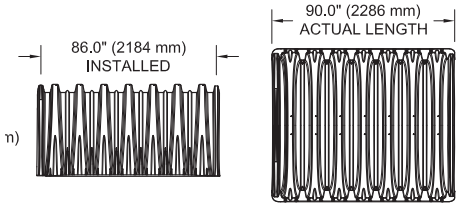
MC-3500 Chamber (not to scale)

Nominal Specifications

Size (LxWxH)	26.5” x 71” x 45.1” (673 x 1803 x 1145 mm)
End Cap Storage	14.9 ft³ (0.42 m³)
Min. Installed Storage*	45.1 ft³ (1.28 m³)
Weight	49 lbs (22.2 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below, 6” (150 mm) of stone perimeter, 6” (150 mm) of stone between chambers/end caps and 40% stone porosity.



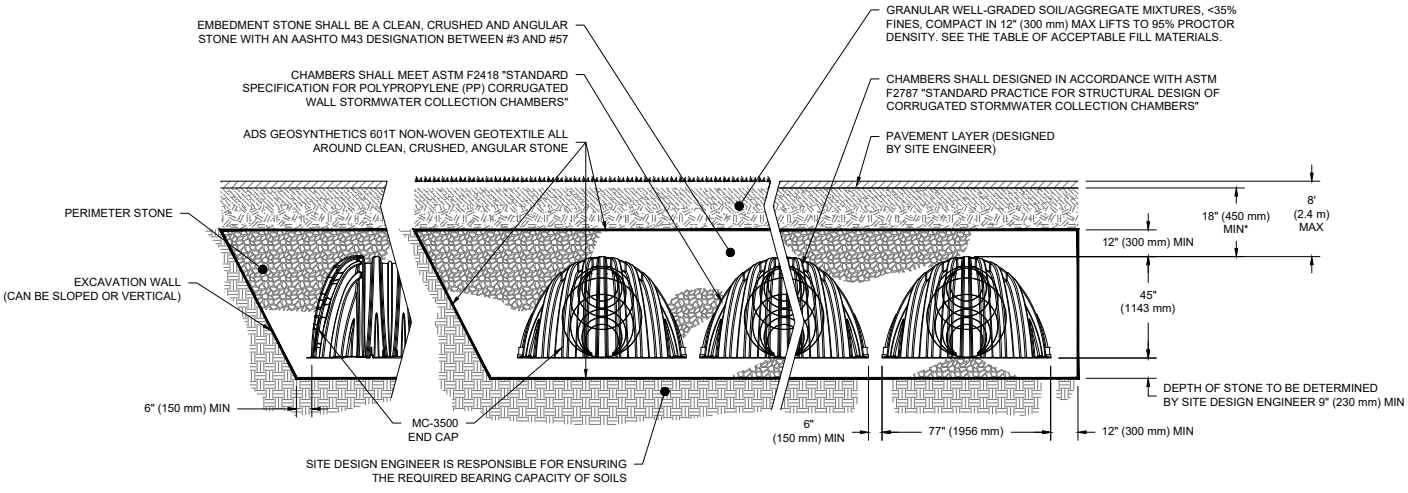


Shipping

15 chambers/pallet

7 end caps/pallet

7 pallets/truck



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 MM)

Storage Volume Per Chamber/End Cap ft³ (m³)

	Bare Unit Storage ft³ (m³)	Chamber/End Cap & Stone Volume - Stone Foundation Depth in. (mm)			
		9 (230)	12 (300)	15 (375)	18 (450)
Chamber	109.9 (3.11)	175.0 (4.96)	179.9 (5.09)	184.9 (5.24)	189.9 (5.38)
End Cap	14.9 (0.42)	45.1 (1.28)	46.6 (1.32)	48.3 (1.37)	49.9 (1.41)

Note: Assumes 6" (150 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume.

Amount of Stone Per Chamber

ENGLISH tons (yd³)	Stone Foundation Depth			
	9"	12"	15"	18"
Chamber	8.5 (6.0)	9.1 (6.5)	9.7 (6.9)	10.4 (7.4)
End Cap	3.9 (2.8)	4.1 (2.9)	4.3 (3.1)	4.5 (3.2)
METRIC kg (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
Chamber	7711 (4.6)	8255 (5.0)	8800 (5.3)	9435 (5.7)
End Cap	3538 (2.1)	3719 (2.2)	3901 (2.4)	4082 (2.5)

Note: Assumes 12" (300 mm) of stone above and 6" (150 mm) row spacing and 6" (150 mm) of perimeter stone in front of end caps.

Volume of Excavation Per Chamber/End Cap yd³ (m³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
Chamber	11.9 (9.1)	12.4 (9.5)	12.8 (9.8)	13.3 (10.2)
End Cap	4.0 (3.1)	4.1 (3.2)	4.3 (3.3)	4.4 (3.4)

Note: Assumes 6" (150 mm) of separation between chamber rows and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

Special applications will be considered on a project by project basis. Please contact our application department should you have a unique application for our team to evaluate.

StormTech MC-7200 Chamber

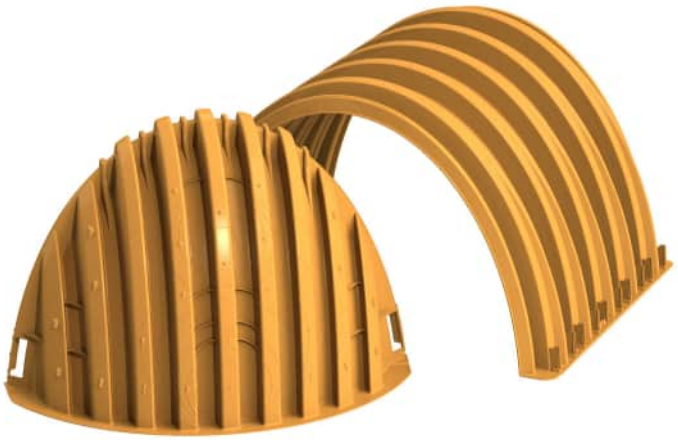
Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

MC-7200 Chamber (not to scale)

Nominal Specifications

Size (LxWxH)	83.4” x 100” x 60” (2120 x 2540 x 1524 mm)
Chamber Storage	175.9 ft³ (4.98 m³)
Min. Installed Storage*	267.3 ft³ (7.56 m³)
Weight	205 lbs (92.9 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below chambers, 9” (230 mm) of stone between chambers/end caps and 40% stone porosity.

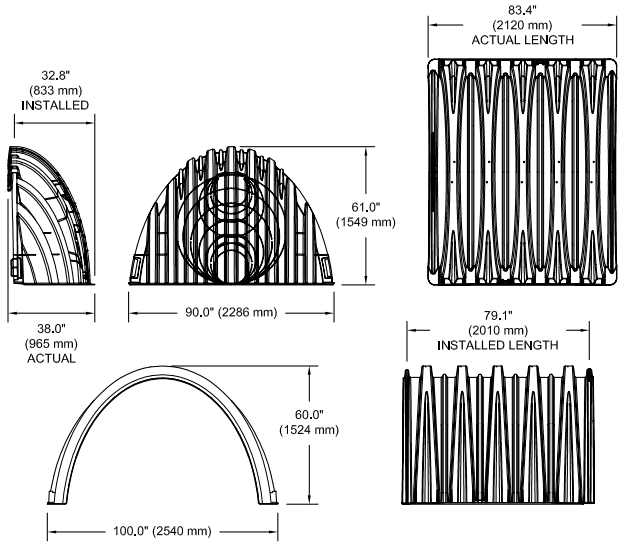


MC-7200 Chamber (not to scale)

Nominal Specifications

Size (LxWxH)	38” x 90” x 61” (965 x 2286 x 1549 mm)
End Cap Storage	39.5 ft³ (1.12 m³)
Min. Installed Storage*	115.3 ft³ (3.26 m³)
Weight	90.0 lbs (40.8 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below, 12” (300 mm) of stone perimeter, 9” (230 mm) of stone between chambers/end caps and 40% stone porosity.

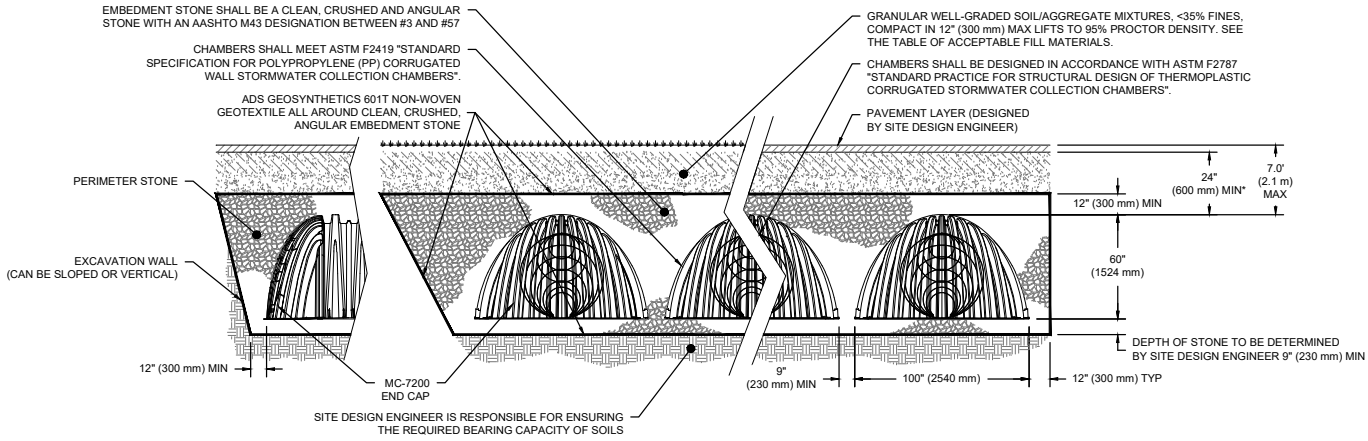


Shipping

7 chambers/pallet

5 end caps/pallet

6 pallets/truck



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR. INCREASE COVER TO 30" (750 mm).

Storage Volume Per Chamber/End Cap ft³ (m³)

	Bare Unit Storage ft³ (m³)	Chamber/End Cap and Stone Volume — Stone Foundation Depth in. (mm)			
		9 (230)	12 (300)	15 (375)	18 (450)
Chamber	175.9 (4.98)	267.3 (7.57)	273.3 (7.74)	279.3 (7.91)	285.2 (8.08)
End Cap	39.5 (1.12)	115.3 (3.26)	111.9 (3.17)	121.9 (3.45)	125.2 (3.54)

Note: Assumes 9" (230 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 12" (300 mm) stone perimeter in front of end cap.

Amount of Stone Per Chamber

ENGLISH tons (yd³)	Stone Foundation Depth			
	9"	12"	15"	18"
Chamber	11.9 (8.5)	12.6 (9.0)	13.4 (9.6)	14.6 (10.1)
End Cap	9.8 (7.0)	10.2 (7.3)	10.6 (7.6)	11.1 (7.9)
METRIC kg (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
Chamber	10796 (6.5)	11431 (6.9)	12156 (7.3)	13245 (7.7)
End Cap	8890 (5.3)	9253 (5.5)	9616 (5.8)	10069 (6.0)

Note: Assumes 12" (300 mm) of stone above and 9" (230 mm) row spacing and 12" (300 mm) of perimeter stone in front of end caps.

Volume of Excavation Per Chamber/End Cap yd³ (m³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
Chamber	17.2 (13.2)	17.7 (13.5)	18.3 (14.0)	18.8 (14.4)
End Cap	9.7 (7.4)	10.0 (7.6)	10.3 (7.9)	10.6 (8.1)

Note: Assumes 9" (230 mm) of separation between chamber rows, 12" (300 mm) of perimeter in front of the end caps, and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

Special applications will be considered on a project by project basis. Please contact our application department should you have a unique application for our team to evaluate.

1.0 Product Information

1.1 Product Design

StormTech's commitment to thorough product testing programs, materials evaluation and adherence to national standards has resulted in two more superior products. Like other StormTech chambers, the MC-3500 and MC-7200 are designed to meet the full scope of design requirements of the American Society of Testing Materials (ASTM) International specification F2787 "Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers" and produced to the requirements of the ASTM F 2418 "Standard Specification for Polypropylene (PP) Corrugated Stormwater Collection Chambers".

The StormTech MC-3500 and MC-7200 chambers provide the full AASHTO safety factors for live loads and permanent earth loads. The ASTM F 2787 standard provides specific guidance on how to design thermoplastic chambers in accordance with AASHTO Section 12.12. of the AASHTO LRFD Bridge Design Specifications. ASTM F 2787 requires that the safety factors included in the AASHTO guidance are achieved as a prerequisite to meeting ASTM F 2418. The three standards provide both the assurance of product quality and safe structural design.

The design of larger chambers in the same tradition of our other chambers required the collaboration of experts in soil-structure interaction, plastics and manufacturing. Years of extensive research, including laboratory testing and field verification, were required to produce chambers that are ready to meet both the rigors of installation and the longevity expected by engineers and owners.

This Design Manual provides the details and specifications necessary for consulting engineers to design stormwater management systems using the MC-3500 and MC-7200 chambers. It provides specifications for storage capacities, layout dimensions as well as requirements for design to ensure a long service life. The basic design concepts for foundation and backfill materials, subgrade bearing capacities and row spacing remain equally as pertinent for the MC-3500 and MC-7200 as the SC-310 and DC-780 chamber systems. However, since many design values and dimensional requirements are different for these larger chambers than the SC-310 and DC-780 chambers, design manuals and installation instructions are not interchangeable.

This manual includes only those details, dimensions, cover limits, etc for the MC-3500 and MC-7200 and is intended to be a stand-alone design guide for the MC-3500 and MC-7200 chambers. A Construction Guide specifically for these two chamber models has also been published.

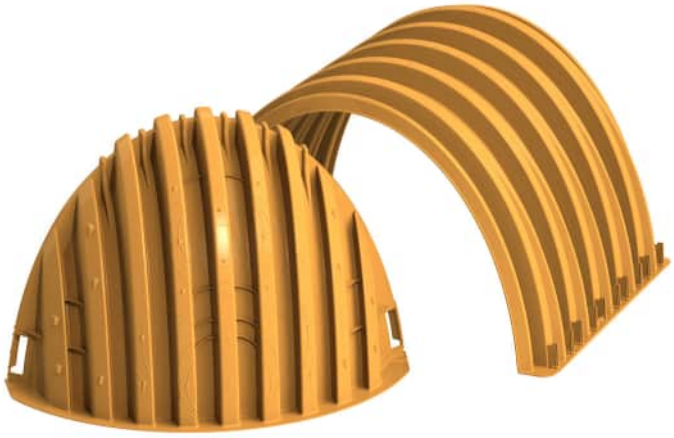
1.2 Technical Support

The StormTech Technical Services Department is available to assist the engineer with the layout of MC-3500 and MC-7200 chamber systems and answer questions regarding all the StormTech chamber models. Call the Technical Services Department, email us at info@stormtech.com or contact your local StormTech representative.

1.3 MC-3500 and MC-7200 Chambers

All StormTech chambers are designed to the full scope of AASHTO requirements without repeating end walls or other structural reinforcing. StormTech's continuously curved, elliptical arch and the surrounding angular backfill are the key components of the structural system. With the addition of patent pending integral stiffening ribs (Figure 5), the MC-3500 and MC-7200 are assured to provide a long, safe service life. Like other StormTech chambers, the MC-3500 and MC-7200 are produced from high quality, impact modified resins which are tested for short-term and long-term mechanical properties.

With all StormTech chambers, one chamber type is used for the start, middle and end of rows. Rows are formed by overlapping the upper joint corrugation of the next chamber over the lower joint corrugation of the previous chamber (Figure 6).



1.4 Chamber Joints

All StormTech chambers are designed with an optimized joining system. The height and width of the end corrugations have been designed to provide the required structural safety factors while providing an unobstructed flow path down each row.

1.0 Product Information

To assist the contractor, StormTech chambers are molded with simple assembly instructions and arrows that indicate the direction in which to build rows. The corrugation valley immediately adjacent to the lower joint corrugation is marked “Overlap Here - Lower Joint.” The corrugation valley immediately adjacent to the upper joint corrugation is marked “Build This Direction - Upper Joint.”

Two people can safely and efficiently carry and place chambers without cumbersome connectors, special tools or heavy equipment. Each row of chambers must begin and end with a joint corrugation. Since joint corrugations are of a different size than the corrugations along the body of the chamber, chambers cannot be field cut and installed. Only whole MC-3500 and MC-7200 chambers can be used. For system layout assistance contact StormTech.

1.5 MC-3500 and MC-7200 End Caps

The MC-3500 and MC-7200 end caps are easy to install. These end caps are designed with a corrugation joint that fits over the top of either end of the chamber. The end cap joint is simply set over the top of either of the upper or lower chamber joint corrugations (Figure 7).

The MC-3500 end cap has pipe cutting guides for 12”–24” (300 mm–600 mm) top inverts (Figure 9).

The MC-7200 end cap has pipe cutting guides for 12”–42” (300 mm–1050 mm) bottom inverts and 12”–24” (300 mm–600 mm) top inverts (Figure 8).

Standard and custom pre-cored end caps are available. MC-3500 pre-cored end caps, 18” in diameter and larger include a welded crown plate.

Figure 5 - Chamber and End Cap Components

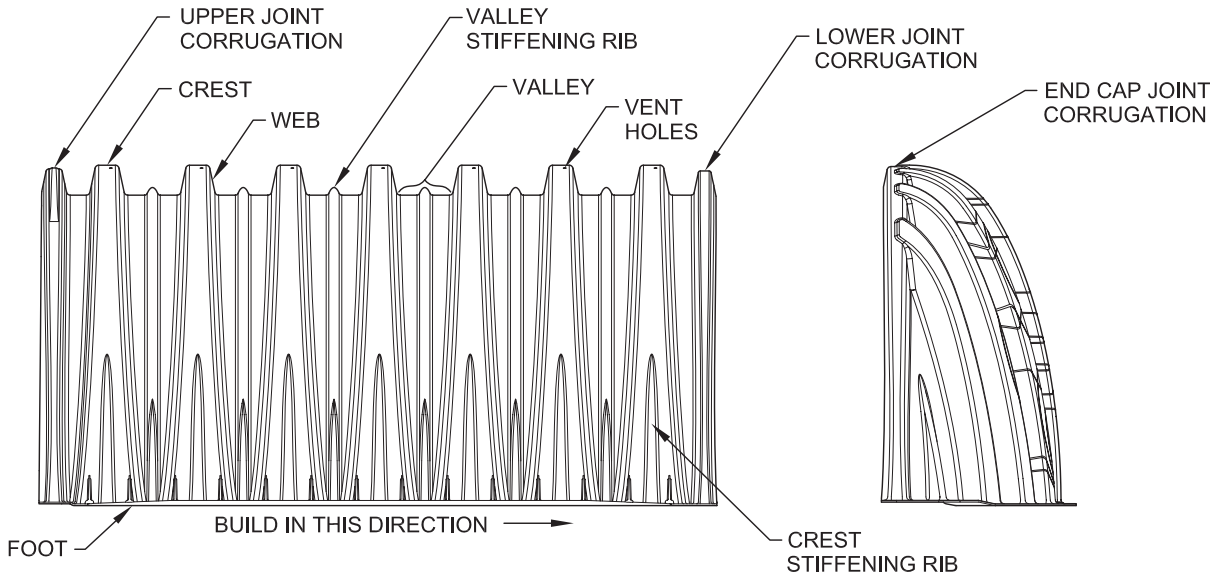


Figure 6 - Chamber Joint Overlap

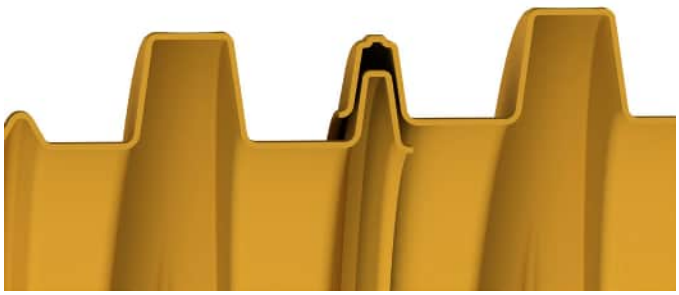


Figure 7 - End Cap Joint Overlap

1.0 Product Information

Figure 8 - MC-7200 End Cap Inverts

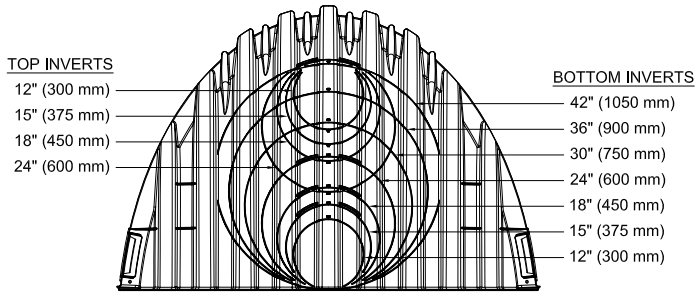
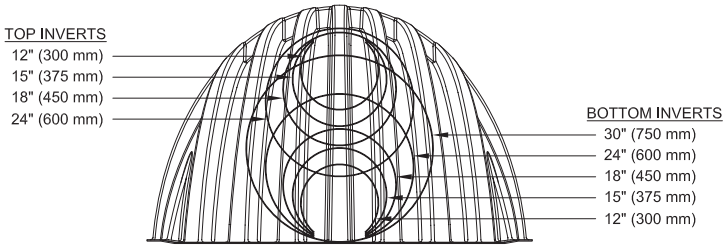


Figure 9 - MC-3500 End Cap Inverts

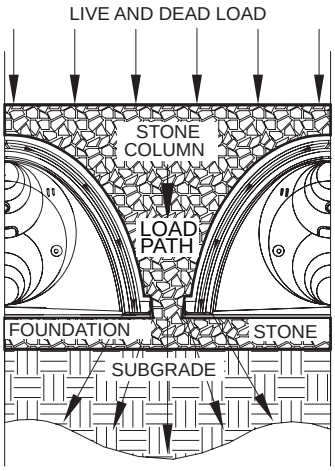


2.0 Foundations for Chambers

2.1 Foundation Requirements

StormTech chamber systems can be installed in various soil types. The subgrade bearing capacity and the cover height over the chambers determine the required depth of clean, crushed, angular foundation stone below the chambers. Foundation stone, also called bedding, is the stone between the subgrade soils and the feet of the chamber. Flexible structures are designed to transfer a significant portion of both live and dead loads through the surrounding soils. Chamber systems accomplish this by creating load paths through the columns of embedment stone between and around the rows of chambers. This creates load concentrations at the base of the columns between the rows. The foundation stone spreads out the concentrated loads to distributed loads that can be supported by the subgrade soils.

Since increasing the cover height (top of chamber to finished grade) causes increasing soil load, a greater depth of foundation stone is necessary to distribute the load to the subgrade soils. **Table 1** and **2** specify the minimum required foundation depths for varying cover heights and allowable subgrade bearing capacities. These tables are based on StormTech service loads. The minimum required foundation depth is 9” (230 mm) for both chambers.



For additional guidance on foundation stone design please see our Technical Note 6.22 - StormTech Subgrade Performance

2.2 Weaker Soils

StormTech has not provided guidance for subgrade bearing capacities less than 2000 pounds per square foot [(2.0 ksf) (96 kPa)]. These soils are often highly vari- able, may contain organic materials and could be more sensitive to moisture. A geotechnical engineer must be consulted if soils with bearing capacities less than 2000 psf (96 kPa) are present.

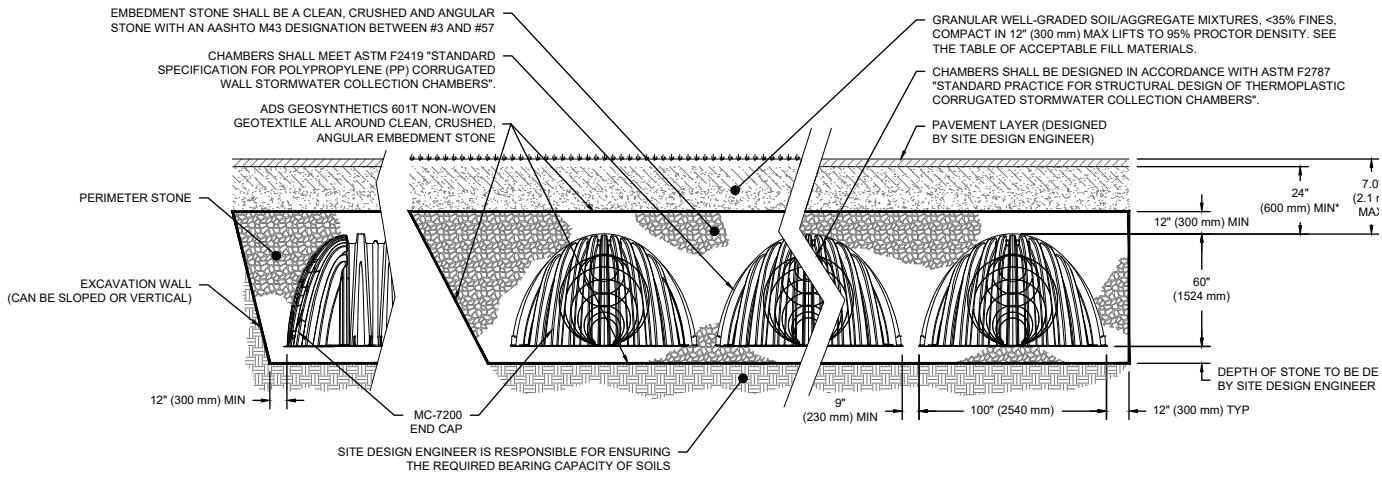
2.0 Foundations for Chambers

Table 1 - MC-3500 Minimum Required Foundation Depth in inches (millimeters)
Assumes 6" (150 mm) row spacing.

Cover Hgt. ft. (m)	Minimum Bearing Resistance for Service Loads ksf (kPa)																								
	4.4 (211)	4.3 (206)	4.2 (201)	4.1 (196)	4.0 (192)	3.9 (187)	3.8 (182)	3.7 (177)	3.6 (172)	3.5 (168)	3.4 (163)	3.3 (158)	3.2 (153)	3.1 (148)	3.0 (144)	2.9 (139)	2.8 (134)	2.7 (129)	2.6 (124)	2.5 (120)	2.4 (115)	2.3 (110)	2.2 (105)	2.1 (101)	2.0 (96)
1.5 (0.46)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)
2.0 (0.61)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)
2.5 (0.76)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	21 (525)
3.0 (0.91)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)
3.5 (1.07)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)
4.0 (1.22)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)
4.5 (1.37)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)
5.0 (1.52)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)	24 (600)	24 (600)	27 (675)	30 (750)
5.5 (1.68)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)
6.0 (1.83)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	30 (750)
6.5 (1.98)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	30 (750)	30 (750)
7.0 (2.13)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	30 (750)	30 (750)	30 (750)
7.5 (2.30)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)	27 (675)	27 (675)	30 (750)	30 (750)	30 (750)	30 (750)
8.0 (2.44)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	30 (750)	30 (750)	30 (750)	30 (750)

NOTE: The design engineer is solely responsible for assessing the bearing resistance (allowable bearing capacity) of the subgrade soils and determining the depth of foundation stone. Subgrade bearing resistance should be assessed with consideration for the range of soil moisture conditions expected under a stormwater system.

Figure 10A - MC-3500 Structural Cross Section Detail (Not to Scale)



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

Special applications will be considered on a project by project basis. Please contact our applications department should you have a unique application for our team to evaluate.

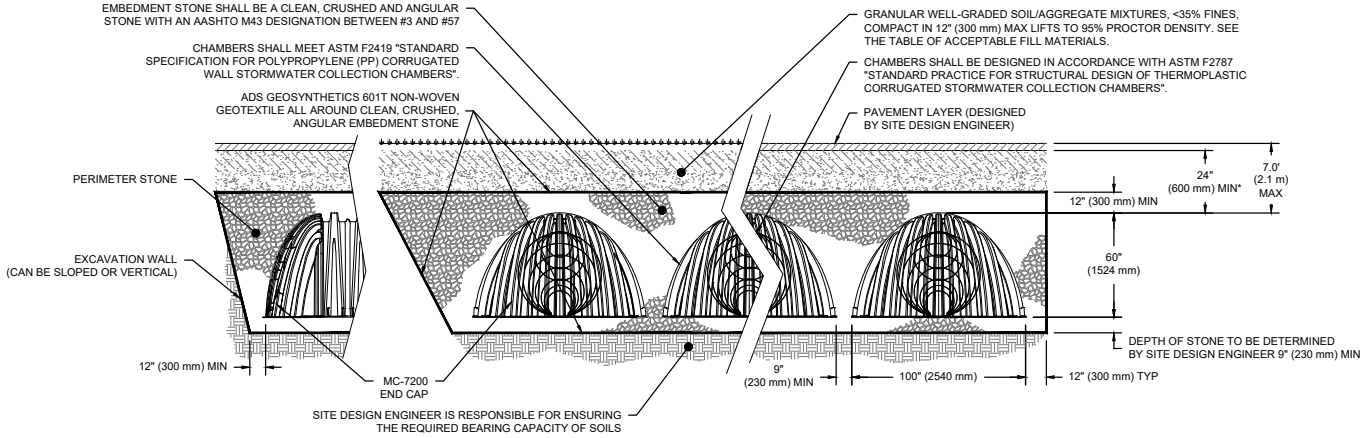
2.0 Foundations for Chambers

Table 2 - MC-7200 Minimum Required Foundation Depth in inches (millimeters)
Assumes 9” (230 mm) row spacing.

Cover Hgt. ft. (m)	Minimum Bearing Resistance for Service Loads ksf (kPa)																								
	4.4 (211)	4.3 (206)	4.2 (201)	4.1 (196)	4.0 (192)	3.9 (187)	3.8 (182)	3.7 (177)	3.6 (172)	3.5 (168)	3.4 (163)	3.3 (158)	3.2 (153)	3.1 (148)	3.0 (144)	2.9 (139)	2.8 (134)	2.7 (129)	2.6 (124)	2.5 (120)	2.4 (115)	2.3 (110)	2.2 (105)	2.1 (101)	2.0 (96)
2.0 (0.61)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	21 (525)	21 (525)
2.5 (0.76)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)
3.0 (0.91)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)
3.5 (1.07)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)	30 (750)
4.0 (1.22)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	27 (675)	27 (675)	30 (750)	30 (750)
4.5 (1.37)	9 (230)	9 (230)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	33 (825)	33 (825)
5.0 (1.52)	9 (230)	9 (230)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	33 (825)	33 (825)	36 (900)
5.5 (1.68)	9 (230)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	33 (825)	33 (825)	36 (900)	36 (900)
6.0 (1.83)	12 (300)	12 (300)	12 (300)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	30 (750)	33 (825)	33 (825)	36 (900)	36 (900)	36 (900)
6.5 (1.98)	12 (300)	12 (300)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	24 (600)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	30 (750)	33 (825)	33 (825)	36 (900)	36 (900)	36 (900)	36 (900)
7.0 (2.13)	15 (375)	15 (375)	15 (375)	15 (375)	18 (450)	18 (450)	18 (450)	18 (450)	21 (525)	21 (525)	21 (525)	24 (600)	24 (600)	24 (600)	27 (675)	27 (675)	30 (750)	30 (750)	33 (825)	36 (900)	36 (900)	36 (900)	36 (900)	36 (900)	36 (900)

NOTE: The design engineer is solely responsible for assessing the bearing resistance (allowable bearing capacity) of the subgrade soils and determining the depth of foundation stone. Subgrade bearing resistance should be assessed with consideration for the range of soil moisture conditions expected under a stormwater system.

Figure 10B - MC-7200 Structural Cross Section Detail (Not to Scale)



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

Special applications will be considered on a project by project basis. Please contact our applications department should you have a unique application for our team to evaluate.

3.0 Required Materials/Row Separation

3.1 Foundation and Embedment Stone

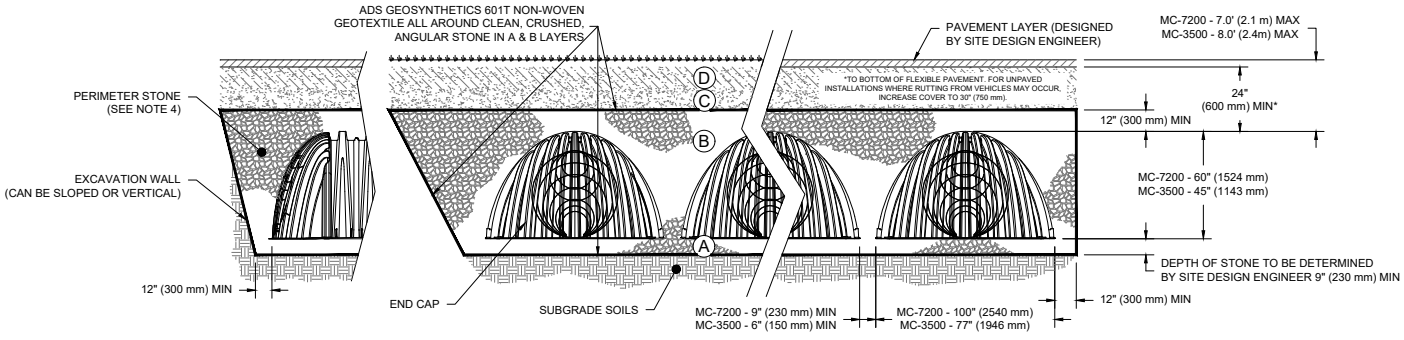
The stone surrounding the chambers consists of the foundation stone below the chambers and embedment stone surrounding the chambers. The foundation stone and embedment stone are important components of the structural system and also provide open void space for stormwater storage. Table 3 provides the stone specifications that achieve both structural requirements and a porosity of 40% for stormwater storage. Figure 11 specifies the extents of each backfill stone location.

Table 3 - Acceptable Fill Materials

	Material Location	Description	AASHTO Material Classifications	Compaction / Density Requirement
D	**Final Fill:** Fill Material for layer 'D' starts from the top of the 'C' layer to the bottom of flexible pavement or unpaved finished grade above. Note that pavement subbase may be part of the 'D' layer.	Any soil/rock materials, native soils, or per engineer's plans. check plans for pavement subgrade requirements.	N/A	Prepare per site design engineer's plans. Paved installations may have stringent material and preparation requirements.
C	**Initial Fill:** Fill material for layer 'C' starts from the top of the embedment stone ('B' layer) to 24" (600 mm) above the top of the chamber. note that pavement subbase may be a part of the 'C' layer.	Granular well-graded soil/aggregate mixtures, <35% fines or processed aggregate. most pavement subbase materials can be used in lieu of this layer.	AASHTO M145[1] a-1,a-2-4,a-3 or AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	Begin compactoins after 24" (600 mm) of material over the chambers is reached. compact addtional layers in 12" (300 mm) max lifts to a min. 95% proctor density for well-graded material and 95% relative density for processed aggregate materials.
B	**Embedment Stone:** Embedment Stone surrounding chambers from the foundation stone to the 'C' layer above.	Clean, crushed, angular stone or Recycled Concrete[4]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	No compaction required.
A	**Foundation Stone:** Foundation Stone below the chambers from the subgrade up to the foot (bottom) of the chamber.	Clean, crushed, angular stone or Recycled Concrete[4]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	Place and compact in 9" (225 mm) lifts using two full coverages with a vibratory compactor.[2, 3]

Please Note:
1. The listed AASHTO designations are for gradations only. The stone must also be clean, crushed, angular. For example, a specification for #4 stone would state: "clean, crushed, angular NO. 4 (AASHTO m43) stone".
2. Stormtech compaction requirements are met for 'A' location materials when placed and compacted in 9" (230 mm) (max) lifts using two full coverages with a vibratory compactor.
3. Where infiltration surfaces may be compromised by compaction, for standard design load conditions, a flat surface may be achieved by raking or dragging without compaction equipment. For special load designs, contact stormtech for compaction requirements.
4. Where recycled concrete aggregate is used in layers 'A' or 'B' the material should also meet the acceptable criteria outlined in ADS Technical Note 6.20 "Recycled Concrete Structural Backfill".

Figure 11 - Fill Material Locations



Once layer 'C' is placed, any soil/material can be placed in layer 'D' up to the finished grade. Most pavement subbase soils can be used to replace the materials of layer 'C' or 'D' at the design engineer's discretion.

3.0 Required Materials/Row Separation

3.2 Fill Above Chambers

Refer to Table 3 and Figure 11 for acceptable fill material above the clean, crushed, angular stone. StormTech requires a minimum of 24" (600 mm) from the top of the chamber to the bottom of flexible pavement. For non-paved installations where rutting from vehicles may occur StormTech requires a minimum of 30" (750 mm) from top of chamber to finished grade.

3.3 Geotextile Separation

A non-woven geotextile meeting AASHTO M288 Class 2 separation requirements must be installed to completely envelope the system and prevent soil intrusion into the crushed, angular stone. Overlap adjacent geotextile rolls per AASHTO M288 separation guidelines. Contact StormTech for a list of acceptable geotextiles.

3.4 Parallel Row Separation/ Perpendicular Bed Separation

Parallel Row Separation

The minimum installed spacing between parallel rows after backfilling is 9" (230 mm) for the MC-7200 chambers and 6" (150mm) for the MC-3500 (measurement taken between the outside edges of the feet). Spacers may be used for layout convenience. Row spacing wider than the minimum spacing above may be specified.

Perpendicular Bed Separation

When beds are laid perpendicular to each other, a minimum installed spacing of 36" (900 mm) between beds is required.

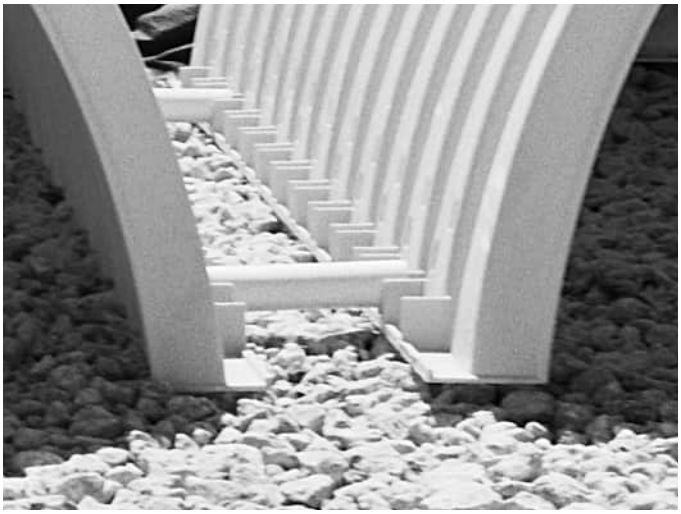
3.5 Special Structural Designs

StormTech engineers may provide special structural designs to enable deeper cover depths or increase the capacity to carry higher live loads. Special designs may utilize the additional strength that can be achieved by compaction of embedment stone or by increasing the spacing between rows.

Increasing the spacing between chamber rows may also facilitate the application of StormTech chambers with either less foundation stone or with weaker subgrade soils. This may be a good option where vertical restrictions on site prevent the use of a deeper foundation.

Contact ADS Engineering Services for more information on special structural designs.

System Cross Section



Minimum Row Spacing

4.0 Hydraulics

4.1 General

StormTech subsurface chamber systems offer the flexibility for a variety of inlet and outlet configurations. Contact the StormTech Technical Services Department or your local StormTech representative for assistance configuring inlet and outlet connections.

The open graded stone around and under the chambers provides a significant conveyance capacity ranging from approximately 0.8 cfs (23 l/s) to 13 cfs (368 l/s) per MC-3500 chamber and for the MC-7200 chamber. The actual conveyance capacity is dependent upon stone size, depth of foundation stone and head of water. Although the high conveyance capacity of the open graded stone is an important component of the flow network, StormTech recommends that a system of inlet and outlet manifolds be designed to distribute and convey the peak flow through the chamber system.

It is the responsibility of the design engineer to provide the design flow rates and storage volumes for the stormwater system and to ensure that the final design meets all conveyance and storage requirements. However, StormTech will work with the design engineer to assist with manifold and chamber layouts that meet the design objectives.

4.2 The Isolator® Row Plus

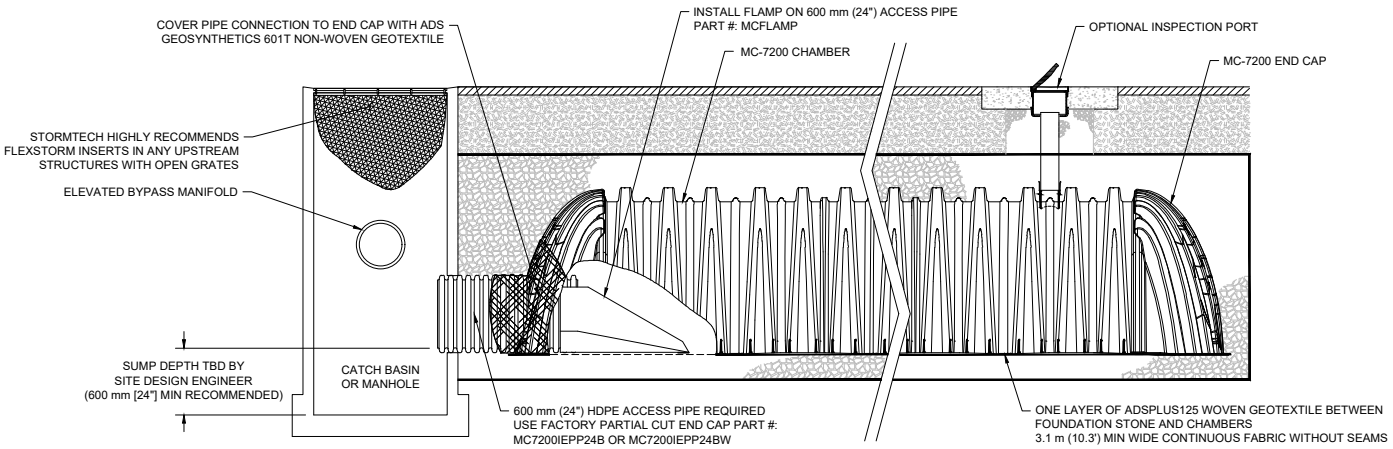
The Isolator Row Plus is a system that inexpensively captures total suspended solids (TSS) and debris and provides easy access for inspection and maintenance. In a typical configuration, a single layer of ADS Plus fabric is placed between the chambers and the stone foundations. This fabric traps and filters sediments as well as protects the stone base during cleaning and maintenance. Each installed MC-3500 chamber and MC-3500 end cap provides 42.9 ft^2 (4.0 m^2) and 7.5 ft^2 (0.7 m^2) of bottom filter area respectively. Each installed MC-7200 chamber and MC-7200 end cap provides 50.0 ft^2 (4.6 m^2) and 13.9 ft^2 (1.29 m^2) of bottom filter area respectively.

The Isolator Row Plus can be configured for maintenance objectives or, in some regulatory jurisdictions, for water quality objectives. For water quality applications, the Isolator Row Plus can be sized based on water quality volume or flow rate.

All Isolator Plus Rows require: 1) a manhole for maintenance access, 2) a means of diversion of flows to the Isolator Row Plus 3) a high flow bypass and 4)FLAMP (Flared End Ramp). When used on an Isolator Row Plus, a 24” FLAMP (flared end ramp) is attached to the inside of the inlet pipe with a provided threaded rod and bolt. The FLAMP then lays on top of the ADS Plus fabric.. Flow diversion can be accomplished by either a weir in the upstream access manhole or simply by feeding the Isolator Row Plus at a lower elevation than the high flow bypass. Contact StormTech for assistance sizing Isolator Plus Rows.

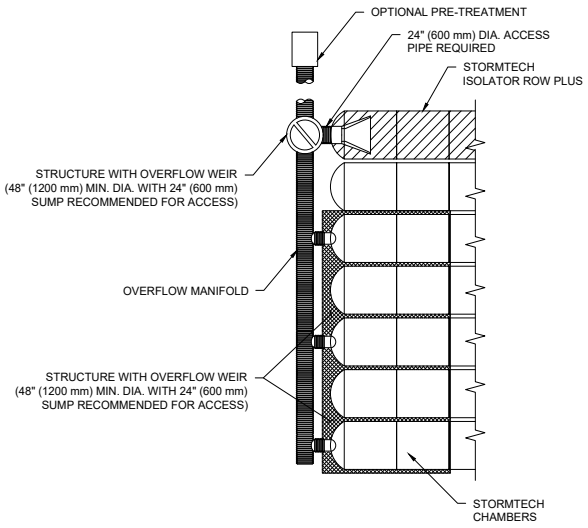
When additional stormwater treatment is required, StormTech systems can be configured using a treatment train approach where other stormwater BMPs are located in series.

Figure 12 - StormTech Isolator Row Plus Detail



4.0 Hydraulics

Figure 13 - Typical Inlet Configuration With Isolator Row Plus and Scour Protection



4.3 Inlet Manifolds

The primary function of the inlet manifold is to convey and distribute flows to a sufficient number of rows in the chamber bed such that there is ample conveyance capacity to pass the peak flows without creating an unacceptable backwater condition in upstream piping or scour the foundation stone under the chambers.

Manifolds are connected to the end caps either at the top or bottom of the end cap. Standard distances from the base of chamber to the invert of inlet and outlet manifolds connecting to StormTech end caps can be found in table 6. High inlet flow rates from either connection location produce a shear scour potential of the foundation stone. Inlet flows from top inlets also produce impingement scour potential. Scour potential is reduced when standing water is present over the foundation stone. However, for safe design across the wide range of applications, StormTech assumes minimal standing water at the time the design flow occurs.

To minimize scour potential, StormTech recommends the installation of woven scour protection fabric at each inlet row. This enables a protected transition zone from the concentrated flow coming out of the inlet pipe to a uniform flow across the entire width of the chamber for both top and bottom connections.

Allowable flow rates for design are dependent upon: the elevation of inlet pipe, foundation stone size and scour protection. With an appropriate scour protection geotextile installed from the end cap to at least 14.5 ft (4.42 m) in front of the inlet pipe for the MC-3500 and for the MC-7200, for both top and bottom feeds, the flow rates listed in Table 4 can be used for all StormTech specified foundation stone gradations.

*See StormTech's Tech Note 6.32 for manifold sizing guidance.

Table 4 - Allowable Inlet Flows*

Inlet Pipe Diameter Inches (mm)	Allowable Maximum Flow Rate cfs (l/s)
12 (300)	2.48 (70)
15 (375)	3.5 (99)
18 (450)	5.5 (156)
24 (600)	8.5 (241) [MC-3500]
24 (600)	9.5 (269) [MC-7200]

*Assumes appropriate length of scour fabric per section 4.3

Table 5 - Maximum Outlet Flow Rate Capacities From StormTech Oulet Manifolds

Pipe Diameter	Flow (CFS)	Flow (L/S)
6" (150 mm)	0.4	11.3
8" (200 mm)	0.7	19.8
10" (250 mm)	1.0	28.3
12" (300 mm)	2.0	56.6
15" (375 mm)	2.7	76.5
18" (450 mm)	4.0	113.3
24" (600 mm)	7.0	198.2
30" (750 mm)	11.0	311.5
36" (900 mm)	16.0	453.1
42" (1050 mm)	22.0	623.0
48" (1200 mm)	28.0	792.9

Table 6 - Standard Distances From Base of Chamber to Invert of Inlet and Outlet Manifolds on StormTech End Caps

MC-3500 ENDCAPS			
	Pipe Diameter	Inv. (in)	Inv. (mm)
Top	6" (150 mm)	33.21	841
	8" (200 mm)	31.16	789
	10" (250 mm)	29.04	738
	12" (300 mm)	26.36	671
	15" (375 mm)	23.39	594
	18" (450 mm)	20.03	509
	24" (600 mm)	14.48	369
Bottom	12" (750 mm)	1.35	34
	15" (900 mm)	1.5	40
	18" (1050 mm)	1.77	46
	24" (1200 mm)	2.06	52

MC-7200 ENDCAPS			
	Pipe Diameter	Inv. (in)	Inv. (mm)
Top	12" (300 mm)	35.69	907
	15" (375 mm)	32.72	831
	18" (450 mm)	29.36	746
	24" (600 mm)	23.05	585
Bottom	12" (750 mm)	1.55	34
	15" (900 mm)	1.7	43
	18" (1050 mm)	1.97	50
	24" (1200 mm)	2.26	57

5.0 Cumulative Storage Volumes

4.4 Outlet Manifolds

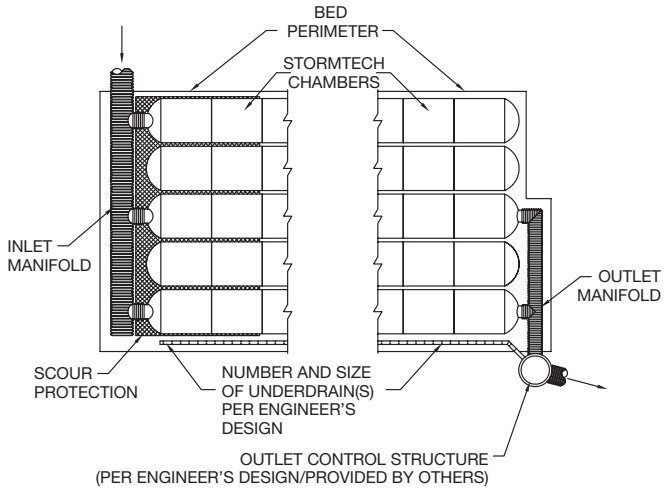
The primary function of the outlet manifold is to convey peak flows from the chamber system to the outlet control structure. Outlet manifolds are often sized for attenuated flows. They may be smaller in diameter and have fewer row connections than inlet manifolds. In some applications however, the intent of the outlet piping is to convey an unattenuated bypass flow rate and manifolds may be sized similar to inlet manifolds.

Since chambers are generally flowing at or near full at the time of the peak outlet flow rate, scour is generally not governing and outlet manifold sizing is based on pipe flow equations. In most cases, StormTech recommends that outlet manifolds connect the same rows that are connected to an inlet manifold. This provides a continuous flow path through open conduits to pass the peak flow without dependence on passing peak flows through stone.

The primary function of the underdrains is to draw down water stored in the stone below the invert of the manifold. Underdrains are generally not sized for conveyance of the peak flow.

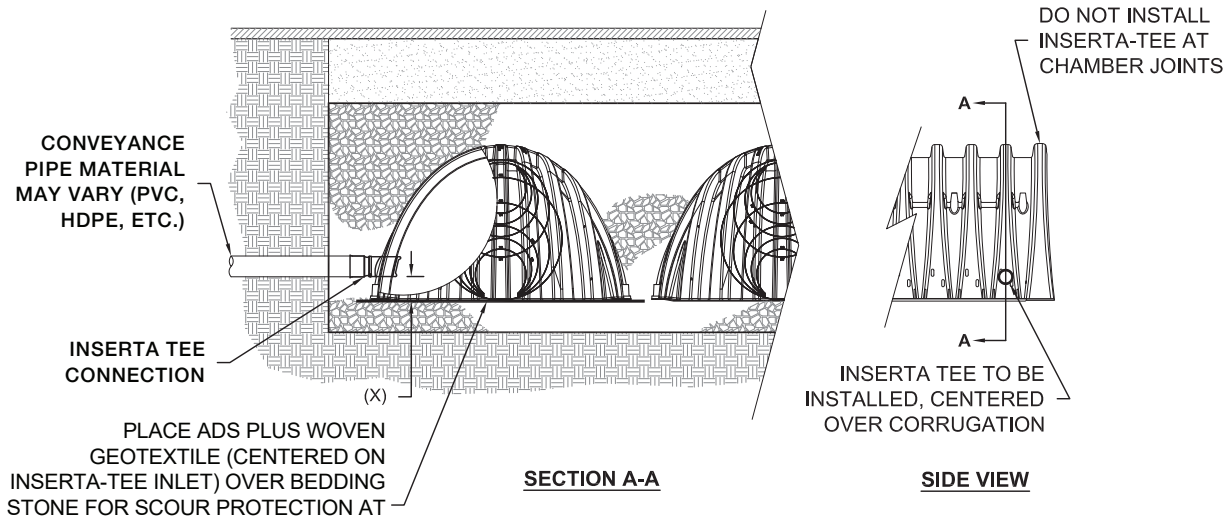
The maximum outlet flow rate capacities from StormTech outlet manifolds can be found in Table 5.

Figure 14 - Typical Inlet, Outlet and Underdrain Configuration



4.5 Inserta Tee® Inlet Connections

Figure 15 - Inserta Tee Detail



CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
MC-3500	12" (250 mm)	6" (150 mm)
MC-7200	12" (250 mm)	8" (200 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

NOTE:
PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.

5.0 Cumulative Storage Volumes

Tables 7 and 8 provide cumulative storage volumes for the MC-3500 chamber and end cap. These tables can be used to calculate the stage-storage relationship for the retention or detention system. Digital spreadsheets in which the number of chambers and end caps can be input for quick cumulative storage calculations are available at adspipe.com/stormtech. For assistance with site-specific calculations or input into routing software, contact the StormTech Technical Services Department.

Table 7 – MC-3500 Incremental Storage Volume Per Chamber
Assumes 40% stone porosity. Calculations are based upon a 9" (230 mm) stone base under the chambers, 12" (300 mm) of stone above chambers, and 6" (150 mm) of spacing between chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft^3 (m^3)	Total System Cumulative Storage ft^3 (m^3)
66 (1676)	0.00	175.02 (4.956)
65 (1651)	0.00	173.36 (4.909)
64 (1626)	0.00	171.71 (4.862)
63 (1600)	0.00	170.06 (4.816)
62 (1575)	0.00	168.41 (4.7.69)
61 (1549)	0.00	166.76 (4.722)
60 (1524)	0.00	165.10 (4.675)
59 (1499)	0.00	163.45 (4.628)
58 (1473)	0.00	161.80 (4.582)
57 (1448)	0.00	160.15 (4.535)
56 (1422)	0.00	158.49 (4.488)
55 (1397)	0.00	156.84 (4.441)
54 (1372)	109.95 (3.113)	155.19 (4.394)
53 (1346)	109.89 (3.112)	153.50 (4.347)
52 (1321)	109.69 (3.106)	151.73 (4.297)
51 (1295)	109.40 (3.098)	149.91 (4.245)
50 (1270)	109.00 (3.086)	148.01 (4.191)
49 (1245)	108.31 (3.067)	145.95 (4.133)
48 (1219)	107.28 (3.038)	143.68 (4.068)
47 (1194)	106.03 (3.003)	141.28 (4.000)
46 (1168)	104.61 (2.962)	138.77 (3.930)
45 (1143)	103.04 (2.918)	136.17 (3.856)
44 (1118)	101.33 (2.869)	133.50 (3.780)
43 (1092)	99.50 (2.818)	130.75 (3.702)
42 (1067)	97.56 (2.763)	127.93 (3.623)
41 (1041)	95.52 (2.705)	125.06 (3.541)
40 (1016)	93.39 (2.644)	122.12 (3.458)
39 (991)	91.16 (2.581)	119.14 (3.374)
38 (965)	88.86 (2.516)	116.10 (3.288)
37 (948)	86.47 (2.449)	113.02 (3.200)
36 (914)	84.01 (2.379)	109.89 (3.112)
35 (889)	81.49 (2.307)	106.72 (3.022)
34 (864)	78.89 (2.234)	103.51 (2.931)
33 (838)	76.24 (2.159)	100.27 (2.839)

Stone Cover

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft^3 (m^3)	Total System Cumulative Storage ft^3 (m^3)
32 (813)	73.52 (2.082)	96.98 (2.746)
31 (787)	70.75 (2.003)	93.67 (2.652)
30 (762)	67.92 (1.923)	90.32 (2.558)
29 (737)	65.05 (1.842)	86.94 (2.462)
28 (711)	62.12 (1.759)	83.54 (2.366)
27 (686)	59.15 (1.675)	80.10 (2.268)
26 (680)	56.14 (1.590)	76.64 (2.170)
25 (635)	53.09 (1.503)	73.16 (2.072)
24 (610)	49.99 (1.416)	69.65 (1.972)
23 (584)	46.86 (1.327)	66.12 (1.872)
22 (559)	43.70 (1.237)	62.57 (1.772)
21 (533)	40.50 (1.147)	59.00 (1.671)
20 (508)	37.27 (1.055)	55.41 (1.569)
19 (483)	34.01 (0.963)	51.80 (1.467)
18 (457)	30.72 (0.870)	48.17 (1.364)
17 (432)	27.40 (0.776)	44.53 (1.261)
16 (406)	24.05 (0.681)	40.87 (1.157)
15 (381)	20.69 (0.586)	37.20 (1.053)
14 (356)	17.29 (0.490)	33.51 (0.949)
13 (330)	13.88 (0.393)	29.81 (0.844)
12 (305)	10.44 (0.296)	26.09 (0.739)
11 (279)	6.98 (0.198)	22.37 (0.633)
10 (254)	3.51 (0.099)	18.63 (0.527)
9 (229)	0.00	14.87 (0.421)
8 (203)	0.00	13.22 (0.374)
7 (178)	0.00	11.57 (0.328)
6 (152)	0.00	9.91 (0.281)
5 (127)	0.00	8.26 (0.234)
4 (102)	0.00	6.61 (0.187)
3 (76)	0.00	4.96 (0.140)
2 (51)	0.00	3.30 (0.094)
1 (25)	0.00	1.65 (0.047)

Stone Cover

NOTE: Add 1.65 ft^3 (0.047 m^3) of storage for each additional inch (25 mm) of stone foundation. Contact StormTech for cumulative volume spreadsheets in digital format.

5.0 Cumulative Storage Volume

Table 8 – MC-3500 Incremental Storage Volume Per End Cap
Assumes 40% stone porosity. Calculations are based upon a 9" (230 mm) stone base under the chambers, 12" (300 mm) of stone above end caps, and 6" (150 mm) of spacing between end caps and 6" (150 mm) of stone perimeter.

Depth of Water in System Inches (mm)	Cumulative End Cap Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
66 (1676)	0.00	45.10 (1.277)
65 (1651)	0.00	44.55 (1.262)
64 (1626)	0.00	44.00 (1.246)
63 (1600)	0.00	43.46 (1.231)
62 (1575)	0.00	42.91 (1.2.15)
61 (1549)	0.00	42.36 (1.200)
60 (1524)	0.00	41.81 (1.184)
59 (1499)	0.00	41.27 (1.169)
58 (1473)	0.00	40.72 (1.153)
57 (1448)	0.00	40.17 (1.138)
56 (1422)	0.00	39.62 (1.122)
55 (1397)	0.00	39.08 (1.107)
54 (1372)	15.64 (0.443)	38.53 (1.091)
53 (1346)	15.64 (0.443)	37.98 (1.076)
52 (1321)	15.63 (0.443)	37.42 (1.060)
51 (1295)	15.62 (0.442)	36.85 (1.043)
50 (1270)	15.60 (0.442)	36.27 (1.027)
49 (1245)	15.56 (0.441)	35.68 (1.010)
48 (1219)	15.51 (0.439)	35.08 (0.993)
47 (1194)	15.44 (0.437)	34.47 (0.976)
46 (1168)	15.35 (0.435)	33.85 (0.959)
45 (1143)	15.25 (0.432)	33.22 (0.941)
44 (1118)	15.13 (0.428)	32.57 (0.922)
43 (1092)	14.99 (0.424)	31.91 (0.904)
42 (1067)	14.83 (0.420)	31.25 (0.885)
41 (1041)	14.65 (0.415)	30.57 (0.866)
40 (1016)	14.45 (0.409)	29.88 (0.846)
39 (991)	14.24 (0.403)	29.18 (0.826)
38 (965)	14.00 (0.396)	28.48 (0.806)
37 (948)	13.74 (0.389)	27.76 (0.786)
36 (914)	13.47 (0.381)	27.04 (0.766)
35 (889)	13.18 (0.373)	26.30 (0.745)
34 (864)	12.86 (0.364)	25.56 (0.724)

Stone Cover

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
33 (838)	12.53 (0.355)	24.82 (0.703)
32 (813)	12.18 (0.345)	24.06 (0.681)
31 (787)	11.81 (0.335)	23.30 (0.660)
30 (762)	11.42 (0.323)	22.53 (0.638)
29 (737)	11.01 (0.312)	21.75 (0.616)
28 (711)	10.58 (0.300)	20.96 (0.594)
27 (686)	10.13 (0.287)	20.17 (0.571)
26 (680)	9.67 (0.274)	19.37 (0.549)
25 (635)	9.19 (0.260)	18.57 (0.526)
24 (610)	8.70 (0.246)	17.76 (0.503)
23 (584)	8.19 (0.232)	16.94 (0.480)
22 (559)	7.67 (0.217)	16.12 (0.456)
21 (533)	7.13 (0.202)	15.29 (0.433)
20 (508)	6.59 (0.187)	14.45 (0.409)
19 (483)	6.03 (0.171)	13.61 (0.385)
18 (457)	5.46 (0.155)	12.76 (0.361)
17 (432)	4.88 (0.138)	11.91 (0.337)
16 (406)	4.30 (0.122)	11.06 (0.313)
15 (381)	3.70 (0.105)	10.20 (0.289)
14 (356)	3.10 (0.088)	9.33 (0.264)
13 (330)	2.49 (0.071)	8.46 (0.240)
12 (305)	1.88 (0.053)	7.59 (0.215)
11 (279)	1.26 (0.036)	6.71 (0.190)
10 (254)	0.63 (0.018)	5.83 (0.165)
9 (229)	0.00	4.93 (0.139)
8 (203)	0.00	4.38 (0.124)
7 (178)	0.00	3.83 (0.108)
6 (152)	0.00	3.28 (0.093)
5 (127)	0.00	2.74 (0.077)
4 (102)	0.00	2.19 (0.062)
3 (76)	0.00	1.64 (0.046)
2 (51)	0.00	1.09 (0.031)
1 (25)	0.00	0.55 (0.015)

Stone Cover

NOTE: Add 0.56 ft³ (0.016 m³) of storage for each additional inch (25 mm) of stone foundation. Contact StormTech for cumulative volume spreadsheets in digital format.

5.0 Cumulative Storage Volumes

Tables 9 and **10** provide cumulative storage volumes for the MC-7200 chamber and end cap. These tables can be used to calculate the stage-storage relationship for the retention or detention system. Digital spreadsheets in which the number of chambers and end caps can be input for quick cumulative storage calculations are available at adspipe.com/stormtech. For assistance with site-specific calculations or input into routing software, contact the StormTech Technical Services Department.

Table 9 – MC-7200 Incremental Storage Volume Per Chamber
Assumes 40% stone porosity. Calculations are based upon a 9" (230 mm) stone base under the chambers, 12" (300 mm) of stone above chambers, and 9" (230 mm) of spacing between chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
81 (2057)	0.00	267.30 (7.569)
80 (2032)	0.00	265.30 (7.512)
79 (2007)	0.00	263.30 (7.456)
78 (1981)	0.00	261.31 (7.399)
77 (1956)	0.00	259.31 (7.343)
76 (1930)	0.00	257.31 (7.286)
75 (1905)	0.00	255.32 (7.230)
74 (1880)	0.00	253.32 (7.173)
73 (1854)	0.00	251.32 (7.117)
72 (1829)	0.00	249.33 (7.060)
71 (1803)	0.00	247.33 (7.004)
70 (1778)	0.00	245.33 (6.947)
69 (1753)	175.90 (4.981)	243.33 (6.890)
68 (1727)	175.84 (4.979)	241.30 (6.833)
67 (1702)	175.65 (4.974)	239.19 (6.773)
66 (1676)	175.38 (4.966)	237.03 (6.712)
65 (1651)	175.02 (4.956)	234.82 (6.649)
64 (1626)	174.56 (4.943)	232.54 (6.585)
63 (1600)	173.82 (4.922)	230.10 (6.516)
62 (1575)	172.72 (4.891)	227.45 (6.441)
61 (1549)	171.41 (4.854)	224.66 (6.362)
60 (1524)	169.91 (4.811)	221.76 (6.280)
59 (1499)	168.25 (4.764)	218.77 (6.195)
58 (1473)	166.46 (4.714)	215.70 (6.108)
57 (1448)	164.53 (4.659)	212.55 (6.019)
56 (1422)	162.50 (4.602)	209.33 (5.928)
55 (1397)	160.36 (4.541)	206.05 (5.835)
54 (1372)	158.11 (4.477)	202.70 (5.740)
53 (1346)	155.77 (4.411)	199.30 (5.644)
52 (1321)	153.33 (4.342)	195.84 (5.546)
51 (1295)	150.81 (4.271)	192.33 (5.446)
50 (1270)	148.21 (4.197)	188.78 (5.346)
49 (1245)	145.53 (4.121)	185.17 (5.244)
48 (1219)	142.78 (4.043)	181.52 (5.140)
47 (1194)	139.96 (3.963)	177.83 (5.036)
46 (1168)	137.07 (3.881)	174.10 (4.930)
45 (1143)	134.11 (3.798)	170.33 (4.823)
44 (1118)	131.09 (3.712)	166.52 (4.715)
43 (1092)	128.01 (3.625)	162.68 (4.607)
42 (1067)	124.88 (3.536)	158.80 (4.497)
41 (1041)	121.68 (3.446)	154.89 (4.386)

Stone Cover

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
40 (1016)	118.44 (3.354)	150.94 (4.274)
39 (991)	115.14 (3.260)	146.97 (4.162)
38 (965)	111.80 (3.166)	142.96 (4.048)
37 (948)	108.40 (3.070)	138.93 (3.934)
36 (914)	104.97 (2.972)	134.87 (3.819)
35 (889)	101.48 (2.874)	130.78 (3.703)
34 (864)	97.96 (2.774)	126.67 (3.587)
33 (838)	94.39 (2.673)	122.54 (3.470)
32 (813)	90.79 (2.571)	118.38 (3.352)
31 (787)	87.14 (2.468)	114.19 (3.234)
30 (762)	83.46 (2.363)	109.99 (3.114)
29 (737)	79.75 (2.258)	105.76 (2.995)
28 (711)	76.00 (2.152)	101.52 (2.875)
27 (686)	72.22 (2.045)	97.25 (2.754)
26 (680)	68.41 (1.937)	92.97 (2.632)
25 (610)	64.56 (1.828)	88.66 (2.511)
24 (609)	60.69 (1.719)	84.34 (2.388)
23 (584)	56.80 (1.608)	80.01 (2.266)
22 (559)	52.87 (1.497)	75.66 (2.142)
21 (533)	48.92 (1.385)	71.29 (2.019)
20 (508)	44.95 (1.273)	66.91 (1.895)
19 (483)	40.96 (1.160)	62.52 (1.770)
18 (457)	36.94 (1.046)	58.11 (1.646)
17 (432)	32.91 (0.932)	53.69 (1.520)
16 (406)	28.85 (0.817)	49.26 (1.395)
15 (381)	24.78 (0.702)	44.82 (1.269)
14 (356)	20.69 (0.586)	40.37 (1.143)
13 (330)	16.58 (0.469)	35.91 (1.017)
12 (305)	12.46 (0.353)	31.44 (0.890)
11 (279)	8.32 (0.236)	26.96 (0.763)
10 (254)	4.17 (0.118)	22.47 (0.636)
9 (229)	0.00	17.97 (0.509)
8 (203)	0.00	15.98 (0.452)
7 (178)	0.00	13.98 (0.396)
6 (152)	0.00	11.98 (0.339)
5 (127)	0.00	9.99 (0.283)
4 (102)	0.00	7.99 (0.226)
3 (76)	0.00	5.99 (0.170)
2 (51)	0.00	3.99 (0.113)
1 (25)	0.00	2.00 (0.057)

Stone Cover

NOTE: Add 2.00 ft³ (0.057 m³) of storage for each additional inch (25 mm) of stone foundation. Contact StormTech for cumulative volume spreadsheets in digital format.

5.0 Cumulative Storage Volumes

Table 10 – MC-7200 Incremental Storage Volume Per End Cap
Assumes 40% stone porosity. Calculations are based upon a 9" (230 mm) stone base under the chambers, 12" (300 mm) of stone above end caps, and 9" (230 mm) of spacing between end caps and 6" (150 mm) of stone perimeter.

Depth of Water in System Inches (mm)	Cumulative End Cap Storage ft^3 (m^3)	Total System Cumulative Storage ft^3 (m^3)
81 (2057)	0.00	115.28 (3.264)
80 (2032)	0.00	114.15 (3.232)
79 (2007)	0.00	113.02 (3.200)
78 (1981)	0.00	111.89 (3.168)
77 (1956)	0.00	110.76 (3.136)
76 (1930)	0.00	109.63 (3.104)
75 (1905)	0.00	108.50 (3.072)
74 (1880)	0.00	107.37 (3.040)
73 (1854)	0.00	106.24 (3.008)
72 (1829)	0.00	105.11 (2.976)
71 (1803)	0.00	103.98 (2.944)
70 (1778)	0.00	102.85 (2.912)
69 (1753)	39.54 (1.120)	101.72 (2.880)
68 (1727)	39.53 (1.119)	100.58 (2.848)
67 (1702)	39.50 (1.118)	99.43 (2.816)
66 (1676)	39.45 (1.117)	98.27 (2.783)
65 (1651)	39.38 (1.115)	97.10 (2.750)
64 (1626)	39.30 (1.113)	95.92 (2.716)
63 (1600)	39.19 (1.110)	94.73 (2.682)
62 (1575)	39.06 (1.106)	93.52 (2.648)
61 (1549)	38.90 (1.101)	92.29 (2.613)
60 (1524)	38.71 (1.096)	91.04 (2.578)
59 (1499)	38.49 (1.090)	89.78 (2.542)
58 (1473)	38.24 (1.083)	88.50 (2.506)
57 (1448)	37.97 (1.075)	87.21 (2.469)
56 (1422)	37.67 (1.067)	85.90 (2.432)
55 (1397)	37.34 (1.057)	84.57 (2.395)
54 (1372)	36.98 (1.047)	83.23 (2.357)
53 (1346)	36.60 (1.036)	81.87 (2.318)
52 (1321)	36.19 (1.025)	80.49 (2.279)
51 (1295)	35.75 (1.012)	79.10 (2.240)
50 (1270)	35.28 (0.999)	77.69 (2.200)
49 (1245)	34.79 (0.985)	76.26 (2.159)
48 (1219)	34.27 (0.970)	74.82 (2.119)
47 (1194)	33.72 (0.955)	73.36 (2.077)
46 (1168)	33.15 (0.939)	71.89 (2.036)
45 (1143)	32.57 (0.922)	70.40 (1.994)
44 (1118)	31.96 (0.905)	68.91 (1.951)
43 (1092)	31.32 (0.887)	67.40 (1.909)
42 (1067)	30.68 (0.869)	65.88 (1.866)
41 (1041)	30.00 (0.850)	64.35 (1.822)

Stone Cover

Depth of Water in System Inches (mm)	Cumulative End Cap Storage ft^3 (m^3)	Total System Cumulative Storage ft^3 (m^3)
40 (1016)	29.30 (0.830)	62.80 (1.778)
39 (991)	28.58 (0.809)	61.23 (1.734)
38 (965)	27.84 (0.788)	59.65 (1.689)
37 (948)	27.07 (0.767)	58.07 (1.644)
36 (914)	26.29 (0.744)	56.46 (1.599)
35 (889)	25.48 (0.722)	54.85 (1.553)
34 (864)	24.66 (0.698)	53.23 (1.507)
33 (838)	23.83 (0.675)	51.60 (1.461)
32 (813)	22.98 (0.651)	49.96 (1.415)
31 (787)	22.12 (0.626)	48.31 (1.368)
30 (762)	21.23 (0.601)	46.65 (1.321)
29 (737)	20.32 (0.575)	44.97 (1.273)
28 (711)	19.40 (0.549)	43.29 (1.226)
27 (686)	18.48 (0.523)	41.61 (1.178)
26 (680)	17.54 (0.497)	39.91 (1.130)
25 (610)	16.59 (0.470)	38.21 (1.082)
24 (609)	15.62 (0.442)	36.50 (1.033)
23 (584)	14.64 (0.414)	34.78 (0.985)
22 (559)	13.66 (0.387)	33.07 (0.936)
21 (533)	12.66 (0.359)	31.33 (0.887)
20 (508)	11.65 (0.330)	29.60 (0.838)
19 (483)	10.63 (0.301)	27.85 (0.3789)
18 (457)	9.60 (0.272)	26.11 (0.739)
17 (432)	8.56 (0.242)	24.35 (0.690)
16 (406)	7.51 (0.213)	22.59 (0.640)
15 (381)	6.46 (0.183)	20.83 (0.590)
14 (356)	5.41 (0.153)	19.07 (0.540)
13 (330)	4.35 (0.123)	17.31 (0.490)
12 (305)	3.28 (0.093)	15.53 (0.440)
11 (279)	2.19 (0.062)	13.75 (0.389)
10 (254)	1.11 (0.031)	11.97 (0.339)
9 (229)	0.00	10.17 (0.288)
8 (203)	0.00	9.04 (0.256)
7 (178)	0.00	7.91 (0.224)
6 (152)	0.00	6.78 (0.192)
5 (127)	0.00	5.65 (0.160)
4 (102)	0.00	4.52 (0.128)
3 (76)	0.00	3.39 (0.096)
2 (51)	0.00	2.26 (0.064)
1 (25)	0.00	1.13 (0.032)

Stone Cover

NOTE: Add 1.08 ft^3 (0.031 m^3) of storage for each additional inch (25 mm) of stone foundation. Contact StormTech for cumulative volume spreadsheets in digital format.

6.0 MC-3500 Chamber System Sizing

The following steps provide the calculations necessary for preliminary sizing of an MC-3500 chamber system. For custom bed configurations to fit specific sites, contact the StormTech Technical Services Department or your local StormTech representative.

1) Determine the amount of storage volume (VS) required. It is the design engineer's sole responsibility to determine the storage volume required.

Table 11 - Storage Volume Per Chamber/EndCap ft³ (m³)

	Bare Unit Storage ft³ (m³)	Chamber/End Cap and Stone Volume — Stone Foundation Depth in. (mm)			
		9 (230)	12 (300)	15 (375)	18 (450)
MC-3500 Chamber	109.9 (3.11)	175.0 (4.96)	179.9 (5.09)	184.9 (5.24)	189.9 (5.38)
MC-3500 End Cap	14.9 (0.42)	45.1 (1.28)	46.6 (1.32)	48.3 (1.37)	49.9 (1.41)

NOTE: Assumes 6" (150 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 6" (150 mm) stone perimeter.

2) Determine the number of chambers (C) required. To calculate the number of chambers required for adequate storage, divide the storage volume (Vs) by the storage volume of the chamber (from **Table 11**), as follows: **C = Vs / Storage Volume per Chamber**

3) Determine the number of end caps required. The number of end caps (EC) required depends on the number of rows required by the project. Once the num- ber of chamber rows is determined, multiply the number of chamber rows by 2 to determine the number of end caps required. **EC = No. of Chamber Rows x 2**

NOTE: Additional end caps may be required for systems having inlet locations within the chamber bed.

4) Determine additional storage provided by end caps. End Caps will provide additional storage to the project. Multiply the number of end caps (EC) by the storage volume per end cap (ECS) to determine the additional storage (As) provided by the end caps. **As = EC x ECs**

5) Adjust number of chambers (C) to account for additional end cap storage (As). The original number of chambers (C) can now be reduced due to the additional storage in the end caps. Divide the additional storage (As) by the storage volume per chamber to determine the number of chambers that can be removed. **Number of chambers to remove = As/ volume per chamber**

NOTE: Additional storage exists in the stone perimeter as well as in the inlet and outlet manifold systems. Contact StormTech's Technical Services Department for assistance with determining the number of chambers and end caps required for your project.

6) Determine the required bed size (S). The size of the bed will depend on the number of chambers and end caps required:

MC-3500 area per chamber = 49.6 ft² (4.6 m²)
MC-3500 area per end cap = 16.4 ft² (1.5 m²)
S = (C x area per chamber) + (EC x area per end cap)

NOTE: It is necessary to add 12" (300 mm) of stone perimeter parallel to the chamber rows and 6" (150 mm) of stone perimeter from the base of all end caps. The additional area due to perimeter stone is not included in the area numbers above.

7) Determine the amount of stone (Vst) required. To calculate the total amount of clean, crushed, angular stone required, multiply the number of chambers (C) and the number of end caps (EC) by the selected weight of stone from **Table 12.**

NOTE: Clean, crushed, angular stone is also required around the perimeter of the system.

Table 12 - Amount of Stone Per Chamber/End Cap

ENGLISH tons (yd³)	Stone Foundation Depth			
	9"	12"	15"	18"
Chamber	8.5 (6.0)	9.1 (6.5)	9.7 (6.9)	10.4 (7.4)
End Cap	3.9 (2.8)	4.1 (2.9)	4.3 (3.1)	4.5 (3.2)
METRIC kg (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
Chamber	7711 (4.6)	8255 (5.0)	8800 (5.3)	9435 (5.7)
End Cap	3538 (2.1)	3719 (2.2)	3901 (2.4)	4082 (2.5)

NOTE: Assumes 12" (300 mm) of stone above, and 6" (150 mm) row spacing, and 6" (150 mm) of perimeter stone in front of end caps.

8) Determine the volume of excavation (Ex) required. Each additional foot of cover will add a volume of excavation of 1.9 yd³ (1.5 m³) per MC-3500 chamber and 0.6 yd³ (0.5 m³) per MC-3500 end cap.

Table 13—Volume of Excavation Per Chamber/End Cap yd³ (m³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
Chamber	11.9 (9.1)	12.4 (9.5)	12.8 (9.8)	13.3 (10.2)
End Cap	4.0 (3.1)	4.1 (3.2)	4.3 (3.3)	4.4 (3.4)

NOTE: Assumes 6" (150 mm) separation between chamber rows, 6" (150 mm) of perimeter in front of end caps, and 24" (600 mm) of cover. The volume of excavation will vary as the depth of cover increases.

9) Determine the area of geotextile (F) required. The bottom, top and sides of the bed must be covered with a non-woven geotextile (filter fabric) that meets AASHTO M288 Class 2 requirements. The area of the sidewalls must be calculated and a 24" (600 mm) overlap must be included for all seams. Geotextiles typically come in 15 foot (4.57 m) wide rolls.

6.0 MC-7200 Chamber System Sizing

The following steps provide the calculations necessary for preliminary sizing of an MC-7200 chamber system. For custom bed configurations to fit specific sites, contact the StormTech Technical Services Department or your local StormTech representative.

1) Determine the amount of storage volume (VS) required. It is the design engineer's sole responsibility to determine the storage volume required.

Table 14 - Storage Volume Per Chamber/EndCap ft³ (m³)

	Bare Unit Storage ft³ (m³)	Chamber/End Cap and Stone Volume — Stone Foundation Depth in. (mm)			
		9 (230)	12 (300)	15 (375)	18 (450)
MC-7200 Chamber	175.9 (4.98)	267.3 (7.57)	273.3 (7.74)	279.3 (7.91)	285.2 (8.08)
MC-7200 End Cap	39.5 (1.12)	115.3 (3.26)	118.6 (3.36)	121.9 (3.45)	125.29 (3.54)

NOTE: Assumes 9" (230 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 12" (300 mm) stone perimeter.

2) Determine the number of chambers (C) required.
To calculate the number of chambers required for adequate storage, divide the storage volume (Vs) by the storage volume of the chamber (from **Table 14**), as follows: **C = Vs / Storage Volume per Chamber**

3) Determine the number of end caps required.
The number of end caps (EC) required depends on the number of rows required by the project. Once the number of chamber rows is determined, multiply the number of chamber rows by 2 to determine the number of end caps required. **EC = No. of Chamber Rows x 2**

NOTE: Additional end caps may be required for systems having inlet locations within the chamber bed.

4) Determine additional storage provided by end caps.
End Caps will provide additional storage to the project. Multiply the number of end caps (EC) by the storage volume per end cap (ECS) to determine the additional storage (As) provided by the end caps. **As = EC x ECs**

5) Adjust number of chambers (C) to account for additional end cap storage (As). The original number of chambers (C) can now be reduced due to the additional storage in the end caps. Divide the additional storage (As) by the storage volume per chamber to determine the number of chambers that can be removed. **Number of chambers to remove = As/ volume per chamber**

NOTE: Additional storage exists in the stone perimeter as well as in the inlet and outlet manifold systems. Contact StormTech's Technical Services Department for assistance with determining the number of chambers and end caps required for your project.

6) Determine the required bed size (S).
The size of the bed will depend on the number of chambers and end caps required:

MC-7200 area per chamber = 59.9 ft² (5.6 m²)
MC-7200 area per end cap = 33.9 ft² (3.1 m²)

S = (C x area per chamber) + (EC x area per end cap)

NOTE: It is necessary to add 12" (300 mm) of stone perimeter parallel to the chamber rows and 6" (150 mm) of stone perimeter from the base of all end caps. The additional area due to perimeter stone is not included in the area numbers above.

7) Determine the amount of stone (Vst) required.
To calculate the total amount of clean, crushed, angular stone required, multiply the number of chambers (C) and the number of end caps (EC) by the selected weight of stone from **Table 15.**

NOTE: Clean, crushed, angular stone is also required around the perimeter of the system.

Table 15 - Amount of Stone Per Chamber/End Cap

ENGLISH tons (yd³)	Stone Foundation Depth			
	9"	12"	15"	18"
Chamber	11.9 (8.5)	12.6 (9.0)	13.4 (9.6)	14.6 (10.1)
End Cap	9.8 (7.0)	10.2 (7.3)	10.6 (7.6)	11.1 (7.9)
METRIC kg (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
Chamber	10796 (6.5)	11431 (6.9)	12156 (7.3)	13245 (7.7)
End Cap	8890 (5.3)	9253 (5.5)	9616 (5.8)	10069 (6.0)

NOTE: Assumes 12" (300 mm) of stone above, and 9" (230 mm) row spacing, and 12" (300 mm) of perimeter stone in front of end caps.

8) Determine the volume of excavation (Ex) required.
Each additional foot of cover will add a volume of excavation of 2.2 yd³ (1.7 m³) per MC-7200 chamber and 1.4 yd³ (0.8 m³) per MC-7200 end cap.

Table 13- Volume of Excavation Per Chamber/End Cap yd³ (m³)

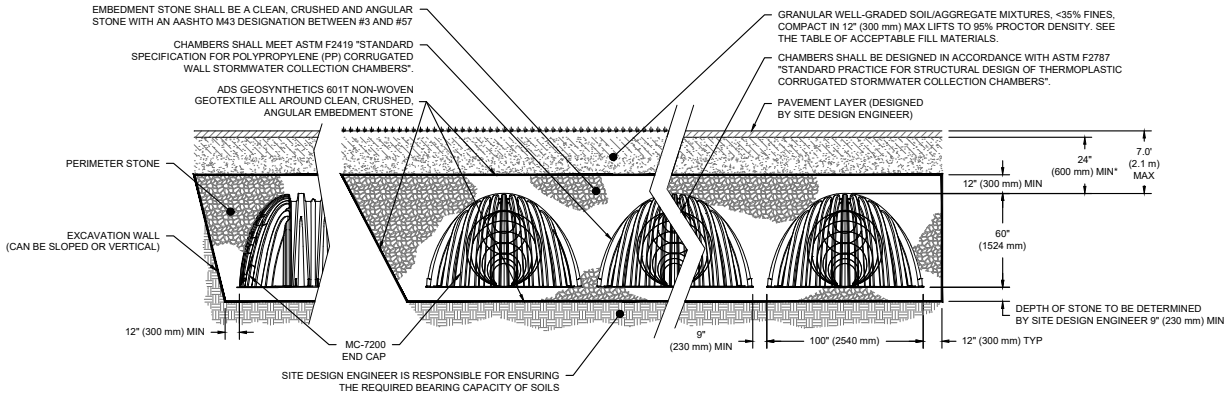
	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
Chamber	17.2 (13.2)	17.7 (13.5)	18.3 (14.0)	18.8 (14.4)
End Cap	9.7 (7.4)	10.0 (7.6)	10.3 (7.9)	10.6 (8.1)

NOTE: Assumes 9" (230 mm) separation between chamber rows, 12" (300 mm) of perimeter in front of end caps, and 24" (600 mm) of cover. The volume of excavation will vary as the depth of cover increases.

9) Determine the area of geotextile (F) required.
The bottom, top and sides of the bed must be covered with a non-woven geotextile (filter fabric) that meets AASHTO M288 Class 2 requirements. The area of the sidewalls must be calculated and a 24" (600 mm) overlap must be included for all seams. Geotextiles typically come in 15 foot (4.57 m) wide rolls.

7.0 Structural Cross Sections and Specifications

Figure 16 - MC-3500 Structural Cross Section Detail (Not to Scale)



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

Special applications will be considered on a project by project basis. Please contact our application department should you have a unique application for our team to evaluate.

MC-3500 Stormwater Chamber Specifications

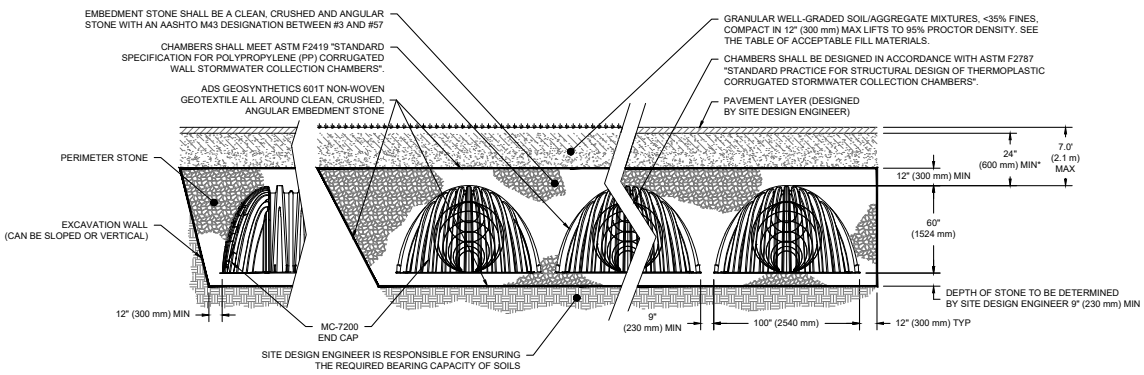
1. Chambers shall be StormTech MC-3500.
2. Chambers shall be arch-shaped and shall be manufactured from virgin, impact-modified polypropylene copolymers.
3. Chambers shall meet the requirements of ASTM F2418, "Standard Specification for Polypropylene (PP) Corrugated Wall Stormwater Collection Chambers" chamber classification 45x76 designation ss.
4. Chamber rows shall provide continuous, unobstructed internal space with no internal supports that would impede flow or limit access for inspection.
5. The structural design of the chambers, the structural backfill, and the installation requirements shall ensure that the load factors specified in the AASHTO LRFD Bridge Design Specifications, Section 12.12, Are met for: 1) long-duration dead loads and 2) short-duration live loads, based on the AASHTO design truck with consideration for impact and multiple vehicle presences.
6. Chambers shall be designed, tested and allowable load configurations determined in accordance with ASTM F2787, "Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers". Load configurations shall include: 1) instantaneous (<1 min) AASHTO design truck live load on minimum cover 2) maximum permanent (75-yr) cover load and 3) allowable cover with parked (1-week) AASHTO design truck.
7. Requirements for handling and installation:
   - To maintain the width of chambers during shipping and handling, chambers shall have integral, interlocking stacking lugs.
   - To ensure a secure joint during installation and backfill, the height of the chamber joint shall not be less than 3".
   - To ensure the integrity of the arch shape during installation, a) the arch stiffness constant shall be greater than or equal to 500 lbs/ft/%. The ASC is defined in section 6.2.8 Of ASTM F2418. And b) to resist chamber deformation during installation at elevated temperatures (above 73° F / 23° C), chambers shall be produced from reflective gold or yellow colors.
8. Only chambers that are approved by the site design engineer will be allowed. Upon request by the site design engineer or owner, the chamber manufacturer shall submit a structural evaluation for approval before delivering chambers to the project site as follows:
   - The structural evaluation shall be sealed by a registered professional engineer.
   - The structural evaluation shall demonstrate that the safety factors are greater than or equal to 1.95 For dead load and 1.75 For live load, the minimum required by ASTM F2787 and by sections 3 and 12.12 Of the AASHTO LRFD bridge design specifications for thermoplastic pipe.
   - The test derived creep modulus as specified in ASTM F2418 shall be used for permanent dead load design except that it shall be the 75-year modulus used for design.

Chambers and end caps shall be produced at an ISO 9001 certified manufacturing facility.

Detail drawings available in Cad Rev. 2000 format at adspipe.com/stormtech

7.0 Structural Cross Sections and Specifications

Figure 16 - MC-7200 Structural Cross Section Detail (Not to Scale)



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

Special applications will be considered on a project by project basis. Please contact our application department should you have a unique application for our team to evaluate.

MC-7200 Stormwater Chamber Specifications

1. Chambers shall be StormTech MC-7200.
2. Chambers shall be arch-shaped and shall be manufactured from virgin, impact-modified polypropylene copolymers.
3. Chambers shall meet the requirements of ASTM F2418, "Standard Specification for Polypropylene (PP) Corrugated Wall Stormwater Collection Chambers" chamber classification 60x101.
4. Chamber rows shall provide continuous, unobstructed internal space with no internal supports that would impede flow or limit access for inspection
5. The structural design of the chambers, the structural backfill, and the installation requirements shall ensure that the load factors specified in the AASHTO LRFD Bridge Design Specifications, Section 12.12, Are met for: 1) long-duration dead loads and 2) short-duration live loads, based on the AASHTO design truck with consideration for impact and multiple vehicle presences.
6. Chambers shall be designed, tested and allowable load configurations determined in accordance with ASTM F2787, "Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers". Load configurations shall include: 1) instantaneous (<1 min) AASHTO design truck live load on minimum cover 2) maximum permanent (75-yr) cover load and 3) allowable cover with parked (1-week) AASHTO design truck.
7. Requirements for handling and installation:
   - To maintain the width of chambers during shipping and handling, chambers shall have integral, interlocking stacking lugs.
   - To ensure a secure joint during installation and backfill, the height of the chamber joint shall not be less than 3".
   - To ensure the integrity of the arch shape during installation, a) the arch stiffness constant shall be greater than or equal to 500 lbs/ft/%. The ASC is defined in section 6.2.8 Of ASTM F2418. And b) to resist chamber deformation during installation at elevated temperatures (above 73° F/ 23° C), chambers shall be produced from reflective gold or yellow colors.
8. Only chambers that are approved by the site design engineer will be allowed. Upon request by the site design engineer or owner, the chamber manufacturer shall submit a structural evaluation for approval before delivering chambers to the project site as follows:
   - The structural evaluation shall be sealed by a registered professional engineer.
   - The structural evaluation shall demonstrate that the safety factors are greater than or equal to 1.95 For dead load and 1.75 For live load, the minimum required by ASTM F2787 and by sections 3 and 12.12 Of the AASHTO LRFD bridge design specifications for thermoplastic pipe.
   - The test derived creep modulus as specified in ASTM F2418 shall be used for permanent dead load design except that it shall be the 75-year modulus used for design.

Chambers and end caps shall be produced at an ISO 9001 certified manufacturing facility.

Detail drawings available in Cad Rev. 2000 format at adspipe.com/stormtech

8.0 General Notes

1. StormTech requires installing contractors to use and understand the latest StormTech **MC-3500 and MC-7200 Construction Guides** prior to beginning system installation.
2. StormTech offers installation consultations to installing contractors. Contact our Technical Service Department or local StormTech representative at least 30 days prior to system installation to arrange a pre-installation consultation. Our representatives can then answer questions or address comments on the StormTech chamber system and inform the installing contractor of the minimum installation requirements before beginning the system's construction. Call 860-529-8188 to speak to a Technical Service Representative or visit adspipe.com/stormtech to receive a copy of our Construction Guide.
3. StormTech requirements for systems with pavement design (asphalt, concrete pavers, etc.): Minimum cover is 18" (450mm) for the MC-3500 and 24"(600mm) for the MC-7200 not including pavement; MC-3500 maximum cover is 8.0' (1.98 m) and MC-7200 maximum cover is 7.0' (2.43 m) both including pavement. For designs with cover depths deeper than these maximums, please contact Stormtech. For installations that do not include pavement, where rutting from vehicles may occur, minimum required cover is increased to 30" (762 mm).
4. The contractor must report any discrepancies with the bearing capacity of the subgrade materials to the design engineer.
5. AASHTO M288 Class 2 non-woven geotextile (ADS601 or equal) (filter fabric) must be used as indicated in the project plans.
6. Stone placement between chamber rows and around perimeter must follow instructions as indicated in the most current version of StormTech MC-3500 / MC-7200 Construction Guides.
7. Backfilling over the chambers must follow requirements as indicated in the most current version of StormTech MC-3500 / MC-7200 Construction Guides.
8. The contractor must refer to StormTech MC-3500 / MC-7200 Construction Guides for a Table of Acceptable Vehicle Loads at various depths of cover. This information is also available at the StormTech website: adspipe.com/stormtech. The contractor is responsible for preventing vehicles that exceed StormTech requirements from traveling across or parking over the stormwater system. Temporary fencing, warning tape and appropriately located signs are commonly used to prevent unauthorized vehicles from entering sensitive construction areas.
9. The contractor must apply erosion and sediment control measures to protect the stormwater system during all phases of site construction per local codes and design engineer's specifications.
10. STORMTECH PRODUCT WARRANTY IS LIMITED. Contact StormTech for warranty information.

9.0 Inspection and Maintenance

9.1 Isolator Row Plus Inspection

Regular inspection and maintenance are essential to assure a properly functioning stormwater system. Inspection is easily accomplished through the manhole or optional inspection ports of an Isolator Row Plus. Please follow local and OSHA rules for a confined space entry.

Inspection ports can allow inspection to be accomplished completely from the surface without the need for a con- fined space entry. Inspection ports provide visual access to the system with the use of a flashlight. A stadia rod may be inserted to determine the depth of sediment. If upon visual inspection it is found that sediment has accumulated to an average depth exceeding 3" (76 mm), cleanout is required.

A StormTech Isolator Row Plus should initially be inspected immediately after completion of the site's construction. While every effort should be made to prevent sediment from entering the system during construction, it is during this time that excess amounts of sediments are most likely to enter any stormwater system. Inspection and maintenance, if necessary, should be performed prior to passing responsibility over to the site's owner. Once in normal service, a StormTech Isolator Row Plus should be inspected bi-annually until an understanding of the sites characteristics is developed. The site's maintenance manager can then revise the inspection schedule based on experience or local requirements.

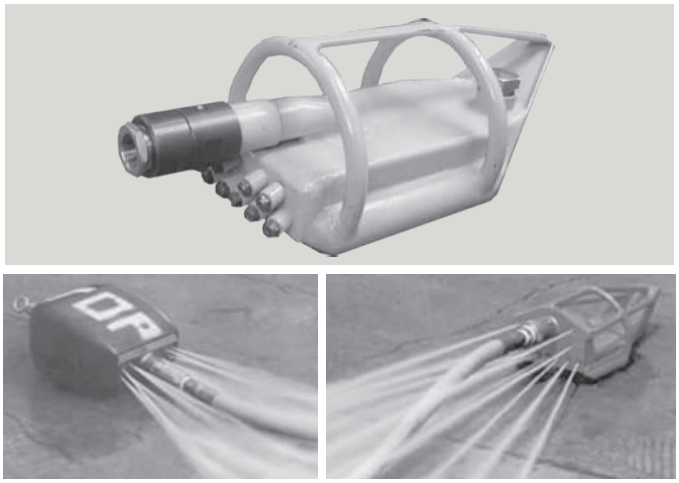
9.2 Isolator Row Plus Maintenance

JetVac maintenance is recommended if sediment has been collected to an average depth of 3" (76 mm) inside the Isolator Row Plus. More frequent maintenance may be required to maintain minimum flow rates through the Isolator Row Plus. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row Plus while scouring and suspending sediments. As the nozzle is retrieved, a wave of suspended sediments is flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/ JetVac combi- nation vehicles. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" (1143 mm) are best. StormTech recommends a maximum nozzle pressure of 2000 psi be utilized during cleaning. The JetVac process shall only be performed on StormTech Rows that have ADS Plus fabric over the foundation stone.

A Flamp (flared end ramp) is attached to the inlet pipe on the inside of the chamber end cap to provide a smooth transition from pipe invert to fabric bottom. It is configured to improve chamber function performance over time by distributing sediment and debris that would otherwise collect at the inlet. It also serves to improve the fluid and solid flow back into the inlet pipe during maintenance and cleaning, and to guide cleaning and inspection equipment back into the inlet pipe when complete.

Flamp (Flared End Ramp)

A typical JetVac truck (This is not a StormTech product.)



Examples of culvert cleaning nozzles appropriate for Isolator Row Plus maintenance. (These are not StormTech products).

MC-7200 MC-4500 MC-3500 SC-800 DC-780 SC-310 SC-160LP

A Family of Products and Services for the Stormwater Industry:

MC-3500, MC-4500 and MC-7200 Chambers and End Caps

SC-160LP, SC-310 & SC-800 Chambers & End Caps

DC-780 Chambers and End Caps

Fabricated End Caps

Fabricated Manifold Fittings

Patented Isolator Row PLUS for Maintenance and Water Quality

Chamber Separation Spacers

In-House System Layout Assistance

On-Site Educational Seminars

Worldwide Technical Sales Group

Centralized Product Applications Department

Research and Development Team

Technical Literature, O&M Manuals and Detailed CAD drawings all downloadable via our Website

StormTech provides state-of-the-art products and services that meet or exceed industry performance standards and expectations. We offer designers, regulators, owners and contractors the highest quality products and services for stormwater management that Saves Valuable Land and Protects Water Resources.

adspipe.com

800-821-6710

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StormTech® and the Isolator® Row Plus are registered trademarks of StormTech, Inc.
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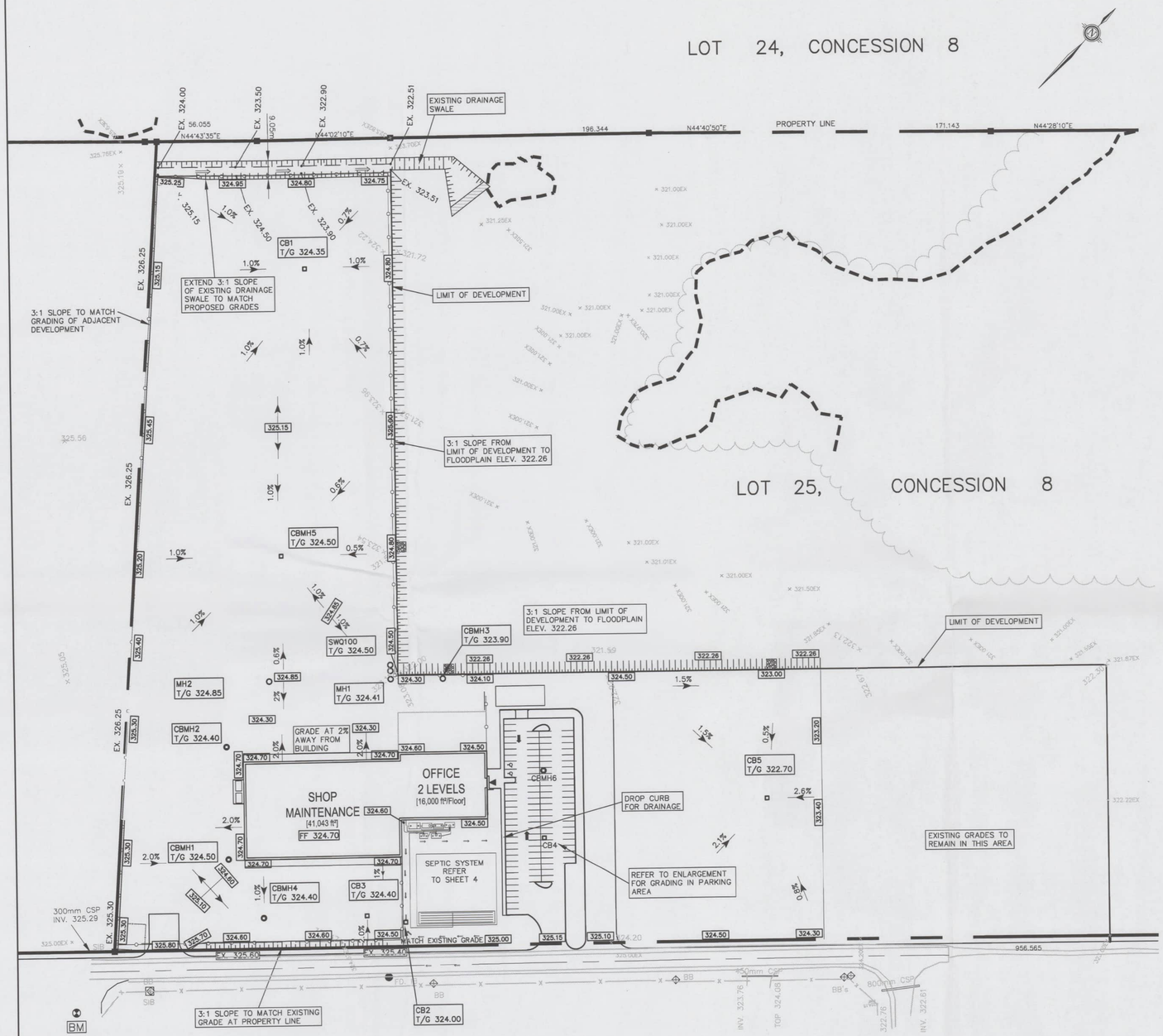
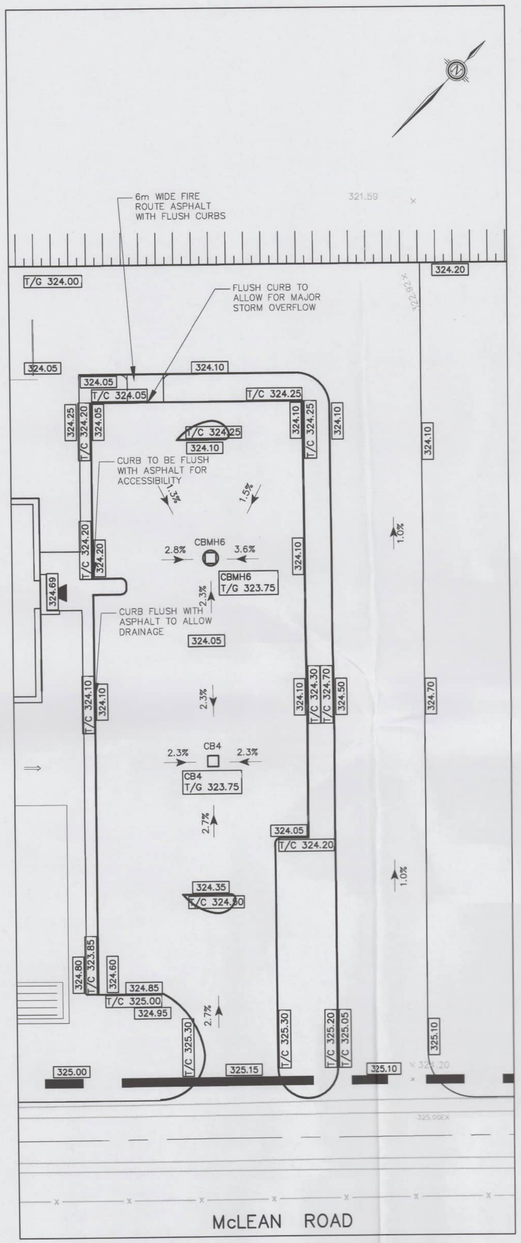
ADS StormTech™

Appendix E

Mammoet Engineering Plans



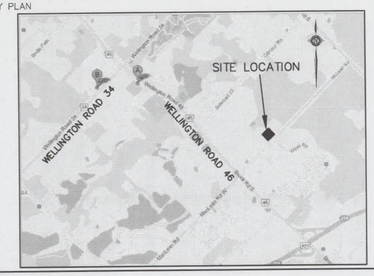


ENLARGEMENT OF ASPHALT PARKING AREA

0 10 20

SCALE: 1:500

KEY PLAN



NOTES:

BENCHMARK NOTES

BRASS TABLET LOCATED ON ONE AND ONE-HALF STOREY FRAME HOUSE WITH ASBESTOS SIDING SITUATED ON THE SOUTHEAST CORNER OF WELLINGTON COUNTY ROAD No. 46 AND PUSLINCH TOWNSHIP ROAD No. 23, 2.0km NORTH OF WELLINGTON COUNTY ROAD No. 46 AND HIGHWAY 401 (INTERCHANGE 37) AT MORRISTON, 0.8km NORTH OF PUSLINCH TOWNSHIP ROAD No. 25, 15.2m SOUTH OF PUSLINCH TOWNSHIP ROAD No. 23 AND 28.3m EAST OF CENTERLINE OF WELLINGTON COUNTY ROAD No. 46. TABLET IS SET HORIZONTALLY IN NORTH FACE OF CONCRETE FOUNDATION, 3.78m EAST OF THE NORTHWEST CORNER AND 52cm BELOW SIDING, HAVING AN ELEVATION OF 317.59 METRES.

LEGEND

x 306.00	EXISTING ELEVATION
306.00	PROPOSED ELEVATION
	DIRECTION OF SURFACE FLOW
	PROPOSED SURFACE SWALE
	BUILDING ENTRANCE
EX. 326.25	EXISTING ELEVATION TO MATCH

No.	REVISIONS	BY	DATE
1.	REVISED AS PER TOWNSHIP COMMENTS	NMB	FEB. 21, 2013
	CONSTRUCTION		
	TENDER		
	ISSUE FOR APPROVALS		
	ISSUE BLOCK		

MAMMOET CANADA EASTERN

McLEAN ROAD, PUSLINCH
PART OF LOT 25, CONC. 8,
TOWNSHIP OF PUSLINGH COUNTY OF WELLINGTON

GRADING PLAN

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER SUDBURY RAINY RIVER

[redacted]

DESIGNED BY: S.S.	0 25 50	DATE: DEC. 21, 2012
CHECKED BY: D.A.H.	SCALE: 1:1250	SHEET 2 OF 7
DRAWN BY: N.M.B.		
CHECKED BY: D.A.H.	REVISION No.	
FILE No. 12-106		

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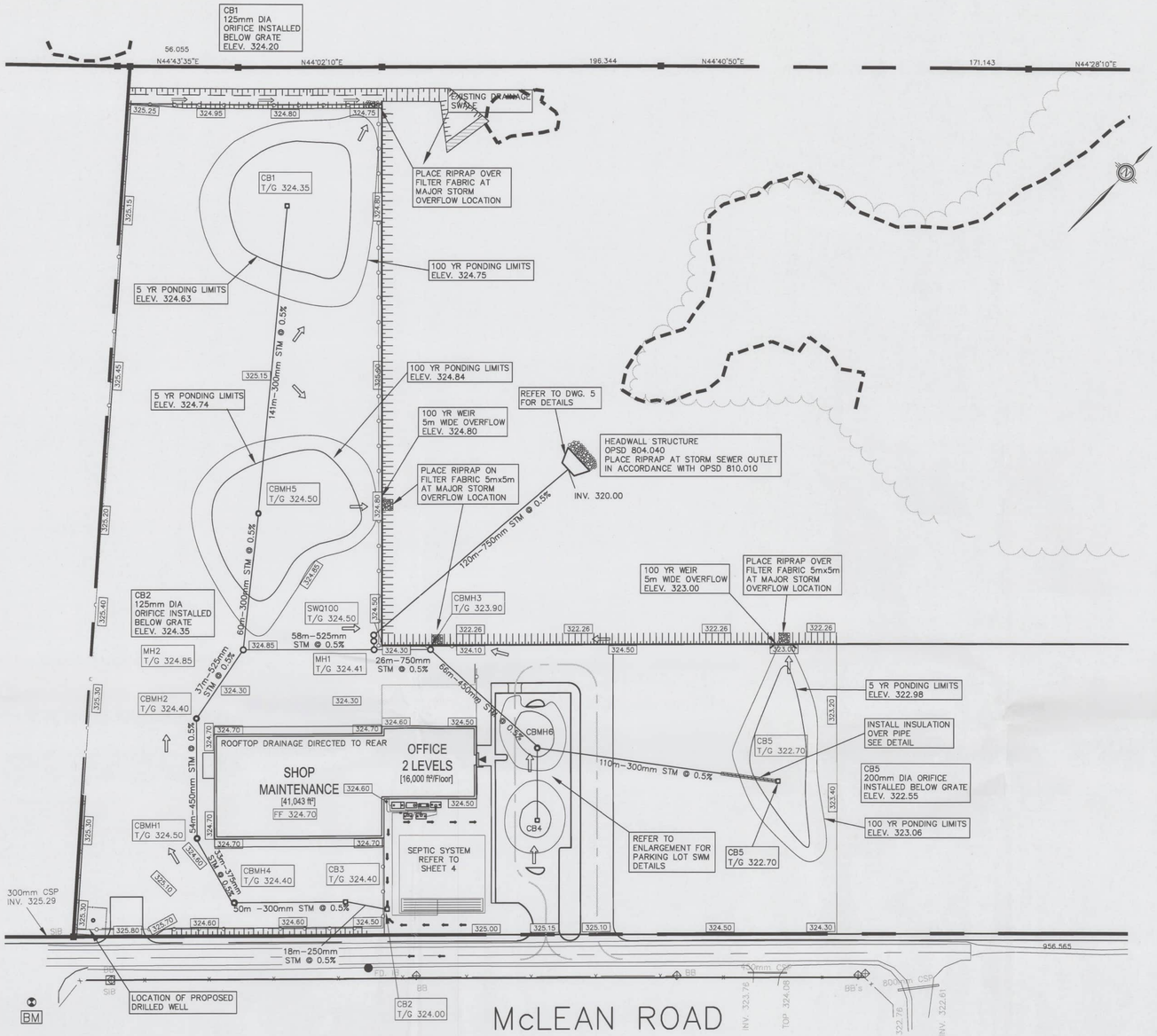
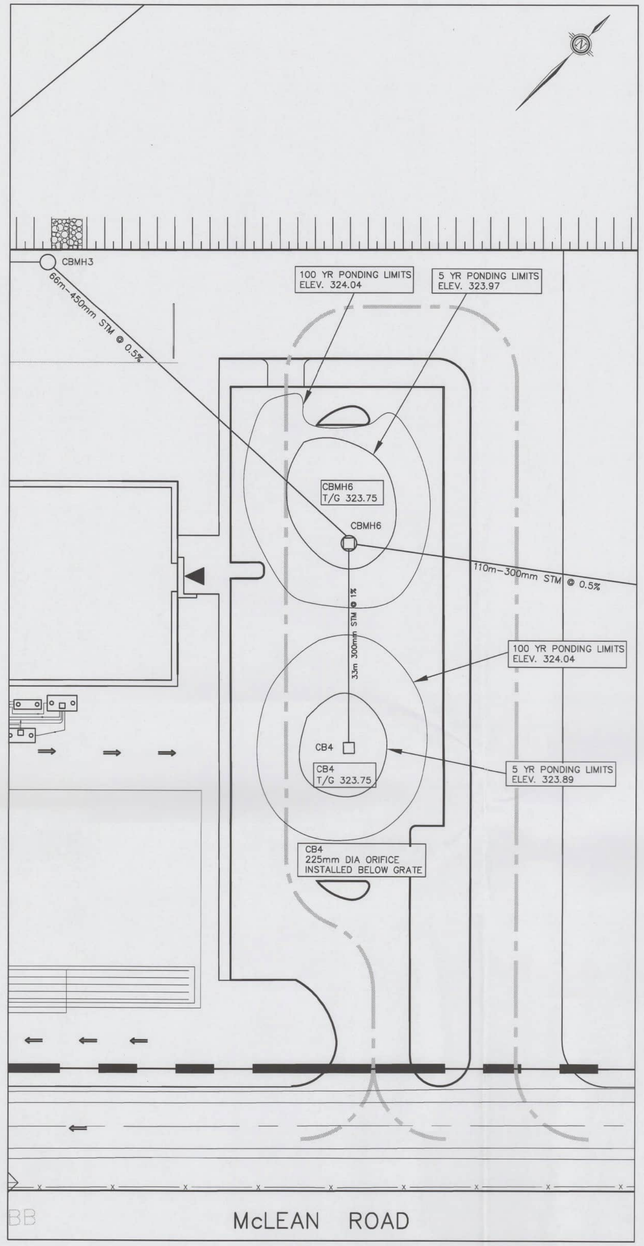


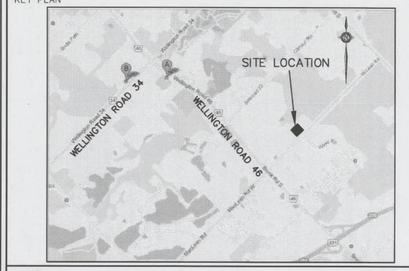


ENLARGEMENT OF ASPHALT PARKING AREA

SCALE 1:500

STRUCTURE	GRATE ELEVATION	INVERT			
		NORTH	SOUTH	EAST	WEST
CB1	324.35		322.17		
CB2	324.00				322.31
CB3	324.40			322.22	322.16
CB4	323.75	321.66			
CB5	322.70			321.88	
CBMH1	324.50	321.62	321.68		
CBMH2	324.40	321.29	321.35		
CBMH3	323.90			320.94	320.88
CBMH4	324.40			321.91	321.85
CBMH5	324.50	321.46	321.40		
CBMH6	323.75		321.33	321.33	321.27
MH1	324.40	320.69		320.75	320.75
MH2	324.85	321.10	321.10	321.04	
SWQ100	324.50	320.60	320.67		
HEADWALL			320.00		

KEY PLAN



NOTES:

LEGEND

306.00	PROPOSED ELEVATION
⟹	PROPOSED SURFACE SWALE
———	STORM SEWER SERVICE
□	STORM SEWER STRUCTURE
▶	BUILDING ENTRANCE
⇨	MAJOR STORM OVERLAND FLOW ROUTE

No.	REVISIONS	BY	DATE
1.	REVISED AS PER TOWNSHIP COMMENTS	NMB	FEB. 21, 2013
	CONSTRUCTION		
	TENDER		
	ISSUE FOR APPROVALS		
	ISSUE BLOCK		

MAMMOET CANADA EASTERN

McLEAN ROAD, PUSLINCH

SERVICING PLAN

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER SUDBURY RAINY RIVER

[redacted]

DESIGNED BY: S.S.	0 25 50	DATE: DEC. 21, 2012
CHECKED BY: D.A.H.		
DRAWN BY: N.M.B.	SCALE: 1:1250	SHEET 3 OF 7
CHECKED BY: D.A.H.		
FILE No. 12-106	REVISION No.	

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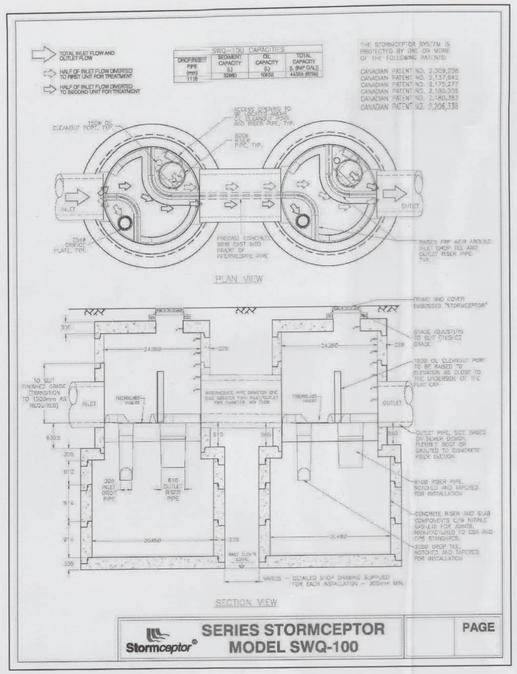
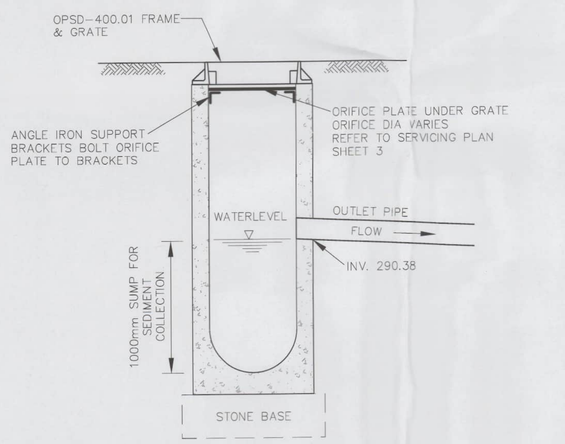
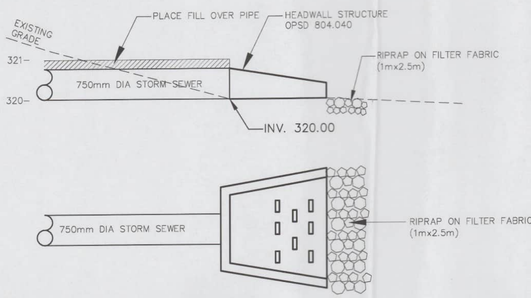
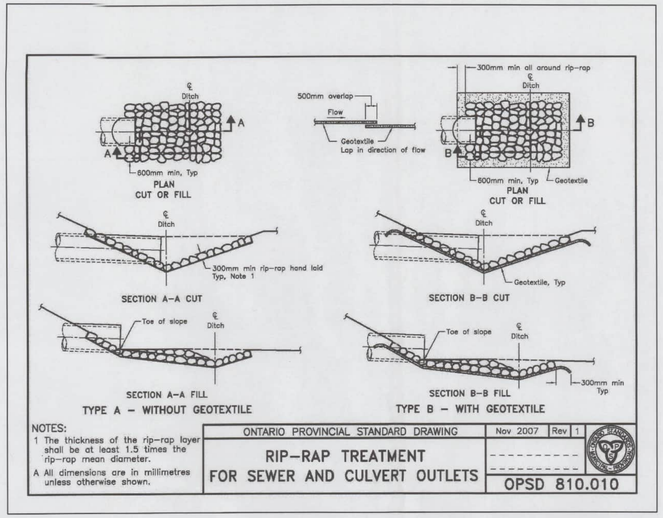


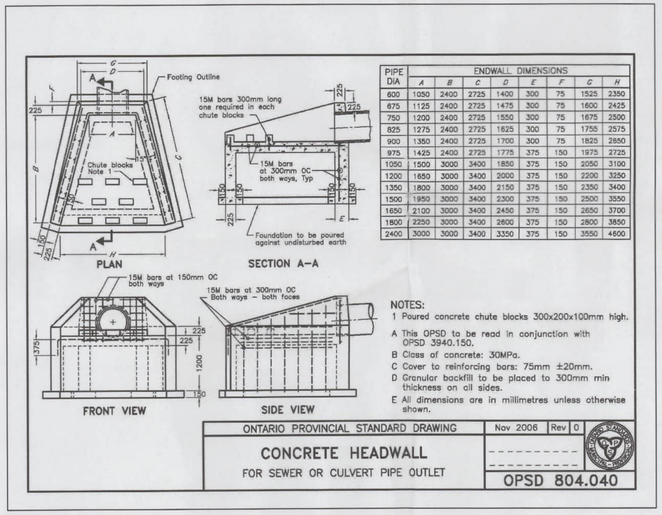


CATCHBASIN DETAIL
OPSD-705.010 CONCRETE CATCHBASIN
N.T.S.

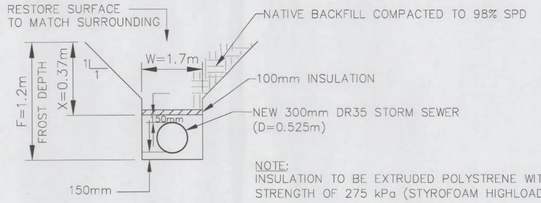


STORM SEWER OUTLET DETAIL
SCALE 1:150





PIPE DIA	ENDWALL DIMENSIONS							
	A	B	C	D	E	F	G	H
600	1050	2400	2725	1400	300	75	1525	2350
675	1125	2400	2725	1475	300	75	1600	2425
750	1200	2400	2725	1550	300	75	1675	2500
825	1275	2400	2725	1625	300	75	1755	2575
900	1350	2400	2725	1700	300	75	1825	2650
975	1425	2400	2725	1775	375	150	1975	2725
1050	1500	3000	3400	1850	375	150	2050	3100
1200	1650	3000	3400	2000	375	150	2200	3250
1350	1800	3000	3400	2150	375	150	2350	3400
1500	1950	3000	3400	2300	375	150	2500	3550
1650	2100	3000	3400	2450	375	150	2650	3700
1800	2250	3000	3400	2600	375	150	2800	3850
2400	3000	3000	3400	3350	375	150	3550	4600



NOTE:
INSULATION TO BE EXTRUDED POLYSTRENE WITH COMPRESSIVE STRENGTH OF 275 kPa (STYROFOAM HIGHLOAD 40)

INSULATED TRENCH DETAIL
N.T.S.

W = D + 2(F-X) - 0.3
W = 0.30 + 2(1.2-0.37) - 0.3
W=1.66m

CONSTRUCTION NOTES AND SPECIFICATIONS

GENERAL
THIS PLAN NOT FOR CONSTRUCTION UNTIL SIGNED AND SEALED BY ENGINEER AND APPROVED BY THE TOWNSHIP OF PUSLINCH.

THIS PLAN IS TO BE USED FOR SERVICING AND GRADING ONLY; ANY OTHER INFORMATION SHOWN IS FOR ILLUSTRATION PURPOSES ONLY. THIS PLAN MUST NOT BE USED TO SITE THE PROPOSED BUILDING.

NO CHANGES ARE TO BE MADE WITHOUT THE APPROVAL OF THE DESIGN ENGINEER.

THIS PLAN NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE PERMISSION OF K. SMART ASSOCIATES LIMITED.

PRIOR TO CONSTRUCTION, THE CONTRACTOR MUST:

CHECK AND VERIFY ALL EXISTING CONDITIONS, LOCATIONS AND ELEVATIONS WHICH INCLUDES BUT IS NOT LIMITED TO THE BENCHMARK ELEVATIONS, EXISTING SERVICE CONNECTIONS AND EXISTING INVERTS. REPORT ALL DISCREPANCIES TO THE ENGINEER PRIOR TO PROCEEDING.

OBTAIN ALL UTILITY LOCATES AND REQUIRED PERMITS AND LICENSES.

VERIFY THAT THE FINISHED FLOOR ELEVATIONS AND BASEMENT FLOOR ELEVATIONS (WHICH MAY APPEAR ON THIS PLAN) COMPLY WITH THE FINAL ARCHITECTURAL DRAWINGS.

CONFIRM ALL DRAWINGS USED FOR CONSTRUCTION ARE OF THE MOST RECENT REVISION.

CONTRACTOR TO MAKE HIS FORCES AWARE OF THE FLOODPLAIN WHICH EXISTS ON THE PROPERTY. CONTRACTOR SHALL NOT PLACE ANY EARTH, BUILDING MATERIALS OR EQUIPMENT WITHIN THE FLOODPLAIN EXCEPT AS SHOWN ON THE DRAWINGS.

THE CONTRACTOR SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE TO EXISTING WORKS.

ALL UNDERGROUND SERVICES ARE TO BE CONSTRUCTED IN FULL COMPLIANCE WITH THE ONTARIO BUILDING CODE (PART 7, PLUMBING), THE ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS) AND IN COMPLIANCE WITH LOCAL APPLICABLE CODES AND REGULATIONS; WHICH CODES AND REGULATIONS SHALL SUPERSEDE ALL OTHERS.

CONTRACTOR IS RESPONSIBLE FOR CONTACTING ENGINEER 48 HOURS PRIOR TO COMMENCING WORK TO ARRANGE FOR INSPECTION. ENGINEER TO DETERMINE DEGREE OF INSPECTION AND TESTING REQUIRED FOR CERTIFICATION OF UNDERGROUND SERVICE INSTALLATION AS MANDATED BY ONTARIO BUILDING CODE SECTION 2.3.2. FAILURE TO NOTIFY ENGINEER WILL RESULT IN EXTENSIVE POST CONSTRUCTION INSPECTION AT CONTRACTOR'S EXPENSE.

EXISTING TOPOGRAPHIC INFORMATION OBTAINED FROM PREDEVELOPMENT GRADING AND EROSION CONTROL PLAN PREPARED BY K.J. BURNSIDE JAN. 29, 2012 (PROJECT. NO. 300030523, DRAWING G1).

CONTRACTOR TO INSTALL EROSION CONTROL MEASURES AS SHOWN PRIOR TO CONSTRUCTION AND MAINTAIN IN GOOD CONDITION UNTIL CONSTRUCTION IS COMPLETED AND VEGETATIVE COVER IS ESTABLISHED.

SITE SERVICING CONTRACTOR TO TERMINATE ALL SERVICES 1.0 METRE FROM FOUNDATION WALL.

FILTER FABRIC TO BE TERRAFIX 200R OR APPROVED EQUIVALENT.

GRASS SLOPES SHALL BE 4:1 WHEN POSSIBLE. MAXIMUM GRASSED SLOPE TO BE 3:1.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD INCLUDING THE SUPPLY, INSTALLATION AND REMOVAL OF ALL NECESSARY SIGNALS, DELINEATORS, MARKERS AND BARRIERS. ALL SIGNS, ETC. SHALL CONFORM TO THE STANDARDS OF THE LOCAL MUNICIPALITY AND THE MTO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

CONTRACTOR TO MAINTAIN SAFE WORKING CONDITIONS IN ALL EXCAVATIONS AND TRENCHES IN ACCORDANCE WITH THE CURRENT MINISTRY OF LABOUR REGULATIONS.

1. STORM SEWERS

MANHOLES AND MANHOLE CATCHBASINS ARE TO BE 1200MM DIAMETER PRECAST WITH ALUMINUM STEPS AT 300MM CENTRES AS PER OPSD 701.010. DOUBLE INLET CATCHBASIN MANHOLES SHALL BE 1500mm DIAMETER AS PER OPSD 701.040.

MANHOLE AND CATCHBASIN, FRAMES, GRATES, CASTINGS AND LIDS TO BE QUALITY GREY IRON ASTM A48 CLASS 30B.

STORM MANHOLE LIDS TO BE PER OPSD 401.010 -TYPE B CATCHBASIN GRATES TO BE PER OPSD 400.020.

ROOF RAIN WATER LEADERS TO BE DIRECTED TO GRAVEL AREA AT REAR OF BUILDING (NORTHWEST SIDE OF BUILDING).

STORMWATER MANAGEMENT TO BE ACCOMPLISHED IN STORMWATER MANAGEMENT AREAS LOCATED IN PARKING LOT AND EQUIPMENT STORAGE AREAS. QUALITY CONTROL PROVIDED BY STORMCEPTOR SWQ100.

ALL STORM SEWERS TO BE PVC SDR 35 PIPE OR AS APPROVED.

PIPE BEDDING FOR RIGID PIPE TO BE CLASS B AS PER OPSD 802.030. PIPE BEDDING FOR FLEXIBLE PIPE TO BE AS PER OPSD 802.010. BEDDING MATERIAL AND COVER MATERIAL TO BE GRANULAR A. TRENCH BACKFILL TO BE NATIVE MATERIAL REPLACED IN 300MM LIFTS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.

2. EROSION AND SEDIMENT CONTROL

CONTRACTOR TO INSTALL EROSION CONTROL MEASURES AS SHOWN PRIOR TO CONSTRUCTION AND MAINTAIN IN GOOD CONDITION UNTIL CONSTRUCTION IS COMPLETED AND VEGETATIVE COVER IS ESTABLISHED.

ALL SILT FENCING TO BE INSTALLED PRIOR TO ANY AREA GRADING, EXCAVATING OR DEMOLITION COMMENCING.

EROSION CONTROL FENCING TO BE INSTALLED AROUND BASE OF ALL STOCKPILES.

EROSION PROTECTION TO BE PROVIDED AROUND ALL STORM AND SANITARY MANHOLES AND CATCHBASINS.

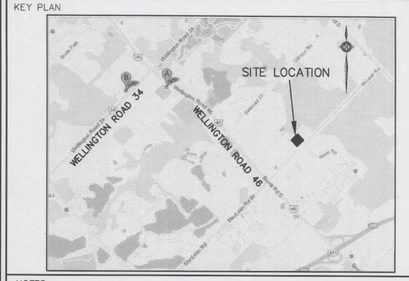
ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AS SITE DEVELOPMENT PROGRESSES. CONTRACTOR TO PROVIDE ALL ADDITIONAL EROSION CONTROL STRUCTURES.

EROSION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN RESTABILIZED.

NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THE ENGINEER AND THE DEPARTMENT OF PUBLIC WORKS.

CONTRACTOR TO CLEAN ROADWAY OF SEDIMENTS RESULTING FROM CONSTRUCTION TRAFFIC FROM THE SITE EACH DAY.

KEY PLAN



NOTES:

No.	REVISIONS	BY	DATE
1.	REVISED AS PER TOWNSHIP COMMENTS	NMB	FEB. 21, 2013
	CONSTRUCTION		
	TENDER		
	ISSUE FOR APPROVALS		
	ISSUE BLOCK		

MAMMOET CANADA EASTERN

McLEAN ROAD, PUSLINCH

SWM DETAILS

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER SUDBURY RAINY RIVER

[redacted]

DESIGNED BY: S.S.	0	DATE: DEC. 21, 2012
CHECKED BY: D.A.H.		
DRAWN BY: N.M.B.	SCALE: AS SHOWN	SHEET
CHECKED BY: D.A.H.		4 OF 7
FILE No. 12-106	REVISION No.	

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Appendix F

Aberfoyle Business Park
SWM Report

ENVIRONMENTAL IMPLEMENTATION PLAN
FINAL DESIGN
QUINTAN INVESTMENTS INC.
ABERFOYLE BUSINESS PARK
PART LOT 26, CONCESSION 8
TOWNSHIP OF PUSLINCH
MMA FILE No. 23T-90012
REVISED

Tile Copy. S-241

Prepared by: Gamsby and Mannerow Limited

Environmental Advisory Services Limited

GAMSBY AND MANNEROW LIMITED
CONSULTING PROFESSIONAL ENGINEERS
GUELPH - OWEN SOUND

June 1995
Our File: S-241

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GAMSBY AND MANNEROW Limited
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ENVIRONMENTAL IMPLEMENTATION PLAN
FINAL DESIGN
QUINTAN INVESTMENTS INC.
ABERFOYLE BUSINESS PARK
PART LOT 26, CONCESSION 8
TOWNSHIP OF PUSLINCH
MMA FILE No. 23T-90012
Our File: S-241
REVISED

1.0 INTRODUCTION

The Aberfoyle Business Park received Draft Plan Approval in October, 1993. The conditions of Draft Plan approval require that a detailed stormwater management report and an ecological assessment of the impact of stormwater discharge on the receiving outlets be prepared. The relationship between the stormwater management activities and the ecology of the adjacent wetlands and/or receiving outlet requires an integrated approach. Gamsby and Mannerow Limited and Environmental Advisory Services Limited, in association with AGRA Earth & Environmental Limited, have jointly prepared this report to specifically address Conditions 11, 12, 14, 20 and 23 of the Draft Plan approval and generally any other applicable conditions.

2.0 LOCATION

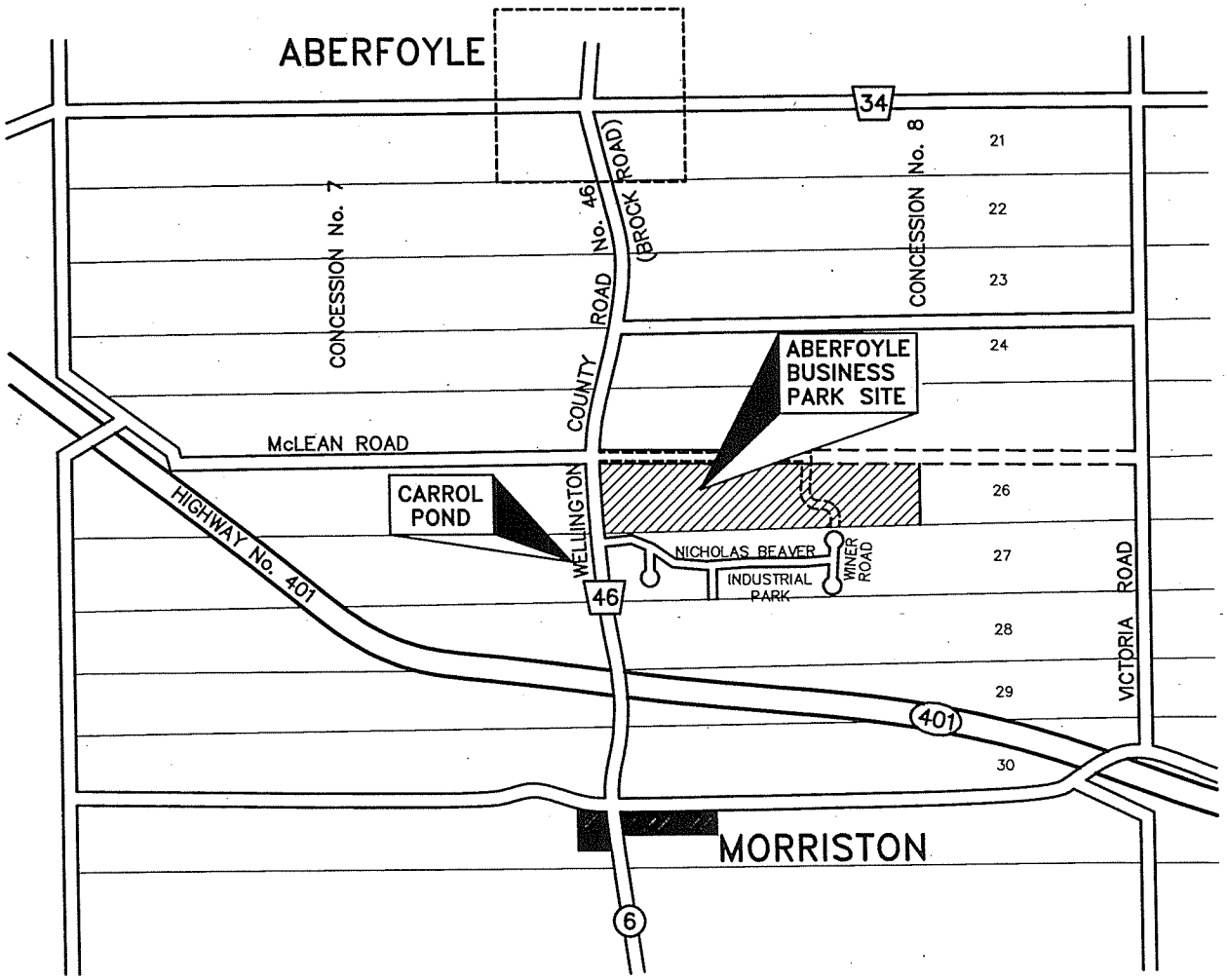
Figure 1 shows the location of the proposed development and the surrounding area. The site is bounded by Wellington County Road No. 46 to the west, McLean Road to the north, by the Nicholas Beaver Industrial Park to the south and to the east, by a portion of the Mill Creek, Class 1, wetland owned by the developer to the east.

3.0 EXISTING CONDITIONS

3.1 Land Use

Existing land use on the Aberfoyle Business Park lands is agriculture. The predominant crops grown on these lands in recent years has been corn and beans. The adjacent lands to the north are also in agricultural production. The lands to the south and west have been developed for industrial and commercial uses. The lands to the east of the proposed development are wetlands and will remain undeveloped.

Aberfoyle Business Park
Environmental Implementation Report
Township of Puslinch



N.T.S.

KEY PLAN

Figure No. 1

JUNE 21 1995 C:\STORE\S241FG1.DWG

3.2 Topography

The topography on the Aberfoyle Business Park lands is gently rolling. Approximately 70% of land to be developed now drains in a westerly direction toward Wellington County Road No. 46 and outlets to the Carrol Pond. The average gradient of the lands draining to the Carrol Pond is 1.0%. The remaining lands to be developed now drain in an easterly direction to the wetland/creek complex at the rear of the property. The average gradient of the lands draining to the wetland outlet is 2.0%.

3.3 Soils

The predominant surface soil type throughout the lands to be developed is Guelph Loam (Wellington County Soils Maps). The hydrologic soil classification for Guelph Loam is BC. This soil type has good drainage characteristics and intermediate infiltration rates.

The test pit logs prepared by AGRA Earth and Environmental, appended under separate cover, generally identify the underlying soils as compact dense sandy silt or silt tills. The infiltration rates of the underlying soils are very low ($K = 1 \times 10^{-6}$ to 1×10^{-5} cm/second). The practical opportunities for recharge will be limited after the development has been regraded.

The soils in the wetland area in the easterly part of the property are identified as muck. These soils have poor drainage characteristics.

3.4 Natural Environment

3.4.1 Terrestrial Features

The Aberfoyle Business Park lands has been extensively used for agriculture, as noted in Section 3.1. Consequently, the natural terrestrial features found on the site were restricted to hedgerows along fence lines and those features associated within or adjacent to the Mill Creek Wetland boundaries. Figure 2 illustrates the Physiognomic (cover type) units found on the site. Table A provides a description of each unit by physiognomic type, main species association and general description. A total of 20 discrete Physiognomic units were characterized and these can be grouped into basic types.

1. Hedgerow (1,2,3,4,5,6,7,8,9,10,12)
2. Upland Woodland (15,17,19)
3. Mixed Transitional Woodland (14,16)
4. Swamp (13,18,20)
5. Residential Plantings (11)

TABLE A
PHYSIOGNOMIC UNIT SUMMARY

1	Hedgerow	Manitoba maple, white elm, bitternut hickory, pin cherry, green ash, poplar, apple, staghorn sumach, red-osier dogwood, tartarian honeysuckle, buckthorn, gooseberry, highbush cranberry and wild grape.	Mainly continuous hedgerow complex running east and west along a fence line bordering the property. The west edge abuts a residence and is adjacent to a cattail swale. The first section contains small (to 10 cm DBH) Manitoba maple mixed in with dogwood, wild grape and grasses. Past the pond, the hedgerow becomes more dense with larger specimens (to 45 cm diameter at breast height DBH) of maple, hickory and elm mixed with dense clumpings of honeysuckle, dogwood and wild grape. The hedgerow continues in this fashion with scattered larger tree specimens (largest was a hickory 70 cm DBH) mixed with younger trees and saplings (often densely packed) and shrubs. Wild grape coverage ranges from sparse to total coverage of some sections and tree specimens.
2	Hedgerow	White pine, white elm, black cherry, willow, Manitoba maple, bitternut hickory, basswood, apple, pin cherry, red-osier dogwood, alternate-leaf dogwood, hawthorn, highbush cranberry, black raspberry, red raspberry, tartarian honeysuckle, staghorn sumach, wild grape.	A mainly continuous hedgerow running west to east (from intersection of Units 1 and 5) along a fence line bordering the property. From the west edge, the tree mix is bitternut (to 55 cm DBH), basswood (to 45 cm DBH), maple (to 50 cm DBH)and elm (to 30 cm DBH). These are present as clumped or scattered single specimens often associated with a moderate to dense shrub layer. Some open sections occur and these have a predominately forb/graminoid cover, though some dense wild grape patches are found. The hedgerow character changes to the east to a more open forb/graminoid (with some shrub presence) and less tree cover. Specimens are smaller (most less than 30 cm DBH, with the exception of a couple of 60 cm DBH pines) and the tree mix is a maple/elm with some pine and cherry.
3	Hedgerow	White elm, Manitoba maple, black cherry, red raspberry, gooseberry, wild grape.	Predominately forb/graminoid hedgerow running north and south between Unit 2 and 4. Scattered solitary specimens of the tree species with the largest to 50 cm DBH (a senescing black cherry) and the others between 10 and 30 cm.
4	Hedgerow	Manitoba maple, white elm, bitternut hickory, black cherry, apple, sugar maple, hawthorn, red-osier dogwood, silky dogwood, alternate-leaf dogwood, gooseberry, elderberry, red raspberry, black raspberry, honeysuckle, wild grape.	This is a double hedgerow, running west to east, lining both sides of an old farm laneway. The west portion begins near the remains of an old barn. Both sides have a dense covering of young Manitoba maple (to 15 cm DBH) with some elm and cherry and dogwood and grape mixed in. The maple specimens get a little larger (to 45 cm DBH) as you progress to the east, with more frequent elm and some hawthorn. Dogwood provides a moderate to dense shrub layer and this is enhanced by contributions from raspberry, gooseberry and wild grape. Towards the east end the specimens become much smaller (to 15 cm DBH) more spaced out with shrub dominated and forb/graminoid covered sections before it intersects with the woodland/wetland edge.
5	Hedgerow	Basswood, bitternut hickory, Manitoba maple, white elm, black cherry, tartarian honeysuckle, red raspberry, black raspberry, elderberry, wild rose, hawthorn, wild grape.	This is a mainly continuous hedgerow running north and south along a fence line between Units 2 and 4. At the south end (starting at the intersection with Unit 2), is a mix of hickory, elm, basswood and maple (to 60 cm DBH) with a moderately dense shrub layer of honeysuckle and wild grape. Towards the centre, the mix becomes more basswood and maple and fewer hickory (specimens to 70 cm DBH) and some open forb/graminoid/wild grape sections. The north portion is much more open with smaller specimens (to 15 cm DBH) of maple and elm and hawthorn with honeysuckle and grape underneath.

6	Hedgerow	Manitoba maple, bitternut hickory, white elm, pin cherry, black cherry, apple, red raspberry, black raspberry, red-osier dogwood, hawthorn, buckthorn, staghorn sumach, willow, wild grape.	Mainly continuous hedgerow running north to south along a fence line between Units 4 and 9. Tree cover is dense through the majority of the hedgerow length and is predominately Manitoba maple (to 30 cm DBH) with mixes of the other species noted and a dense shrub layer. A small shrub/sapling thicket occurs at the intersection with Unit 10.
7	Hedgerow	Black cherry, Manitoba maple, pin cherry, apple, red raspberry, hawthorn, buckthorn, elderberry, wild rose, wild grape.	Predominately an open forb/graminoid hedgerow with some scattered tree specimens running north and south between Units 4 and 9. Tree specimens to 35 cm DBH and found mainly in the south half.
8	Hedgerow	Manitoba maple, pin cherry, white elm, green ash, white birch, black cherry, red-osier dogwood, black raspberry, red raspberry, elderberry, gooseberry, buckthorn, hawthorn, wild grape.	Mixed tree and forb/graminoid hedgerow running north and south between Units 4 and 9. The largest tree specimen is an 85 cm DBH green ash near the mid section with the others ranging from 10 to 65 cm DBH.
9	Hedgerow	Norway spruce, black cherry, basswood, apple, Manitoba maple, trembling aspen, cottonwood, white elm, white birch, white cedar, green ash, pin cherry, bitternut hickory, hawthorn, buckthorn, red-osier dogwood, alternate-leaf dogwood, red raspberry, tartarian honeysuckle, highbush cranberry, wild grape.	Continuous hedgerow running west to east adjacent to road allowance along the north boundary of the property. The west portion begins with a mix of spruce and cherry (to 45 cm DBH) with a dense undergrowth of maple saplings and honeysuckle. This gradually changes to a mix of maple, basswood, ash and elm (to 60 cm DBH) with a dense undergrowth of saplings of these as well as honeysuckle, highbush, dogwood and raspberry. Further to the east is a mix of cherry, elm, ash, poplar and birch (to 40 cm DBH) with a moderate understorey cover of saplings, raspberry and dogwood.
10	Hedgerow	Manitoba maple, white elm, honeysuckle, dogwood, wild grape.	Small hedgerow running west to east and intersecting with Unit 6. Predominately forb/graminoid cover with small scattered tree specimens to 20 cm DBH.
11	Residential Landscape	Black walnut, apple, white cedar, white birch, lilac.	Plantings associated with old residence. Specimens to 50 cm DBH.
12	Hedgerow	Norway spruce, Manitoba maple, walnut, white pine, trembling aspen, sumach, buckthorn, wild grape.	Continuous three sided hedgerow of predominately norway spruce (to 25 cm DBH) and infrequent specimens of the other species noted.
13	Mixed tree/shrub swamp	White cedar, balsam poplar, trembling aspen, larch, birch, willow, white elm, white pine, balsam fir, red-osier dogwood, alder, buckthorn, spirea, silky dogwood, wild grape.	A mixed tree/shrub woodland located at the northeast portion of the property. The area contains mosaics of dense young cedar (to 10 cm DBH) with scattered larch (to 40 cm DBH) and the various shrubs mixed in, open sedge dominated portions with less frequent scattered larch (to 40 cm DBH), concentrations of dense shrub thickets, and small larch concentrations (to 35 cm DBH).
14	Mixed woodland transitional edge	White cedar, trembling aspen, white elm, black cherry, white pine, white birch, green ash, red raspberry, red-osier dogwood, wild grape.	Transitional woodland edge, between agricultural field, lowland mixed woodland and upland mix. Specimens to 35 cm DBH.

15	Upland mixed woodland	Hemlock, white pine, white cedar, black cherry, balsam fir, white birch, white ash, sugar maple, trembling aspen, red maple, green ash, beech, ironwood, red-osier dogwood, choke cherry, alternate-leaf dogwood, wild grape.	Upland mixed community on a knoll in the east portion of the property. The northward facing slope is predominately cedar (to 55 cm DBH) mixed with pine, hemlock and ash. The south and east slopes are more of a mixed mosaic of sugar maple, cherry, beech, hemlock, ironwood and ash (to 75 cm DBH). Understorey growth is sparse to moderate due to varying density of the canopy closure.
16	Mixed transitional woodland	Balsam fir, black ash, white cedar, green ash, red maple, trembling aspen, balsam poplar, hemlock, white pine, willow, red-osier dogwood, silky dogwood, alternate-leaf dogwood, elderberry, wild grape.	Transitional mixed woodland between upland community, old-field and swales and wetland community. Mosaics of cedar concentrations, mixed shrub/sapling sections with scattered larger trees (to 45 cm DBH), and concentrations of mixed tree specimens (to 40 cm DBH).
17	Upland mixed woodland/old-field	White pine, hemlock, beech, white ash, green ash, black cherry, ironwood, white birch, red-osier dogwood, choke cherry, wild grape.	Upland mixed community on a knoll located in the southeast portion of the property. The west side of the slope has a small old-field community being gradually overtaken by dogwood and pine (to 8 cm DBH). The upper portions of the slope is a mix of beech/sugar maple/black cherry/hemlock (to 55 cm DBH) with a sparse understorey. This mix changes sugar maple\ash\birch\ hemlock to the northeast and then to a red maple\ash\birch\ balsam fir mix as it grades into Unit 16. South and east is a small draw with a predominately hemlock cover (to 40 cm DBH) mixed with birch and then it slopes up to Unit 19.
18	Shrub dominated swamp/swale	White cedar, trembling aspen, red-osier dogwood, willow, wild grape.	A dense shrub dominated swamp and swale in a natural draw running southwest to northeast.
19	upland mixed woodland	Hemlock, white birch, sugar maple, balsam fir, green ash, black cherry, white pine, white cedar, trembling aspen, choke cherry, red-osier dogwood, willow, red raspberry, gooseberry, wild grape.	This unit is an upland mixed community on a knoll located at the southeast corner of the property. The basic mix is sugar maple/cherry/hemlock/pine with specimens to 70 cm DBH. The west slope is dense cedar (to 15 cm DBH) coming up from Unit 18, changing to a hemlock/pine/ash/poplar mix near the top (specimens to 75 cm DBH) with sparse undergrowth.
20	Tree dominated swamp	Red maple, white cedar, black ash, balsam poplar, trembling aspen, green ash, black ash, larch, white pine, red-osier dogwood, silky dogwood, elderberry, spirea, willow, alder, wild grape.	This area is the wetland swamp which has the stream running through it. It is only a small portion of the very large Class 1 wetland complex. In this portion, however, is the classical swamp mix of red maple dominated swamp (specimens to 45 cm DBH), black ash concentration portions, cedar concentrations, dense shrub dominated thickets, and open sedge dominated portions. Of course ecotonal gradations between these types occur.

The high percentage (55%) of hedgerows reflects the previous agricultural usage of the site.

Table B, Appendix B lists the species noted on the site by common and scientific name. The species mix and specimen sizes are indicative of the past and present usage of the site (the most frequent species being Manitoba maple with specimens less than 30 cm DBH), though in the southwest quite a few good size bitternut hickory were noted. The upland areas, adjacent to the wetland, while small, contained a well

balanced size and species mix with several quite large specimens of maple, hemlock, and cedar noted. No significant species nor honour role trees were identified, however it should be emphasized that the site-specific observations do not include a complete list of species on the site since:

1) the intent of this investigation was to provide a general characterization of natural features associated with the Site;

2) the site visit was undertaken in one season only and, therefore, some species which otherwise are present would be absent;

3) the observers may overlook some species and be differentially familiar with various taxonomic groups.

3.4.2 Wetland/Aquatic Features

A portion of the Mill Creek, Class 1 Provincially Significant Wetland Complex, is located within the east portion of the site. According to the Ontario Ministry of Natural Resources (MNR) evaluation record, dated 1984, the Mill Creek Complex contains 48 discrete wetlands (95% listed as swamp) and covers a total size of 1452.9 ha. The portion within the site is 16.8 ha or approximately 1% of the total area.

Aberfoyle Creek, a tributary of Mill Creek, classified as a cold water stream, traverses through the northeast corner of the site within the wetland boundaries (Figure 3). A smaller side tributary, which appears to begin within the wetlands at the southeast portion of the site, joins with the main channel at the point where it turns to the east (Figure 3). A review of the 1:10,000 OBM map (based upon 1982 photography, MNR) shows that the section of Aberfoyle Creek upstream of McLean Road is considered to be intermittent (illustrated as a dashed line). The section downstream of McLean Road to the Mill Creek Pond at Aberfoyle is considered to be permanent. No background information appeared to be available on the stretch of the stream upstream of County Road 23 to Victoria Road, however, limited information was available on Aberfoyle Creek at County Road 23. Flow data (gathered as part of the Mill Creek Watershed Study by CH2M Hill Engineering Limited) was available for Aberfoyle Creek, one concession lot downstream (at County Road 23) of McLean Road.

Mill Creek Flow Data, CH2M Hill		
STATION	**DATE**	**FLOW (m^3/s)**
MC07	7/6/93	0.0430
MC07	8/11/93	0.0400
MC07	8/30/93	0.0290
MC07	5/11/94	0.1052
MC07	6/10/94	0.0381
MC07	9/12/94	0.0400

Aberfoyle Business Park
Environmental Implementation Report
Township of Puslinch

REFER TO TABLE 'A' FOR UNIT DESCRIPTIONS

8 PHYSIOGNOMIC UNITS
Scale 1:4000

Figure No. 2

MAY 5 1995 C:\STORE\S241FG5.DWG

The results show that for the period of a little more than a year, except for an obvious freshet event in May of 94, the flow rate is relatively stable. This factor would indicate the strong possibility of stable groundwater input from the area downstream of McLean Road, if indeed the stream section upstream of McLean Road is intermittent.

The Grand River Conservation Authority (GRCA) have temperature information (Stanfield, 1985) on Aberfoyle Creek at Sideroad 23. This data shows that in 1984, for July and August, the maximum temperature reached was 17.2^0 C showing that this section falls within the cold water classification.

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WETLAND BOUNDARIES
Scale 1:10000

Figure No. 3

Aberfoyle Business Park
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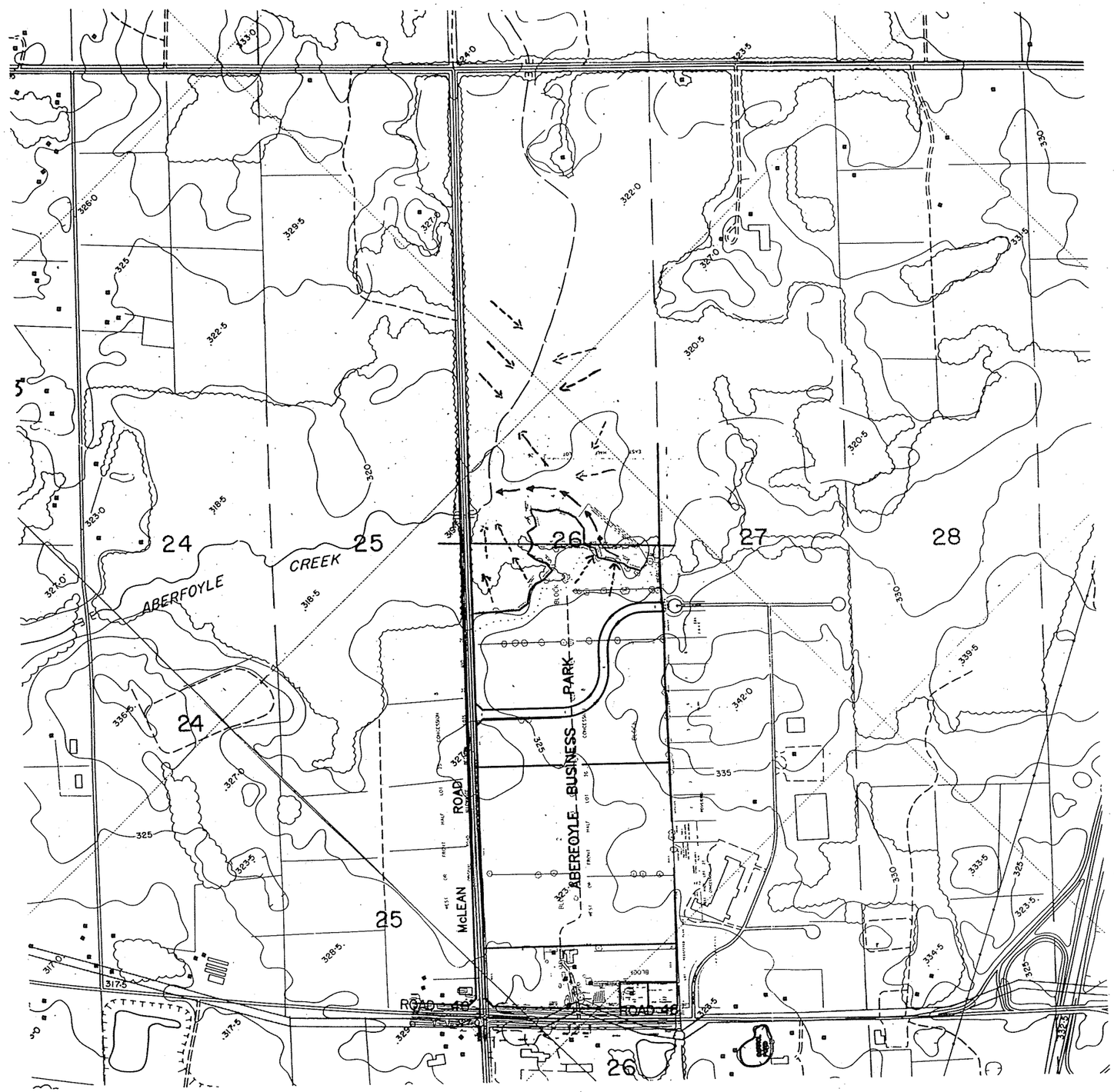

WETLAND MICRO-DRAINAGE PATTERN

Figure No. 3a

4.0 PROPOSED DEVELOPMENT

The approved Draft Plan (Figure 4) illustrates the mix of highway commercial development adjacent to Wellington County Road No. 46, the blocks set aside for industrial lot, the stormwater management areas and the internal road. It also shows Wellington County Road No. 46 and McLean Road as adjacent arterial roads.

The layout of the lands zoned for industrial use allows the flexibility of tailoring the size of the lot required to the needs of the industry locating within this development. The minimum lot size is 1.0 hectares.

4.1 Water Supply

Each industry locating within the Aberfoyle Business Park will be required to drill a private well to supply the water needs of the industry.

4.2 Sanitary

Sanitary services for each industry will provided by the construction of a septic system to the requirements of the Guelph/Wellington/Dufferin Health Unit and the Ministry of the Environment and Energy.

4.3 Stormwater Management

Stormwater management for the development will be provided through a two stage process.

Each industrial lot will carry out on-site quality and quantity controls as detailed in Section 6.2(a). The maintenance and operation of the on-site stormwater management systems will be the responsibility of the individual property owner.

Two stormwater management ponds as detailed in Section 6.2(b) will be constructed to provide the quality and quantity control to meet the current Provincial and municipal criteria. These ponds will perform the final filtering, cleaning and polishing of the pre-treated runoff from the on-site stormwater management systems prior to release to the Carrol Pond or the Wetland outlets.

4.4 Site Constraints

Both drainage outlets for the proposed development have constraints that must be addressed.

The Carrol Pond has a contributing watershed of approximately 290 hectares. The Carrol Pond does not have a positive surface drainage outlet, i.e., storm runoff entering the pond is released through infiltration. The development of the lands around the Carrol Pond for commercial and industrial uses has imposed the constraint that the runoff volume from any proposed development must be maintained at the pre-development rates.

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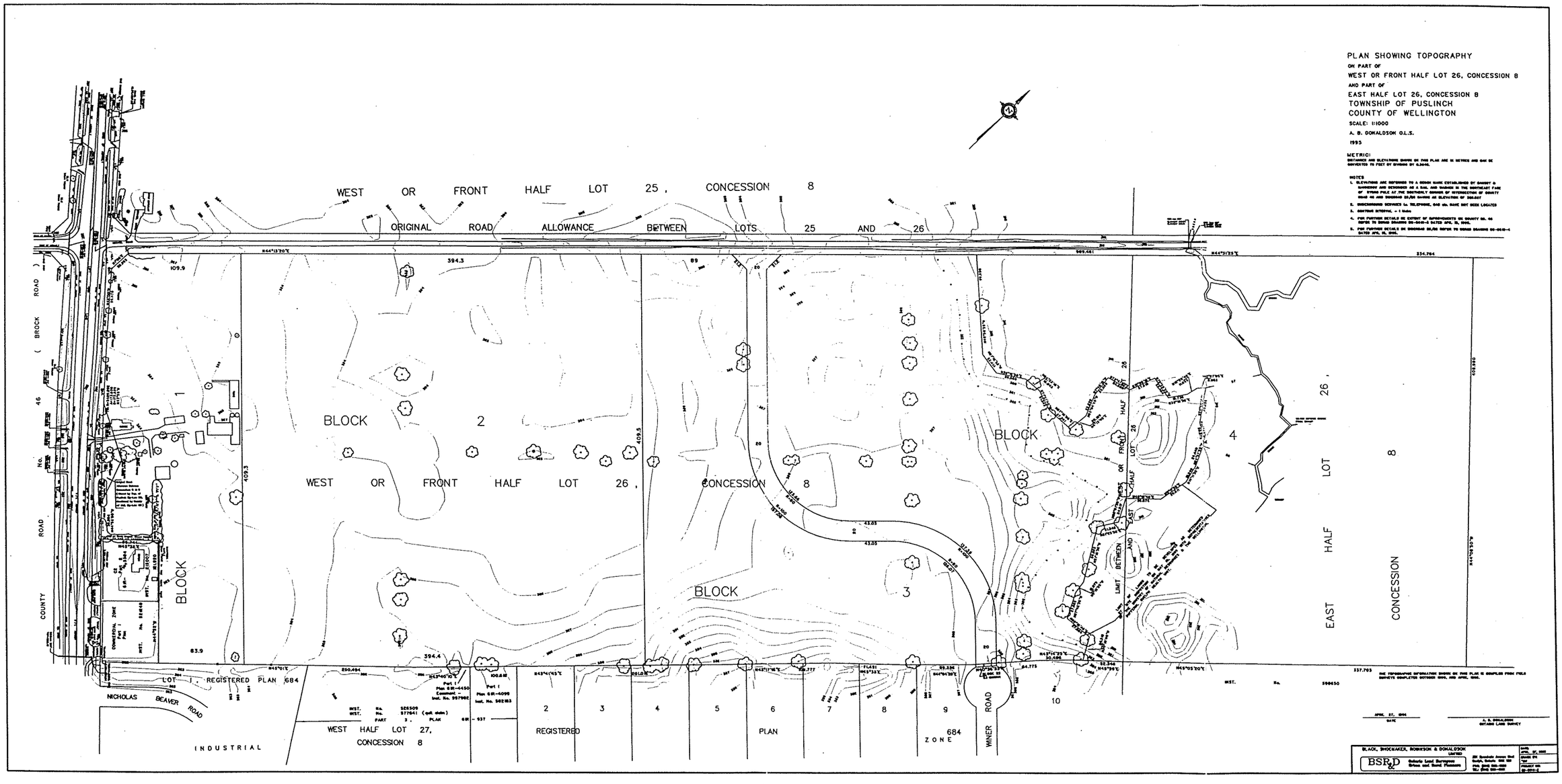

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Figure No. 4

The Wetland outlet drains to a wetland (Mill Creek, Class I, Wetland Complex) with a section of a cold water tributary (Aberfoyle Creek). The constraint for the Wetland outlet is to manage the storm runoff to meet the Interim Stormwater Quality Guidelines for New Development while minimizing any potential impact to the wetland.

5.0 STORMWATER MANAGEMENT CRITERIA

The studies, policies and guidelines used to develop the stormwater management plan for the Aberfoyle Business Park were as follows:

1) The Stormwater Management Practices Planning and Design Manual, 1994
2) The Interim Stormwater Quality Control Guidelines, 1991
3) The Stormwater Quality Best Management Practices Manual, 1991
4) The MTO Drainage Management Technical Guidelines, 1989
5) The Ontario Urban Drainage Design Guidelines, 1987

The method used to evaluate and design the stormwater management plan was as follows:

The mass rainfall data for the "first flush" design storm was generated using a two hour duration rainfall event. A three hour duration rainfall event was used to generate the mass rainfall data required to model the 5 and 100 year design storms. The Chicago parameters and the total depth of rainfall for each storm are as follows:

	First Flush	5 Year	100 Year
a =	743.000	1,593.000	4,688.000
b =	6.000	11.000	17.000
c =	0.799	0.879	0.962
r =	0.400	0.400	0.400
td =	120.000	180.000	180.000
Rainfall depth (mm)	31.200	47.200	87.300

The SCS infiltration method was used for the pre-development runoff calculations. Runoff coefficients of 0.2 and 0.9 were used for the pervious and impervious surfaces respectively. The MIDUSS program was used to determine the SCS Curve Numbers used in the infiltration calculations.

The Horton infiltration method was used in the post-development runoff calculations. The parameters used in MIDUSS were as follows:

	Impervious Areas	Pervious Areas
Maximum Infiltration	0.0 mm/hr	76.0 mm/hr
Minimum Infiltration	0.0 mm/hr	13.0 mm/hr
Lag Constant	0.0 hr	0.25 mm/hr
Depression Storage	1.5 mm	5.00 mm

The hydrologic model MIDUSS was used to create the runoff hydrographs and to route the flows through the storage structures.

6.0 STORMWATER MANAGEMENT PLAN

6.1 Pre-Development Conditions

Figure 5 shows the pre-development drainage catchments within the Aberfoyle Business Park.

Under existing conditions, 24.8 hectares of the 52.6 hectare Aberfoyle Business Park site drains to the Carrol Pond. The average grade of this catchment is 1.0%. The drainage outlet for this part of the site is a pipe/swale system located in the southwest corner of the property.

The easterly part of the Aberfoyle Business Park site is comprised of 16.8 hectares of wetland. The limit of development along the wetland has been identified on the Draft Plan prepared by Black, Shoemaker, Robinson and Donaldson Limited in consultation with representatives from the Ministry of Natural Resources. Also identified, on the Draft Plan, is the location of the creek through the rear of the property.

The remaining 11.0 hectares of development land on the Aberfoyle Business Park site drains to the Wetland outlet. The average gradient through this part of the site is 2.0%. Storm runoff is uniformly distributed along the wetland edge in the northeast and southeast corners of the site.

Table 1 lists the total flow rate and the total runoff volume draining to the pre-development outlets under the "first flush", 5 year and 100 year design storms.

Table 1: Uncontrolled Flow Rate and Runoff Volume (Total)

Design Storm	Carrol Pond Outlet		Wetland Outlet	
	Flow Rate m^3/s	Runoff Volume m^3	Flow Rate m^3/s	Runoff Volume m^3
First Flush	0.07	1,286	0.06	571
5 Year	0.21	2,983	0.16	1,325
100 Year	0.98	8,910	0.76	3,955

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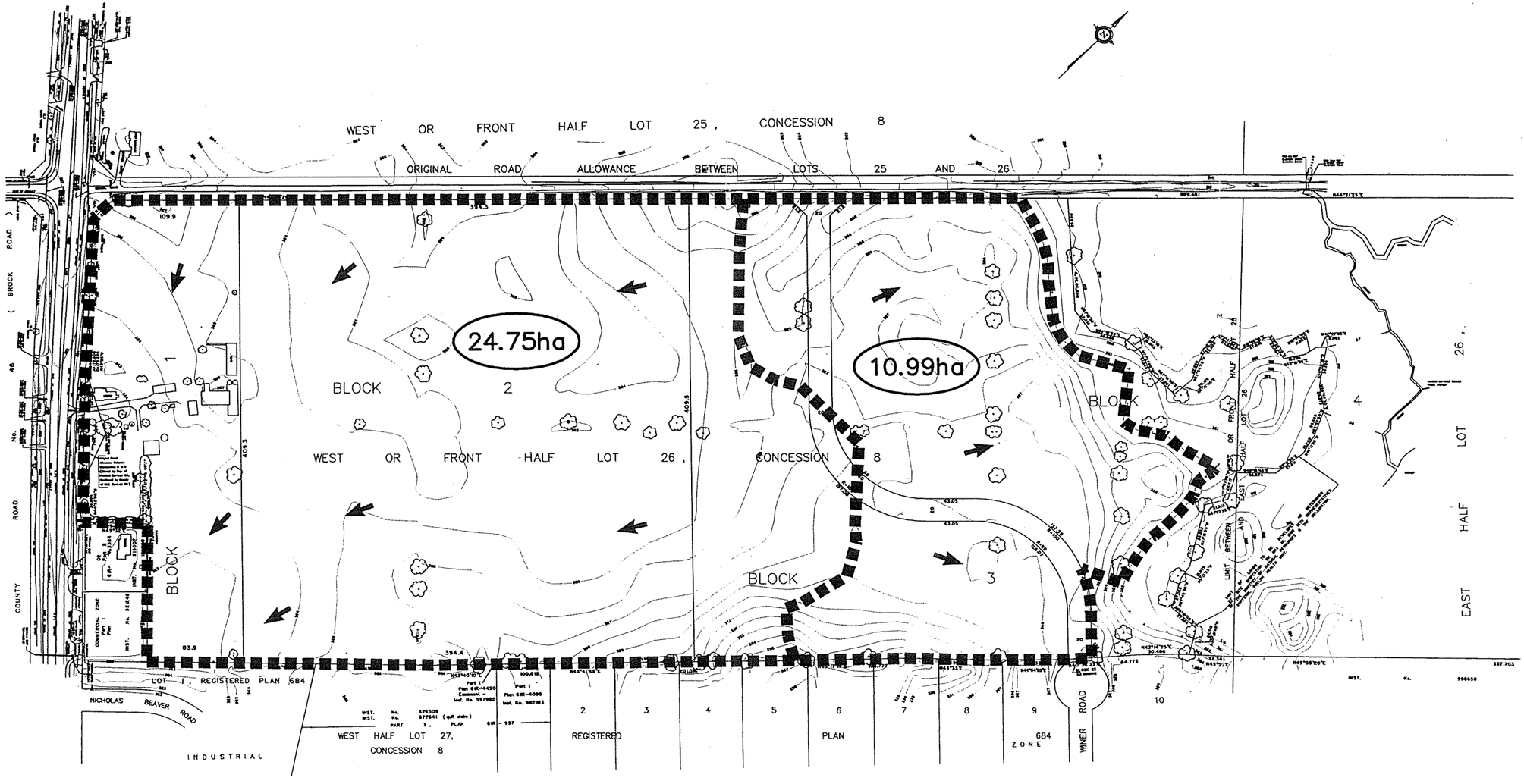

PRE-DEVELOPMENT DRAINAGE AREAS

Figure No. 5

JUNE 21 1995 S241FG3.DWG

6.2 Post-Development Conditions

Figure 6 shows the post-development drainage catchments within the Aberfoyle Business Park.

After development, 8.4 hectares will drain to the Carrol Pond outlet. The reduction of the pre-development drainage area (24.8 hectares) is required to maintain the volume of runoff at pre-development rates. The low soil permeabilities will limit the opportunities for recharge after the site has been regraded. The average grade of this catchment will be 1.0%. The drainage outlet for this part of the site is a pipe/swale system located in the southwest corner of the property.

The remaining 27.4 hectares of development land will drain to the Wetland outlet. The average gradient through this part of the site will be 1.0%. The runoff released from the stormwater management facility will be uniformly distributed along the wetland edge in the northeast and southeast corners of the site.

The easterly part of the Aberfoyle Business Park site is comprised of 16.8 hectares of Class I wetland. No encroachment will be allowed into this area.

The stormwater management will be achieved through a two stage process. Stage I will occur on the individual lots as described in Section 6.2(a). Quality controls will pre-treat the storm runoff prior to release to the municipal drainage system. Quantity controls will maintain the pre-development flow rates to the municipal stormwater management systems located at the Carrol Pond and the Wetlands outlets.

Stage II will provide the necessary end-of-pipe quality and quantity controls to meet the Interim Stormwater Quality Guidelines for New Development, the conditions of Draft Plan Approval and the site constraints of the development. These controls are described in Section 6.2(b).

a) On-site Controls

A site plan and a stormwater management report will be prepared under Section 41, The Planning Act and submitted to the Grand River Conservation Authority, the Ministry of Natural Resources, the Ministry of the Environment and Energy and the Township of Puslinch for review and approval prior to the issuing of building permits. The criteria for the stormwater management report will be as follows:

i) Quality Controls

Oil/Grit separators or other appropriate methods will be installed in paved parking lot areas for sediment/contaminant removal prior to discharging to the on-site quantity control system.

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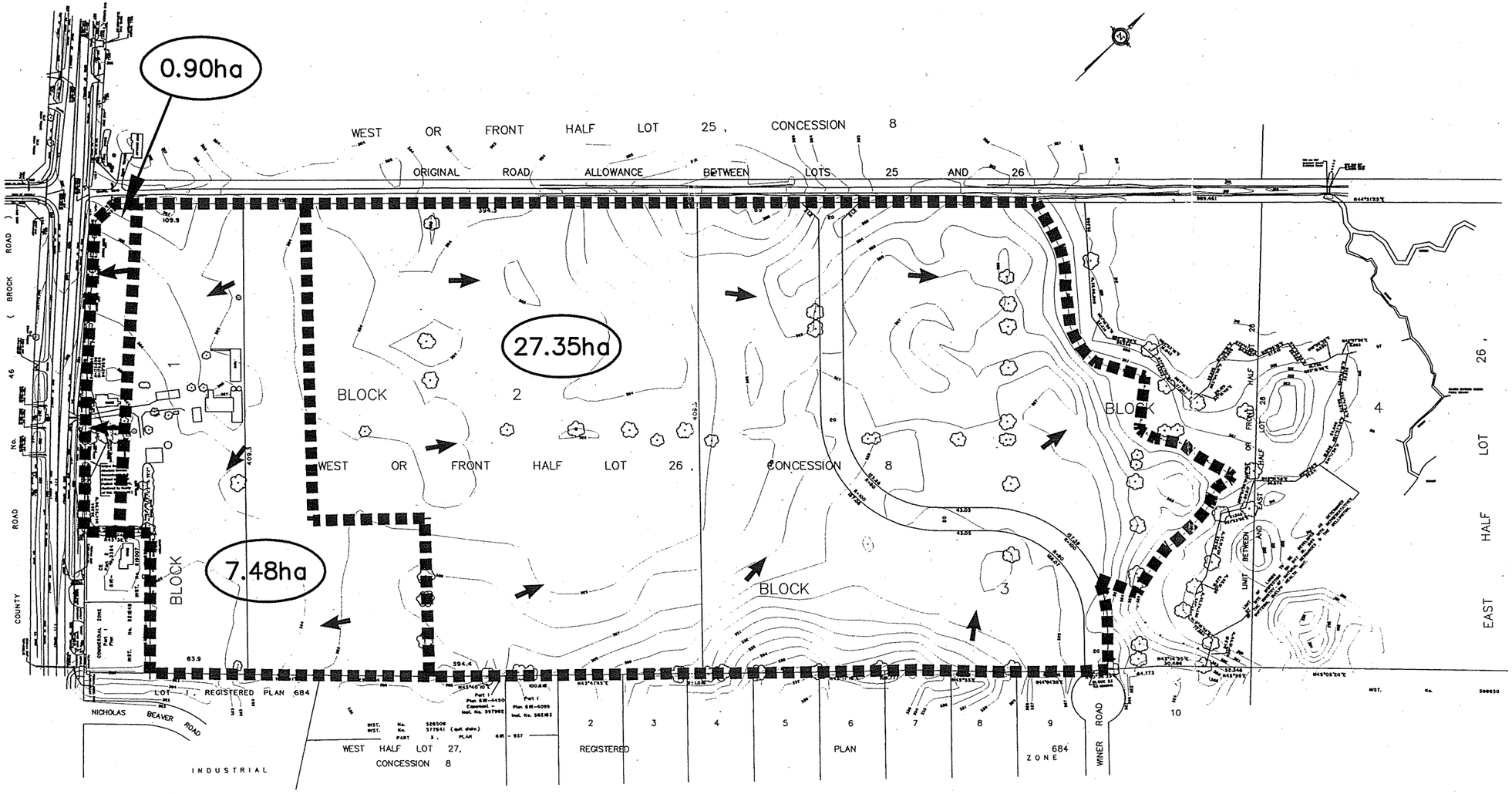


CARROL POND

POST-DEVELOPMENT DRAINAGE AREAS

Figure No. 6

JUNE 21 1995 C:\STORE\S241FG4.DWG

Grassed filter strips/swales or other appropriate methods will be used to pre-treat runoff discharging from gravel parking or storage areas to the on-site quantity control system.

Where soils conditions make it practical, runoff from roof and landscaped surfaces will be recharged.

ii) Quantity Controls

Adequate control will be provided, on-site, to attenuate the flows from the 2 to 100 year design storms to the allowable release rates outlined in Table 2.

Table 2: Allowable Release Rates - On-site Controls

Design Storm	Carrol Pond Outlet	Wetland Outlet
	Flow Rate $m^3/s/ha$	Flow Rate $m^3/s/ha$
2 Year	0.003	0.005
5 Year	0.008	0.015
100 Year	0.039	0.069

The criteria and methods outlined in Section 5.0 of this report will be used to establish the infiltration and runoff rates for the on-site stormwater management systems.

iii) Other Considerations

Each industrial property will prepare a spill containment plan identifying the areas and methods to be used to contain an accidental spill of potentially hazardous material.

A maintenance plan will be prepared outlining an inspection and maintenance schedule to preserve the on-site quality and quantity control systems in reasonable operating condition. A yearly inspection and maintenance report will be submitted to the Chief Building Officer for the Township of Puslinch.

An erosion and sediment control plan will be prepared outlining how sediments will be retained on-site during the construction period.

A landscape plan will be submitted as part of the site plan approval submission.

b) End-of-Pipe Controls

The end-of-pipe stormwater management controls will provide quality control to meet the current Provincial requirements. The pre-treated runoff from the on-site stormwater management systems will be routed through flat grassed swales and roadside ditches (average swale grade 0.5%) to the end-of-pipe control ponds for filtering, cleaning and polishing before being released to either the Carrol Pond or the Wetland outlet.

The end-of-pipe system will have adequate quantity control capacity to hold and release the runoff from the development at the pre-development rates for the 2 to 100 year design storms.

The components of the end-of-pipe systems are as follows:

i) Carrol Pond Outlet

Quality Control

The extended detention dry pond (Drawing A) selected for this location will be graded to create an inactive storage area in the central part of the pond. An artificial marsh component (Figure 7) will be planted in this area to supply final cleaning and polishing of the pre-treated runoff from the adjacent on-site stormwater management systems.

The pond has been sized to store and detain the "First Flush" (25 mm) rainfall event to the cold water fishery criteria set out in the Interim Stormwater Control Guidelines for New Development.

Quantity Control

The post-development drainage catchment (Figure 6) has been reduced from 24.8 hectares (pre-development) to 8.4 hectares (post-development). The purpose of this reduction is to maintain or reduce the volume of runoff to the Carrol Pond outlet. The pre-development runoff volume of 8910 m^3 has been reduced to 6644 m^3 after development.

All design storms up to the 100 year event have been over-controlled due to the outlet constraints of the Carrol Pond outlet (west pond). A 200 mm diameter outlet will be used to release all controlled flows for the "First Flush" to 100 year design storms.

The pond has been sized with adequate capacity to provide the necessary quantity control for the highway commercial development adjacent to the north end of the pond. The highway commercial properties will provide, on-site, the required quality controls outlined in Section 6.2(a)(i) of this report.

An overflow weir will be constructed at the south end of the pond to convey the flow from events exceeding the 100 year event to the Carrol Pond outlet.

Table 3 lists the total flow rate and the total runoff volume draining to the Carrol Pond outlet under the "first flush", 5 year and 100 year post-development design storms. It is noted that the flows indicated do not account for the attenuation to pre-development levels being provided by the on-site stormwater management systems.

Table 3: Uncontrolled Flow Rate and Runoff Volume (Total)

Design Storm	Carrol Pond Outlet	
	Flow Rate m^3/s	Runoff Volume m^3
First Flush	1.15	2,123
5 Year	1.78	3,376
100 Year	3.69	6,644

Table 4 compares the routing of the uncontrolled flows with the available stage/storage/ discharge capacities at the Carrol Pond outlet:

Table 4: Carrol Pond Outlet - Stage/Storage/Discharge Comparison

Control Point	Available Capacity			Actual Capacity Used		
	Peak Flow m^3/s	Storage Volume m^3	Storage Elev. m	Peak Flow m^3/s	Storage Volume m^3	Storage Elev. m
Pond Bottom	0.00	0	322.50			
First Flush	0.05	2,000	322.80	0.04	1,848	322.78
5 Year	---	---	---	0.05	2,924	322.93
100 Year	---	---	---	0.08	5,997	323.36
Weir	0.09	6,286	323.40			
Top of Berm	2.06	7,039	323.50			

The estimated "draw down" time for the "first flush" storm is 30 hours, for the 5 year storm is 33 hours and for the 100 year storm is 41 hours.

The cross-sections on Drawings A indicate the storage elevations for the "first flush", 5 year and 100 year design storms.

ii) **Wetland Outlet**

Quality Control

An extended detention wetland pond was selected to manage the stormwater at the Wetland outlet (east pond). The pond has been sized to store and detain the "First Flush" (25 mm) rainfall event to the cold water fishery criteria set out in the Interim Stormwater Control Guidelines for New Development.

The municipal conveyance system for the development consists of flat grassed swales and roadside ditches. The swales/ditches will be graded at 0.5% with minor exceptions near the property boundary and 3:1 side slopes.

An inlet pool with a 3:1 length/width ratio will be constructed at the outlet from the municipal swale system. The maximum depth of the inlet pond will be 1.35 metres. Drawings B and C show the configuration of the inlet pool and a cross-section details through the pool. The inlet pool will serve to dissipate the flow velocities entering the pond and to remove silts and sediments.

The pond bottom will be graded operationally flat to an elevation of 322.10. All detention storage has been provided above this elevation. Below the operational level the pond bottom will be micro-graded to create a series of shallow pools with an average depth of 0.3 metres. Drawing F shows the plantings recommended.

Two outlet pools will be constructed as shown on Drawings B and C. The maximum depth of the outlet pool will be 1. 8 metres. Two 200 mm diameter bottom draw outlet structures will be installed 0.45 metres from the outlet pool bottom to discharge the quality control storm runoff.

The berm along the east side of the pond will parallel the Regional flood line contour with a 3 metre offset and a top of berm elevation 322.80. A 90 metre long energy dissipation/distribution trench will be installed at each outlet location. The outlet locations have been selected to coincide with the natural discharge areas.

The easterly toe of the berm is an average of 15 to 20 metres from the existing vegetated edge. This area is now ploughed and cropped. The landscape plan on Drawing F details the plantings proposed to further buffer the wetland edge.

Quantity Control

The drainage catchment has been increased in size from 11.0 hectares (pre-development) to 27.3 hectares (post-development). To compensate for the increased runoff volume, extended detention of all design storms to the pre-development rates for the existing drainage catchment has been incorporated in the design of the stormwater management system.

Four 375 mm diameter control structures will be installed as shown on Drawings B and C. The outlet control structures will discharge to the energy dissipation/dispersion structures. The discharge will the be uniformly distributed to the natural drainage outlet.

Two 60 metre long weirs aligned with the energy dissipation/dispersion structures will be used as emergency overflow to release flow volumes exceeding the 100 year design storm.

Table 5 lists the total flow rate and the total runoff volume draining to the Wetland Pond outlet under the "first flush", 5 year and 100 year post-development design storms. It is noted that the flows indicated do not account for the attenuation to pre-development levels being provided by the on-site stormwater management systems. The impact will be that slightly lower peak flows occur with the same runoff volume arriving at the Wetland Pond.

Table 5: Uncontrolled Flow Rate and Runoff Volume (Total)

Design Storm	Wetland Outlet	
	Flow Rate m^3/s	Runoff Volume m^3
First Flush	3.43	6,924
5 Year	5.17	11,039
100 Year	10.37	21,681

Table 6: Wetland Outlet - Stage/Storage/Discharge Comparison

Control Point	Available Capacity			Actual Capacity Used		
	Peak Flow m^3/s	Storage Volume m^3	Storage Elev. m	Peak Flow m^3/s	Storage Volume m^3	Storage Elev. m
Pond Bottom	0.00	0	322.10			
First Flush	0.08	8,991	322.40	0.06	6,481	322.32
5 Year	---	---	---	0.08	10,213	322.45
100 Year	---	---	---	0.73	17,041	322.67
Weir	0.75	17,893	322.70			
Rear Lot Line	6.10	20,968	322.80			

The cross-sections on Drawings C indicate the storage elevations for the "first flush", 5 year and 100 year design storms.

The estimated "draw down" time for the "first flush" storm is 34 hours, for the 5 year storm is 38 hours and for the 100 year storm is 48 hours.

7.0 ECOLOGICAL ASSESSMENT

7.1 Terrestrial Environment

The terrestrial features identified on the site have been shown to reflect the past and present land use (agricultural) and the presence of a wetland.

The proposed development requires a major regrading of the site with an attendant loss of the on-site vegetation in physiognomic units 1 through 12.

No direct removal will occur in Physiognomic Units 13 through 20.

As indicated in Section 3.4.1, no significant species or specimens were identified. It is suggested however, that an attempt be made at retaining the larger hickory trees noted in Physiognomic Unit 2.

Section 8.0 discusses a landscape strategy which will replace the current woody vegetation which will be removed.

7.2 Wetland/Aquatic Features

A portion (16.8 ha or approximately 1%) of the Mill Creek Class 1 Wetland Complex is located on the site. The proposed development will not physically encroach into the wetland boundaries, in fact, no physical disturbance will occur past the regional flood line (Drawing B) resulting in an extra buffer strip which ranges from 15 to 20 metres.

There will, however, be an impact from the stormwater drainage system proposed for the site. Section 6.0 discusses the details of the proposed stormwater design. From the information provided, there will be a substantial increase (Table 7) in total volume received by the wetland.

Table 7: Wetland Outlet Runoff Volume Summary Comparison

Design Storm	Wetland Outlet		
	Pre-Development (m^3)	Post-Development (m^3)	Increase Factor
First Flush	571	6,924	12.0
5 Year	1,325	11,039	8.0
100 Year	3,955	21,681	5.5

This volume increase ranges from a factor of 12 for the first flush, to a factor of 5.5 for the 100 year storm. Allowable release rates will, however, be kept at or below the pre-development flow rates. The draw down times for the first flush is 34 hours, the 5 year storm is 38 hours and the 100 year storm is 48 hours.

patterns (cloudy versus sunny, windy versus no wind, frequency of rain events), depth of pond, presence and abundance of vegetation, and release rate. The Wetland Pond outlets will have a maximum depth of 1.8 metres and have bottom draw outlet pipes which will serve to somewhat dampen the temperature fluctuations. The pond area itself will be reasonably well vegetated (Section 8) also helping to dampen the temperature elevation. Provincial policy requires a 30 metre buffer from cold water streams. In the present case, the main stream channel at the closest point is approximately 240 metres from the Regional storm line and the small tributary, flowing from the south, is 148 metres from the Regional storm line at the closest point (56 metres from the wetland boundary (Drawing B). Within this expanse is dense vegetation cover, flooded portions and suspected groundwater seepage. It is suggested that any elevation in temperature of the effluent from the Wetland Pond outlet will quickly be assimilated, long before it reaches the stream. Consequently, no adverse impacts are expected to occur.

Section 3.4 noted that the section of Aberfoyle Creek upstream of McLean Road (on-site) is considered to be intermittent and therefore not cold water habitat. However, the stream downstream of McLean Road is permanent and classed as cold water at the Sideroad 23 crossing. A stream characterization is presently underway on the main stream and tributary on-site and a portion of the section downstream of McLean Road (100 to 150 metres), as well as, a portion (80 to 100 metres) upstream of Side Road 23. This characterization and updating over the next few months will serve as a baseline to establish current conditions and refine impact predictions and aid in the development of a monitoring plan to measure any impacts that may occur once the plan is operational.

For the Carrol Pond, the proposed stormwater drainage design results in a reduction in the runoff volume from 8910 m^3 to 6644 m^3. Additionally, as mentioned earlier, the pond has been sized to store and detain the "First Flush" rainfall event to the cold water fishery criteria set out in the Interim Stormwater Control Guidelines for New Development even though the Carrol Pond is not a cold water habitat. No significant impact is expected to occur.

8.0 LANDSCAPE STRATEGY AND VEGETATION

The Aberfoyle Business Park will have several individual industrial lots privately owned. Each of the owners will design landscape plans according to their own requirements.

However, for the purposes of the present application, a landscape strategy needs to be developed for the south side of McLean Road and the internal access road (Winer Road), as well as the Wetland and Carrol Ponds.

8.1 General Road Landscaping

Section 7.0 discussed the woody vegetation presently found on-site, the majority of which will be removed to allow for the site grading.

It is recommended any planting scheme have regard for the native species that are presently doing well on-site and use those species to the extent possible. Two exceptions to this are Norway Spruce (*Picea abies*) which is presently doing very well on-site and Norway Maple (*Acer platanoides*) proven to be much more resistant to road salt, exhaust effluent, etc. than sugar maple.

For McLean Road, the planting should consist of a pattern of grouped clumpings, mixed with linearly spaced individuals. Spacing between groups or individuals should be 15 to 20 metres apart. At the west end, a mix of Norway Maple, Norway Spruce and Bitternut Hickory (in various combinations) is suggested with some tartarian honeysuckle and dogwood mixed in. Further down the road, as conditions get a bit more moist, Norway Maple, Green Ash and Cedar should be used with Highbush Cranberry and Dogwood.

Along Winer Road, the same concept of grouped clumpings and linearly spaced individuals should also be used. At each end the mix can be a Norway Maple, Cedar, Green Ash, however, in the more central portions and especially where the drainage swales occur, it would be more appropriate to go with a Green Ash, Cedar, Larch, Willow mix with Elderberry, Dogwood and Black or Pussy Willow.

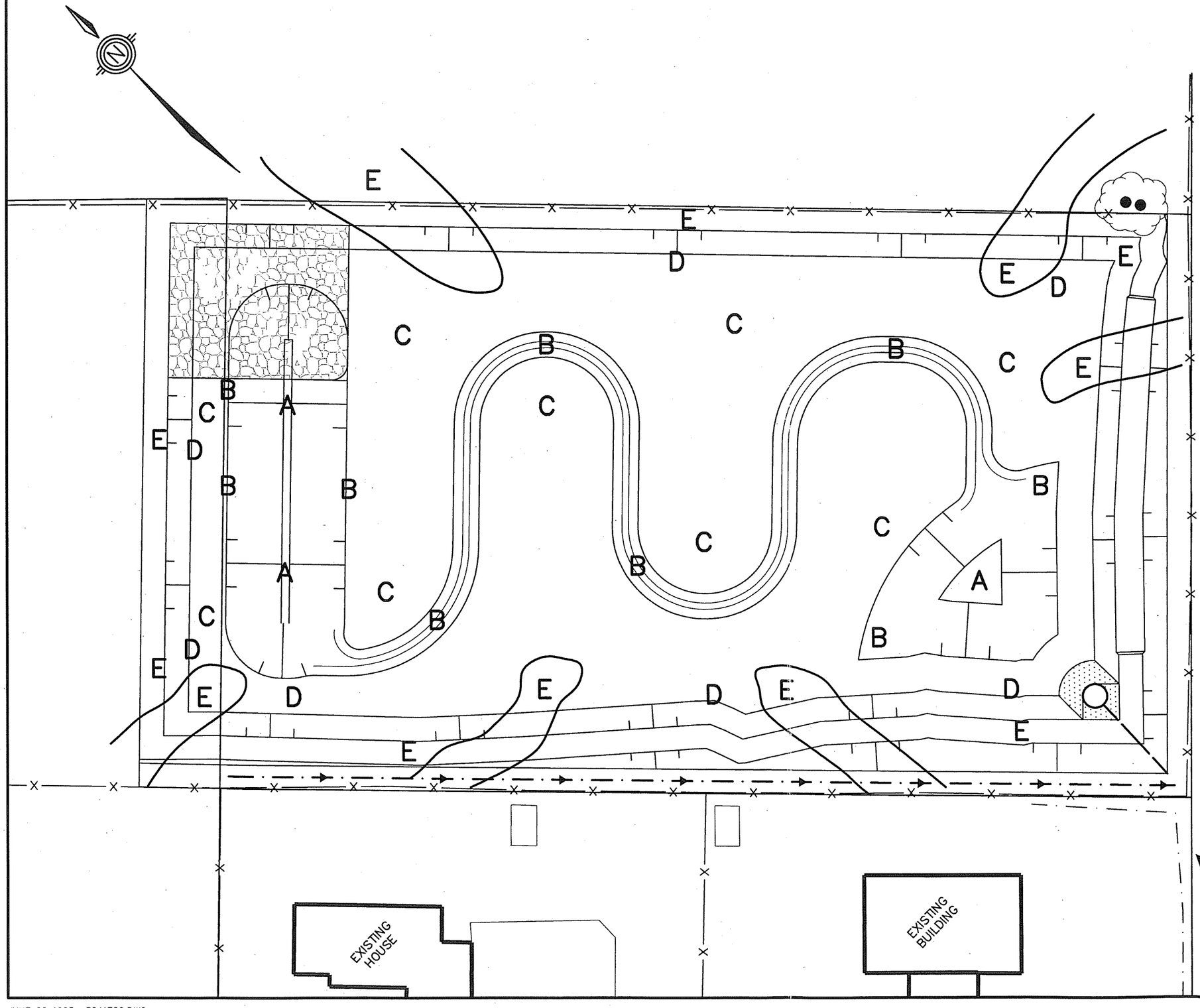
8.2 Wetland and Carrol Pond Landscaping

Suggested landscape plans for both the Wetland and Carrol Ponds are shown on Drawing F and Figure 7 respectively and listed in Tables C and D, Appendix "B".

Aberfoyle Business Park
Environmental Implementation Report
Township of Puslinch

LEGEND

A	> 40cm BELOW POND SURFACE
B	< 40 TO 10cm BELOW POND SURFACE
C	< 10 TO 10cm ABOVE POND SURFACE
D	FREQUENTLY FLOODED (BETWEEN FIRST FLUSH & 5yr.)
E	INFREQUENTLY FLOODED (ABOVE 5yr. BUT < 100yr.)



SEE TABLE ON Pg. 23 OF REPORT FOR REVISED PLANTING SCHEDULE

PLANTING ZONES

Scale 1:500

Figure No. 7

JUNE 22 1995 S241FG6.DWG

CARROL POND OUTLET

PLANTING ZONES	RECOMMENDED SPECIES	
	Common Name	*Scientific Name*
ZONE A- > 40 CM BELOW POND SURFACE	Water Lily	*Nuphar microphylla*
	Pondweed	*Potomageton pectinatus*
	Water-weed	*Elodea canadensis*
ZONE B -<40 TO 10 CM BELOW POND SURFACE	Water Arum	*Calla palustris*
	Bulrush	*Scirpus americanus*
	Bulrush	*Scirpus validus*
	Water Plantain	*Alisma triviale*
	Bur-reed	*Sparganium eurycarpum*
ZONE C -<10 TO >10 ABOVE POND SURFACE	Woolgrass	*Scirpus cyperinus*
	Reed Canarygrass	*Phalaris arundinacea*
	Black Willow	*Salix nigra*
	Red-osier Dogwood	*Cornus stolonifera*
ZONE D -FREQUENTLY FLOODED AREA (BETWEEN FIRST FLUSH & 5 YR)	Soft Rush	*Juncus effusus*
	Blue Joint	*Calamagrostis canadensis*
	Green ash	*Fraxinus pennsylvanica*
	Black Willow	*Salix nigra*
	Narrow-leaf Willow	*Salix exigua*
ZONE E -INFREQUENTLY FLOODED (ABOVE 5 YR BUT < 100 YR)	Switchgrass	*Panicum virgatum*
	Green ash	*Fraxinus pennsylvanica*
	Silky Dogwood	*Cornus ammomum*
	Elderberry	*Sambucus canadensis*
	Pussy Willow	*Salix discolor*

WETLAND POND OUTLET

PLANTING ZONES	RECOMMENDED SPECIES	
	Common Name	*Scientific Name*
ZONE A- > 40 CM BELOW POND SURFACE	Water Lily	*Nuphar microphylla*
	Pondweed	*Potomageton pectinatus*
	Water-weed	*Elodea canadensis*
ZONE B -<40 TO 10 CM BELOW POND SURFACE	Water Arum	*Calla palustris*
	Bulrush	*Scirpus americanus*
	Bulrush	*Scirpus validus*
	Water Plantain	*Alisma triviale*
	Bur-reed	*Sparganium eurycarpum*
ZONE C -<10 TO >10 ABOVE POND SURFACE	Woolgrass	*Scirpus cyperinus*
	Reed Canarygrass	*Phalaris arundinacea*
	Black Willow	*Salix nigra*
	Red-osier Dogwood	*Cornus stolonifera*
ZONE D -FREQUENTLY FLOODED AREA (BETWEEN FIRST FLUSH & 5 YR)	Soft Rush	*Juncus effusus*
	Blue Joint	*Calamagrostis canadensis*
	Green ash	*Fraxinus pennsylvanica*
	Black Willow	*Salix nigra*
	Narrow-leaf Willow	*Salix exigua*
ZONE E -INFREQUENTLY FLOODED (ABOVE 5 YR BUT < 100 YR)	Switchgrass	*Panicum virgatum*
	Green ash	*Fraxinus pennsylvanica*
	Silky Dogwood	*Cornus ammomum*
	Elderberry	*Sambucus canadensis*
	Pussy Willow	*Salix discolor*

Five discrete zones (A through E) for planting purposes have been established and a planting scheme designed for each zone, keeping in mind the pond's attributes, location, adjacent areas, water treatment and adherence to native species, especially those currently within the site.

Consequently the landscape pond plans differ somewhat from each other.

Several species have been chosen for each zone to maximize the potential for planting success, provide quick stability to the area, and encourage diversity. It is expected that, especially for the Wetland Pond, natural seeding will quickly occur.

9.0 EROSION CONTROL PLAN

Drawing E shows the erosion control details proposed for this development. Silt fencing will be installed along the property boundary as shown on Drawing E before area grading commencing operations. The first phase of the area grading will include the shaping of the stormwater management ponds at the Carrol Pond and Wetland outlets and a temporary sediment control pond to the west of the internal road. The stormwater management ponds will be used as temporary sediment ponds to remove silt from the runoff by providing a minimum storage area of 1100 m^3 and 3600 m^3 at the Carrol Pond and Wetland outlets respectively. The discharge structure from each pond will release the runoff over a minimum 24 hour period.

Rock silt check dams will be installed in the municipal swale/roadside ditch system after the initial grading has been completed.

Upon completion of the grading, any area not subject to active construction within 30 days shall be topsoiled and hydroseeded as per OPSS 572 immediately.

As each industrial property develops, an on-site sediment and erosion control plan will be prepared and implemented as part of the Section 41 site plan approval process. Sedimentation ponds in these plans will be sized to provide a minimum of 128 m^3 of storage per hectare with an minimum 24 hour detention time.

After construction of the complete development, erosion will not occur and sediment transport will be minimal.

10.0 MAINTENANCE PLAN AND SCHEDULE

A two phase maintenance plan is recommended. Phase I will address the short term more intensive maintenance necessary during and immediately after construction. Once all landscaping has been completed, maintenance will shift to Phase II.

Phase I will include bi-monthly inspection of all sediment control devices plus "as needed" inspection after any significant rainfall of 13 mm or more, with the immediate repair of any damaged works and collection of captured sediment. This work will be carried out by the consultant on behalf of the owner during the construction of the works. A monthly status report will be prepared and distributed to the Township of Puslinch and the Grand River Conservation Authority.

Phase II will be the maintenance carried out by the Township of Puslinch after all construction has been completed. This work will involve a yearly visual inspection of the municipal stormwater management ponds to determine the amount of sediment accumulation. When sediment removal is required, the silt accumulation should be removed and the recommended vegetation replanted.

IMPLEMENTATION SCHEDULE
ABERFOYLE BUSINESS PARK
QUINTAN INVESTMENTS (GUELPH) LTD.
Our File: S-241

| TASK | TIMELINE | | |

11.0 CONCLUSIONS

The stormwater management systems for the Aberfoyle Business Park have been designed to collect, clean and filter all of the runoff up to the 100 year design storm within the boundaries of the development prior to release to the receiving outlets. The stormwater management system is a two stage process. The first stage is accomplished on the individual lots by providing pre-treatment quality control and quantity control on all design storms including the 100 year event to the allowable pre-development release rates. The second stage is the municipal conveyance and end-of-pipe system which includes flat grassed swale/roadside ditches and two extended detention wetland pond systems which outlet to the Carrol Pond and the Wetland outlets respectively.

From the analysis, the following conclusions are drawn:

1. The on-site controls required for the individual lots will provide the necessary quality and quantity measures to pre-treat all runoff before releasing it from the lot to the municipal drainage system at the allowable pre-development release rates.

2. The municipal conveyance/end-of-pipe system has been designed as a stand-alone system with adequate capacity to provide the necessary quality and quantity controls for the entire development as if the on-site controls were not being implemented.

3. The runoff volume discharging to the Carrol Pond will be reduced slightly from pre-development rates after development. The runoff volume to the Wetland outlet will increase after development. The increase in volume is expected to cause subtle changes in the species mix of transitional areas of some on-site physiognomic units, but is not expected to have an adverse impact on the integrity of the wetland complex.

   No adverse temperature impacts are expected to occur to either the wetland character or cold water habitat integrity after development due to the buffering capacity of the natural and artificial wetland complexes.

   Studies are currently underway to further refine the characteristics of the wetland and stream to aid in developing the monitoring program.

4. The stormwater management systems outlined meet the requirements of the Interim Stormwater Quality Control Guidelines for New Development and the requirements of the Township of Puslinch and the Agencies.

5. The principles of "Stormwater Management Practices" have been used in the selection of the stormwater management systems.

6. During the construction phase, the roughed-in stormwater management ponds will be used as part of the erosion and sediment control plan. This in conjunction, with the other erosion control measures, will retain any sediments on-site during the construction period. The on-site erosion control measures proposed for each industrial property will provide additional protection for the adjacent natural features and properties.

All of which is respectfully submitted.

GAMSBY AND MANNEROW LIMITED
Per:

Christopher R. Sims, P.Eng.

ENVIRONMENTAL ADVISORY SERVICES LIMITED
Per:

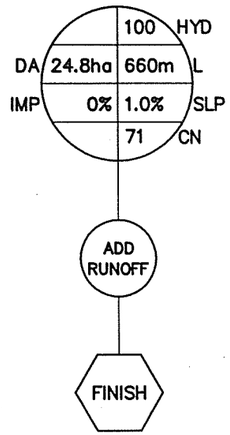
Thomas J. Wheaton, Ecologist

CRS/TJW

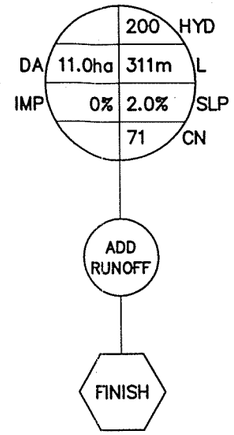
APPENDIX "A"

Stormwater Management Analysis

Aberfoyle Business Park
Environmental Implementation Report
Township of Puslinch

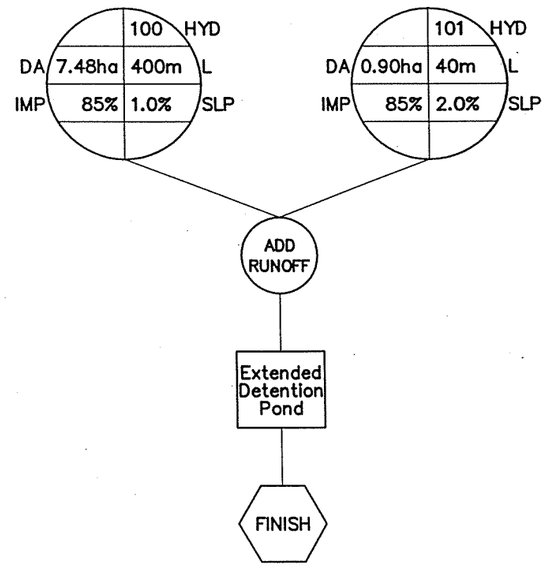


CARROL POND OUTLET

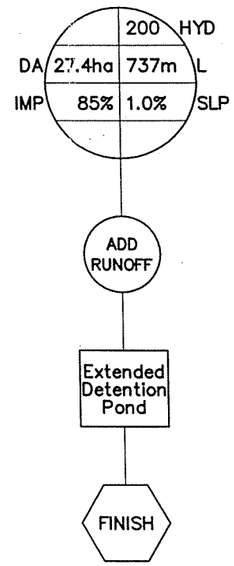


WETLAND OUTLET

PRE-DEVELOPMENT



CARROL POND OUTLET



WETLAND OUTLET

POST-DEVELOPMENT

WATERSHED SCHEMATIC

Figure No. A

APPENDIX "A"

1. Stormwater Management Analysis

The pre and post development calculations for each receiving outlet are included on the diskette in the attached pocket.

Directory	Sub-Directory	File	Description
S241	STORAGE	S241_100.WK1	Stage/Storage/Discharge Calculations for Carrol Pond Outlet
		S241_200.WK1	Stage/Storage/Discharge Calculations for Wetland Outlet
S241	POST_DEV	S241POST.M47	Analysis of the post-development stormwater management system under the "First Flush", 5 Year and 100 Year Design Storms
S241	PRE_DEV	S241PRE.M47	Analysis of the pre-development conditions under the "First Flush", 5 Year and 100 Year Design Storms

STORAGE VOLUME CALCULATIONS - CATCHMENT 100/101 - CARROL POND

ELEV (m)	INC D (m)	POND SURFACE AREA (sq m)	INCR. VOL (cu m)	ACCUM VOL (cu m)	
322.50	0.00	6509	0	0	
322.60	0.10	6613	656	656	
322.70	0.20	6717	667	1323	
322.80	0.30	6823	677	2000	
322.90	0.40	6929	688	2687	
323.00	0.50	7036	698	3385	
323.10	0.60	7143	709	4094	
323.20	0.70	7252	720	4814	
323.30	0.80	7361	731	5545	
323.40	0.90	7471	742	6286	weir
323.50	1.00	7582	753	7039	

WEIR CALCULATIONS

d1 =	1.00	m
h =	0.90	m
H =	0.10	m
2g =	19.62	
L =	45.00	m
Q =	1.98	cu m/s

ORIFICE - QUALITY/QUANTITY

Q =	0.045	cu m/s
Cd =	0.600	
H =	0.300	m
2g =	19.620	
A =	0.031	sq m
D =	0.199	m

STAGE-STORAGE-DISCHARGE TABLE

ELEVATION (m)	STAGE (m)	STORAGE (cu m)	SUMMER (cu m/s)	
322.50	0.00	0	0.000	
322.60	0.10	656	0.026	
322.70	0.20	1323	0.037	
322.80	0.30	2000	0.045	quality
322.90	0.40	2687	0.052	
323.00	0.50	3385	0.059	
323.10	0.60	4094	0.064	
323.20	0.70	4814	0.069	
323.30	0.80	5545	0.074	
323.40	0.90	6286	0.079	
323.50	1.00	7039	2.059	weir

STORAGE VOLUME CALCULATIONS - CATCHMENT 200 - WETLANDS

ELEV (m)	INC D (m)	POND SURFACE AREA (sq m)	INCR. VOL (cu m)	ACCUM VOL (cu m)	
322.10	0.00	29028	0	0	
322.20	0.10	29291	2916	2916	
322.30	0.20	29555	2942	5858	
322.40	0.30	29820	2969	8827	quality
322.50	0.40	30085	2995	11822	5 year
322.60	0.50	30352	3022	14844	
322.70	0.60	30619	3049	17893	weir
322.80	0.70	30887	3075	20968	

WEIR CALCULATIONS

d1 =	0.70	m
h =	0.60	m
H =	0.10	m
2g =	19.62	
L =	120.00	m
Q =	5.34	cu m/s

ORIFICE - QUALITY/MINOR
Two Bottom Draw Orifices

Q(total) =	0.075	cu m/s
Q(1/2) =	0.037	cu m/s
Cd =	0.600	
H =	0.200	m
2g =	19.620	
A =	0.031	sq m
D =	0.200	m

ORIFICE - QUANTITY
Four orifices

Q(total) =	0.754
Q(1/4) =	0.189
Cd =	0.600
H =	0.413
2g =	19.620
A =	0.110
D =	0.375

STAGE-STORAGE-DISCHARGE TABLE

ELEVATION (m)	STAGE (m)	STORAGE (cu m)	SUMMER (cu m/s)	
322.10	0.00	0	0.000	
322.20	0.10	2916	0.026	
322.30	0.20	5858	0.053	
322.40	0.30	8827	0.075	quality
322.50	0.40	11822	0.091	5 year
322.60	0.50	14844	0.656	
322.70	0.60	17893	0.754	weir
322.80	0.70	20968	6.095	

cu m/s

cu m/s

m

sq m
m

0.1 0.1875

```
      Output File (4.7) S241POST.OUT opened 1995-06-26   0:15
      Units used are defined by G =    9.810
          72   576     5.000        are MAXDT MAXHYD & DTMIN values
      Licensee: GAMSBY AND MANNEROW LIMITED
 2    STORM
          1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
    743.000     Coefficient  a
      6.000     Constant  b    (min)
       .799     Exponent  c
       .400     Fraction to peak  r
    120.000     Duration ó  360 min
               31.175 mm     Total depth
 3    IMPERVIOUS
          2     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .013     Manning "n"
       .000     Max.Infiltn. mm/hr
       .000     Min.Infiltn. mm/hr
       .000     Lag const (hours)
      1.500     Dep.Storage mm
 4    CATCHMENT
    100.000     ID No.ó 99999
      6.646     Area in hectares
    400.000     Length (PERV) metres
      1.000     Gradient (%)
     85.000     Per cent Impervious
    400.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          2     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     76.000     Max.Infiltn. mm/hr
     13.000     Min.Infiltn. mm/hr
       .250     Lag const (hours)
      5.000     Dep.Storage mm
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .937       .000       .000       .000 c.m/s
              .047       .950       .815     C perv/imperv/total
27    HYDROGRAPH DISPLAY
      4     is # of Hyeto/Hydrograph chosen
      Volume  =  .1685106E+04 c.m
15    ADD RUNOFF
              .937       .937       .000       .000 c.m/s
10    POND
      3 Depth - Discharge - Volume sets
         .000        .000          .0
        1.000       .0250      1970.0
        2.000       .0270      2130.0
      Peak Outflow    =      .020 c.m/s
      Maximum Depth   =      .791 metres
      Maximum Storage =     1558. c.m
              .937       .937       .020       .000 c.m/s
16    NEXT LINK
              .937       .020       .020       .000 c.m/s
 4    CATCHMENT
    101.000     ID No.ó 99999
      1.739     Area in hectares
     40.000     Length (PERV) metres
      2.000     Gradient (%)
     85.000     Per cent Impervious
     40.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          2     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     76.000     Max.Infiltn. mm/hr
```

```
 13.000     Min.Infiltn. mm/hr
   .250     Lag const (hours)
  5.000     Dep.Storage mm
      1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
         .349       .019       .019       .000 c.m/s
         .047       .936       .802     C perv/imperv/total
27    HYDROGRAPH DISPLAY
 4     is # of Hyeto/Hydrograph chosen
  Volume  =  .4349664E+03 c.m
15    ADD RUNOFF
         .349       .350       .020       .000 c.m/s
27    HYDROGRAPH DISPLAY
 5     is # of Hyeto/Hydrograph chosen
  Volume  =  .1924287E+04 c.m
10    POND
 11 Depth - Discharge - Volume sets
     .000        .000          .0
     .100       .0260       656.0
     .200       .0370      1323.0
     .300       .0450      2000.0
     .400       .0520      2687.0
     .500       .0590      3385.0
     .600       .0640      4094.0
     .700       .0690      4814.0
     .800       .0740      5545.0
     .900       .0790      6286.0
    1.000       2.059      7039.0
  Peak Outflow    =      .018 c.m/s
  Maximum Depth   =      .069 metres
  Maximum Storage =      451. c.m
         .349       .350       .018       .000 c.m/s
14    START
 1     1=Zero; 2=Define
 4    CATCHMENT
200.000     ID No.ó 99999
 27.353     Area in hectares
737.000     Length (PERV) metres
  1.000     Gradient (%)
 85.000     Per cent Impervious
737.000     Length (IMPERV)
   .000     %Imp. with Zero Dpth
      2     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
   .250     Manning "n"
 76.000     Max.Infiltn. mm/hr
 13.000     Min.Infiltn. mm/hr
   .250     Lag const (hours)
  5.000     Dep.Storage mm
      1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
        3.430       .000       .018       .000 c.m/s
         .047       .950       .814     C perv/imperv/total
27    HYDROGRAPH DISPLAY
 4     is # of Hyeto/Hydrograph chosen
  Volume  =  .6945306E+04 c.m
15    ADD RUNOFF
       3.430      3.430       .018       .000 c.m/s
27    HYDROGRAPH DISPLAY
 5     is # of Hyeto/Hydrograph chosen
  Volume  =  .6945306E+04 c.m
10    POND
 3 Depth - Discharge - Volume sets
     .000        .000          .0
    1.000        .137      6010.0
    2.000        .159      6950.0
```

```
      Peak Outflow    =      .137 c.m/s
      Maximum Depth   =      .999 metres
      Maximum Storage =     6002. c.m
            3.430      3.430       .137       .000 c.m/s
16    NEXT LINK
            3.430       .137       .137       .000 c.m/s
10    POND
     8 Depth - Discharge - Volume sets
        .000       .000          .0
        .100      .0260      2916.0
        .200      .0530      5858.0
        .300      .0750      8827.0
        .400      .0910     11822.0
        .500       .656     14844.0
        .600       .754     17893.0
        .700      5.845     20968.0
      Peak Outflow    =      .034 c.m/s
      Maximum Depth   =      .130 metres
      Maximum Storage =     3793. c.m
            3.430       .137       .034       .000 c.m/s
14    START
     1     1=Zero; 2=Define
 2    STORM
         1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
   1593.000    Coefficient  a
     11.000    Constant  b    (min)
       .879    Exponent  c
       .400    Fraction to peak  r
    180.000    Duration ó  360 min
              47.240 mm     Total depth
 3    IMPERVIOUS
         2     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .013    Manning "n"
       .000    Max.Infiltn. mm/hr
       .000    Min.Infiltn. mm/hr
       .000    Lag const (hours)
      1.500    Dep.Storage mm
 4    CATCHMENT
    100.000    ID No.ó 99999
      7.484    Area in hectares
    400.000    Length (PERV) metres
      1.000    Gradient (%)
     85.000    Per cent Impervious
    400.000    Length (IMPERV)
       .000    %Imp. with Zero Dpth
         2     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250    Manning "n"
     76.000    Max.Infiltn. mm/hr
     13.000    Min.Infiltn. mm/hr
       .250    Lag const (hours)
      5.000    Dep.Storage mm
         1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          1.578       .000       .013       .000 c.m/s
           .226       .965       .854     C perv/imperv/total
27    HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .3019539E+04 c.m
15    ADD RUNOFF
            1.578      1.578       .034       .000 c.m/s
10    POND
     3 Depth - Discharge - Volume sets
        .000       .000          .0
       1.000      .0670      2870.0
```

```
   2.000       .0789      3380.0
  Peak Outflow    =      .060 c.m/s
  Maximum Depth   =      .892 metres
  Maximum Storage =     2559. c.m
        1.578      1.578       .060       .000 c.m/s
16   NEXT LINK
        1.578       .060       .060       .000 c.m/s
 4   CATCHMENT
101.000     ID No.ó 99999
  1.739     Area in hectares
 40.000     Length (PERV) metres
  2.000     Gradient (%)
 85.000     Per cent Impervious
 40.000     Length (IMPERV)
   .000     %Imp. with Zero Dpth
     2      Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
   .250     Manning "n"
 76.000     Max.Infiltn. mm/hr
 13.000     Min.Infiltn. mm/hr
   .250     Lag const (hours)
  5.000     Dep.Storage mm
     1      Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
        .470       .060       .060       .000 c.m/s
        .226       .954       .845     C perv/imperv/total
27   HYDROGRAPH DISPLAY
 4     is # of Hyeto/Hydrograph chosen
  Volume  =  .6939805E+03 c.m
15   ADD RUNOFF
        .470       .478       .060       .000 c.m/s
27   HYDROGRAPH DISPLAY
 5     is # of Hyeto/Hydrograph chosen
  Volume  =  .3652072E+04 c.m
10   POND
11 Depth - Discharge - Volume sets
     .000        .000          .0
     .100       .0260       656.0
     .200       .0370      1323.0
     .300       .0450      2000.0
     .400       .0520      2687.0
     .500       .0590      3385.0
     .600       .0640      4094.0
     .700       .0690      4814.0
     .800       .0740      5545.0
     .900       .0790      6286.0
    1.000      2.059      7039.0
  Peak Outflow    =      .035 c.m/s
  Maximum Depth   =      .183 metres
  Maximum Storage =     1210. c.m
        .470       .478       .035       .000 c.m/s
14   START
 1     1=Zero; 2=Define
 4   CATCHMENT
200.000     ID No.ó 99999
 27.353     Area in hectares
737.000     Length (PERV) metres
  1.000     Gradient (%)
 85.000     Per cent Impervious
737.000     Length (IMPERV)
   .000     %Imp. with Zero Dpth
     2      Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
   .250     Manning "n"
 76.000     Max.Infiltn. mm/hr
 13.000     Min.Infiltn. mm/hr
```

```
        .250     Lag const (hours)
       5.000     Dep.Storage mm
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
             5.166       .000       .032       .000 c.m/s
              .226       .967       .856     C perv/imperv/total
27      HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
        Volume  =  .1106185E+05 c.m
15      ADD RUNOFF
              5.166      5.166       .035       .000 c.m/s
27      HYDROGRAPH DISPLAY
       5     is # of Hyeto/Hydrograph chosen
        Volume  =  .1106185E+05 c.m
10      POND
       3 Depth - Discharge - Volume sets
           .000        .000          .0
          1.000        .410       8140.0
          2.000        .558      11100.0
        Peak Outflow    =       .410 c.m/s
        Maximum Depth   =       .999 metres
        Maximum Storage =     8131. c.m
              5.166      5.166       .410       .000 c.m/s
16      NEXT LINK
              5.166       .410       .410       .000 c.m/s
10      POND
       8 Depth - Discharge - Volume sets
           .000        .000          .0
           .100       .0260       2916.0
           .200       .0530       5858.0
           .300       .0750       8827.0
           .400       .0910      11822.0
           .500        .656      14844.0
           .600        .754      17893.0
           .700       5.845      20968.0
        Peak Outflow    =       .066 c.m/s
        Maximum Depth   =       .260 metres
        Maximum Storage =     7633. c.m
              5.166       .410       .066       .000 c.m/s
14      START
       1     1=Zero; 2=Define
 2      STORM
           1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
     4688.000    Coefficient  a
       17.000    Constant  b    (min)
         .962    Exponent  c
         .400    Fraction to peak  r
      180.000    Duration ó  360 min
                87.263 mm     Total depth
 3      IMPERVIOUS
           2     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
         .013    Manning "n"
         .000    Max.Infiltn. mm/hr
         .000    Min.Infiltn. mm/hr
         .000    Lag const (hours)
        1.500    Dep.Storage mm
 4      CATCHMENT
      100.000    ID No.ó 99999
        7.484    Area in hectares
      400.000    Length (PERV) metres
        1.000    Gradient (%)
       85.000    Per cent Impervious
      400.000    Length (IMPERV)
         .000    %Imp. with Zero Dpth
```

```
          2     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250    Manning "n"
      76.000    Max.Infiltn. mm/hr
      13.000    Min.Infiltn. mm/hr
        .250    Lag const (hours)
       5.000    Dep.Storage mm
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
            3.303       .000       .034       .000 c.m/s
             .511       .980       .910     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
       Volume  =  .5941438E+04 c.m
15     ADD RUNOFF
            3.303      3.303       .066       .000 c.m/s
10     POND
       3 Depth - Discharge - Volume sets
          .000        .000          .0
         1.000        .327      4900.0
         2.000        .444      6650.0
       Peak Outflow    =      .290 c.m/s
       Maximum Depth   =      .887 metres
       Maximum Storage =     4348. c.m
            3.303      3.303       .290       .000 c.m/s
16     NEXT LINK
            3.303       .290       .290       .000 c.m/s
 4     CATCHMENT
     101.000     ID No.ó 99999
       1.739     Area in hectares
      40.000     Length (PERV) metres
       2.000     Gradient (%)
      85.000     Per cent Impervious
      40.000     Length (IMPERV)
        .000     %Imp. with Zero Dpth
          2     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250    Manning "n"
      76.000    Max.Infiltn. mm/hr
      13.000    Min.Infiltn. mm/hr
        .250    Lag const (hours)
       5.000    Dep.Storage mm
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
             .874       .290       .290       .000 c.m/s
             .508       .970       .901     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
       Volume  =  .1366588E+04 c.m
15     ADD RUNOFF
             .874       .933       .290       .000 c.m/s
27     HYDROGRAPH DISPLAY
       5     is # of Hyeto/Hydrograph chosen
       Volume  =  .7307934E+04 c.m
10     POND
      11 Depth - Discharge - Volume sets
          .000        .000          .0
          .100       .0260       656.0
          .200       .0370      1323.0
          .300       .0450      2000.0
          .400       .0520      2687.0
          .500       .0590      3385.0
          .600       .0640      4094.0
          .700       .0690      4814.0
          .800       .0740      5545.0
          .900       .0790      6286.0
         1.000       2.059      7039.0
```

```
      Peak Outflow    =      .068 c.m/s
      Maximum Depth   =      .675 metres
      Maximum Storage =     4633. c.m
            .874       .933       .068       .000 c.m/s
14    START
     1     1=Zero; 2=Define
 4    CATCHMENT
    200.000     ID No.ó 99999
     27.353     Area in hectares
    737.000     Length (PERV) metres
      1.000     Gradient (%)
     85.000     Per cent Impervious
    737.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
         2      Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     76.000     Max.Infiltn. mm/hr
     13.000     Min.Infiltn. mm/hr
       .250     Lag const (hours)
      5.000     Dep.Storage mm
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
           10.367       .000       .064       .000 c.m/s
             .511       .981       .910     C perv/imperv/total
27    HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .2172682E+05 c.m
15    ADD RUNOFF
           10.367     10.367       .068       .000 c.m/s
27    HYDROGRAPH DISPLAY
     5     is # of Hyeto/Hydrograph chosen
      Volume  =  .2172682E+05 c.m
10    POND
     3 Depth - Discharge - Volume sets
         .000        .000          .0
        1.000       1.890     13100.0
        2.000       3.140     21800.0
      Peak Outflow    =     1.887 c.m/s
      Maximum Depth   =      .999 metres
      Maximum Storage =    13082. c.m
           10.367     10.367      1.887       .000 c.m/s
16    NEXT LINK
           10.367      1.887      1.887       .000 c.m/s
10    POND
     8 Depth - Discharge - Volume sets
        .000        .000          .0
        .100       .0260      2916.0
        .200       .0530      5858.0
        .300       .0750      8827.0
        .400       .0910     11822.0
        .500        .656     14844.0
        .600        .754     17893.0
        .700       5.845     20968.0
      Peak Outflow    =      .595 c.m/s
      Maximum Depth   =      .489 metres
      Maximum Storage =    14518. c.m
           10.367      1.887       .595       .000 c.m/s
20    MANUAL
```

```
      Output File (4.7) S241PRE.M47  opened 1995-04-23  21:40
      Units used are defined by G =    9.810
          72   576     5.000        are MAXDT MAXHYD & DTMIN values
      Licensee: GAMSBY AND MANNEROW LIMITED
 2    STORM
          1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
    743.000     Coefficient  a
      6.000     Constant  b    (min)
       .799     Exponent  c
       .400     Fraction to peak  r
    120.000     Duration ó  360 min
               31.175 mm     Total depth
 3    IMPERVIOUS
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .013     Manning "n"
     98.190     SCS Curve No or C
       .100     Ia/S Coefficient
       .468     Initial Abstraction
 4    CATCHMENT
    100.000     ID No.ó 99999
     24.752     Area in hectares
    660.000     Length (PERV) metres
      1.000     Gradient (%)
       .000     Per cent Impervious
    660.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     70.620     SCS Curve No or C
       .100     Ia/S Coefficient
      5.000     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .071       .000       .000       .000 c.m/s
              .167       .000       .167     C perv/imperv/total
27    HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .1285705E+04 c.m
14    START
     1     1=Zero; 2=Define
 4    CATCHMENT
    200.000     ID No.ó 99999
     10.986     Area in hectares
    311.000     Length (PERV) metres
      2.000     Gradient (%)
       .000     Per cent Impervious
    311.000     Length (IMPERV)
       .000     %Imp. with Zero Dpth
          1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
       .250     Manning "n"
     70.620     SCS Curve No or C
       .100     Ia/S Coefficient
      5.000     Initial Abstraction
          1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .056       .000       .000       .000 c.m/s
              .167       .000       .167     C perv/imperv/total
27    HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .5707017E+03 c.m
14    START
     1     1=Zero; 2=Define
14    START
     1     1=Zero; 2=Define
 2    STORM
```

```
       1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
  1593.000     Coefficient  a
    11.000     Constant  b    (min)
      .879     Exponent  c
      .400     Fraction to peak  r
   180.000     Duration ó  360 min
            47.240 mm     Total depth
 3    IMPERVIOUS
       1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
      .013     Manning "n"
    98.190     SCS Curve No or C
      .100     Ia/S Coefficient
      .468     Initial Abstraction
 4    CATCHMENT
   100.000     ID No.ó 99999
    24.752     Area in hectares
   660.000     Length (PERV) metres
     1.000     Gradient (%)
      .000     Per cent Impervious
   660.000     Length (IMPERV)
      .000     %Imp. with Zero Dpth
       1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
      .250     Manning "n"
    70.620     SCS Curve No or C
      .100     Ia/S Coefficient
     5.000     Initial Abstraction
       1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .206       .000       .000       .000 c.m/s
          .255       .000       .255     C perv/imperv/total
27    HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .2983889E+04 c.m
14    START
     1     1=Zero; 2=Define
 4    CATCHMENT
   200.000     ID No.ó 99999
    10.986     Area in hectares
   311.000     Length (PERV) metres
     2.000     Gradient (%)
      .000     Per cent Impervious
   311.000     Length (IMPERV)
      .000     %Imp. with Zero Dpth
       1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
      .250     Manning "n"
    70.620     SCS Curve No or C
      .100     Ia/S Coefficient
     5.000     Initial Abstraction
       1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
          .163       .000       .000       .000 c.m/s
          .255       .000       .255     C perv/imperv/total
27    HYDROGRAPH DISPLAY
     4     is # of Hyeto/Hydrograph chosen
      Volume  =  .1325087E+04 c.m
14    START
     1     1=Zero; 2=Define
 2    STORM
       1     1=Chicago;2=Huff;3=User;4=Cdn1hr;5=Historic
  4688.000     Coefficient  a
    17.000     Constant  b    (min)
      .962     Exponent  c
      .400     Fraction to peak  r
   180.000     Duration ó  360 min
            87.263 mm     Total depth
```

```
 3     IMPERVIOUS
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .013     Manning "n"
       98.190     SCS Curve No or C
        .100     Ia/S Coefficient
        .468     Initial Abstraction
 4     CATCHMENT
      100.000     ID No.ó 99999
       24.752     Area in hectares
      660.000     Length (PERV) metres
        1.000     Gradient (%)
         .000     Per cent Impervious
      660.000     Length (IMPERV)
         .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
       70.620     SCS Curve No or C
        .100     Ia/S Coefficient
        5.000     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .976       .000       .000       .000 c.m/s
              .413       .000       .413     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
       Volume  =  .8910660E+04 c.m
14     START
       1     1=Zero; 2=Define
 4     CATCHMENT
      200.000     ID No.ó 99999
       10.986     Area in hectares
      311.000     Length (PERV) metres
        2.000     Gradient (%)
         .000     Per cent Impervious
      311.000     Length (IMPERV)
         .000     %Imp. with Zero Dpth
           1     Option 1=SCS CN/C; 2=Horton; 3=Green-Ampt; 4=Repeat
        .250     Manning "n"
       70.620     SCS Curve No or C
        .100     Ia/S Coefficient
        5.000     Initial Abstraction
           1     Option 1=Trianglr; 2=Rectanglr; 3=SWM HYD; 4=Lin. Reserv
              .762       .000       .000       .000 c.m/s
              .413       .000       .413     C perv/imperv/total
27     HYDROGRAPH DISPLAY
       4     is # of Hyeto/Hydrograph chosen
       Volume  =  .3955318E+04 c.m
20     MANUAL
```

APPENDIX "B"

Species List

TABLE B: SPECIES LIST

Latin Name	Common Name
Abies balsamea	Balsam Fir
Larix laricina	Tamarack
Picea abies	Norway Spruce
Pinus strobus	White Pine
Tsuga canadensis	Eastern Hemlock
Thuja occidentalis	White Cedar
Populus sp.	Poplar sp.
Populus balsamifera	Balsam Poplar
Populus deltoides	Cottonwood
Populus tremuloides	Trembling Aspen
Salix sp.	Willow sp.
Salix discolor	Pussy Willow
Salix nigra	Black Willow
Carya cordiformis	Bitternut Hickory
Juglans nigra	Black Walnut
Alnus rugosa	Speckled Alder
Betula papyrifera	White Birch
Ostrya virginiana	Hop Hornbeam
Fagus grandifolia	American Beech
Ulmus americana	White Elm
Ribes cynosbati	Prickly Gooseberry
Ribes hirtellum	Canada Gooseberry
Malus domestica	Apple
Prunus pensylvanica	Pin Cherry
Prunus serotina	Wild Black Cherry
Prunus virginiana	Chokecherry
Rosa blanda	Wild Rose
Rubus idaeus	Red Raspberry
Rubus occidentalis	Black Raspberry
Spiraea alba	Meadowsweet
Spiraea tomentosa	Hardhack
Rhus typhina	Staghorn Sumac

TABLE B: SPECIES LIST

Latin Name	Common Name
Acer negundo	Manitoba Maple
Acer rubrum	Red Maple
Acer saccharum	Sugar Maple
Rhamnus cathartica	Common Buckthorn
Vitis riparia	Riverbank Grape
Tilia americana	Basswood
Cornus alternifolia	Alternate-leaved Dogwood
Cornus amomum	Silky Dogwood
Cornus stolonifera	Red-osier Dogwood
Fraxinus nigra	Black Ash
Fraxinus pennsylvanica	Green Ash
Lonicera tatarica	Tartarian Honeysuckle
Sambucus canadensis	Common Elder
Sambucus pubens	Red-berried Elder
Viburnum trilobum	Highbush-cranberry

TRANSPORTATION DEPOT

7504 McLean Rd

LANDSCAPE ARCHITECTURE

ISSUED FOR SITE PLAN APPROVAL

MHBC PROJECT NO. 2469A

GENERAL NOTES:

1. ALL DRAWINGS ARE IN METRIC SCALE.

2. DEVELOPER SHALL MAINTAIN EXISTING TREES AND NEW PLANTINGS IN ACCORDANCE WITH THE APPROVED VEGETATION PLAN. ANY VEGETATION REPLACEMENT SHALL BE CONDUCTED IN ACCORDANCE WITH THE FINAL LANDSCAPE PLAN APPROVED BY THE CITY.

3. CONTRACTOR SHALL OBTAIN ALL NECESSARY PROVINCIAL OR LOCAL MUNICIPAL PERMITS REQUIRED. ALL CONSTRUCTION SHALL CONFORM TO PROVINCIAL AND LOCAL MUNICIPAL STANDARDS AND CODES THAT PERTAIN TO THE SITE UNDER CONSTRUCTION.

4. CONTRACTOR SHALL ARRANGE FOR UTILITY STAKING PRIOR TO START OF CONSTRUCTION. IT IS THE CONTRACTORS RESPONSIBILITY TO VISIT THE SITE PRIOR TO CONSTRUCTION TO BECOME FAMILIAR WITH EXISTING CONDITIONS. IF ANY DISCREPANCIES EXIST BETWEEN THE DRAWINGS AND ACTUAL SITE CONDITIONS, CONTRACTOR SHALL BRING THIS TO THE ATTENTION OF THE LANDSCAPE ARCHITECT.

5. EXISTING UNDERGROUND UTILITIES SHOWN ON THE DRAWINGS ARE PLOTTED FROM ORIGINAL SITE DRAWINGS AND/OR SITE TOPOGRAPHIC SURVEY. EVERY ATTEMPT HAS BEEN MADE TO SHOW ALL UTILITY LINES WHERE THEY EXIST. CONTRACTOR SHALL USE EVERY PRECAUTION IN EXCAVATING SINCE ACTUAL UNDERGROUND UTILITIES MAY NOT BE AS SHOWN. CONTRACTOR SHALL MAKE HIMSELF THOROUGHLY FAMILIAR WITH ALL UNDERGROUND UTILITY LOCATIONS PRIOR TO ANY EXCAVATION AND VERIFY LOCATIONS AND DEPTHS OF ALL UTILITIES.

6. CONTRACTOR SHALL PROVIDE HIS OWN LAYOUT, GRADING, STAKING, AND SURVEYING REQUIRED FOR CONSTRUCTION. REFER TO EXISTING SURVEY FOR BENCHMARKS AND OTHER EXISTING INFORMATION. CONTRACTOR SHALL FIELD VERIFY LAYOUT PRIOR TO CONSTRUCTION.

7. CONTRACTOR SHALL PROTECT ALL EXISTING AND NEW CONSTRUCTION FROM DAMAGE. SHOULD ANY DAMAGE OCCUR, CONTRACTOR SHALL MAKE ALL NECESSARY REPAIRS AT NO COST TO THE OWNER.

8. CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER CONTRACTORS ON SITE.

9. PROVIDE BARRIERS OR OTHER PROTECTION TO KEEP VEHICULAR AND PEDESTRIAN TRAFFIC AWAY FROM CONSTRUCTION AREA AND OFF NEWLY PAVED AREAS BEFORE ASPHALT OR CONCRETE HAS CURED. DO NOT LEAVE ANY HOLES OPEN OVERNIGHT.

10. KEEP AREA OUTSIDE CONSTRUCTION ZONE CLEAN AND USABLE BY OTHERS AT ALL TIMES.

11. CONTRACTOR SHALL SUBMIT SAMPLES OF ALL PROPOSED MATERIALS FOR APPROVAL PRIOR TO PLACING ORDERS.

12. OBTAIN WORK PERMIT FROM EITHER THE MUNICIPALITY, REGION, OR BOTH AS THE CASE MAY BE PRIOR TO DOING ANY WORK WITHIN THE PUBLIC RIGHT-OF-WAY.

PLANTING NOTES:

1. ALL PLANTING AND INSTALLATION IN RIGHT OF WAY SHALL MEET LOCAL MUNICIPAL STANDARDS AND SPECIFICATIONS.

2. LANDSCAPE CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER CONTRACTORS ON SITE TO MINIMIZE DAMAGE TO COMPLETED LAWN AND PLANT MATERIAL INSTALLATION.

3. IF ANY DISCREPANCY EXISTS BETWEEN THE QUANTITIES, SIZES OR MATERIALS INDICATED ON THE PLAN AND SHOWN IN THE PLANT LIST, THE PLAN SHALL GOVERN.

4. IT IS THE LANDSCAPE CONTRACTORS RESPONSIBILITY TO VISIT THE SITE PRIOR TO START OF WORK, TO BECOME FAMILIAR WITH EXISTING CONDITIONS AT THE SITE.

5. CONTRACTOR IS RESPONSIBLE FOR ROUGH GRADING OF SUBGRADE BELOW LAWN AND LANDSCAPE AREAS.

6. CONTRACTOR IS RESPONSIBLE FOR RESPREADING TOPSOIL, FINE GRADING AND PREPARATION OF ALL LAWN AND LANDSCAPE AREAS.

7. PRIOR TO SPREADING TOPSOIL, LANDSCAPE CONTRACTOR SHALL INSPECT AND ACCEPT ALL BASE GRADES. ANY DEVIATION FROM LINE AND GRADE INDICATED ON THE GRADING PLAN SHALL BE CORRECTED BY EARTHWORK CONTRACTOR BEFORE PLACING ANY TOPSOIL.

8. BEFORE PLANT MATERIAL INSTALLATION BEGINS, STAKE LOCATIONS OF NEW PLANT MATERIAL AND NOTIFY LANDSCAPE ARCHITECT FOR APPROVAL. NOTIFY LANDSCAPE ARCHITECT ONE WEEK MINIMUM PRIOR TO TENTATIVE DATE OF STAKING.

9. CONTRACTOR SHALL NOTIFY LANDSCAPE ARCHITECT IF AREAS OF POOR DRAINAGE OR OTHER UNUSUAL SUBSURFACE CONDITIONS ARE ENCOUNTERED DURING EXCAVATION FOR PLANTING PITS.

10. ALL GRADING, UTILITY, AND IRRIGATION WORK SHALL BE COMPLETED PRIOR TO INSTALLATION OF PLANT MATERIAL AND LANDSCAPE MULCH.

11. ALL PLANT MATERIALS SHALL BE NO.1 NURSERY GROWN WHICH MEET SPECIFICATIONS FOR SIZE, HEIGHT, SPREAD, GRADING, QUALITY, METHOD OF CULTIVATION, AND CONDITION SPECIFICATIONS AS SET OUT IN THE CURRENT EDITION OF THE GUIDE SPECIFICATION FOR NURSERY STOCK PREPARED BY THE CANADIAN NURSERY LANDSCAPE ASSOCIATION.

12. ALL SHRUBS AND CONIFEROUS PLANTINGS SHALL BE INSTALLED IN CONTINUOUS PLANTING BEDS.

13. ALL SHRUB BEDS ADJACENT TO LAWN AREAS SHALL HAVE A SPADED EDGE BORDER, UNLESS METAL EDGE BORDER IS SPECIFIED. BORDER SHALL BE CUT 75mm DEEP AT A 45° ANGLE, SO THERE IS A CLEAR AND WELL DEFINED SEPARATION BETWEEN THE PLANTING BEDS AND SODDED AREAS.

14. ALL SHRUB BED AREAS SHALL HAVE A MINIMUM 100mm THICK LAYER OF LANDSCAPE MULCH.

15. CONTRACTOR SHALL SEED ALL AREAS DISTURBED BY CONSTRUCTION NOT DESIGNATED TO BE SODDED.

16. WHERE PROJECT SITE IS TO BE SODDED, CONTRACTOR SHALL PROVIDE NEW TOPSOIL AND SOD IN ANY ADJACENT RIGHT OF WAY FROM PROPERTY LINE TO BACK OF MUNICIPAL CURB.

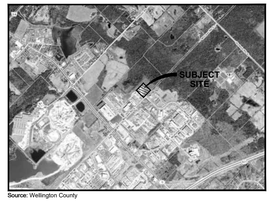
17. UNLESS OTHERWISE SPECIFIED, SODDED AREAS TO BE STAKED ON ANY 3:1 SLOPES.

18. CONTRACTOR SHALL WORK OVER LAWN AREAS THAT HAVE REMAINED PARTIALLY INTACT, TOP DRESSING WITH SOIL, SCARIFYING, AND SEEDING TO FORM A SMOOTH, FULL, EVEN LAWN, FREE OF BARE SPOTS, INDENTATIONS, AND WEEDS.

19. PLANT MATERIAL TO HAVE A WARRANTY OF TWO YEARS FROM ACCEPTANCE DATE.

GEODETIC BENCHMARK ELEVATION = 326.301
COSINE STATION - 0082068036, WELLINGTON COUNTY, MORRISTON
NORTHEASTERLY PAD OF HYDRO TOWER ON NORTH SIDE OF 401 AT HWY 6 SOUTH
SITE BENCHMARK ELEVATION = 324.493
RIB IN SOUTH CORNER OF SITE, POINT NUMBER-1

Key Plan



Source: Wellington County

Subject Site

NOT TO SCALE

Legend

Rev.	Date	Issued / Revision	By
6			
5			
4	JULY 29, 2025	ISSUED FOR SITE PLAN APPROVAL #3	PH
3	MAY 23, 2025	ISSUED FOR SITE PLAN APPROVAL #2	PH
2	MAY 15, 2025	ISSUED FOR COORDINATION	PH
1	JAN. 27, 2025	ISSUED FOR SITE PLAN APPROVAL	PH

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Date 2024-08-13

Drawn By RB/PH

Plan Scale AS NOTED

File No. 2469A

Checked By NP

Other

Project

TRANSPORTATION DEPOT
7504 McLEAN ROAD
Puslinch, Ontario

File Name COVER PAGE

Dwg No. L0

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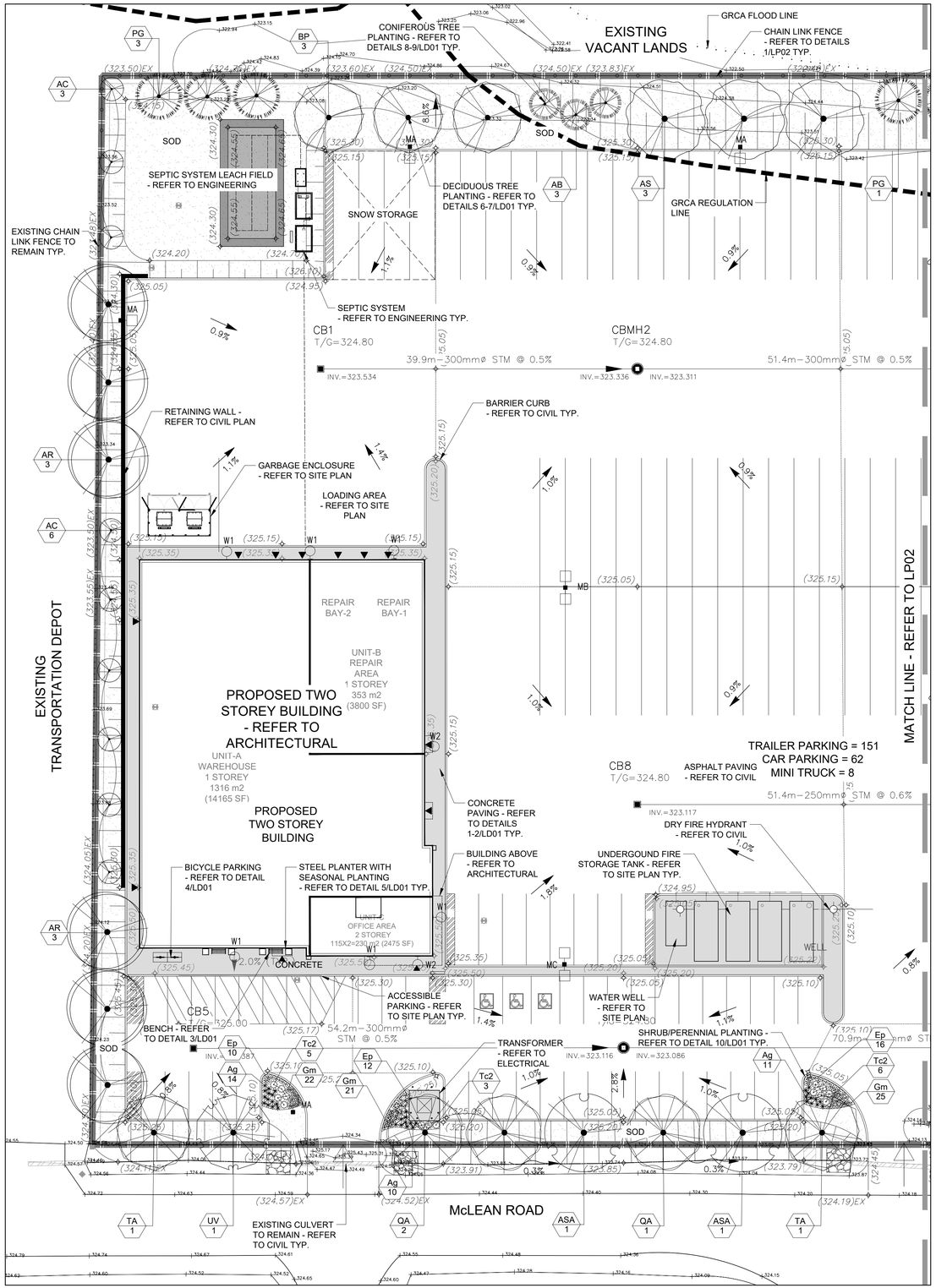

2 SOUTH LANDSCAPE PLAN

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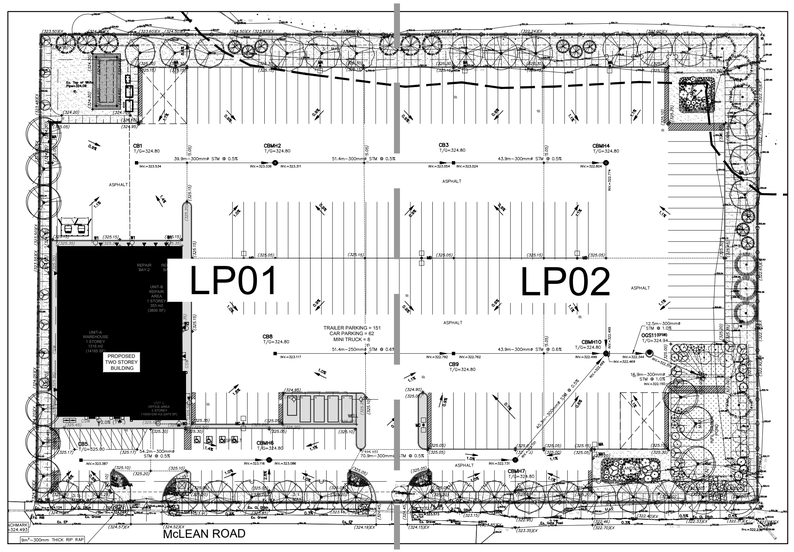


1 LANDSCAPE KEY PLAN

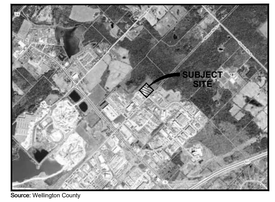
1:500

PLANT SCHEDULE LP01

SYMBOL	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	CONTAINER
CONIFEROUS TREES						
	AB	3	ABIES BALSAMEA	BALSAM FIR	250CM HT.	W.B.
	PG	4	PICEA GLAUCA	WHITE SPRUCE	250CM HT.	W.B.
DECIDUOUS TREES						
	AR	6	ACER RUBRUM	RED MAPLE	60MM CAL.	W.B.
	ASA	2	ACER SACCHARINUM	SILVER MAPLE	60MM CAL.	W.B.
	AS	3	ACER SACCHARUM	SUGAR MAPLE	60MM CAL.	W.B.
	AC	9	AMELANCHIER CANADENSIS	CANADIAN SERVICEBERRY	60MM CAL.	W.B.
	BP	3	BETULA PAPYRIFERA	PAPER BIRCH	60MM CAL.	W.B.
	QA	3	QUERCUS ALBA	WHITE OAK	60MM CAL.	W.B.
	TA	2	TILIA AMERICANA	AMERICAN LINDEN	60MM CAL.	W.B.
	UV	1	ULMUS AMERICANA `VALLEY FORGE`	VALLEY FORGE AMERICAN ELM	60MM CAL.	W.B.
CONIFEROUS SHRUBS						
	Tc2	14	TAXUS CANADENSIS	CANADA YEW	3 GAL.	POT
GRASSES						
	Ag	35	ANDROPOGON GERARDII	BIG BLUESTEM	1 GAL.	POT
PERENNIALS						
	Ep	38	ECHINACEA PURPUREA	PURPLE CONEFLOWER	1 GAL.	POT
	Gm	68	GERANIUM MACULATUM	SPOTTED GERANIUM	1 GAL.	POT

GEODETIC BENCHMARK ELEVATION = 326.301
COSINE STATION - 0082068036; WELLINGTON COUNTY; MORRISTON
NORTHEASTERLY PAD OF HYDRO TOWER ON NORTH SIDE OF 401 AT HWY 6 SOUTH
SITE BENCHMARK ELEVATION = 324.493
RIB IN SOUTH CORNER OF SITE; POINT NUMBER:-1

Key Plan



Source: Wellington County

Legend

- PROPERTY BOUNDARY
- EXISTING CHAIN LINK FENCE
- PROPOSED CHAIN LINK FENCE
- PROPOSED CONCRETE PAVING
- PROPOSED TREES
- PROPOSED SHRUBS & PERENNIALS
- PROPOSED SOD

SEED MIX #1 - CUSTOM NATIVE PRAIRIE MEADOW MIX
by OSC Seeds 519-886-0557 or approved equal.

5% BLACK EYED SUSAN	(Rudbeckia hirta)
5% EARLY GOLDENROD	(Solidago juncea)
5% EVENING PRIMROSE	(Oenothera biennis)
20% FOWL BLUEGRASS	(Poa palustris)
5% FOXGLOVE/BEARDTOUNGUE	(Penstemon digitalis)
25% VIRGINIA WILD RYE	(Elymus virginicus)
5% NEW ENGLAND ASTER	(Aster novae-angliae)
10% BUTTERFLY WEED	(Asclepias tuberosa)
5% WHITE VERVAIN	(Verbena urticifolia)
5% WILD BERGAMOT	(Monarda fistulosa)
10% BOTTLEBRUSH GRASS	(Elymus hystrix)

SEEDING RATE: 25 kg/ha OR 500g/180m2
SIMUTANEOUSLY SOW COVER CROP OF ANNUAL RYE GRASS FOR EROSION AND WEED CONTROL AT 22kg/ha. INSTALL AS PER MANUFACTURER'S SPECIFICATIONS. ALL PACKING SLIPS MUST BE PROVIDED TO THE LANDSCAPE ARCHITECT OR OWNER, PRIOR TO SEED PLACEMENT.

NOTES:

1. EXISTING TOPOGRAPHICAL INFORMATION PROVIDED BY MTE CONSULTANTS DATED MAY 14, 2024.
2. REFER TO CIVIL ENGINEERING DRAWINGS BY MTE CONSULTANTS FOR SEDIMENT AND EROSION CONTROL MEASURES, LIMIT OF CONSTRUCTION, DETAILED SERVICING AND GRADING.
3. PROPERTY LINE IS APPROXIMATE ONLY AND SHOULD NOT BE USED FOR DETERMINING SETBACKS OR LAYOUT.
4. ANY AREAS DISTURBED BY CONSTRUCTION TO BE RESTORED AND MADE GOOD WITH 150mm TOPSOIL AND SOD OR MATCH EXISTING MATERIAL AS INDICATED TO TOWNSHIP OF PUSLINCH SATISFACTION, AT NO EXTRA COST.
5. REMOVE AND DISPOSE OF EXCESS MATERIAL OFF SITE.
6. ALL PLANTING BEDS TO HAVE THE FOLLOWING DEPTH OF PLANTING MIX:
   6.1. MINIMUM 600mm PLANTING MEDIUM FOR SHRUBS.
   6.2. MINIMUM 900mm PLANTING MEDIUM FOR TREES.
   6.3. 100mm SHREDDED BARK MULCH TYP. FOR ALL PLANTS.
7. ALL SUBSTITUTIONS/DELETIONS ARE TO BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO SELECTION AND INSTALLATION.
8. ALL PLANT MATERIAL SUBSTITUTIONS MUST BE TO THE SATISFACTION OF THE LANDSCAPE ARCHITECT AND CITY OF KITCHENER
9. ALL TREES TO BE PLANTED A MINIMUM OF 2m FROM UTILITIES. ANY TREE PLANTED WITHIN 2m OF UTILITIES SHALL HAVE A 48" (4') DEPTH ROOT BARRIER PRODUCT.

Rev.	Date	Issued / Revision	By
6			
5			
4	JULY 29, 2025	ISSUED FOR SITE PLAN APPROVAL #3	PH
3	MAY 23, 2025	ISSUED FOR SITE PLAN APPROVAL #2	PH
2	MAY 15, 2025	ISSUED FOR COORDINATION	PH
1	JAN. 27, 2025	ISSUED FOR SITE PLAN APPROVAL	PH

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Date 2024-08-13
Drawn By RB/PH
Plan Scale AS NOTED
File No. 2469A
Checked By NP
Other

Project

TRANSPORTATION DEPOT
7504 McLEAN ROAD
Puslinch, Ontario

NORTH

File Name **LANDSCAPE PLAN**
Dwg No. **LP01**

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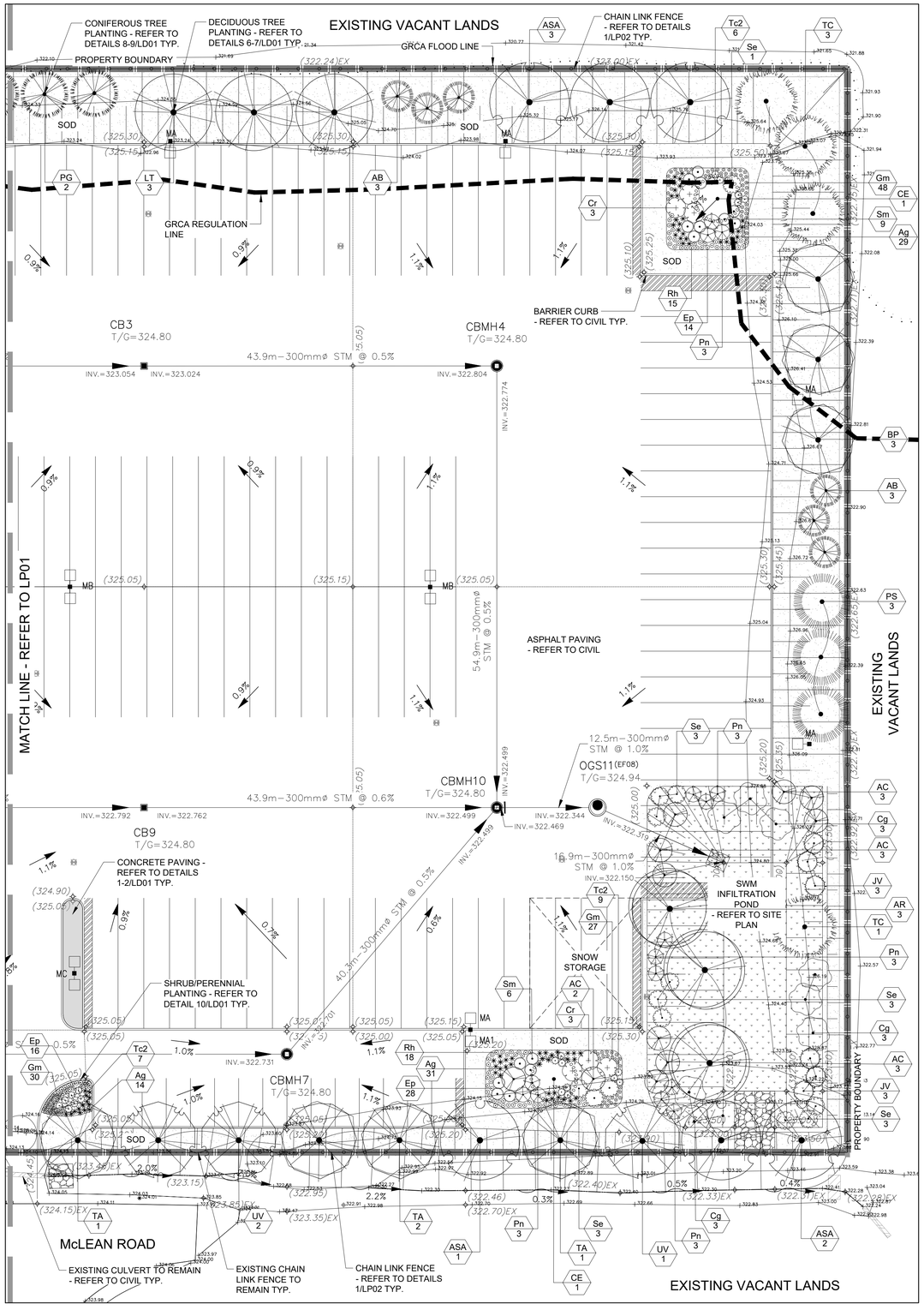

2 NORTH LANDSCAPE PLAN

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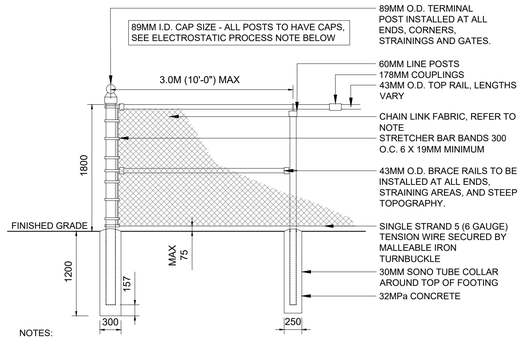


NOTES:

1. CHAIN LINK FABRIC TO BE BLACK VINYL COATED, WOVEN MESH SIZE 38mm, FABRIC HEIGHT 1.8M, CONSTRUCTED WITH 3.5 (9 GAUGE) GALVANIZED WIRE COATED WITH BLACK VINYL, FASTENED TO TOP RAIL, BRACE RAIL, LINE POST, STRETCHER BAR AND TENSION WIRE WITH 3.5 (9 GAUGE) GALVANIZED (AND PAINTED BLACK) WIRE 450 (18") O.C.
2. ALL FENCE COMPONENTS OTHER THAN VINYL COATED CHAIN LINK FABRIC SHALL BE PAINT TREATED WITH ONE COAT STERLING RED PRIMER #1734, FOLLOWED BY ONE COAT STERLING SEMI-GLOSS BLACK ENAMEL #3813, BY ELECTROSTATIC PROCESS.
3. ALL DIMENSIONS ARE IN METRES AND MILLIMETRES.

1 1.8M CHAIN LINK FENCE

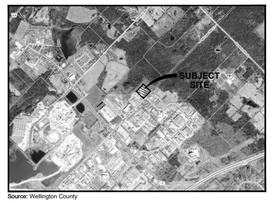
1:40 MHBC-FE-31

PLANT SCHEDULE LP02

SYMBOL	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	CONTAINER
CONIFEROUS TREES						
	AB	6	ABIES BALSAMEA	BALSAM FIR	250CM HT.	W.B.
	JV	6	JUNIPERUS VIRGINIANA	EASTERN REDCEDAR	250CM HT.	W.B.
	PG	2	PICEA GLAUCA	WHITE SPRUCE	250CM HT.	W.B.
	PS	3	PINUS STROBUS	WHITE PINE	250CM HT.	W.B.
	TC	4	TSUGA CANADENSIS	EASTERN HEMLOCK	250CM HT.	W.B.
DECIDUOUS TREES						
	AR	3	ACER RUBRUM	RED MAPLE	60MM CAL.	W.B.
	ASA	6	ACER SACCHARINUM	SILVER MAPLE	60MM CAL.	W.B.
	AC	11	AMELANCHIER CANADENSIS	CANADIAN SERVICEBERRY	60MM CAL.	W.B.
	BP	3	BETULA PAPYRIFERA	PAPER BIRCH	60MM CAL.	W.B.
	CE	2	CERCIS CANADENSIS	EASTERN REDBUD MULTI-TRUNK	60MM CAL.	W.B.
	LT	3	LIRIODENDRON TULIPIFERA	TULIP POPLAR	60MM CAL.	W.B.
	TA	4	TILIA AMERICANA	AMERICAN LINDEN	60MM CAL.	W.B.
	UV	3	ULMUS AMERICANA `VALLEY FORGE`	VALLEY FORGE AMERICAN ELM	60MM CAL.	W.B.
CONIFEROUS SHRUBS						
	Tc2	22	TAXUS CANADENSIS	CANADA YEW	3 GAL.	POT
DECIDUOUS SHRUBS						
	Cg	9	CORNUS RACEMOSA	GRAY DOGWOOD	125CM HT.	POT
	Cr	6	CORNUS SERICEA	RED TWIG DOGWOOD	60CM HT.	POT
	Pn	15	PHYSOCARPUS OPULIFOLIUS	NINEBARK	60CM HT.	POT
	Se	13	SAMBUCUS CANADENSIS	AMERICAN ELDERBERRY	125CM HT.	POT
	Sm	15	SPIRAEA ALBA	MEADOWSWEET	60CM HT.	POT
GRASSES						
	Ag	74	ANDROPOGON GERARDII	BIG BLUESTEM	1 GAL.	POT
PERENNIALS						
	Ep	58	ECHINACEA PURPUREA	PURPLE CONEFLOWER	1 GAL.	POT
	Gm	105	GERANIUM MACULATUM	SPOTTED GERANIUM	1 GAL.	POT
	Rh	33	RUDBECKIA HIRTA	BLACK-EYED SUSAN	1 GAL.	POT

GEODETIC BENCHMARK ELEVATION = 326.301
COSINE STATION - 00820068036, WELLINGTON COUNTY, MORRISTON
NORTHEASTERLY PAD OF HYDRO TOWER ON NORTH SIDE OF 401 AT HWY 6 SOUTH
SITE BENCHMARK ELEVATION = 324.493
RIB IN SOUTH CORNER OF SITE, POINT NUMBER:1

Key Plan



Legend

- PROPERTY BOUNDARY
- EXISTING CHAIN LINK FENCE
- PROPOSED CHAIN LINK FENCE
- PROPOSED CONCRETE PAVING
- PROPOSED TREES
- PROPOSED SHRUBS & PERENNIALS
- PROPOSED SOD

SEED MIX #1 - CUSTOM NATIVE PRAIRIE MEADOW MIX
by OSC Seeds 519-886-0557 or approved equal.

5% BLACK EYED SUSAN	(Rudbeckia hirta)
5% EARLY GOLDENROD	(Solidago juncea)
5% EVENING PRIMROSE	(Oenothera biennis)
20% FOWL BLUEGRASS	(Poa palustris)
5% FOXGLOVE/BEARDTOUNGUE	(Penstemon digitalis)
25% VIRGINIA WILD RYE	(Elymus virginicus)
5% NEW ENGLAND ASTER	(Aster novae-anglaie)
10% BUTTERFLY WEED	(Aesclepias tuberosa)
5% WHITE VERVAIN	(Verbena urticifolia)
5% WILD BERGAMOT	(Monarda fistulosa)
10% BOTTLEBRUSH GRASS	(Elymus hystrix)

SEEDING RATE: 25 kg/ha OR 500g/180m2
SIMUTANEOUSLY SOW COVER CROP OF ANNUAL RYE GRASS FOR EROSION AND WEED CONTROL AT 22kg/ha. INSTALL AS PER MANUFACTURER'S SPECIFICATIONS. ALL PACKING SLIPS MUST BE PROVIDED TO THE LANDSCAPE ARCHITECT OR OWNER, PRIOR TO SEED PLACEMENT.

NOTES:

1. EXISTING TOPOGRAPHICAL INFORMATION PROVIDED BY MTE CONSULTANTS DATED MAY 14, 2024.
2. REFER TO CIVIL ENGINEERING DRAWINGS BY MTE CONSULTANTS FOR SEDIMENT AND EROSION CONTROL MEASURES, LIMIT OF CONSTRUCTION, DETAILED SERVICING AND GRADING.
3. PROPERTY LINE IS APPROXIMATE ONLY AND SHOULD NOT BE USED FOR DETERMINING SETBACKS OR LAYOUT.
4. ANY AREAS DISTURBED BY CONSTRUCTION TO BE RESTORED AND MADE GOOD WITH 150mm TOPSOIL AND SOD OR MATCH EXISTING MATERIAL AS INDICATED TO TOWNSHIP OF PUSLINCH SATISFACTION, AT NO EXTRA COST.
5. REMOVE AND DISPOSE OF EXCESS MATERIAL OFF SITE.
6. ALL PLANTING BEDS TO HAVE THE FOLLOWING DEPTH OF PLANTING MIX:
   - 6.1. MINIMUM 600mm PLANTING MEDIUM FOR SHRUBS.
   - 6.2. MINIMUM 900mm PLANTING MEDIUM FOR TREES.
   - 6.3. 100mm SHREDDED BARK MULCH TYP. FOR ALL PLANTS.
7. ALL SUBSTITUTIONS/DELETIONS ARE TO BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO SELECTION AND INSTALLATION.
8. ALL PLANT MATERIAL SUBSTITUTIONS MUST BE TO THE SATISFACTION OF THE LANDSCAPE ARCHITECT AND CITY OF KITCHENER
9. ALL TREES TO BE PLANTED A MINIMUM OF 2m FROM UTILITIES. ANY TREE PLANTED WITHIN 2m OF UTILITIES SHALL HAVE A 48" (4') DEPTH ROOT BARRIER PRODUCT.

Rev.	Date	Issued / Revision	By
6			
5			
4	JULY 29, 2025	ISSUED FOR SITE PLAN APPROVAL #3	PH
3	MAY 23, 2025	ISSUED FOR SITE PLAN APPROVAL #2	PH
2	MAY 15, 2025	ISSUED FOR COORDINATION	PH
1	JAN. 27, 2025	ISSUED FOR SITE PLAN APPROVAL	PH

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Date	2024-08-13
Drawn By	RB/PH
Plan Scale	AS NOTED
File No.	2469A
Checked By	NP
Other	

Project

TRANSPORTATION DEPOT
7504 McLEAN ROAD
Puslinch, Ontario

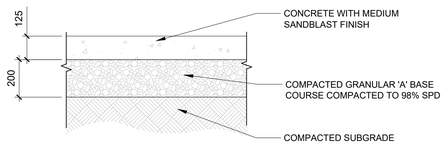
File Name LANDSCAPE PLAN

Dwg No. LP02

R:\PROJECTS IN PROGRESS\2469\A 7504 MCLEAN ROAD, PUSLINCH\01-CAD\2469A_7504 MCLEAN ROAD_LANDSCAPE PLAN_2025_05_23.DWG

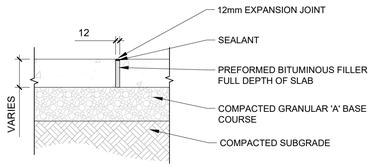
NOTES:

1. 6.0m MAX SPACING FOR EXPANSION JOINTS, 3.0m MAX FOR CONTROL JOINTS ON 1500mm WIDE WALK OR AS REQUIRED
2. CONCRETE TO BE CAST IN PLACE AT 32MPa



1 CONCRETE PAVING

1:15

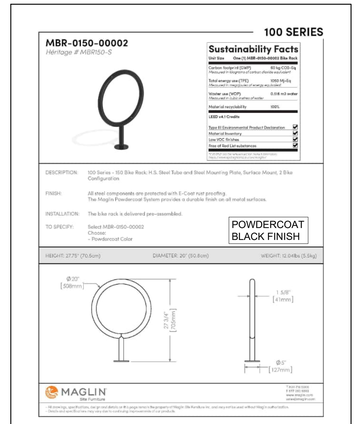


2 TYPICAL CONCRETE JOINTS

1:20

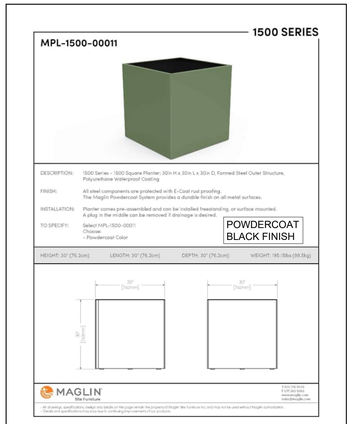
3 BENCH - MAGLIN

N.T.S.



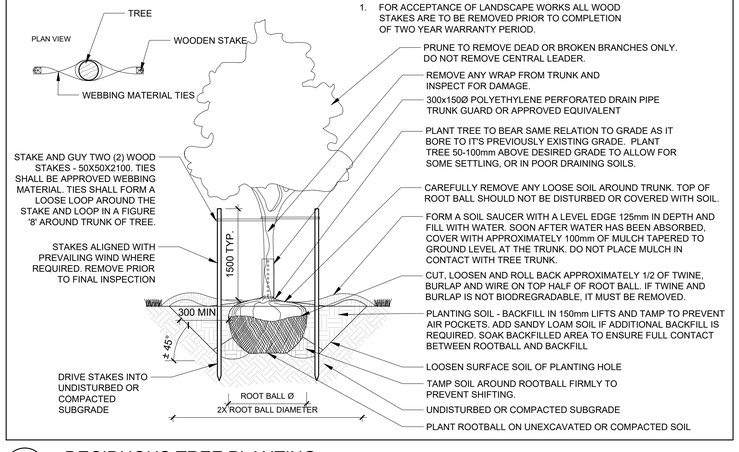
4 BICYCLE RACK - MAGLIN

N.T.S.



5 STEEL PLANTER - MAGLIN

N.T.S.

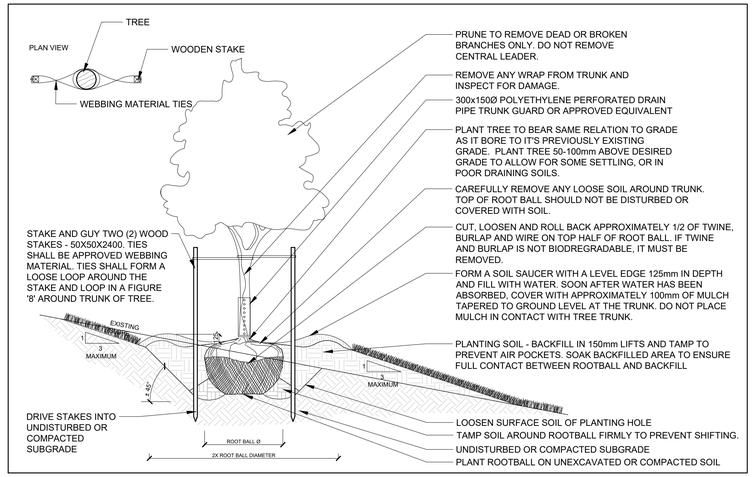


NOTES:

1. FOR ACCEPTANCE OF LANDSCAPE WORKS ALL WOOD STAKES ARE TO BE REMOVED PRIOR TO COMPLETION OF TWO YEAR WARRANTY PERIOD.

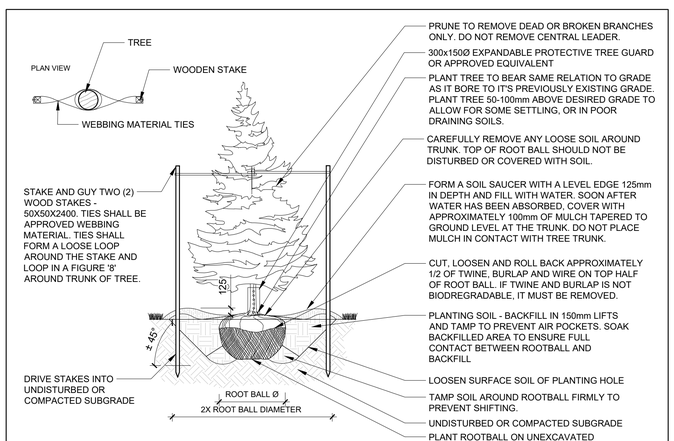
6 DECIDUOUS TREE PLANTING

1:25



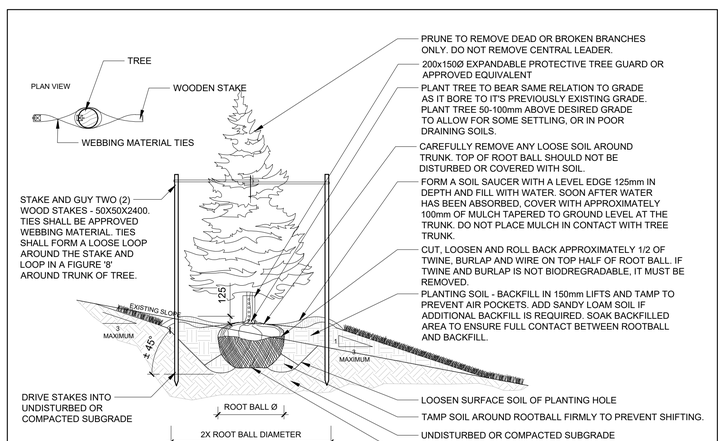
7 DECIDUOUS TREE PLANTING ON SLOPE

1:25



8 CONIFEROUS TREE PLANTING

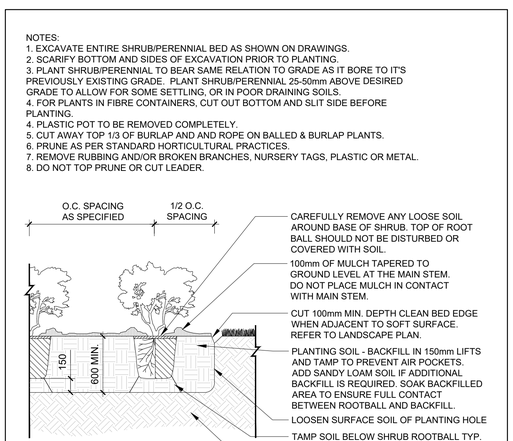
1:25



9 CONIFEROUS TREE PLANTING ON SLOPE

1:25

NOTES:
1. EXCAVATE ENTIRE SHRUB/PERENNIAL BED AS SHOWN ON DRAWINGS.
2. SCARIFY BOTTOM AND SIDES OF EXCAVATION PRIOR TO PLANTING.
3. PLANT SHRUB/PERENNIAL TO BEAR SAME RELATION TO GRADE AS IT BORE TO IT'S PREVIOUSLY EXISTING GRADE. PLANT SHRUB/PERENNIAL 25-50mm ABOVE DESIRED GRADE TO ALLOW FOR SOME SETTLING, OR IN POOR DRAINING SOILS.
4. FOR PLANTS IN FIBRE CONTAINERS, CUT OUT BOTTOM AND SLIT SIDE BEFORE PLANTING.
4. PLASTIC POT TO BE REMOVED COMPLETELY.
5. CUT AWAY TOP 1/3 OF BURLAP AND AND ROPE ON BALLED & BURLAP PLANTS.
6. PRUNE AS PER STANDARD HORTICULTURAL PRACTICES.
7. REMOVE RUBBING AND/OR BROKEN BRANCHES, NURSERY TAGS, PLASTIC OR METAL.
8. DO NOT TOP PRUNE OR CUT LEADER.

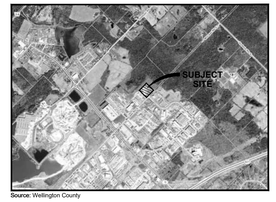


10 SHRUB/PERENNIAL PLANTING

1:30

GEODETIC BENCHMARK ELEVATION = 326.301
COSINE STATION - 0082068036; WELLINGTON COUNTY; MORRISTON
NORTHEASTERLY PAD OF HYDRO TOWER ON NORTH SIDE OF 401 AT HWY 6 SOUTH
SITE BENCHMARK ELEVATION = 324.493
RIB IN SOUTH CORNER OF SITE; POINT NUMBER:1

Key Plan



Source: Wellington County

Legend

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Other	

Project

TRANSPORTATION DEPOT
7504 McLEAN ROAD
Puslinch, Ontario

File Name: **LANDSCAPE DETAILS**	Dwg No. **LD01**

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7504 McLean Road East, Puslinch

Scoped Environmental Impact Study

Prepared for:

BVD Real Estate Inc.
130 Delta Park BLVD
Brampton ON L6T 5E7

Project No. 3370 | May 2025

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

7504 McLean Road East, Puslinch

Scoped Environmental Impact Study

Project Team

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Laura Cobham	GIS Analyst

Report submitted on May 30, 2025

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[redacted]

Project Manager
Terrestrial and Wetland Biologist

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Map 1. Study Area and Existing Conditions

Map 2. Natural Features

Map 3. Proposed Development

Map 4. Habitat Enhancement Areas

1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained by BVD Real Estate Inc to complete a Scoped Environmental Impact Study (EIS) in support of a proposed construction of a logistics facility at 7504 McLean Road East in the Township of Puslinch, Ontario, herein referred to as 'the subject property'.

The subject property is approximately 2.7ha in size and is bounded by McLean Road to the southeast and industrial facilities to the south and southwest. Small areas of cultural meadow lie immediately to the northwest and northeast of the subject property. Beyond these cultural meadows, a woodland natural feature containing the Mill Creek Puslinch Wetland Complex lies approximately 30m from the northwest and northeast property boundaries.

The subject property has been graded and is comprised of an area of gravel fill surrounded by soil berms vegetated with weedy early-succession plant species. No natural features exist on the subject property itself. Small areas of cultural meadow lie immediately to the northwest and northeast of the subject property.

The majority of the subject property is currently zoned as Secondary Agricultural lands, and the northeast edge of the property is mapped as forming part of the Core Greenlands System (Wellington County OP, Schedule B7, 2024). The Core Greenlands System mapping within the subject property appears to be inaccurate or outdated. Historical aerial imagery of this area shows it has been subject to agricultural activities since at least 2012. The northern part of the subject property also falls within the regulation limit of the Grand River Conservation Authority (GRCA); this regulated area is part of the buffer of the engineered floodplain as mapped by GRCA.

Due to the presence of GRCA-regulated features on and adjacent to the subject property, a scoped EIS is required to demonstrate that the proposed development will not negatively impact adjacent natural features or their ecological functions.

This Scoped EIS has been prepared in accordance with the approved Terms of Reference dated September 26, 2024 (included in Appendix I) following the guidance of the County of Wellington OP (2024), the Township of Puslinch (2024) and the EIS guidelines of the GRCA (2005). This report assesses the potential impacts of the proposed development on the natural heritage features and their ecological functions. Mitigation measures, where appropriate, have

been recommended to ensure that the proposed works do not cause negative impacts on the natural areas and their ecological functions.

1.1 Study Area

The term “study area” refers to the subject property and lands surrounding the subject property, including adjacent lands (approximately 120m) and any contiguous natural features extending beyond (Map 1). The 120m radius that is included in the study area has been selected based on the definition of ‘adjacent lands’ provided in the Natural Heritage Reference Manual [NHRM] (OMNR 2010), which requires the assessment of potential impacts on all relevant ecological receivers and wildlife habitat for any development within 120m.

Additionally, the study area review includes data from the Natural Heritage Information Centre [NHIC] (MNRF 2022) (1x1km squares) natural heritage background data and the areas covered by wildlife atlases (10x10km squares).

2.0 Project Scoping

2.1 Proposed Undertaking

The proposed development of the subject property consists of the construction of a commercial transportation logistics facility (1899 m^2, Kalap Architect Inc 2024), which will include a two-story logistics facility with a first-floor warehouse space and second floor offices, 2 loading dock spaces, 151 trailer parking spots, 72 car and mini-truck parking spots, access roads, and a sewer system and stormwater management pond.

2.2 Collection and Review of Background Information

Existing natural heritage information was collected and reviewed to identify key natural heritage features, habitats and species that are reported from, or have the potential to occur within the study area. The following background information sources were reviewed to provide an accurate understanding of the physical and biological attributes within the study area:

- Natural Heritage Information Centre (NHIC) significant species database;
- Ministry of Natural Resources and Forestry (MNRF), Aylmer Guelph District;
- Grand River Conservation Authority Regulations Mapping;
- Wellington County Official Plan (2024);
- Ontario Breeding Bird Atlas (BSC et al. 2022);
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2021);
- Atlas of the Mammals of Ontario (Dobbyn 1994);
- Ontario Butterfly Atlas (McNaughton et al. 2024);
- Ontario Odonate Atlas Database (OOAD 2023); and,
- iNaturalist online records for the vicinity of the subject lands.

Species lists were compiled to provide information on species reported from within the vicinity of the study area based on data available from the wildlife atlases listed above. These atlases provide data based on 10x10 km survey squares. Information on species from the survey squares that overlap with the study area (Atlas square 17NJ71, NHIC squares 17NJ7012 and 17NJ7013) were compiled. These initial species lists were used to guide the scope and type of wildlife field surveys required as outlined in the following sections.

2.2.1 Significant Species Screening

A preliminary list of potential Species at Risk (SAR) was developed to identify those species which are reported within the local area and may have suitable habitat within the subject property and study area. An initial list was compiled from background data gathered from the sources mentioned above. The screening was completed by cross-referencing the preferred habitat for potential SAR and Species of Conservation Concern (SCC) (OMNR 2000) against habitats known to occur in the subject property and study area. This was completed to ensure that the potential presence of all SAR and SCC within the study area was adequately assessed. SAR are defined as species listed as Threatened or Endangered provincially or federally. Confirmed habitat for SAR is protected under the *ESA* (2007). SCC are defined as:

- Species designated provincially as Special Concern;
- Species that have been assigned a conservation status (S-Rank) of S1 to S3 or SH by the NHIC; and
- Species that are designated federally as Threatened or Endangered by the Committee for the Status of Endangered Wildlife in Canada (COSEWIC), but not provincially by the Committee on the Status of Species at Risk in Ontario (COSSARO). These species are protected by the federal *Species at Risk Act*, but not provincially by the *ESA*.

The screenings identified the following SAR/SCC as having potential to be present and to have potential to be impacted by the proposed development:

- Midland Painted Turtle (*Chrysemys picta marginata*),
- Snapping Turtle (*Chelydra serpentina*),
- Eastern Milksnake (*Lampropeltis triangulum*),
- Smooth Yellow False Foxglove (*Aureolaria flava*),
- Black Ash (*Fraxinus nigra*),
- Eastern Meadowlark (*Sturnella magna*), and
- Bobolink (*Dolichonyx oryzivorus*).

The SAR/SCC screening results have been updated since the TOR stage and are provided in Appendix I.

2.2.2 Significant Wildlife Habitat Screening

A Significant Wildlife Habitat (SWH) assessment was completed for the study area and is included in Appendix I. The Significant Wildlife Habitat Technical Guide (SWHTG) is a guideline document that outlines the types of habitats that the MNRF considers significant in Ontario as well as criteria to identify these habitats (OMNR 2000, OMNR 2015). The SWHTG groups SWH into 4 broad categories: 1) seasonal concentration areas, 2) rare vegetation communities and specialized wildlife habitat, 3) habitats of SCC, and 4) animal movement corridors.

Based on the comparison of the species observed and documented, natural features, and vegetation communities present within the subject property, none of the natural features screened were identified as potential SWH candidates within the subject property.

Adjacent lands in the study area associated with the large woodland feature and PSW have more potential to provide several SWH types. Due to a lack of access to the adjacent properties, SWH was assessed as best as possible from within the subject property boundaries. For the full list of potential SWH types in the study area, see Appendix I.

3.0 Relevant Policies, Legislation and Planning Studies

Table 1 provides an overview of natural heritage-based policies, regulation and legislation that were considered and which informed the field program and analysis. To help inform suitable land-use concepts, guide the layout of development and identify areas to be protected, inventoried natural features were evaluated against relevant policies, regulations and legislation outlined in the following sections. The specific implications of these policies to the proposed development are discussed further below.

Table 1. Relevant Policies, Legislation and Planning Studies

Policy/Legislation/Planning Study	Description	Project Relevance
Provincial Policy Statement (OMMAH 2024)	• Issued under the authority of Section 3 of the Planning Act and came into effect on October 20, 2024, replacing the 2020 Provincial Policy Statement and the Growth Plan for the Greater Golden Horseshoe (2019). • Section 4.1 of the PPS – Natural Heritage establishes clear direction on the adoption of an ecosystem approach and the protection of resources that have been identified as 'significant'. • The Natural Heritage Reference Manual (OMNR 2010) and the Significant Wildlife Habitat Technical Guide (OMNR 2000) were prepared by the MNRF to provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS.	• Natural features were identified within or adjacent to the subject property development area as having implications under the PPS that should be considered: o Provincially Significant Wetland; o Significant Woodland; • Development or site alteration shall not be permitted within significant wildlife habitats, unless it is demonstrated that there will be no negative impacts of the features and their ecological functions. • Diversity and connectivity of natural features and the long-term ecological functions and biodiversity of natural heritage systems should be maintained, restored and improved where possible, recognizing linkages between and among natural heritage features and areas, surface water features and groundwater features.

Policy/Legislation/Planning Study	Description	Project Relevance
Endangered Species Act (Government of Ontario 2007)	• The original ESA, written in 1971, underwent a year-long review which resulted in a number of changes which came into force in 2007. • The ESA prohibits killing, harming, harassing or capturing Species at Risk (SAR) and protects their habitats from damage and destruction. Ontario Regulation 242/08 under the ESA applies to all species on the Species at Risk in Ontario List, as of June 2, 2017. • Ontario Regulation 829/21 and 830/21 may apply depending on which SAR are confirmed to be present within the Subject Property where harm to those species and their habitat is proposed.	• Potential habitat for Endangered and Threatened Species within the Study Area was identified during the initial TOR screening exercise for the Block Plan EIS. • The EIS must have consideration for the ESA which is administered by the MECP.
Species at Risk Act (SARA, Government of Canada 2002)	• SARA establishes the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as an independent body of experts responsible for assessing and identifying species at risk. • It creates prohibitions to protect listed threatened and endangered species and their critical habitat.	• Any observed species listed by COSEWIC as endangered or threatened shall be protected, along with their habitat. • The EIS shall demonstrate that no impacts to SAR will occur.

Policy/Legislation/Planning Study	Description	Project Relevance
Migratory Birds Convention Act (MCBA) (Government of Canada 2017)	• The MBCA protects migratory game birds, insectivorous birds, and several other migratory non-game birds from persecution in the form of harassment. • The schedule of on-site work must consider MBCA windows, with timing of breeding bird season typically occurring between April 1 and August 31, however, this is a guideline, since the MBCA applies to nesting bird species. • "Incidental take" is considered illegal, with the exception of a permit obtained by the Canadian Wildlife Service (CWS).	• Species protected by the MBCA were observed within the subject property during field surveys. • The timing of construction activities, especially vegetation clearing and site grading must have consideration for the MB CA timing windows.
Fish and Wildlife Conservation Act (FWCA) (Government of Ontario 2019)	• The *Fish and Wildlife Conservation Act* (FWCA) provides protection for certain bird species, not protected under the MBCA (e.g., raptors), as well as furbearing mammals and their dens or habitual dwellings, aside from the Red Fox (*Vulpes vulpes*) and Striped Skunk (*Mephitis mephitis*).	• The timing of construction activities, especially vegetation clearing and site grading must have consideration for bird nesting (including nesting season for Raptors, Hawks and Owls) and den sites for furbearing mammals. • Wildlife sweeps by a qualified biologist are recommended in advance of any vegetation clearing and site grubbing during the bird active season to ensure that no active nests/dens are present.
County of Wellington Official Plan (The Corporation of Wellington, 2024)	• The County of Wellington's new Official Plan (2024), outlines current policies for the protection of natural features within the County of Wellington which represent a constraint for development.	• The Township of Puslinch Greenbelt mapping (Schedule A7) shows the property designated as "secondary agriculture". • County mapping (Schedule B7) also shows the property within the "Paris Galt Moraine Policy Area". • All woodlands, wetlands, and habitat for threatened or endangered species are part of the Greenlands System (Schedule A).

Policy/Legislation/Planning Study	Description	Project Relevance
		According to the County OP, the Greenlands System will be maintained or enhanced. • The northeast edge of the property is mapped as forming part of the “Core Greenlands System”. The boundary of this feature requires review and verification. • All wetlands and habitat for threatened or endangered species are designated as Core Greenlands. Wetlands will be protected and development must not impair future ecological functions. Development and site alteration will not be allowed in significant habitat or endangered or threatened species.
County of Wellington Forest Conservation Bylaw 5115-09 (2009)	• The County of Wellington Forest Conservation Bylaw regulates harm or destruction of individual trees and woodlands within the County of Wellington. • Defines “woodlands” (Section 1. ai, i-iv).	• The significant woodland is protected by the Forest Conservation Bylaw (5115-09). • The EIS shall demonstrate that no long-term impacts to the adjacent woodland will occur.
Puslinch Zoning By-Law (2021)	• The Puslinch Zoning By-Law prohibits the use of land and building development except or certain purposes, to regulate the size and development impacts of buildings. This by-law protects significant woodlands within the Township	• Section 13.2 of the by-law states that development will not be allowed in significant woodlands unless it has been demonstrated to the satisfaction of the Township that there will be no negative impact on the woodland or its ecological functions • The significant woodland is considered Natural Environment Zone.

Policy/Legislation/Planning Study	Description	Project Relevance
Ontario Regulation 41/24: Prohibited Activities, Exemptions and Permits	• This Minister's regulation replaced Ontario Regulation 150/06 (and all other individual conservation authority regulations) as of April 1, 2024. • The regulation prohibits certain development activities directly in the legislation. The GRCA will be required to develop policy and procedure documents with respect to permits.	• GRCA noted in a letter September 15 2022 that the study area surrounding the subject property includes an unevaluated wetland and its regulated allowance, as well as the regulated allowance to a separate off-site wetland. These features and their associated allowances are regulated by GRCA. • Development within regulated areas or adjacent lands (30 m) may require a permit.
Mill Creek Subwatershed Study (CH2M Gore and Storrie Ltd. et al 1996)	• Investigates and provides recommendations on wetland setbacks and stormwater management details within the Mill Creek Subwatershed	• The subject property is adjacent to the Mill Creek Subwatershed

4.0 Field Methods

Field surveys were undertaken within the subject property to characterize natural features and identify any significant and sensitive natural heritage features and species that have potential to be adversely affected by the proposed development. Field visits were completed between May and June, 2024 and are described in detail below and summarized in Table 2. Surveys were undertaken in accordance with provincial and local guidance documents as indicated below.

Table 2. Field Survey Summary.

Survey	Protocol	Dates (2024)
Preliminary Site Visit - Ecological Land Classification, Spring Vegetation Inventory, review of Core Greenlands mapping	Ecological Land Classification for Southern Ontario (Lee et al. 1998) & Systematic search by ELC polygon	May 14
Breeding Bird Surveys	Ontario Breeding Bird Atlas (Birds Canada 2021a and 2021b)	June 10
		June 24
Ecological Land Classification & Summer Vegetation Inventory	Ecological Land Classification for Southern Ontario (Lee et al. 1998) & Systematic search by ELC polygon	June 10

4.1.1 Ecological Land Classification

Vegetation communities up to 120m from the edge of the proposed development were mapped and classified following the Ecological Land Classification (ELC) system for southern Ontario (Lee et al. 1998). There was no access to the communities beyond property boundaries, therefore surveys were completed using a combination of aerial imagery (wetlands) and surveys from the edge of the property line (woodlands). The boundary of the woodland forming the edge of the Core Greenlands System (Wellington County OP, Schedule B7, 2024) was revised based on the ELC mapping. Details of the vegetation communities were recorded including species composition, dominance, uncommon species or features, surficial soil types, and evidence of human impacts.

4.1.2 Vegetation Inventories

A one-season summer inventory of all vegetation communities within the subject property was completed on June 10, 2024. All species of vascular flora identifiable at the time of the field

survey were documented and recorded by ELC polygon. Any rare species and their location(s) were to be recorded with a handheld GPS unit.

4.1.3 Wetland Boundary Delineation

A GRCA mapped wetland is shown within the woodland to the north and north-west of the subject property. This wetland is part of the Mill Creek Puslinch Wetland Complex and is regulated by the GRCA; wetland mapping of the area is available through the GRCA watershed mapping (GRCA, 2024). Access to the adjacent properties north of the subject property, which contained the wetland feature in question, was not granted during the field surveys, so an in-depth assessment of the wetland was not achieved.

4.1.4 Breeding Bird Surveys

NRSI biologists conducted two early morning breeding bird surveys within the subject property boundaries. Two rounds of surveys were conducted at least a week apart during the peak breeding season (May 25 to July 10), and included one 10-minute point count station and an area search of the property. Breeding evidence was be recorded in accordance with the Ontario Breeding Bird Atlas (OBBA) protocol (Birds Canada 2021a and 2021b). Any observations of significant species were recorded in detail, including their specific observation location(s), observed behavior, and the highest level of breeding evidence.

4.1.5 Additional Wildlife

All observations of birds, herpetofauna, mammals and insects were documented on all field visits. This included direct observations of individuals, as well as signs of wildlife presence (i.e., tracks, scats, dens, nests etc.).

5.0 Existing Conditions

5.1 Soils, Terrain and Drainage

The subject property occurs within the southern reaches of the Horseshoe Moraines Region ((Chapman and Putnam 1984, A&A Consultants 2024a), and the flatter low-lying outwash valley orientated from southwest to northeast through the Puslinch area. The surficial geology typically consists of hard stony sand silt till, but can vary into a sandy till in many areas (Karrow 1987).

The subject property is underlain with loose compacted fill ranging of gravel and sand to gravelly silty sand at 1.5-2.0 m depths, with glacial till deposits underneath at 1.5-2.5 m depths.

The subject property is located within the Mill Creek-Grand River watershed, which consists of Mill Creek, Grand River, and its associated tributaries. Mill Creek and its associated wetlands are located to the northeast and northwest of the subject property. The subject property ranges in elevation from approximately 330 mASL in the southeast corner to 320 mASL in the northwest corner, with a generally flat grading with slight sloping towards the southwest corner of the subject property. Groundwater from the subject property flows towards a tributary of Mill Creek southwest from the subject property before draining into the Grand River; groundwater flow may also be influenced by surrounding utility trenches and/or other substrate surfaces in the vicinity (A&A Consultants, 2024b).

The water table for the subject property was assessed using an existing groundwater monitoring well at the southwest property corner, and supported by three additional monitoring wells in the remaining property corners (A&A Consultants, 2024b). The existing monitoring well showed the lowest water elevation compared to the other wells utilized, with MW24-1 at the southern edge of the subject property observed dry at all of seven monitoring events. Results from this monitoring concluded that seasonally high groundwater elevation was present at the subject property at elevations 255.536 – 315.323 mASL (A&A Consultants, 2024b).

5.2 Vegetation

5.2.1 Vegetation Communities

The subject property has been graded and is comprised of an area of gravel fill surrounded by soil berms vegetated with weedy early-succession plant species. No natural features exist on the subject property. Small areas of cultural meadow lie immediately to the northwest and northeast of the subject property. Beyond these cultural meadows, a woodland natural feature containing the Mill Creek Puslinch Wetland Complex lies about 30 m from the northwest and 60m from the northeast property boundaries. A summary of the ELC communities identified within and adjacent to the subject property is provided in Table 3 and shown on Map 2.

Table 3. Ecological Land Classification Community Descriptions.

ELC Code	Community Type	Community Description
CUM1-1	Mineral Cultural Meadow Ecosite	The cultural meadow ecosite is the only community present on the subject property. The site is mostly disturbed with new pioneer field species emerging. Common field species such as Creeping Thistle (*Cirsium arvense*), White Clover (*Trifolium repens*), Garden Bird's-foot Trefoil (*Lotus corniculatus*), and Oxeye Daisy (*Leucanthemum vulgare*) occur in abundance throughout the cultural meadow. Lesser amounts of woody species are present with Meadow Willow (*Salix petiolaris*) and Staghorn Sumac (*Rhus typhina*) noted as rare.
FOM (Study Area)	Mixed Forest Ecosite	The mixed forest ecosite is approximately 30m to the northwest and 60m to the northeast of the property boundary. This ecosite was characterized from within the subject property at a distance and therefore lacks detailed inventory of the understory and groundcover layers. The canopy is dominated by Silver Maple (*Acer saccharinum*), Eastern White Cedar (*Thuja occidentalis*), and Eastern White Pine (*Pinus strobus*) with Black Pine (*Pinus nigra*) being rare. The sub-canopy consists of American Basswood (*Tilia americana*) and Trembling Aspen (*Populus tremuloides*). Species visible in the understory were Manitoba Maple (*Acer negundo*), Trembling Aspen, Common Buckthorn (*Rhamnus cathartica*), Gray Dogwood (*Cornus racemosa*), Riverbank Grape (*Vitis riparia*), and Thicket Creeper (*Parthenocissus vitacea*).

5.2.2 Vascular Flora

A total of 61 plant species were observed by NRSI biologists within the subject property during vegetation inventories. A complete list of all observed species and species reported from the vicinity of the study area is provided in Appendix II.

Based on available background information, two SAR plants, Black Ash (*Fraxinus nigra*) and Smooth Yellow False Foxglove (*Aureolaria flava*) have been reported from the vicinity of the study area (MNRF 2022, iNaturalist 2024). NRSI did not observe any provincially, federally or regionally significant species within the subject property during the 2024 field visits.

5.3 Wildlife

5.3.1 Birds

A total of 130 bird species are reported from the study area or vicinity based on the OBBA and NHIC data bases (BSC et al. 2022; MNRF 2022). NRSI biologist observed 30 species during the 2024 breeding bird surveys and during other site visits. Of these species, 7 were "Observed" with no breeding evidence, 11 had "Possible" breeding evidence, 10 had "Probable" breeding evidence, and 2 had "Confirmed" breeding evidence. This includes species that were observed on the subject property and from the subject property in the surrounding habitat. A complete list of species observed by NRSI and reported from the vicinity of the study area is provided in Appendix III.

Based on available background information, 12 bird SCC and 5 bird SAR are reported from the vicinity of the study area (BSC et al. 2024; MNRF 2022) as summarized in the screening table in Appendix I. One SCC, Barn Swallow (*Hirundo rustica*), was documented by NRSI during breeding bird surveys.

Barn Swallows were observed during both rounds of breeding bird surveys foraging over the subject property with no associated breeding evidence. This species nests almost exclusively on human-made structures in Ontario, and will build their nests on any available building and on sheds, bridges, culverts, or any vertical sites with an overhang (OMNR 2000). No occupied nests or suitable structures were present on the subject property, though open construction buildings on adjacent properties have the potential to support nesting habitat; however, no nesting behaviors were observed during breeding bird surveys, with the individuals observed on site utilizing the adjacent open fields for foraging. Barn Swallows require open country for foraging and prefer areas near water (OMNR 2000, Brown and Brown 2020), and the

combination of wetland and large open areas in the vicinity of the subject property provides suitable foraging habitat for this species.

No significant species of birds are expected to use the subject property for breeding based on the lack of habitat on-site.

5.3.2 Amphibians and Reptiles

According to the Ontario Reptile and Amphibian Atlas, iNaturalist, and the NHIC database (Ontario Nature 2019, iNaturalist 2024, MNRF 2022), 27 species of herpetofauna, including 3 SCC and 2 SAR are known from within the 10x10km grid overlapping the subject property.

NRSI biologists incidentally observed 2 common herpetofauna species during field surveys in 2024; Northern Leopard Frog (*Lithobates pipiens*) and Gray Treefrog (*Dryophytes versicolor*). There are no natural features within the subject property that would provide suitable habitat for these species, though the surrounding wetlands and woodlands adjacent to the subject property are likely to contain suitable habitat.

All species of herpetofauna reported from background sources for the study area are listed in Appendix IV.

5.3.3 Mammals

A total of 46 mammal species are documented from the study area or vicinity based on the Mammal Atlas of Ontario and NHIC database (Dobbyn 1994; MNRF 2022). Two common mammal species were observed during field investigations in 2024, Eastern Cottontail (*Sylvilagus floridanus*) and White-tailed Deer (*Odocoileus virginianus*). A complete list of all species observed and reported from the vicinity of the study area is provided in Appendix V.

Based on available background information, 1 mammal SCC and 5 mammal SAR are reported from the vicinity of the study area (Dobbyn 1994; MNRF 2022). The woodlands in the surrounding study area have potential to provide habitat for SAR bats including Little Brown Myotis (*Myotis lucifungus*), Northern Myotis (*Myotis septentrionalis*) and Tri-colored Bat (*Perimyotis subflavus*). Eastern Small-footed Myotis (*Myotis leibii*) may use buildings or other structures in the study area for roosting if entry is possible. There is no suitable bat habitat on the subject property itself due to the lack of structure that would support roosting (large cavity trees, buildings, etc.).

5.3.4 Butterflies

A total of 55 butterfly species are reported from the study area or vicinity based on the Ontario Butterfly Atlas, iNaturalist, and the NHIC database (MacNaughton et al. 2023, iNaturalist 2024, MNRF 2022). NRSI biologists did not conduct any dedicated surveys during the butterfly active season and no butterfly species were observed incidentally during site visits in 2024. A complete list of all species reported from the vicinity of the study area is provided in Appendix VI.

Based on available background information, 3 SCC have been reported from the vicinity of the study area, Monarch (*Danaus plexippus*), Black Dash (*Euphyes conspicua*) and West Virginia White (*Pieris virginiensis*). Although the subject property does contain meadow vegetation, it is not considered preferred habitat for butterflies due to its small size and overall poor quality. No regionally, provincially or federally significant species were observed within the subject property during field surveys and none are expected to be present.

5.3.5 Odonates

A total of 72 odonate species are reported from the study area or vicinity based on the Ontario Odonata Atlas and NHIC database (OOAD 2023, MNRF 2022). NRSI biologists did not conduct any dedicated surveys for insects and no odonate species were observed incidentally during site visits in 2024. A complete list of all species reported from the vicinity of the study area is provided in Appendix VI.

Based on available background information, 4 SCC odonate species are reported from the vicinity of the study area. The subject property itself in not expected to provide suitable habitat for odonates, though the surrounding wetlands off site may provide habitat. No regionally, provincially or federally significant species were observed within the subject property during field surveys and none are expected to be present.

6.0 Significance and Sensitivity

The subject property is adjacent to the eastern headwaters of the Mill Creek Subwatershed, within the Mill Creek-Grand River watershed. Mill Creek is a significant watercourse with important coldwater aquatic habitats which support sensitive coldwater fish species including Brook Trout. The coldwater thermal regime is created due to the progressive and significant inputs of cold groundwater, discharging to the creek throughout the upper and middle parts of the subwatershed. In order to preserve and maintain this significant habitat, upland recharge and lowland discharge must continue (CH2M Gore and Storrie 1996). The Mill Creek Subwatershed Study provides guidance on maintaining the balance of water to Mill Creek such as impervious cover limits, infiltration practices and erosion and sediment control.

The subject property has been altered through the grading and filling of the majority of the property. The results of the field surveys and background review conducted show that the subject property is composed primarily of cultural meadow and disturbed areas, which are of low quality and not significant. There are no natural features within the subject property boundary itself, although a small section of significant woodland and wetland is present at the northeast and northwest boundary of the study area. These features extend off-site to the north, and are not anticipated to be affected by development of the subject property. These features have been re-delineated based on the results of vegetation community surveys and review of historical aerial imagery within the subject property and study area, which do not show the features mapped in the Core Greenlands System (Map 1). New delineations and associated setback buffers have been recommended based on these results of these surveys, and are shown on Map 2.

The topography of the subject property is generally flat with a gentle sloping towards the southwest corner of the property, away from the wetland complex to the north (A&A Consultants, 2024b). Groundwater is expected to flow in a southwest direction, and indicates that the nearby wetland complex is not influenced by groundwater flow from the subject property. Surface runoff wastewater flows from the subject property northwest, towards the wetland complex, but has been accounted for with the stormwater management design features and is not anticipated to influence the hydrology of the wetland complex.

Groundwater recharge at the property was estimated using average annual precipitation and evapotranspiration levels, and resulted in an estimated groundwater recharge and surface runoff volume of 363 mm/year (A&A Consultants, 2024b). Groundwater infiltration levels may

vary within the subject property post-development, but is generally expected to be in deficit when compared to pre-development levels, due to a substantial increase in the amount of impervious and hard surfaces covering the property. These influences are to be factored into the stormwater management plan to maintain and enhance the groundwater discharge function of the subject property and surrounding area (MTE 2024).

The woodland adjacent to the subject property is considered possible SWH for Eastern Wood-Pewee, bat maternity roosts, woodland raptor nesting and deer yarding areas. The PSW adjacent to the woodlands have potential to provide SWH turtle wintering and snake hibernacula habitat. However, these woodland and wetland complexes are outside of the limits of development, and are not anticipated to be affected by the proposed development of the subject property. A 10m buffer area for the delineated woodland dripline adjacent to the subject property is recommended to minimize impacts to the natural feature. In addition, a 30m buffer area is recommended extending from the PSW complex within the adjacent study area, of which the boundaries extend into the woodland feature edge. Map 2 shows a combined natural feature setback boundary for the combined woodland and PSW buffer areas, which considers the greater of these two buffers extending into the adjacent cultural meadow. These buffer areas will be subsequently utilized as enhancement planting locations, which is discussed in further detail in Section 7.6. Additional wildlife impact mitigation measures are discussed and recommended below in the impact section of this report.

7.0 Impact Analysis and Enhancement Recommendations

7.1 Proposed Development

The proposed development consists of a two-story 1899 m^2 logistics facility with a first-floor warehouse space and second floor offices. The proposed facility includes 49 car parking spaces,16 mini-truck parking spaces, 147 trailer parking spaces, 4 bicycle parking spaces, access roads, and a sewer system and stormwater management pond. The parking areas will be asphalt paved. A Conceptual Site Plan has been prepared by Kalap Architect Inc (2024) and is superimposed onto the natural feature mapping and shown on Map 2.

A Stormwater Management Report has been prepared by MTE (2024) to show how the proposed development will be serviced including wastewater treatment and stormwater management. Runoff wastewater will be managed by an on-site treatment system which will discharge treated effluent to the subsurface in accordance with the requirements of the Ontario Building Code. The stormwater management approach will provide parking lot storage in the eastern property corner, and an oil-grit separator to satisfy the criteria for water quantity and quality control. Wastewater will subsequently be directed into an infiltration pond located in the east corner of the subject property, which is equipped with a weir to allow overflow into the McLean's Road roadside ditch.

7.2 Approach to Impact Analysis

This impact analysis has been prepared by comparing the details of the proposed development plan to the natural heritage features within and adjacent to the subject property. NRSI has reviewed the reports and plans provided by other team members including a Conceptual Site Plan as well as geotechnical and hydrogeological reports to prepare this section.

The following is a description of the types of impacts discussed in the sections below:

- **Direct impacts** to the natural features on the subject property associated with disruption or displacement caused by the actual proposed footprint of the undertaking.
- **Indirect impacts** associated with changes in site conditions such as drainage and water quantity/quality.
- **Induced impacts** associated with impacts after the development is constructed such as subsequent demand on the resources created by increased use of the area and vicinity.

7.3 Direct Impacts and Recommended Mitigation

7.3.1 Tree and Vegetation Removal

The development of the subject property has avoided any direct impacts to the significant woodland and the wetlands adjacent to the subject property. These features are to be retained and buffered against potential damage resulting from construction activities, through the use of tree protective fencing around individual trees near the development as needed, and sediment barriers installed at the limit of development to reduce sediment erosion resulting from vegetation removal. A 10m buffer area for the delineated woodland dripline adjacent to the subject property is recommended to ensure no constructed-related damages to trees occurs.

The conceptual development plan has the proposed facility positioned within disturbed graded areas and surrounding cultural meadow, which consists of sparse weedy vegetation dominated by non-native species. The development will require the removal of the cultural meadow vegetation and individual trees across the subject property. Hedgerow trees along the east and south boundaries of the subject property will be protected by avoiding and minimizing grading and asphalt within the dripline and providing a 1m buffer where possible.

Mitigation

Construction limit fencing and sediment barrier be located and installed as needed at the limit of development to protect the on- and off-site significant woodland, trees and wetlands. Trees should be protected using standard tree protection fencing in which no site alteration or disturbance may occur.

7.3.2 Birds and Their Nests

The removal of trees and meadow vegetation has the potential to harm and disrupt nesting birds. The *Migratory Birds Convention Act* (MBCA, Government of Canada 2017) identifies a list of migratory bird species that are protected. It prohibits the destruction of nests, individuals and activities that would cause an adult bird to abandon a nest. Tree and vegetation removal is required to occur outside of the core nesting period for migratory birds as established by the Canadian Wildlife Service (CWS), which extends from approximately April 1 – August 31 (Government of Canada 2018). Every developer, consultant, contractor, etc. is legally obliged to carry out due diligence to protect migratory birds from harm during all construction projects.

Mitigation

Should vegetation/tree removal be required to occur within the core nesting period, a nest search may be conducted by qualified biologists within simple habitat just prior to the removal activity (less than 48 hours prior). Simple habitat means individual trees or small areas of vegetation where the visibility and probability of detecting nests is good. Should any active nest be identified, or signs of an active nest be observed, there shall be no removal or construction activity until sign-off is obtained from the qualified biologist that the nest is no longer active. Vegetated areas and tree(s) identified as having no nesting activity can be removed; however, removal is to occur within 48 hours of the nest search. If removal does not occur within this time frame, additional nest searches are to be conducted.

If a nest search is conducted, a clearance letter is to be prepared by the qualified biologist that undertook the surveys. The letter would be submitted to the client for their files in the event a record of due diligence is requested by the CWS.

7.3.3 SAR Bats

The removal of trees has the potential to harm SAR bats. The primary way to avoid impacts to bats is to retain trees which have suitable habitat for bats such as cavities and loose bark. It is also important to avoid removing any trees during the time when bats are most apt to be using them. Tree and vegetation removal is to occur outside of the core active bat season (April 1 to September 30). Every developer, consultant, contractor, etc. is legally obliged to carry out due diligence to protect migratory birds from harm during all construction projects.

No trees with suitable cavities for candidate bat roosting habitat were observed on-site during the field surveys of the subject property.

Mitigation

Any removal of trees is to be completed outside of the bat active season generally extending from April 1- October 1, with the understanding that SAR are protected during all seasons. Any removals within the bat active season will be in compliance with the Endangered Species Act and in consultation with MECP.

7.4 Indirect Impacts

The following section outlines potential sources of indirect impacts associated with the proposed development.

- Alterations to Drainage and Flow Patterns, Water Quality, Groundwater;
- Wildlife Disturbance; and,
- Erosion and Sedimentation.

7.4.1 Alterations to Drainage and Flow Patterns, Water Quality, Groundwater

A Stormwater Management Report has been prepared by MTE (2024) that provides details on the proposed approach to managing and treating stormwater runoff following development. Due to the past alteration of the subject property surface, along with the existing land cover, concerns over flooding downstream warranted a conservative approach to managing recharge, with the site assumed to be fully pervious and a higher recharge target set (MTE 2024)

The proposed stormwater management plan will control water quantity by providing storage in the parking lots and an on-site infiltration pond. The parking lots will drain to a storm sewer system at the east corner of the subject property, which controls the outflow by an appropriately sized orifice, prior to being outlet to an oil/grit separator for quality control. The OGS will provide Level 1 (enhanced) water quality control (MTE 2024). Treated water will be released to an on-site infiltration pond, with capacity for 229m^3 storage, and is equipped with a weir to allow overflow into the McLean's Road roadside ditch.

The Hydrogeological Report prepared by A&A Consultants (2024b) indicates that the wetland feature adjacent to the subject property is upland of the proposed development, and is not expected to be impacted by the drainage outflow of the development.

Mitigation

Implement the stormwater management plan, including erosion sediment fencing mitigation measures, as designed and recommended by MTE.

7.4.2 Wildlife Disturbance

Increased disturbance caused by excessive noise, dust, vibrations, lighting, and proximity of human presence during construction may cause wildlife species on-site and within the adjacent natural features to abandon or avoid the area for travel, nesting or foraging. Additionally, truck noise and parking lot lighting during operation of the facility has potential to disrupt wildlife.

The wildlife species and individuals that are present in the study area are those which have adapted to the current noise, lighting and disturbance conditions which are present due to the existing adjacent trucking facility, heavy equipment business, McLean Road traffic and neighboring aggregate operations. This includes common species as well as the significant species which have been noted or have potential to be present within the on-site and adjacent woodland such as Eastern Wood-Pewee and SAR bats. Any potential significant wildlife habitat functions that are present are expected to be maintained by retaining the natural features in their entirety, maintaining the water balance that supports them, providing a buffer and maintaining connectivity within the adjacent woodlands.

Construction limit fencing is recommended to ensure that buffers are adhered to prior to and during construction. This fencing should be combined with sediment barrier fencing to also function as a measure to ensure that wildlife (especially turtles that may inhabit adjacent wetland features) are not able to enter the work area during construction, where they may be at risk of harm. Daily construction hours are recommended to be between 9:00am and 9:00pm during the spring and summer months (April to August), as a method of mitigating noise and human activity impacts to wildlife. Noise, dust, vibration and lighting disturbance impacts due to construction are anticipated to be localized and temporary.

To avoid and minimize disturbance to wildlife during operation it is recommended that truck movements and noise be limited to the extent possible during the breeding season for birds and wildlife which includes April to August, including nighttime. The proposed hours of operation of the facility are 8:00am to 4:30pm, Monday to Friday, year-round. These hours are not expected to result in noise or other disturbance impacts to breeding birds and other wildlife. Parking lot lighting should be reduced in height, directed away and shielded from shining into natural features.

Mitigation

Combined construction limit fencing/sediment barrier should be installed prior to any works beginning to ensure that buffering of natural features is adhered to and to exclude wildlife from the work area. Construction noise be restricted during spring and summer (April to August) to between 9:00 am and 9:00 pm. Any lighting equipment associated with construction activities should be turned off at the end of daily construction activities. Impacts due to dust should be mitigated for by moistening areas of bare, dry soil with water as needed during construction activities to reduce the amount of dust produced. Permanent parking lot lighting should be

shielded and directed away from the adjacent natural features and the height should be reduced as much as possible so as to prevent 'lightwash' of these areas.

7.4.3 Erosion & Sedimentation

During rain or thaw events, erosion of exposed soils has the potential to occur during construction. Sediment laden surface water runoff has potential to flow into receiving catch basins and ditches, potentially impairing downstream water quality. The adjacent wetland feature is located upslope from the development and therefore are not at risk of sedimentation during construction; however, combined construction limit fencing/sediment barrier is recommended along the outer limit of the work area.

Mitigation

ESC measures should be installed along the limit of construction/grading to ensure that sediment laden runoff does not impact the on-site and adjacent natural features, or downstream receiving watercourses or water bodies. An erosion and sediment control plan should be prepared at the Site Plan stage and sediment fencing implemented prior to any grading, construction or other site works. Sediment fencing proposed is included in Map 3.

7.5 Induced Impacts

Induced impacts are described as those that are not directly related to the construction or operation of the facilities in question, but rather arise as a result of the use of the natural areas or immediately adjacent lands for the development. The simplest example is an increase in the use of natural areas adjacent to development by residents, feral domestic wildlife, and unauthorized trail/pathway construction and dumping of debris.

Induced impacts are anticipated to be negligible on this subject property. The proposed development has been placed within the disturbed and cultural areas of the property. Human activity is expected to be focused within the development and will not enter natural features.

Mitigation

Fencing of the active portion of the truck facility is recommended to deter human intrusion into the natural features. Debris from the operation of the facility should be contained within the site by a chain link fence as well as routine maintenance and garbage collection, and not allowed to blow into adjacent natural features.

7.6 Enhancements

The buffers and gaps between retained natural features are an opportunity to enhance the natural features and improve ecological connectivity. The lands and buffer areas along the north and west subject property boundaries, bordering the woodland and wetland features in adjacent properties, are suitable locations for potential plantings and enhancement activities. Plantings and naturalization are further recommended to enhance the ecological connectivity between the woodland and the wetlands for wildlife habitat functions such as for an amphibian movement corridor.

Enhancements may include the planting of native larger caliper trees or smaller tree 'whips', shrub plantings and native herbaceous seed mixes, all of which will serve to expand the size of the existing natural features. The selection of species for edge plantings should reflect the native species composition of adjacent natural areas and species that are common and hardy in the local planting zone; a list of recommended species has been provided in the landscape plans for the subject property and study area (MHBC 2024), and includes suitable native species to replace non-native/native cultivars and maintain and enhance the ecological functions of the area. Natural regeneration that is currently present should be considered and retained within the planting plans. Removal of common buckthorn from these areas and the edges of the woodland and wetlands should be considered. Any stumps and root systems of removed native trees can be left in place for habitat and soil stabilization. Re-seeding of the natural feature buffer areas within the cultural meadow should be undertaken using a pollinator-friendly seed mix (including Common Milkweed). Areas recommended for these enhancement plantings are outlined in Map 4.

8.0 Summary

The proposed undertaking is to construct a warehouse, logistics facility with parking lots, and stormwater management and septic system on the subject property. The property has been previously altered by grading and filling, and contains no on-site and limited adjacent natural features. The natural features adjacent to the subject property are well defined and have been incorporated into the Site Plan along with appropriate buffers and recommended mitigation and enhancement measures. These measures are considered sufficient to protect common and significant plant and wildlife species, wildlife habitat functions and provide opportunities for ecological enhancements.

Below is a summary of mitigation measures provided is this report:

- Install combined construction limit fencing/sediment barrier along the outer edge of construction/grading/buffer limit prior to any clearing or construction activity;
- Install tree protection fencing around individual trees as needed to prevent indirect damage from construction activities;
- Install enhancement plantings within designated planting areas within the natural feature setback buffers, utilizing native species selected from the landscape plan planting list (MHBC 2024) and a pollinator-friendly seed mix (including Common Milkweed);
- All vegetation/tree clearing should be conducted outside of the core bird nesting season (April 1 to August 31);
- Nest searches should be conducted by a qualified biologist where vegetation/tree clearing cannot be maintained outside of the core bird nesting season;
- All tree clearing should be conducted outside of the active bat season (April 1 to September 30). Any removals of suitable bat habitat trees during the active season are to be conducted in consultation with MECP and in compliance with the ESA;
- Implement Stormwater Management Plan and recommendations provided by MTE;
- Mitigate spring and summer construction noise impacts by restricting activities to between 9:00 am and 9:00 pm during April to August;
- Turn off construction lighting at the end of each day;
- Implement measures to mitigate dust;
- Permanent lighting of the parking lots to be reduced in height, directed away and shielded from shining into the woodland and wetlands;
- Prepare and implement an Erosion and Sediment Control plan.

Providing the protection and mitigation measures recommended within this report, as well as the stormwater management plan and recommendations by other team members are adhered to, no significant negative environmental impacts are anticipated to the natural features on-site and adjacent as a result of the proposed development.

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Appendix I
Terms of Reference, SAR and SWH Screening Tables

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

September 23, 2024 Project No. 3370

Planning & Development Department
Township of Puslinch
7404 Wellington Road 34
Puslinch, Ontario N0B 2J0

RE: Proposed Terms of Reference for Scoped EIS, 7504 McLean Road East, Puslinch

On behalf of Natural Resource Solutions Inc. (NRSI), I am pleased to provide the following Terms of Reference (TOR) to undertake a Scoped Environmental Impact Study (EIS) to support the proposed construction a logistics facility on the above noted property in Puslinch, ON (henceforth the "subject property"). The subject property has been graded and is comprised of an area of gravel fill surrounded by soil berms vegetated with weedy early-succession plant species. No natural features exist on the subject property, but there are areas of meadow immediately to the north and east of the subject property.

The majority of the subject property is currently zoned as Secondary Agricultural lands, and the northeast edge of the property is mapped as forming part of the Core Greenlands System (Wellington County OP, Schedule B7, 2024). The northern part of the subject property also falls within the regulation limit of the Grand River Conservation Authority (GRCA); this regulated area is part of the buffer of the engineered floodplain as mapped by GRCA.

Due to the presence of GRCA-regulated features on and adjacent to the subject property, a scoped EIS is required to demonstrate that the proposed development will not negatively impact adjacent natural features or their ecological functions.

The following TOR has been prepared to outline NRSI's proposed work plan to complete the scoped EIS. This work plan has been prepared in accordance with the requirements outlined in the GRCA's EIS Guidelines (GRCA 2005).

Sincerely,

[redacted]

Jacqueline Weber, M Sc
Terrestrial & Wetland Biologist
Natural Resource Solutions Inc.

Scoped Environmental Impact Study – 7504 McLean Road E, Puslinch
Terms of Reference (Draft)

Introduction

The subject property is 2.7 ha in size and is bounded by McLean Road to the southeast and industrial facilities to the south and southwest. Small areas of cultural meadow lie immediately to the northwest and northeast of the subject property. Beyond these cultural meadows, a treed natural feature containing portions of the Mill Creek Puslinch Wetland Complex, a Provincially-significant wetland, lies about 30 m from the northwest and northeast property boundaries.

The subject property has been graded and is comprised of an area of gravel fill surrounded by soil berms vegetated with weedy early-succession plant species. No natural features exist on the subject property. Small areas of cultural meadow lie immediately to the northwest and northeast of the subject property.

For the purposes of this EIS, the study area is defined as the subject property and the adjacent lands within 120 m.

Collection and Review of Background Information

Background information pertaining to the biological resources on and within up to 10km of the subject property was collected and compiled. This includes a review of the following sources:

- Natural Heritage Information Centre (NHIC) significant species database;
- Grand River Conservation Authority Regulations Mapping;
- Ontario Breeding Bird Atlas (BSC et al. 2008);
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2021);
- Atlas of the Mammals of Ontario (Dobbyn 1994);
- Ontario Butterfly Atlas (McNaughton et al. 2024);
- Ontario Odonate Atlas Database (OOAD 2024);
- eBird and iNaturalist online records for the vicinity of the subject lands.

In addition to these biological resources, a comprehensive review of all relevant federal, provincial, regional and local natural heritage legislation and policies was conducted, to ensure that the proposed development complies with all relevant policies. This includes a review of the following sources;

- Provincial Policy Statement (OMMAH 2020b);
- A Place to Grow: Growth Plan for the Greater Golden Horseshoe (OMMAH 2020a);
- Wellington County Official Plan (2024);
- Township of Puslinch Comprehensive Zoning By-law No. 023-18 (2018)
- Conservation Authority Act and O. Reg 41/24 (2024);
- Endangered Species Act (Government of Ontario, 2007);
- Fish and Wildlife Conservation Act (Government of Ontario 2019);
- Migratory Bird Convention Act (MCBA) (Government of Ontario, 1994);
- Species at Risk Act (2002).

Based on the review of background information and natural heritage legislation and policy, a Species at Risk (SAR) and Species of Conservation Concern (SCC) screening exercise was completed to identify any significant species that are known to occur within the study area. A Significant Wildlife Habitat (SWH) screening exercise has also been completed based on available background information to identify which SWH types are present in the study area. The screening exercise used criteria from both the SWH Technical Guide (OMNR 2000) and SWH Criteria Schedules for Ecoregion 6E (OMNRF 2015). The SAR/SCC and SWH assessment tables, informed by our surveys to date, are appended to this Terms of Reference.

The screenings identified the following SAR/SCC as having potential to be present in lands adjacent to the subject property. No natural features exist on the subject property, and following review no SAR/SCC habitat has the potential to occur on this parcel.

- Midland Painted Turtle (*Chrysemys picta marginata*)
- Snapping Turtle (*Chelydra serpentina*)
- Eastern Milksnake (*Lampropeltis triangulum*)
- Smooth Yellow False Foxglove (*Aureolaria flava*)
- Eastern Meadowlark (*Sturnella magna*)
- Bobolink (*Dolichonyx oryzivorus*)

The screenings did not identify any type of Significant Wildlife Habitat (SWH) as having potential to be present on site and to be impacted by the proposed development.

Field Studies

The following is a summary of the field survey methodology that will be used to characterize the existing natural features on the subject property.

Breeding Bird Surveys (June - July 2024)
NRSI biologists will conduct two early morning breeding bird surveys within the subject property. 10-minute point counts will be conducted on two days, at least a week apart, between May 25 and July 10; the first Breeding Bird Survey has already been completed in early June 2024. Breeding evidence will be recorded in accordance with the Ontario Breeding Bird Atlas (OBBA) protocol (Birds Canada 2021a and 2021b). Any observations of significant species will be recorded in detail, including their specific observation location(s), observed behaviour, and the highest level of breeding evidence.

Ecological Land Classification (June 2024)
Vegetation communities up to 120 metres from the edge of the proposed development will be mapped and classified following the Ecological Land Classification (ELC) system for southern Ontario (Lee et al. 1998). Access beyond property boundaries is not anticipated, and these surveys are expected to be completed using aerial imagery and surveys at the property boundaries. Details of the vegetation communities will be recorded including species composition, dominance, uncommon species or features, surficial soil types, and evidence of human impacts.

Vegetation Inventory (June 2024)
A 1-season vegetation inventory will be completed in summer, and the subject property will be systematically searched for plant species. Any rare species and their location(s)

will be recorded with a handheld GPS unit. Vascular flora species will be recorded by ELC polygon.

Additional Observations (all surveys)

Incidental observations of mammals, herpetofauna, butterflies and odonates (dragonflies/damselflies) observed on-site during site visits will be recorded.

Reporting

Opportunities and Constraints Analysis

The results of the site investigation will be combined with the background information to provide a detailed summary of the existing natural features and ecological functions that occur within the study area. This will include detailed vegetation community descriptions and mapping, and summaries of wildlife species present within the study area. The ecological significance of the on-site natural features will be determined according to municipal and provincial criteria, as well as professional expertise. Constraints mapping will be completed to indicate development opportunities and required development setbacks or buffers from natural features on the subject lands.

Impact Analysis, Mitigations, and Other Recommendations

An impact analysis will be completed based on details of the proposed development. This will include review of the proposed site plan, and any other development plan details from other disciplines as may be applicable, such as a hydrogeological assessment. Any areas of conflict between significant features or ecological functions and the development will be discussed with the client and options for avoiding or minimizing impacts will be recommended. Potential impacts will be described in detail, with corresponding recommended mitigation measures where impacts cannot be avoided.

The impact of the development on the existing natural features and ecological functions will be determined based on the following:

- Direct impacts (i.e., natural feature or habitat removal) associated with the actual 'footprint' of the proposed development area. The approach to identifying and delineating constraint areas, discussed above, will be used to avoid direct impacts from the development on any significant natural features.
- Indirect impacts associated with changes in site conditions such as drainage and water quantity/quality or temporary construction-related impacts.
- Induced impacts associated with post-construction human use of the property.

Enhancement and Monitoring

Recommendations for ecological enhancement or restoration will be made where opportunities exist. Details will be based on the results of the site characterization and may include specific areas of restoration or enhancement, native species buffer plantings, invasive species management, etc. Where appropriate, monitoring recommendations may be provided to ensure that mitigation measures are functioning appropriately during and/or following construction.

Scoped EIS Report

The findings of the natural feature characterization, constraints analysis and the impact analysis with associated mitigation, enhancement, and monitoring recommendations (if applicable) will be summarized in the scoped EIS report. The report will include the

approved TOR, records of agency correspondence, the findings of the EIS, and a description of the proposed undertaking, including a review of the relevant guidelines and policies governing the development. Species lists will be appended and natural features will be shown on a series of maps including existing conditions, development opportunities and constraints, and the development concept.

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Common Name	Scientific Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	NRSI Observed	Habitat Source	Habitat Preference	Suitable Habitats within Study Area	Carried Forward to EIS?	Rationale
Vascular Plants												
Black Ash	*Fraxinus nigra*	S4	END	T	NS	No schedule	No	Species at Risk in Ontario (MECP 2024)	Grows in moist to wet sites such as swamps, bogs and riparian areas.	No	No	No SAR or SCC habitat present on subject lands. No access beyond property boundaries.
Smooth Yellow False Foxglove	*Aureolaria flava*	S2?	THR	T	T	Schedule 1	No		Dry, open upland forests with well drained soils; typically associated with White Oak.	No	No	No SAR or SCC habitat present on subject lands.
Birds												
Redhead	*Aythya americana*	S2B,S4N					No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Live in shallow cattail/bulrush marshes, lakes and ponds and fens; preferred nesting usually close to shallow water (most within 2 m), but can be found as far as 266 m from water's edge.	No	No	No SAR or SCC habitat present on subject lands.
Ruddy Duck	*Oxyura jamaicensis*	S3B,S4N,S5M					No	Cornell Lab of Ornithology (2019)	Breeds mostly in the prairie pothole region of North America and winters in wetlands throughout the U.S. and Mexico. In the fall through spring, they inhabit open water, both inland and in protected coastal areas such as harbors and small bays.	No	No	No SAR or SCC habitat present on subject lands.
Blue-winged Teal	*Spatula discors*	S3B,S4M					No	Cornell Lab of Ornithology (2019)	Inhabits shallow ponds and wetlands across much of North America. Prefers grasslands bordering small potholes and other freshwater wetlands.	No	No	No SAR or SCC habitat present on subject lands.
Chimney Swift	*Chaetura pelagica*	S3B	THR	T	T	Schedule 1	No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Commonly found in urban areas near buildings; nests in chimneys, hollow trees, and crevices of rock cliffs. Feeds over open water.	No	No	No SAR or SCC habitat present on subject lands.
American Coot	*Fulica americana*	S3B,S4N	NAR	NAR	NS	No schedule	No	Cornell Lab of Ornithology (2019)	Inhabits open water habitats such as lakes, ponds and wetlands.	No	No	No SAR or SCC habitat present on subject lands.
Common Gallinule	*Gallinula galeata*	S3B					No	Cornell Lab of Ornithology. 2019. All About Birds. Cornell Lab of Ornithology, Ithaca, New York. https://www.allaboutbirds.org	Freshwater and brackish marshes, ponds, and lakes that have a mix of submerged, floating, and emergent aquatic vegetation and are open water year-round. They also use artificial aquaculture ponds, rice fields, sewage lagoons, and urban stormwater retention ponds.	No	No	No SAR or SCC habitat present on subject lands.
Black Tern	*Chlidonias niger*	S3B,S4M	SC	NAR	NS	No schedule	No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Large cattail marshes; marshy edges of rivers, lakes or ponds; wet open fens; wet meadows. Returns to same area to nest each year. Must have areas of shallow water (0.5 to 1m deep) and area of open water near nests. Generally found in marshes >20 ha in size.	No	No	No SAR or SCC habitat present on subject lands.
Least Bittern	*Ixobrychus exilis*	S4B	THR	T	T	Schedule 1	No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Strongly prefers cattail marshes with a mix of open pools and channels. Also found in swamps and bogs and marshy borders of lakes, ponds, streams and ditches with dense emergent vegetation of cattail, bulrush and sedge. Nests in cattails. Intolerant of loss of habitat and human disturbance.	No	No	No SAR or SCC habitat present on subject lands.
Black-crowned Night-Heron	*Nycticorax nycticorax*	S3B,S2N,S4M					No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Deciduous woodland swamps, cattail marshes, islands, wooded river and lake banks, coastal wetlands	Yes	No	No SAR or SCC habitat present on subject lands. No access beyond property boundaries.
Eastern Wood-Pewee	*Contopus virens*	S4B	SC	SC	SC	Schedule 1	No	Species at Risk in Ontario (MECP 2022)	Mid-canopy layer of forest clearings and edges of deciduous and mixed forest. Abundant in intermediate-age mature forest stands with little understory vegetation.	Yes	No	No SAR or SCC habitat present on subject lands.
Barn Swallow	*Hirundo rustica*	S4B	SC	SC	T	Schedule 1	Yes	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Farmlands, rural areas and other open or semi-open areas near body of water. Nests almost exclusively on human-made structures such as open barns, buildings, bridges and culverts.	No	No	No SAR or SCC habitat present on subject lands.
Purple Martin	*Progne subis*	S3B					No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Open, trees areas such as farmland, parks, yards, marshes; usually near large bodies of water; colonial; nests in tree cavities, cliff ledges; most common in nest boxes; requires open space for foraging; prefers trees >15 cm dbh.	No	No	No SAR or SCC habitat present on subject lands.
Bank Swallow	*Riparia riparia*	S4B	THR	T	T	Schedule 1	No	Recovery Strategy for the Bank Swallow in Ontario (Falconer et al. 2016)	Nests in burrows in natural and human-made settings with vertical faces in silt and sand deposits. Usually on banks of river and lakes, but also found in sand and gravel pits.	No	No	No SAR or SCC habitat present on subject lands.

Wood Thrush	*Hylocichla mustelina*	S4B	SC	T	T	Schedule 1	No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Carolinian and Great Lakes-St. Lawrence forest zones. Undisturbed moist mature deciduous or mixed forest with deciduous sapling growth. Near pond or swamp. Must have some trees higher than 12 m.	No	No	No SAR or SCC habitat present on subject lands.
Grasshopper Sparrow	*Ammodramus savannarum*	S4B	SC	SC	SC	Schedule 1	No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Well-drained grassland or prairie with low cover of grasses, taller weeds or sandy soil; hayfields or weedy fallow fields; uplands with ground vegetation of various densities. Requires perches for singing and tracts of grassland generally >5ha.	No	No	No SAR or SCC habitat present on subject lands.
Bobolink	*Dolichonyx oryzivorus*	S4B	THR	SC	T	Schedule 1	No	Recovery Strategy for the Bobolink and Eastern Meadowlark in Ontario (McCracken et al. 2013)	Large (>10 ha), open expansive grasslands, pastures, hayfields, meadows or fallow fields with dense ground cover. Occasionally nest in large (>50 ha) fields of winter wheat and rye in southwestern Ontario.	Yes	Yes	Open meadows are present adjacent to the subject property, within the study area.
Eastern Meadowlark	*Sturnella magna*	S4B,S3N	THR	T	T	Schedule 1	No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Open pastures, hayfields, grasslands or grassy meadows with elevated singing perches (small trees, shrubs or fence posts). Also weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields or other open areas. Generally prefers larger tracts of habitat >10 ha, but will sometimes use smaller tracts.	Yes	Yes	Open meadows are present adjacent to the subject property, within the study area.
Reptiles and Amphibians												
Snapping Turtle	*Chelydra serpentina*	S4	SC	SC	SC	Schedule 1	No	Species at Risk in Ontario (MECP 2022)	Slow-flowing rivers and streams, lakes, and permanent or semi-permanent wetlands with soft substrates and vegetation. Key habitat requirements: open areas with structures for basking, open sand or gravel areas for nesting, shallow areas with soft substrates to bury in, soft banks or substrates for hibernation.	No	No	No SAR or SCC habitat present on subject lands.
Midland Painted Turtle	*Chrysemys picta marginata*	S4		SC	SC	Schedule 1	No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	quiet, warm, shallow water with abundant aquatic vegetation such as ponds, large pools, streams, ditches, swamps, marshy meadows; eggs are laid in sandy places, usually in a bank or hillside, or in fields; basks in groups; not territorial	No	No	No SAR or SCC habitat present on subject lands.
Blanding's Turtle (Great Lakes / St. Lawrence population)	*Emydoidea blandingii*	S3	THR	E	E	Schedule 1	No	Recovery Strategy for the Blanding's Turtle (MECP 2019)	Eutrophic, shallow wetlands such as marshes, ponds, swamps, bogs, fens, or coastal wetlands, with soft, muddy substrates, abundant aquatic vegetation, and basking structures (logs, stumps, hummocks). Large overland movements occur between aquatic habitats and to open sandy or gravelly areas for nesting. Forest habitat is important for upland movements. Overwintering typically occurs in permanent wetlands.	No	No	No SAR or SCC habitat present on subject lands.
Eastern Milksnake	*Lampropeltis triangulum*	S4	NAR	SC	SC	Schedule 1	No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Farmlands, meadows, hardwood or aspen stands; pine forest with brushy or woody cover; river bottoms or bog woods; hides under logs, stones, or boards or in outbuildings; often uses communal nest sites.	No	No	No SAR or SCC habitat present on subject lands.
Jefferson Salamander	*Ambystoma jeffersonianum*	S2	END	E	E	Schedule 1	No	Recovery Strategy for the Jefferson Salamander (Linton, J, J. McCarter & H. Fotherby)	Large deciduous or mixed forest containing, or in close proximity to, suitable breeding ponds which include fishless vernal pools or wetlands with suitable hydroperiod for larval development (was present until Aug/Sept). Habitats must contain shelter features including leaf litter, woody debris, rocks, logs, or stumps. Hibernation sites are underground in mammal burrows, root systems, or crevices or fissures in rocks.	No	No	No SAR or SCC habitat present on subject lands.
Unisexual Ambystoma (Jefferson Salamander-dependent population)	*Ambystoma laterale - (2) jeffersonianum*	S2	END	E	E	Schedule 1	No	Species at Risk in Ontario (MECP 2022)	Unisexual Ambystoma salamanders live in leaf litter, under logs and in underground cavities in deciduous and mixed forests, typically within close proximity to breeding habitats. Adults breeds in vernal pools (temporary woodland ponds) or fish-free permanent wetlands. They lay their eggs in clumps attached to underwater vegetation in shallow water. The eggs hatch into aquatic larvae after about one month, and the larvae transform into juveniles by the end of summer. The juveniles leave the pond and head into the surrounding forest. Unisexual Ambystoma salamanders spend the winter underground where they can get below the frost line and avoid freezing temperatures, such as in mammal burrows, rock crevices or other underground cavities. Although these salamanders spend much of the year underground or under cover, they can often be observed in early spring when they travel to breeding sites.	No	No	No SAR or SCC habitat present on subject lands.

Western Chorus Frog (Great Lakes / St. Lawrence - Canadian Shield population)	*Pseudacris triseriata pop. 2*	S4	NAR	T	T	Schedule 1	No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Roadside ditches or temporary ponds in fields; swamps or wet meadows; woodland or open country with cover and moisture; small ponds and temporary pools ponds and temporary pools.	No	No	No SAR or SCC habitat present on subject lands.
Mammals												
Eastern Small-footed Myotis	*Myotis leibii*	S2S3	END				No	Recovery Strategy for Eastern Small-footed Myotis In Ontario (Humphrey 2017)	Primarily roosts in open, sunny, rocky habitats, including cracks and crevices in cliffs and boulders, in talus slopes, beneath stones on rock barrens and in rock outcrops containing crevices. Occasionally roosts in buildings (including barns, sheds, and exterior walls). Maternity roosts have been documented in rocky habitats, on bridge structures, and in or on buildings. Overwinters in caves and abandoned mines.	No	No	No SAR or SCC habitat present on subject lands.
Little Brown Myotis	*Myotis lucifugus*	S3	END	E	E	Schedule 1	No	Recovery Strategy for the Little Brown Myotis, Northern Myotis and Tri-colored Bat in Ontario (Humphrey, C. & H. Fortherby. 2019)	Uses caves, quarries, tunnels, hollow trees or buildings for roosting. Winters in humid caves. Maternity sites in dark warm areas such as attics and barns. Feeds primarily in wetlands and forest edges.	No	No	No SAR or SCC habitat present on subject lands.
Northern Myotis	*Myotis septentrionalis*	S3	END	E	E	Schedule 1	No	Recovery Strategy for the Little Brown Myotis, Northern Myotis and Tri-colored Bat in Ontario (Humphrey, C. & H. Fortherby. 2019)	Roosts in houses and man-made structures but prefers hollow trees or under loose bark. Hibernates in mines or caves. Hunts within forest, below the canopy.	No	No	No SAR or SCC habitat present on subject lands.
Tri-colored Bat	*Perimyotis subflavus*	S3?	END	E	E	Schedule 1	No	Recovery Strategy for the Little Brown Myotis, Northern Myotis and Tri-colored Bat in Ontario (Humphrey, C. & H. Fortherby. 2019)	Roosts and maternity colonies in older forests and occasionally in barns or other structures. Forage over water and along streams in the forest. Hibernate in caves.	No	No	No SAR or SCC habitat present on subject lands.
Woodland Vole	*Microtus pinetorum*	S3?	SC	SC	SC	Schedule 1	No	Species at Risk in Ontario (MECP 2022)	Mature deciduous forest in the Carolinian region where there is a deep litter layer that allows it to burrow.	No	No	No SAR or SCC habitat present on subject lands.
American Badger (Southwestern Ontario population)	*Taxidea taxus jacksoni*	S1	END	E	E	Schedule 1	No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Open grasslands and oak savannahs; dens in new hole or enlarged existing hole; sometimes makes food caches.	No	No	No SAR or SCC habitat present on subject lands.
Butterflies												
Black Dash	*Euphyes conspicua*	S3					No	Lotts, K and T. Naberhaus. 2021. Butterflies and Moths of North America Online. Available: https://www.butterfliesandmoths.org/	Boggy marshes, wet meadows, and marshy stream banks with host plants Carex stricta.	No	No	No SAR or SCC habitat present on subject lands.
West Virginia White	*Pieris virginiensis*	S3	SC				No	Species at Risk in Ontario (MECP 2022)	Rich, moist, deciduous woods with populations of Two-leaved Toothwort (Cardamine diphylla; larval food plant).	No	No	No SAR or SCC habitat present on subject lands.
Monarch	*Danaus plexippus*	S2N,S4B	SC	E	E	Schedule 1	No	Species at Risk in Ontario (MECP 2022)	Adults found in a diversity of habitats with a variety of wildflowers. Caterpillars are confined to meadows and open areas where milkweeds grow (larval food plants).	No	No	No SAR or SCC habitat present on subject lands.
Odonates												
Unicorn Clubtail	*Arigomphus villosipes*	S3					No	Tracked Species in Ontario (MNRF 2024)	Ponds in highly localized area in Southern Ontario.	No	No	No SAR or SCC habitat present on subject lands.
Pronghorn Clubtail	*Phanogomphus graslinellus*	S3					No	Illinois Department of Natural Resourcces (2024)	Muddy, slow-moving streams and medium to large lakes.	No	No	No SAR or SCC habitat present on subject lands.
Arrowhead Spiketail	*Cordulegaster obliqua*	S3					No	Ottawa Field Naturalists Species Profile (2020)	Small streams outletting from ponds or lakes with abundant overhanging vegetation.	No	No	No SAR or SCC habitat present on subject lands.
Clamp-tipped Emerald	*Somatochlora tenebrosa*	S3					No	Maryland Biodiversity Project (2024)	Small, shaded forest streams.	No	No	No SAR or SCC habitat present on subject lands.

Significant Wildlife Habitat Assessment Tables

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH	Assessment Details	
	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Study Area	Subject Property
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Terrestrial)					Not Present	Not Present
Rationale: Habitat important to migrating waterfowl.	American Black Duck Wood Duck Green-winged Teal Blue-winged Teal Mallard Northern Pintail Northern Shoveler American Wigeon Gadwall	CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these Ecosites.	Fields with sheet water during Spring (mid March to May). • Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. • Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available[exlviii]. Information Sources • Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence. • Reports and other information available from Conservation Authorities (CAs) • Sites documented through waterfowl planning processes (eg. EHJV implementation plan) • Field Naturalist Clubs • Ducks Unlimited Canada • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • Any mixed species aggregations of 100 or more individuals required. • The area of the flooded field ecosite habitat plus a 100-300m radius buffer dependent on local site conditions and adjacent land use is the significant wildlife habitat[cxlviii]. • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). • SWHMiST[cxlix] Index #7 provides development effects and mitigation measures.	*No suitable fields are present within the study area.*	

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH	Assessment Details	
	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Study Area	Subject Property
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Aquatic)					Possible	Not Present
Rationale: Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district.	Canada Goose Cackling Goose Snow Goose American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Ring-necked Duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	• Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water). Information Sources • Environment Canada • Naturalist clubs often are aware of staging/stopover areas. • OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. • Sites documented through waterfowl planning processes (eg. EHJV implementation plan) • Ducks Unlimited projects • Element occurrence specification by Nature Serve: http://www.natureserve.org • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of: • Aggregations of 100[i] or more of listed species for 7 days[i], results in > 700 waterfowl use days. • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH[cxlix] • The combined area of the ELC ecosites and a 100m radius area is the SWH[cxlviii] • Wetland area and shorelines associated with sites identified within the SWHTG[cxlviii] Appendix K[cxlix] are significant wildlife habitat. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded). • SWHMiST[cxlix] Index #7 provides development effects and mitigation measures.	Suitable swamp ecosites may be present within the PSW in the study area. No suitable habitats are present on site.	
Wildlife Habitat: Shorebird Migratory Stopover Area					Possible	Not Present
Rationale: High quality shorebird stopover habitat is extremely rare and typically has a long history of use.	Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird’s Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin Whimbrel	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH. Information Sources • Western hemisphere shorebird reserve network. • Canadian Wildlife Service (CWS) Ontario Shorebird Survey. • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • Natural Heritage Information Center (NHIC) Shorebird Migratory Concentration Area	Studies confirming: • Presence of 3 or more of listed species and > 1000 shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) • Whimbrel stop briefly (<24hrs) during spring migration, any site with >100 Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area[cxlviii] • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • SWHMiST[cxlix] Index #8 provides development effects and mitigation measures.	A large open-water wetland within the study area may have suitable shoreline habitats. No suitable habitat exists within the subject property.	

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH	Assessment Details	
	Wildlife Species	**ELC Ecosite Codes**	**Habitat Criteria and Information Sources**	**Defining Criteria**	**Study Area**	**Subject Property**
Wildlife Habitat: Raptor Wintering Area					Possible	Not Present
<u>Rational:</u> Sites used by multiple species, a high number of individuals and used annually are most significant	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl <u>Special Concern:</u> Short-eared Owl Bald Eagle	Hawks/Owls: Combination of ELC Community Series; need to have present one Community Series from each land class: Forest: FOD, FOM, FOC Upland: CUM, CUT, CUS, CUW	The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. Raptor wintering sites need to be > 20 ha[cxlviii, cxlix] with a combination of forest and upland.[xvi, xvii, xviii, xix, xx, xxi]. Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands[cxlix] Field area of the habitat is to be wind swept with limited snow depth or accumulation. Eagle sites have open water, large trees and snags available for roosting <u>Information Sources</u> • OMNRF Ecologist or Biologist • Field Natural Clubs • Natural Heritage Information Center (NHIC) Raptor Winter Concentration Area • Data from Bird Studies Canada • Reports and other information available from Conservation Authorities CAs.	Studies confirm the use of these habitats by: • One or more Short-eared Owls or; One or more Bald Eagles or; At least 10 individuals and two listed hawk/owl species • To be significant a site must be used regularly (3 in 5 years)[cxlix] for a minimum of 20 days by the above number of birds • The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • SWHMiST[cxlix] Index #10 and #11 provides development effects and mitigation measures.	The large wooded feature in the study area may contain suitable raptor wintering habitat. Suitable habitat is not present on the subject property.	
Wildlife Habitat: Bat Hibernacula					Not Present	Not Present
<u>Rationale</u> Bat hibernacula are rare habitats in Ontario landscapes.	Big Brown Bat Tri-coloured Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	• Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. • Active mine sites should not be considered as SWH • The locations of bat hibernacula are relatively poorly known. <u>Information Sources</u> • OMNRF for possible locations and contact for local experts • Natural Heritage Information Center (NHIC) Bat Hibernaculum • Ministry of Northern Development and Mines for location of mine shafts. • Clubs that explore caves (eg. Sierra Club) • University Biology Departments with bat experts.	• All sites with confirmed hibernating bats are SWH. • The habitat area includes a 200m radius around the entrance of the hibernaculum[cxlviii, ccvii] for most. • Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects"[ccv] • SWHMiST[cxlix] Index #1 provides development effects and mitigation measures.	There are no mine shafts, caves, or karsts within the subject property or study area.	

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH	Assessment Details	
	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Study Area	Subject Property
Wildlife Habitat: Bat Maternity Colonies					Possible	Not Present
Rationale: Known locations of forested bat maternity colonies is extremely rare in all Ontario landscapes.	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	Maternity colonies can be found in tree cavities, vegetation and often in buildings[xxii, xxv, xxvi, xxvii, xxxi] (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario[xxii] • Maternity colonies located in Mature deciduous or mixed forest stands[ccix, ccx] with >10/ha large diameter (>25cm dbh) wildlife trees[ccvii] • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3[ccxiv] or class 1 or 2[ccxii] • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred[ccx] Information Sources • OMNRF for possible locations and contact for local experts • University Biology Departments with bat experts.	• Maternity Colonies with confirmed use by: • >10 Big Brown Bats • >5 Adult Female Silver-haired Bats • The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies. • Evaluation methods for maternity colonies should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for wind Power Projects[ccv] • SWHMiST[cxlix] Index #12 provides development effects and mitigation measures.	The study area contains areas of treed swamp and forest which may contain sutiable tree habitat. There is no suitable habitat on the subject property.	
Wildlife Habitat: Turtle Wintering Area					Possible	Not Present
Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant	Midland Painted Turtle Special Concern: Northern Map Turtle Snapping Turtle	Snapping and Midland Painted Turtles - ELC Community Classes: SW, MA, OA and SA; ELC Community Series: FEO and BOO Northern Map Turtle - Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.	For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen[cix, cx, cxi, cxviii]. • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH. Information Sources • EIS studies carried out by Conservation Authorities. • Local field naturalists and experts, as well as university herpetologists may also know where to find some of these sites. • OMNRF ecologist or biologist • Natural Heritage Information Center (NHIC)	• Presence of 5 over-wintering Midland Painted Turtles is significant. • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant. • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May)[cvii] • Congregation of turtles is more common where wintering areas are limited and therefore significant[cix, cx, cxi, cxii]. • SWHMiST[cxlix] Index #28 provides development effects and mitigation measures for turtle wintering habitat.	Areas of open-water wetland within the study area may provide turtle overwintering habitat. No wetlands or water bodies are present within the subject property.	

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH	Assessment Details	
	Wildlife Species	**ELC Ecosite Codes**	**Habitat Criteria and Information Sources**	**Defining Criteria**	**Study Area**	**Subject Property**
Wildlife Habitat: Snake Hibernaculum					Possible	Not Present
Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant	Snakes: Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake Special Concern: Milksnake Eastern Ribbonsnake Lizard: Special Concern (Southern Shield population): Five-lined Skink	For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats. Observations of congregations of snakes on sunny warm days in the spring or fall is a good indicator. For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites: FOC1 FOC3	• For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural locations. The existence of features that go below the frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. • Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line[xliv, l, li, lii, cxii.] • Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. • Five-lined skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures cciii. Information Sources • In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g. old dug wells). • Reports and other information from CAs. • Local Field naturalists and experts, as well as university herpetologists may also know where to find some of these sites. clubs • Natural Heritage Information Center (NHIC) • OMNRF ecologist or biologist may be aware of locations of wintering skinks	Studies confirming: • Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (eg. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct). • Note: If there are Special Concern Species present, then site is SWH • Note: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population [i.e. strong hibernation site fidelity]. Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30m buffer is the SWH[í] • SWHMiST[cxlix] Index #13 provides development effects and mitigation measures for snake hibernacula. • Presence of any active hibernaculum for skink is significant. • SWHMiST[cxlix] Index #37 provides development effects and mitigation measures for five-lined skink wintering habitat.	The study area may contain sutiable habitat for snake hibernacula. This habitat type is not present within the subject property.	
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)					Not Present	Not Present
Rationale: Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow populations are declining in Ontario.	Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles Cliff faces, bridge abutments, silos, barns Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	• Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation. Information Sources • Reports and other information available from CAs • Ontario Breeding Bird Atlas [ccv] • Bird Studies Canada; *NatureCounts* http://www.birdscanada.org/birdmon/ • Field Naturalist clubs	Studies confirming: • Presence of 1 or more nesting sites with 8[cxlvix] or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. • A colony identified as SWH will include a 50m radius habitat area from the peripheral nests[ccvii] • Field surveys to observe and count swallow nests are to be completed during the breeding season Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • SWHMiST[cxlix] Index #4 provides development effects and mitigation measures	The study area and subject property do not contain sutiable banks or cliffs for nesting bird breeding habitat.	

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH	Assessment Details	
	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Study Area	Subject Property
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)					Possible	Not Present
Rationale: Large Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Great Blue Heron Black-crowned Night-heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15m from ground, near the top of the tree. Information Sources • Ontario Breeding Bird Atlas[ccv], colonial nest records. • Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNR). • NHIC Mixed Wader Nesting Colony • Aerial photographs can help identify large heronries • Reports and other information available from CAs • MNRF District Offices • Local naturalist clubs	Studies confirming: • Presence of 5[í] or more active nests of Great Blue Heron or other listed species. • The habitat extends from the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH [cc, ccvii] • Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells • SWHMiST[cxlix] Index #5 provides development effects and mitigation measures.	This habitat type may be present within the large treed feature in the study area. No suitable habitat is present on the subject property.	
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Ground)					Not Present	Not Present
Rationale: Colonies are important to local bird populations, typically sites are only known colony in area and are used annually.	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) MAM1 – 6 MAS1 – 3 CUM CUT CUS	• Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. • Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands. Information Sources • Ontario Breeding Bird Atlas[ccv], rare/colonial species records. • Canadian Wildlife Service • Reports and other information available from CAs • Natural Heritage Information Center (NHIC) Colonial Waterbird Nesting Area • MNRF District Offices • Field naturalist clubs	Studies confirming: • Presence of >25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern[í]. • Presence of 5 or more pairs for Brewer's Blackbird. • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant. • The edge of the colony and a minimum 150m area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH[cc, ccvii] • Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST[cxlix] Index #6 provides development effects and mitigation measures.	The study are and subject property do not contain islands or peninsulas in open water or marshy areas.	

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH	Assessment Details	
	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Study Area	Subject Property
Wildlife Habitat: Migratory Butterfly Stopover Areas					Not Present	Not Present
Rationale: Butterfly stopovers areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.	Painted Lady Red Admiral Special Concern: Monarch	Combination of ELC Community Series: Need to have present one Community Series from each landclass: Field: CUM CUS CUT Forest: FOC FOM FOD CUP Anecdotally, a candidate sight for butterfly stopover will have a history of butterflies being observed.	A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Ontario[cxlix]. • The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south[xxxii, xxxiii, xxxiv, xxxv, xxxvi.] • The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat cxlviii, cxlix. • Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes[xxxvii, xxxviii, xxxix, xl, xli.] Information Sources • OMNRF (NHIC) • Agriculture Canada in Ottawa may have list of butterfly experts. • Field Naturalist Clubs • Toronto Entomologists Association • Conservation Authorities	Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct)[xliii]. MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day[xxxvii], significant variation can occur between years and multiple years of sampling should occur [xl, xlii]. • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD • MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant. • SWHMiST[cxlix] Index #16 provides development effects and mitigation measures.	The study area or subject property is not within 5km of Lake Ontario.	
Wildlife Habitat: Landbird Migratory Stopover Areas					Not Present	Not Present
Rationale: Sites with a high diversity of species as well as high number are most significant	All migratory songbirds. Canadian Wildlife Service Ontario website: http://www.on.ec.gc.ca/wildlife_e.html All migrant raptors species: Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	Woodlots need to be >10 ha[l] in size and within 5km [iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv] of Lake Ontario. • If multiple woodlands are located along the shoreline, those woodlands <2km from Lake Ontario are more significant[cxlix] • Sites have a variety of habitats; forest, grassland and wetland complexes[cxlix]. • The largest sites are more significant[cxlix] • Woodlots and forest fragments are important habitats to migrating birds[ccxviii], these features located along the shore and located within 5km of Lake Ontario are Candidate SWH[cxlviii]. Information Sources • Bird Studies Canada • Ontario Nature • Local birders and naturalist club • Ontario Important Bird Areas (IBA) Program	Studies confirm: • Use of the woodlot by >200 birds/day and with >35 spp. with at least 10 bird spp. recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (Apr/May) and fall (Aug/Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST[cxlix] Index #9 provides development effects and mitigation measures.	The study area and subject property is not within 5km of Lake Ontario.	

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH	Assessment Details	
	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Study Area	Subject Property
Wildlife Habitat: Deer Yarding Areas					Possible	Not Present
Rationale: Winter habitat for deer is considered to be the main factor for northern deer populations. In winter, deer congregate in "yards" to survive severe winter conditions. Deer yards typically have a long history of annual use by deer, yards typically represent 10-15% of an areas summer range.	White-tailed Deer	Note: OMNRF to determine this habitat. ELC Community Series providing a thermal cover component for a deer yard would include: FOM, FOC, SWM and SWC. Or these ELC Ecosites: CUP2 CUP3 FOD3 CUT	• Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter. • The Core of a deer yard (Stratum I) is located within the Stratum II area and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60%[cxciv]. • OMNRF determines deer yards following methods outlined in “Selected Wildlife and Habitat Features: Inventory Manual"[cxcv] • Woodlots with high densities of deer due to artificial feeding are not significant.	No Studies Required: • Snow depth and temperature are the greatest influence on deer use of winter yards. Snow depths > 40cm for more than 60 days in a typically winter are minimum criteria for a deer yard to be considered as SWH[lvi, lvii, lviii, lix, lx, Í]. • Deer Yards are mapped by OMNRF District offices. Locations of Core or Stratum 1 and Stratum 2 Deer yards considered significant by OMNRF will be available at local MNRF offices or via Land Information Ontario (LIO). • Field investigations that record deer tracks in winter are done to confirm use (best done from an aircraft). Preferably, this is done over a series of winters to establish the boundary of the Stratum I and Stratum II yard in an "average" winter. MNRF will complete these field investigations[cxcv]. • If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMiST[cxlix] Index #2 provides development effects and mitigation measures.	The large wooded feature within the study area may contain deer yarding habitat. This habitat type is not present on the subject property.	
Wildlife Habitat: Deer Winter Congregation Areas					Not Present	Not Present
Rationale: Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions[exlviii]	White-tailed Deer	All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD Conifer plantations much smaller than 50ha may also be used.	• Woodlots will typically be >100 ha in size. Woodlots <100ha may be considered as significant based on MNRF studies or assessment. • Deer movement during winter in the southern areas of Eco-region 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands[cxlviii]. • If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule. • Large woodlots > 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha[ccxxiv]. • Woodlots with high densities of deer due to artificial feeding are not significant. Information Sources • MNRF District Offices • LIO/NRVIS	Studies confirm: • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF[cxlviii]. • Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNR[Í]. • Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques[ccxxiv] , ground or road surveys, or a pellet count deer density survey[ccxxv]. • If a SWH is determined for Deer Wintering Area of if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMiST[cxlix] Index #2 provides development effects and mitigation measures.	The large wooded feature within the study area may contain deer congregation habitat. This habitat type is not present on the subject property.	

Significant Wildlife Habitat Assessment Tables

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH		
	ELC Ecosite Codes	Habitat Description	Detailed Information and Sources	Defining Criteria	Study Area	Subject Property
Cliff and Talus Slopes					Not Present	Not Present
Rationale: Cliffs and Talus Slopes are extremely rare habitats in Ontario.	Any ELC Ecosite within Community Series: TAO CLO TAS CLS TAT CLT	A Cliff is vertical to near vertical bedrock >3m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris.	Most cliff and talus slopes occur along the Niagara Escarpment. Information Sources • The Niagara Escarpment Commission has detailed information on location of these habitats. • OMNRF District • Natural Heritage Information Center (NHIC) has location information on their website • Local naturalist clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes[lxxviii] • SWHMiST[cxlix] Index #21 provides development effects and mitigation measures.	There are no cliffs or talus slopes within the study area or subject property.	
Sand Barrens					Not Present	Not Present
Rationale: Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry.	ELC Ecosites: SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always <60%.	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. They have little or no soil and the underlying rock protrudes through the surface. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%.	Any sand barren area, >0.5ha in size. Information Sources • OMNRF Districts. • Natural Heritage Information Center (NHIC) has location information on their website • Field naturalist clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Sand Barrens[lxxviii] • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics)[i]. • SWHMiST[cxlix] Index #20 provides development effects and mitigation measures.	There are no sand barrens within the study area or subject property.	

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH		
	ELC Ecosite Codes	Habitat Description	Detailed Information and Sources	Defining Criteria	Study Area	Subject Property
Alvar					Not Present	Not Present
Rationale: Alvars are extremely rare habitats in Ecoregion 6E. Most alvars in Ontario are in Ecoregion 6E and 7E. Alvars in 6E are small and highly localized just north of the Palaeozoic-Precambrian contact.	ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2 Five Alvar Indicator Species: 1) Carex crawei 2) Panicum philadelphicum 3) Eleochairs compressa 4) Scutellaria parvula 5) Trichostema branchiatum These indicator species are very specific to Alvars within Ecoregion 6E	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoo geographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover[lxxviii].	An Alvar site > 0.5 ha in size[lxxv]. Information Sources • Alvars of Ontario (2000), Federation of Ontario Naturalists[lxxvi]. • Ontario Nature – Conserving Great Lakes Alvars[ccviii]. • Natural Heritage Information Center (NHIC) has location information on their website • Field Naturalist clubs • Conservation Authorities	Field studies identify four of the five Alvar indicator species[lxxv, cxlix] at a Candidate Alvar site is Significant. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotics sp.). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses[lxxv]. • SWHMiST[cxlix] Index #17 provides development effects and mitigation measures.	The study area or subject property do not contain alvar habitat.	
Old Growth Forest					Not Present	Not Present
Rationale: Due to historic logging practices, extensive old growth forest is rare in the Ecoregion. Interior habitat provided by old growth forests is required by many wildlife species.	Forest Community Series: FOD FOC FOM SWD SWC SWM	Old Growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.	Woodland Stands areas 30ha or greater in size or with at least 10 ha interior habitat assuming 100m buffer at edge of forest Í. Information Sources • OMNRF Forest Resource Inventory mapping • OMNRF Forester, Ecologist or Biologist • Field Local naturalist clubs • Conservation Authorities • Sustainable Forestry License (SFL) companies will possibly know locations through field operations. • Municipal forestry departments	Field Studies will determine: • If dominant trees species of the ecosite are >140 years old, then stand is Significant Wildlife Habitat[cxlviii] • The stand will have experienced no recognizable forestry activities[cxlviii] • The area of Forest Ecosites combined to make up the stand is the SWH. • Determine ELC Vegetation Type for forest stand[lxxviii] • SWHDSS[cxlix] Index #23 provides development effects and mitigation measures.	The study area or subject property do not contain old growth forest habitat.	

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH		
	ELC Ecosite Codes	Habitat Description	Detailed Information and Sources	Defining Criteria	Study Area	Subject Property
Savannah					Not Present	Not Present
Rationale: Savannahs are extremely rare habitats in Ontario.	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%.	• No minimum size to site Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • Natural Heritage Information Center (NHIC) has location information on their website • OMNRF Ecologists • Field naturalists clubs • Conservation Authorities	Field studies confirm one or more of the Savannah indicator species listed in[lxxv] Appendix N should be present. Note: Savannah plant spp. list from Ecoregion 6E should be used[cxlviii]. • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics sp.). • SWHMiST[cxlix] Index #18 provides development effects and mitigation measures.	The study area or subject property does not contain savannah habitat.	
Tallgrass Prairie					Not Present	Not Present
Rationale: Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover.	• No minimum size to site Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • OMNR Districts • Natural Heritage Information Center (NHIC) has location information available on their website • Field naturalists clubs • Conservation Authorities	Field studies confirm one or more of the Prairie indicator species listed in[lxxv] Appendix N should be present. Note: Prairie plant spp. list from Ecoregion 6E should be used[cxlviii]. • Area of the ELC Ecosite is the SWH • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHMiST[cxlix] Index #19 provides development effects and mitigation measures.	The study area and subject property does not contain tallgrass prarie.	

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH		
	ELC Ecosite Codes	Habitat Description	Detailed Information and Sources	Defining Criteria	Study Area	Subject Property
Other Rare Vegetation Communities					Not Present	Not Present
Rationale: Plant communities that often contain rare species which depend on the habitat for survival.	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG[cxlviii]. Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M[cxlviii] The OMNR/NHIC will have up to date listing for rare vegetation communities. Information Sources • Natural Heritage Information Center (NHIC) has location information available on their website • OMNRF Districts • Field naturalists clubs • Conservation Authorities	Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG[cxlviii]. • Area of the ELC Vegetation Type polygon is the SWH. • SWHMiST[cxlix] Index #37 provides development effects and mitigation measures.	There are no other rare vegeration communites present within the study area or subject property.	

Significant Wildlife Habitat Assessment Tables

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH	Assessment Details	
	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Study Area	Subject Property
Wildlife Habitat: Waterfowl Nesting Area					Possible	Not Present
Rationale: Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant.	American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4 Note: includes adjacency to Provincially Significant Wetlands	A waterfowl nesting area extends 120m[cxlix] from a wetland (> 0.5 ha) or a wetland (>0.5ha) and any small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120m of each individual wetland where waterfowl nesting is known to occur[cxlix]. • Upland areas should be at least 120m wide so that predators such as raccoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites. Information Sources • Ducks Unlimited staff may know the locations of particularly productive nesting sites. • OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat. • Reports and other information available from CAs	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards, or • Presence of 10 or more nesting pairs for listed species including Mallards. • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120m[cxlviii] from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWHMiST[cxlix] Index #25 provides development effects and mitigation measures.	The study area has upland habitats adjacent to marsh and swamp communities that may provide suitable habitat for waterfowl nesting.	

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH	Assessment Details	
	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Study Area	Subject Property
Wildlife Habitat: Bald Eagle and Osprey Nesting, Foraging and Perching Habitat					Possible	Not Present
Rationale: Nest sites are fairly uncommon in Eco-region 6E are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.	Osprey Special Concern: Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	• Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. • Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. • Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). Information Sources • Natural Heritage Information Center (NHIC) compiles all known nesting sites for Bald Eagles in Ontario. • MNRF values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point and does not represent all the habitat. • Nature Counts, Ontario Nest Records Scheme data. • OMNRF Districts • Sustainable Forestry License (SFL) companies will identify additional nesting locations through field operations. • Check the Ontario Breeding Bird Atlas[ccv] or Rare Breeding Birds in Ontario for species documented • Reports and other information available from CAs. • Field naturalists clubs	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area[cxlviii]. • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300m radius around the nest or the contiguous woodland stand is the SWHccvii, maintaining undisturbed shorelines with large trees within this area is important[cxlviii]. • For a Bald Eagle the active nest and a 400-800m radius around the nest is the SWH[cvi], ccvii. Area of the habitat from 400-800m is dependent on site lines from the nest to the development and inclusion of perching and foraging habitat[cvi]. • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for >3 years or suspected of not being used for >5 years before being considered not significant[ccvii] • Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid March to mid August. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST[cxlix] Index #26 provides development effects and mitigation measures	The study area in proximity to open water wetlands and its possible that suitable nesting habitat may be present.	

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH	Assessment Details	
	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Study Area	Subject Property
Wildlife Habitat: Woodland Raptor Nesting Habitat					Possible	Not Present
Rationale: Nests sites for these species are rarely identified; these area sensitive habitats and are often used annually by these species.	Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3.	All natural or conifer plantation woodland/forest stands >30ha with >10ha of interior habitat[lxxxviii, lxxxix, xc, xci, xciii, xciv, xcv, xcvi, cxxxiii]. Interior habitat determined with a 200m buffer[cxlviii]. • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Cooper's hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. Information Sources • OMNRF • Check the Ontario Breeding Bird Atlas[ccv] or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada • Reports and other information available from CAs	Studies confirm: • Presence of 1 or more active nests from species list is considered significant[cxlviii]. • Red-shouldered Hawk and Northern Goshawk – a 400m radius around the nest or 28ha area of habitat is the SWH[ccvii]. • Barred Owl – a 200m radius around the nest is the SWH[ccvii]. • Broad-winged Hawk and Coopers Hawk – a 100m radius around the nest is the SWH[ccvii]. • Sharp-shinned Hawk – a 50m radius around the nest is the SWH[ccvii]. • Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. • SWHMiST[cxlix] Index #27 provides development effects and mitigation measures.	The study area overlaps with a woodland of sufficient size to suuport woodland raptor nesting.	
Wildlife Habitat: Turtle Nesting Area					Possible	Possible
Rationale: These habitats are rare and when identified will often be the only breeding site for local populations of turtles	Midland Painted Turtle Special Concern: Northern Map Turtle Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100m)[cxlviii] or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1	• Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used. Information Sources • Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels). • Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them. • Natural Heritage Information Center (NHIC) • Field Naturalist clubs and landowners	Studies confirm: • Presence of 5 or more nesting Midland Painted Turtles • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH[i] • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH[cxlviii]. • Travel routes from wetland to nesting area are to be considered within the SWH[cxlix]. • Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method. • SWHMiST[cxlix] Index #28 provides development effects and mitigation measures for turtle nesting habitat.	Turtle nesting habitat may occur within the subject property and study area, but the subject property is greater than 100m from the marsh community.	

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH	Assessment Details	
	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Study Area	Subject Property
Wildlife Habitat: Seeps and Springs					Possible	Not Present
Rationale: Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams.	Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system[cxvii, cxlix] • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species[cxix, cxx, cxxi, cxxii, cxiii, cxiv] Information Sources • Topographical Map • Thermography • Hydrological surveys conducted by CAs and MOE • Field naturalists clubs and landowners • Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped.	Field Studies confirm: • Presence of a site with 2 or more seeps/springs should be considered SWH. • The area of a ELC forest ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat[cxlviii] • SWHMiST[cxlix] Index #30 provides development effects and mitigation measures	It is possible that seeps and springs are present in the forested areas of the study area, but not within the subject property itself.	
Wildlife Habitat: Amphibian Breeding Habitat (Woodland)					Possible	Not Present
Rationale: These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations.	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians.	• Presence of a wetland, pond or woodland pool (including vernal pools) >500m^2 (about 25m diameter)[ccvii] within or adjacent (within 120m) to a woodland (no minimum size)[clxxxii, lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx] Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat[cxlviii] Information Sources • Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records • Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. • OMNRF District • OMNRF wetland evaluations • Field naturalist clubs • Canadian Wildlife Service Amphibian Road Call Survey • Ontario Vernal Pool Association: http://www.ontariovernalpools.org	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses)[lxxi] or 2 or more of the listed frog species with Call Level Codes of 3. • A combination of observational study and call count surveys[cviii] will be required during the spring March-June when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. • The habitat is the woodland area plus a 230m radius of woodland area[lxiii,lxv, lxvi, lxvii, lxviii, lxix, lxx, lxxi] if a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is the be included in the habitat. • SWHMiST[cxlix] Index #14 provides development effects and mitigation measures.	It is possible that the woodlands in the study area have suitable vernal pools to support woodland breeding amphibians.	

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH	Assessment Details	
	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Study Area	Subject Property
Wildlife Habitat: Amphibian Breeding Habitat (Wetland)					Not Present	Not Present
Rationale: These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Tree frog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	ELC Community Classes SW, MA, FE, BO, OA and SA. Typically these wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) may be adjacent to woodlands.	• Wetlands >500m2 (about 25m diameter)[ccvii] supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats[clxxxiv]. • Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. • Bullfrogs require permanent water bodies with abundant emergent vegetation. Information Sources • Ontario Herpetofaunal Summary Atlas (or other similar atlases) • Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count. • OMNRF Districts and wetland evaluations • Reports and other information available from CAs.	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species and with at least 20 individuals (adults or eggs masses)[lxxi, lxxiii], or 2 or more of the listed frog/toad species with Call Level Codes of 3. or; Wetland with confirmed breeding Bullfrogs are significant. • The ELC ecosite wetland area and the shoreline are the SWH. • A combination of observational study and call count surveys[cviii] will be required during spring March to June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. • If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMiST[cxlix] Index #15 provides development effects and mitigation measures.	There are no isolated wetlands in the study area or subject property to support wetland amphibian breeding.	
Woodland Area-Sensitive Bird Breeding Habitat					Possible	Not Present
Rationale: Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior forest song birds.	Yellow-Bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren Special Concern: Cerulean Warbler Canada Warbler	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	• Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha.[cv, cxxxi, cxxxii, cxxxiii, cxxxiv, cxxv, cxxvi, cxxxvii, cxxxviii, cxxxix, cxl, cxli, cxlii, cxliii, cxliv, cxlv, cxlvi, cl, cli, clii, cliii, cliv, clv, clvii, clviii, clix] • Interior forest habitats are at least 200m from forest edge habitat. Information Sources • Local bird clubs • Canadian Wildlife Service (CWS) for the location of forest bird monitoring. • Bird studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to greatest value to interior species • Reports and other information available from CAs.	• Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. • Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH. • Conduct field investigations in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • SWHMiST[cxlix] Index #34 provides development effects and mitigation measures.	The study area includes interior forest habitat that is within a larger contiguous woodland feature, that may provide suitable woodland breeding bird habitat.	

Significant Wildlife Habitat Assessment Tables

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH		
	Wildlife Species	**ELC Ecosites**	**Detailed Information and Sources**	**Defining Criteria**	**Study Area**	**Subject Property**
Wildlife Habitat: Marsh Bird Breeding Habitat					Possible	Not Present
<u>Rationale:</u> Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.	American Bittern Virginia Rail Sora Common Gallinule American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Sandhill Crane Green Heron Trumpeter Swan <u>Special Concern</u>: Black Tern Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites.	• Nesting occurs in wetlands • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present[cxxiv]. • For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. <u>Information Sources</u> • Contact OMNRF, wetland evaluations are a good source of information. • Field naturalist clubs • Natural Heritage Information Center (NHIC) Records • Reports and other information available from CAs. • Ontario Breeding Bird Atlas[ccv]	Studies confirm: • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species[j]. • Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH[j]. • Area of the ELC ecosite is the SWH • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi]. • SWHMiST[cxlix] Index #35 provides development effects and mitigation measures	There is limited potential for the adjacent forested wetlands to provide nesting habitat for Green Heron. It is unlikely that the habitat would be suitable for the other listed species.	
Wildlife Habitat: Open Country Bird Breeding Habitat					Not Present	Not Present
<u>Rationale:</u> This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.	Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow <u>Special Concern</u>: Short-eared Owl	CUM1 CUM2	Large grassland areas (includes natural and cultural fields and meadows) >30 ha [clx, clxi, clxii, clxiii, clxiv, clxv, clxvi, clxvii, clxviii, clxix]. Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years)[j]. Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species. <u>Information Sources</u> • Agricultural land classification maps, Ministry of Agriculture. • Ask local birders • Ontario Breeding Bird Atlas[ccv] • Reports and other information available from CAs.	Field Studies confirm: • Presence of nesting or breeding of 2 or more of the listed species. • A field with 1 or more breeding Short-eared Owl is to be considered SWH. • The area of SWH is the contiguous ELC ecosite field areas. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi]. • SWHMiST[cxlix] Index #32 provides development effects and mitigation measures.	There are no grasslands in the study area or subject propetry that are of suitable size to support this habitat type.	

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH		
	Wildlife Species	**ELC Ecosites**	**Detailed Information and Sources**	**Defining Criteria**	**Study Area**	**Subject Property**
Wildlife Habitat: Shrub/Early Successional Bird Breeding Habitat					Not Present	Not Present
<u>Rationale:</u> This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records cxcix.	<u>Indicator spp.</u>: Brown Thrasher Clay-coloured Sparrow <u>Common spp.</u>: Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher <u>Special Concern</u>: Yellow-breasted Chat Golden-winged Warbler	CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species.	Large field areas succeeding to shrub and thicket habitats>10ha[clxiv] in size. • Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years)[l]. Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species [clxxiii]. Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. <u>Information Sources</u> • Agricultural land classification maps Ministry of Agriculture Local bird clubs • Ontario Breeding Bird Atlas[ccv] • Reports and other information available from CAs	Field Studies confirm: • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species[l]. • A field with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat. • The area of the SWH is the contiguous ELC ecosite field/thicket area. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • SWHMiST[cxlix] Index #33 provides development effects and mitigation measures.	There are no shrub thickets in the study area or subject propetry that are of suitable size to support this habitat type.	
Wildlife Habitat: Terrestrial Crayfish					Possible	Not Present
<u>Rationale:</u> Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare.[ccii]	Chimney or Digger Crayfish: (*Fallicambarus fodiens*) Devil Crawfish or Meadow Crayfish: (*Cambarus Diogenes*)	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM	Wet meadow and edges of shallow marshes (no minimum size) identified should be surveyed for terrestrial crayfish. • Constructs burrows in marshes, mudflats, meadows, the ground can’t be too moist. Can often be found far from water. • Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed. Information Sources • Information sources from “Conservation Status of Freshwater Crayfishes” by Dr. Premek Hamr for the WWF and CNF March 1998	Studies Confirm: • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable marsh meadow or terrestrial sites[cci] • Area of ELC Ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH • Surveys should be done April to August during in temporary or permanent water Note the presence of burrows or chemistry are often the only indicator of presence, observance or collection of individuals is very difficult[cci] • SWHMiST[cxlix] Index #36 provides development effects and mitigation measures.	It is possible that the edges of the wetlands present in the study area may provide suitable habitat for terrestrial crayfish.	

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH		
	Wildlife Species	ELC Ecosites	Detailed Information and Sources	Defining Criteria	Study Area	Subject Property
Wildlife Habitat: Special Concern and Rare Wildlife Species					Possible	Not Present
Rationale: These species are quite rare or have experienced significant population declines in Ontario.	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre.	All plant and animal element occurrences (EO) within a 1 or 10km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites[lxxviii]. Information Sources • Natural Heritage Information Centre (NHIC) will have the Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data. • NHIC Website: "Get Information": http://nhic.mnr.gov.on.ca • Ontario Breeding Bird Atlas[ccv] • Expert advice should be sought as many of the rare spp. have little information available about their requirements.	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs to be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat. • SWHMiST[cxlix] Index #37 provides development effects and mitigation measures.	No other speical concern or rare species or their habitats were observed on the subject property. There is potential for special concern or rare species to occur in the study area habitats that were not accessible and therefore not surveyed.	

Significant Wildlife Habitat Assessment Tables

Table 5. Characteristics of Animal Movement Corridors for Ecoregion 6E.

Rationale	Candidate SWH			Confirmed SWH		
	Wildlife Species	**Habitat Description**	**Detailed Information and Sources**	**Defining Criteria**	**Study Area**	**Subject Property**
Wildlife Habitat: Amphibian Movement Corridors					Not Present	Not Present
Rationale: Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	Corridors may be found in all ecosites associated with water. • Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1.	Movement corridors between breeding habitat and summer habitat [clxxiv, clxxv, clxxvi, clxxvii, clxxviii, clxxix, clxxx, clxxxi]. Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat – Wetland) of this Schedule[i]. Information Sources • MNRF District Office • Natural Heritage Information Center NHIC • Reports and other information available from CAs • Field Naturalist Clubs	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Cooridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant[cxlix]. • Corridors should have at least 15m of vegetation on both sides of waterway [cxlix] or be up to 200m wide[cxlix] of woodland habitat and with gaps <20m [cxlix]. • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat[cxlix]. • SWHMiST[cxlix] Index #40 provides development effects and mitigation measures.	There is no wetland amphibian breeding habitat present in the vicinity of the study area or subject property and therefore there are no amphibian movement corridors.	
Wildlife Habitat: Deer Movement Corridors					Possible	Not Present
Rationale: Corridors important for all species to be able to access seasonally important life-cycle habitats or to access new habitat for dispersing individuals by minimizing their vulnerability while travelling.	White-tailed Deer	Corridors may be found in all forested ecosites. A Project Proposal in Stratum II Deer Wintering Area has potential to contain corridors.	Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH from Table 1.1 of this schedule[i]. • A deer wintering habitat identified by the OMNRF as SWH in Table 1.1 of this Schedule will have corridors that the deer use during fall migration and spring dispersion [clxxxii, clxxxiii, cxlix, cxciv]. • Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges). Information Sources • MNRF District Office • Natural Heritage Information Center (NHIC) • Reports and other information available from CAs • Field Naturalist Clubs	• Studies must be conducted at the time of year when deer are migrating or moving to and from winter concentration areas. • Corridors that lead to a deer wintering yard should be unbroken by roads and residential areas. • Corridors should be at least 200m wide[cxlix] with gaps <20m[cxlix] and if following riparian area with at least 15m of vegetation on both sides of waterway[cxlix]. Shorter corridors are more significant than longer corridors[cxlix] • SWHMiST[cxlix] Index #39 provides development effects and mitigation measures.	The forested comunities that overlap with the study area may act as a movement corridor for deer, depending on the presence of deer wintering habitat.	

Appendix II
Plant Species List

Plant Species Reported from the Study Area - Puslinch Logistics Facility (Project #3370)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Wellington-Dufferin	iNaturalist	NHIC Data*	NRSI Observed	CUM1-1	FOM (Off Property)
		MNRF 2023a	MECP 2024	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	Riley 1989	iNaturalist 2024	MNRF 2023b	NRSI Results From 2024	NRSI Results From 2024	NRSI Results From 2024
Gymnosperms	**Conifers**											
Cupressaceae	**Cypress Family**											
Thuja occidentalis	Eastern White Cedar	S5								X		X
Pinaceae	**Pine Family**											
Pinus nigra	Black Pine	SE3								X		X
Pinus strobus	Eastern White Pine	S5								X		X
Dicotyledons	**Dicots**											
Aceraceae	**Maple Family**											
Acer negundo	Manitoba Maple	S5								X	X	X
Acer saccharinum	Silver Maple	S5								X		X
Acer saccharum	Sugar Maple	S5								X		X
Anacardiaceae	**Sumac or Cashew Family**											
Rhus typhina	Staghorn Sumac	S5								X	X	
Apiaceae	**Carrot or Parsley Family**											
Daucus carota	Wild Carrot	SE5								X	X	
Asclepiadaceae	**Milkweed Family**											
Asclepias syriaca	Common Milkweed	S5								X	X	
Asteraceae	**Composite or Aster Family**											
Arctium lappa	Great Burdock	SE5								X	X	
Arctium minus	Common Burdock	SE5								X	X	
Cirsium arvense	Creeping Thistle	SE5								X	X	
Erigeron annuus	Annual Fleabane	S5								X	X	
Leucanthemum vulgare	Oxeye Daisy	SE5								X	X	
Solidago sp.	Goldenrod sp.									X	X	
Symphyotrichum lanceolatum	Panicled Aster	S5								X	X	
Symphyotrichum novae-angliae	New England Aster	S5								X	X	
Taraxacum officinale	Common Dandelion	SE5								X	X	
Tragopogon pratensis	Meadow Goat's-beard	SE5								X	X	
Tripleurospermum inodorum	Scentless Chamomile	SE								X	X	
Tussilago farfara	Colt's-foot	SE5								X	X	
Boraginaceae	**Borage Family**											
Echium vulgare	Common Viper's Bugloss	SE5								X	X	
Brassicaceae	**Mustard Family**											
Alliaria petiolata	Garlic Mustard	SE5								X	X	
Barbarea vulgaris	Bitter Wintercress	SE5								X	X	
Berteroa incana	Hoary False-alyssum	SE5								X	X	
Diplotaxis muralis	Stinking Wallrocket	SE3								X	X	
Hesperis matronalis	Dame's Rocket	SE5								X	X	
Sinapis arvensis	Corn Mustard	SE5								X	X	
Thlaspi arvense	Field Penny-cress	SE5								X	X	
Caryophyllaceae	**Pink Family**											
Silene vulgaris	Bladder Campion	SE5								X	X	
Cornaceae	**Dogwood Family**											
Cornus racemosa	Gray Dogwood	S5								X		X
Cornus sericea	Red-osier Dogwood	S5								X	X	
Elaeagnaceae	**Oleaster Family**											
Elaeagnus umbellata	Autumn Olive	SE3								X	X	
Fabaceae	**Pea Family**											
Lathyrus tuberosus	Tuberous Vetchling	SE3								X	X	
Lotus corniculatus	Garden Bird's-foot Trefoil	SE5								X	X	
Medicago lupulina	Black Medic	SE5								X	X	
Trifolium repens	White Clover	SE5								X	X	
Vicia cracca	Tufted Vetch	SE5								X	X	

Plant Species Reported from the Study Area - Puslinch Logistics Facility (Project #3370)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Wellington-Dufferin	iNaturalist	NHIC Data*	NRSI Observed	CUM1-1	FOM (Off Property)
		MNRF 2023a	MECP 2024	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	Riley 1989	iNaturalist 2024	MNRF 2023b	NRSI Results From 2024	NRSI Results From 2024	NRSI Results From 2024
Lamiaceae	**Mint Family**											
Leonurus cardiaca	Common Motherwort	SE5								X	X	
Nepeta cataria	Catnip	SE5								X	X	
Oleaceae	**Olive Family**											
Fraxinus americana	White Ash	S4								X	X	X
Fraxinus nigra	Black Ash	S4	END	T	NS	No schedule		X				
Plantaginaceae	**Plantain Family**											
Plantago lanceolata	English Plantain	SE5								X	X	
Polygonaceae	**Smartweed Family**											
Reynoutria japonica	Japanese Knotweed	SE5								X	X	
Rumex crispus	Curly Dock	SE5								X	X	
Rumex obtusifolius	Bitter Dock	SE5								X	X	
Rhamnaceae	**Buckthorn Family**											
Rhamnus cathartica	Common Buckthorn	SE5								X	X	X
Salicaceae	**Willow Family**											
Populus tremuloides	Trembling Aspen	S5								X		X
Salix petiolaris	Meadow Willow	S5								X	X	
Scrophulariaceae	**Figwort Family**											
Aureolaria flava	Smooth Yellow False Foxglove	S2?	THR	T	T	Schedule 1			X			
Verbascum thapsus	Common Mullein	SE5								X	X	
Solanaceae	**Nightshade Family**											
Solanum dulcamara	Bittersweet Nightshade	SE5								X	X	
Tiliaceae	**Linden Family**											
Tilia americana	American Basswood	S5								X		X
Urticaceae	**Nettle Family**											
Urtica dioica ssp. dioica	European Stinging Nettle	SE2								X	X	
Violaceae	**Violet Family**											
Viola sororia	Woolly Blue Violet	S5								X	X	
Vitaceae	**Grape Family**											
Parthenocissus vitacea	Thicket Creeper	S5								X	X	X
Vitis riparia	Riverbank Grape	S5								X		X
Monocotyledons	**Monocots**											
Poaceae	**Grass Family**											
Dactylis glomerata	Orchard Grass	SE5								X	X	
Elymus repens	Creeping Wildrye	SE5								X	X	
Lolium perenne	Perennial Ryegrass	SE4								X	X	
Phalaris arundinacea var. arundinacea	Reed Canary Grass	S5								X	X	
Phragmites australis ssp. australis	European Reed	SE5								X	X	
Poa pratensis	Kentucky Bluegrass	S5								X	X	
Total								**1**	**1**	**61**	**52**	**13**

*NHIC Atlas Squares: 17NJ7012, 17NJ7013

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Appendix III
Bird Species List

Bird Species Reported from the Study Area - Puslinch Logistics Facility (Project #3370)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	OBBA*	NHIC Data**	NRSI Observed: Highest Level of Breeding Evidence	Other Observations - Incidental
		MNRF 2023a	MECP 2024	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	BSC et al. 2006	MNRF 2023b	NRSI Results from 2024	NRSI Results from 2024
Anatidae	**Ducks, Geese & Swans**									
Aix sponsa	Wood Duck	S5B,S3N					CO			
Anas acuta	Northern Pintail	S5B,S4N					CO			
Anas platyrhynchos	Mallard	S5					CO			
Anas rubripes	American Black Duck	S4					PO			
Aythya americana	Redhead	S2B,S4N					PR			
Branta canadensis	Canada Goose	S5					CO		**OB**	OB
Cygnus olor	Mute Swan	SNA					CO			
Lophodytes cucullatus	Hooded Merganser	S5					CO			
Mareca americana	American Wigeon	S4B,S4N,S5M					CO			
Mareca strepera	Gadwall	S4B,S4N,S5M					CO			
Oxyura jamaicensis	Ruddy Duck	S3B,S4N,S5M					CO			
Spatula clypeata	Northern Shoveler	S4B,S4N,S5M					PO			
Spatula discors	Blue-winged Teal	S3B,S4M					CO			
Phasianidae	**Partridges, Grouse & Turkeys**									
Bonasa umbellus	Ruffed Grouse	S5					CO			
Podicipediformes	**Grebes**									
Podilymbus podiceps	Pied-billed Grebe	S4B,S2N					CO			
Columbidae	**Pigeons & Doves**									
Columba livia	Rock Pigeon	SNA					PR			
Zenaida macroura	Mourning Dove	S5					CO		**PO**	OB
Cuculiformes	**Cuckoos & Anis**									
Coccyzus americanus	Yellow-billed Cuckoo	S4B					PR			
Coccyzus erythropthalmus	Black-billed Cuckoo	S4S5B					PR			
Apodidae	**Swifts**									
Chaetura pelagica	Chimney Swift	S3B	THR	T	T	Schedule 1	PO			
Trochilidae	**Hummingbirds**									
Archilochus colubris	Ruby-throated Hummingbird	S5B					CO		**PO**	
Rallidae	**Rails, Gallinules & Coots**									
Fulica americana	American Coot	S3B,S4N	NAR	NAR	NS	No schedule	CO			
Gallinula galeata	Common Gallinule	S3B					CO			
Porzana carolina	Sora	S5B					PR			
Rallus limicola	Virginia Rail	S4S5B					CO			
Charadriidae	**Plovers & Lapwings**									
Charadrius vociferus	Killdeer	S4B					CO		**CO**	CO
Scolopacidae	**Sandpipers & Allies**									
Actitis macularius	Spotted Sandpiper	S5B					PR			
Gallinago delicata	Wilson's Snipe	S5B					PR			
Scolopax minor	American Woodcock	S4B					PR			
Laridae	**Gulls, Terns & Skimmers**									
Chlidonias niger	Black Tern	S3B,S4M	SC	NAR	NS	No schedule	PO			
Ardeidae	**Herons & Bitterns**									
Ardea herodias	Great Blue Heron	S4					PO			
Butorides virescens	Green Heron	S4B					PR			
Ixobrychus exilis	Least Bittern	S4B	THR	T	T	Schedule 1	PO			
Nycticorax nycticorax	Black-crowned Night-Heron	S3B,S2N,S4M					PO			
Cathartidae	**Vultures**									
Cathartes aura	Turkey Vulture	S5B,S3N					PO			
Pandionidae	**Osprey**									
Pandion haliaetus	Osprey	S5B					CO			

Bird Species Reported from the Study Area - Puslinch Logistics Facility (Project #3370)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	OBBA*	NHIC Data**	NRSI Observed: Highest Level of Breeding Evidence	Other Observations - Incidental
		MNRF 2023a	MECP 2024	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	BSC et al. 2006	MNRF 2023b	NRSI Results from 2024	NRSI Results from 2024
Accipitridae	**Hawks, Kites, Eagles & Allies**									
Accipiter cooperii	Cooper's Hawk	S4	NAR	NAR	NS	No schedule	CO			
Accipiter gentilis	Northern Goshawk	S4	NAR	NAR	NS	No schedule	CO			
Accipiter striatus	Sharp-shinned Hawk	S5	NAR	NAR	NS	No schedule	CO			
Buteo jamaicensis	Red-tailed Hawk	S5	NAR	NAR	NS	No schedule	PR		**CO**	
Buteo platypterus	Broad-winged Hawk	S5B					PR			
Circus hudsonius	Northern Harrier	S5B,S4N	NAR	NAR	NS	No schedule	PR			
Strigidae	**Typical Owls**									
Bubo virginianus	Great Horned Owl	S4					PR			
Megascops asio	Eastern Screech-Owl	S4	NAR	NAR	NS	No schedule	PR			
Alcedinidae	**Kingfishers**									
Megaceryle alcyon	Belted Kingfisher	S5B,S4N					CO			
Picidae	**Woodpeckers**									
Colaptes auratus	Northern Flicker	S5					CO		**OB**	OB
Dryobates pubescens	Downy Woodpecker	S5					CO			
Dryobates villosus	Hairy Woodpecker	S5					CO			
Dryocopus pileatus	Pileated Woodpecker	S5					PR			
Tyrannidae	**Tyrant Flycatchers**									
Contopus virens	Eastern Wood-Pewee	S4B	SC	SC	SC	Schedule 1	PR			
Empidonax alnorum	Alder Flycatcher	S5B					PR		**PO**	
Empidonax minimus	Least Flycatcher	S5B					PR			
Empidonax traillii	Willow Flycatcher	S4B					PR			
Myiarchus crinitus	Great Crested Flycatcher	S5B					CO			
Sayornis phoebe	Eastern Phoebe	S5B					CO			
Tyrannus tyrannus	Eastern Kingbird	S4B					CO		**PO**	
Vireonidae	**Vireos**									
Vireo flavifrons	Yellow-throated Vireo	S4B					PR			
Vireo gilvus	Warbling Vireo	S5B					PR		**PR**	
Vireo olivaceus	Red-eyed Vireo	S5B					CO		**PO**	
Vireo solitarius	Blue-headed Vireo	S5B					PR			
Corvidae	**Crows & Jays**									
Corvus brachyrhynchos	American Crow	S5					CO		**OB**	OB
Cyanocitta cristata	Blue Jay	S5					CO			
Alaudidae	**Larks**									
Eremophila alpestris	Horned Lark	S4					PR			
Hirundinidae	**Swallows**									
Hirundo rustica	Barn Swallow	S4B	SC	SC	T	Schedule 1	CO		**OB**	OB
Petrochelidon pyrrhonota	Cliff Swallow	S4S5B					CO			
Progne subis	Purple Martin	S3B					CO			
Riparia riparia	Bank Swallow	S4B	THR	T	T	Schedule 1	PO			
Stelgidopteryx serripennis	Northern Rough-winged Swallow	S4B					PR		**OB**	
Tachycineta bicolor	Tree Swallow	S4S5B					CO		**PR**	OB
Paridae	**Chickadees & Titmice**									
Poecile atricapillus	Black-capped Chickadee	S5					CO		**PO**	
Sittidae	**Nuthatches**									
Sitta canadensis	Red-breasted Nuthatch	S5					PR			
Sitta carolinensis	White-breasted Nuthatch	S5					CO			
Certhiidae	**Creepers**									
Certhia americana	Brown Creeper	S5					PR			
Troglodytidae	**Wrens**									

Bird Species Reported from the Study Area - Puslinch Logistics Facility (Project #3370)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	OBBA*	NHIC Data**	NRSI Observed: Highest Level of Breeding Evidence	Other Observations - Incidental
		MNRF 2023a	MECP 2024	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	BSC et al. 2006	MNRF 2023b	NRSI Results from 2024	NRSI Results from 2024
Cistothorus palustris	Marsh Wren	S4B,S3N					PR			
Cistothorus stellaris	Sedge Wren	S4B	NAR	NAR	NS	No schedule	PO			
Troglodytes aedon	House Wren	S5B					CO			
Troglodytes hiemalis	Winter Wren	S5B,S4N					PR			
Polioptilidae	**Gnatcatchers**									
Polioptila caerulea	Blue-gray Gnatcatcher	S4B					PR			
Regulidae	**Kinglets**									
Regulus satrapa	Golden-crowned Kinglet	S5					CO			
Turdidae	**Thrushes**									
Catharus fuscescens	Veery	S5B					PR			
Hylocichla mustelina	Wood Thrush	S4B	SC	T	T	Schedule 1	PR			
Sialia sialis	Eastern Bluebird	S5B,S4N	NAR	NAR	NS	No schedule	PR			
Turdus migratorius	American Robin	S5					CO		**PR**	OB
Mimidae	**Mockingbirds, Thrashers & Allies**									
Dumetella carolinensis	Gray Catbird	S5B,S3N					CO		**PR**	
Toxostoma rufum	Brown Thrasher	S4B					CO			
Sturnidae	**Starlings**									
Sturnus vulgaris	European Starling	SNA					CO		**PO**	OB
Bombycillidae	**Waxwings**									
Bombycilla cedrorum	Cedar Waxwing	S5					CO		**PR**	
Passeridae	**Old World Sparrows**									
Passer domesticus	House Sparrow	SNA					CO		**OB**	OB
Fringillidae	**Finches & Allies**									
Haemorhous mexicanus	House Finch	SNA					CO		**OB**	
Haemorhous purpureus	Purple Finch	S5					CO			
Spinus tristis	American Goldfinch	S5					CO		**PR**	OB
Passerellidae	**New World Sparrows & Allies**									
Ammodramus savannarum	Grasshopper Sparrow	S4B	SC	SC	SC	Schedule 1	PO			
Melospiza georgiana	Swamp Sparrow	S5B,S4N					CO			
Melospiza melodia	Song Sparrow	S5					CO		**PR**	OB
Passerculus sandwichensis	Savannah Sparrow	S5B,S3N					CO			
Pipilo erythrophthalmus	Eastern Towhee	S4B,S3N					CO			
Pooecetes gramineus	Vesper Sparrow	S4B					PR			
Spizella passerina	Chipping Sparrow	S5B,S3N					CO			
Spizella pusilla	Field Sparrow	S4B,S3N					PR			
Zonotrichia albicollis	White-throated Sparrow	S5					PR			
Icteridae	**Troupials & Allies**									
Agelaius phoeniceus	Red-winged Blackbird	S5					CO		**PR**	OB
Dolichonyx oryzivorus	Bobolink	S4B	THR	SC	T	Schedule 1	CO	X		
Icterus galbula	Baltimore Oriole	S4B					CO		**PO**	
Molothrus ater	Brown-headed Cowbird	S5					CO			
Quiscalus quiscula	Common Grackle	S5					CO		**PO**	
Sturnella magna	Eastern Meadowlark	S4B,S3N	THR	T	T	Schedule 1	CO	X		
Parulidae	**Wood Warblers**									
Geothlypis philadelphia	Mourning Warbler	S5B					CO			
Geothlypis trichas	Common Yellowthroat	S5B,S3N					CO		**PR**	
Leiothlypis ruficapilla	Nashville Warbler	S5B					CO			
Mniotilta varia	Black-and-white Warbler	S5B					PR			
Parkesia noveboracensis	Northern Waterthrush	S5B					PR			
Seiurus aurocapilla	Ovenbird	S5B					CO			

Bird Species Reported from the Study Area - Puslinch Logistics Facility (Project #3370)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	OBBA*	NHIC Data**	NRSI Observed: Highest Level of Breeding Evidence	Other Observations - Incidental
		MNRF 2023a	MECP 2024	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	BSC et al. 2006	MNRF 2023b	NRSI Results from 2024	NRSI Results from 2024
Setophaga coronata	Yellow-rumped Warbler	S5B,S4N					PO			
Setophaga fusca	Blackburnian Warbler	S5B					PO			
Setophaga magnolia	Magnolia Warbler	S5B					PR			
Setophaga pensylvanica	Chestnut-sided Warbler	S5B					PR			
Setophaga petechia	Yellow Warbler	S5B					CO		**PR**	OB
Setophaga pinus	Pine Warbler	S5B,S3N					PR		**PO**	
Setophaga ruticilla	American Redstart	S5B					CO			
Setophaga virens	Black-throated Green Warbler	S5B					PR			
Vermivora cyanoptera	Blue-winged Warbler	S4B					CO			
Cardinalidae	**Cardinals, Grosbeaks & Allies**									
Cardinalis cardinalis	Northern Cardinal	S5					CO			
Passerina cyanea	Indigo Bunting	S5B					CO		**PO**	
Pheucticus ludovicianus	Rose-breasted Grosbeak	S5B					CO			
Piranga olivacea	Scarlet Tanager	S5B					PR			
Total							**130**	**2**	**30**	**14**

*OBBA Atlas Square: 17TNJ71

**NHIC Atlas Squares: 17NJ7012, 17NJ7013

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Appendix IV
Reptiles and Amphibians Species Lists

Reptile and Amphibian Species Reported from the Study Area - Puslinch Logistics Facility (Project #3370)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	iNaturalist	ORAA*	NHIC Data**	NRSI Observed
		MNRF 2023a	MECP 2024	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	iNaturalist 2024	Ontario Nature 2019	MNRF 2023b	NRSI Results from 2024
Turtles										
Chelydra serpentina	Snapping Turtle	S4	SC	SC	SC	Schedule 1	X	X	X	
Chrysemys picta marginata	Midland Painted Turtle	S4		SC	SC	Schedule 1		X	X	
Emydoidea blandingii	Blanding's Turtle (Great Lakes / St. Lawren	S3	THR	E	E	Schedule 1		X		
Trachemys scripta	Pond Slider	SNA						X		
Snakes										
Lampropeltis triangulum	Eastern Milksnake	S4	NAR	SC	SC	Schedule 1		X	X	
Opheodrys vernalis	Smooth Greensnake	S4						X		
Nerodia sipedon sipedon	Northern Watersnake	S5	NAR	NAR	NS	No schedule		X		
Storeria dekayi	Dekay's Brownsnake	S5	NAR	NAR	NS	No schedule		X		
Storeria occipitomaculata	Red-bellied Snake	S5						X		
Thamnophis sirtalis sirtalis	Eastern Gartersnake	S5						X		
Salamanders										
Ambystoma sp.	Jefferson/Blue-spotted Salamander Compl	NP						X		
Ambystoma jeffersonianum	Jefferson Salamander	S2	END	E	E	Schedule 1		X		
Ambystoma laterale - (2) jeffersonianum	Unisexual Ambystoma (Jefferson Salaman	S2	END	E	E	Schedule 1		X		
Ambystoma (2) laterale - jeffersonianum	Unisexual Ambystoma (Blue-spotted Salan	S4	NAR	NAR	NS	No schedule		X		
Ambystoma laterale	Blue-spotted Salamander	S4						X		
Ambystoma maculatum	Spotted Salamander	S4						X		
Notophthalmus viridescens viridescens	Red-spotted Newt	S5						X		
Plethodon cinereus	Eastern Red-backed Salamander	S5						X		
Frogs and Toads										
Anaxyrus americanus	American Toad	S5						X		
Dryophytes versicolor	Gray Treefrog	S5						X		X
Pseudacris triseriata pop. 2	Western Chorus Frog (Great Lakes / St. La	S4	NAR	T	T	Schedule 1		X		
Pseudacris crucifer	Spring Peeper	S5						X		
Lithobates catesbeianus	American Bullfrog	S4					X	X		
Lithobates clamitans	Green Frog	S5					X	X		
Lithobates palustris	Pickerel Frog	S4	NAR	NAR	NS	No schedule		X		
Lithobates pipiens	Northern Leopard Frog	S5	NAR	NAR	NS	No schedule		X		X
Lithobates sylvaticus	Wood Frog	S5						X		
Total							3	**27**	**3**	2

*ORAA Atlas Square: 17NJ71

**NHIC Atlas Squares: 17NJ7012, 17NJ7013

References

Ministry of Natural Resources and Forestry (MNRF). 2023a. Natural Heritage Information Centre (NHIC): Species List for Ontario. Published: 2014-07-17. All Species List Updated: 2023-09-19. Available: https://www.ontario.ca/page/get-natural-heritage-information

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Appendix V
Mammals Species Lists

Mammal Species Reported from the Study Area - Puslinch Logistics Facility (Project #3370)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Ontario Mammal Atlas	NHIC Data**	NRSI Observed
		MNRF 2023a	MECP 2024	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	Dobbyn 1994	MNRF 2023b	NRSI Results from 2024
Didelphimorphia	**Opossums**								
Didelphis virginiana	Virginia Opossum	S4					X		
Eulipotyphla	**Shrews, Moles, Hedgehogs, and Allies**								
Blarina brevicauda	Northern Short-tailed Shrew	S5					X		
Condylura cristata	Star-nosed Mole	S5					X		
Parascalops breweri	Hairy-tailed Mole	S4					X		
Sorex cinereus	Masked Shrew	S5					X		
Sorex fumeus	Smoky Shrew	S5					X		
Sorex palustris	Water Shrew	S5					X		
Chiroptera	**Bats**								
Eptesicus fuscus	Big Brown Bat	S4					X		
Lasionycteris noctivagans	Silver-haired Bat	S4		E	NS	No schedule	X		
Lasiurus borealis	Eastern Red Bat	S4		E	NS	No schedule	X		
Lasiurus cinereus	Hoary Bat	S4		E	NS	No schedule	X		
Myotis leibii	Eastern Small-footed Myotis	S2S3	END				X		
Myotis lucifugus	Little Brown Myotis	S3	END	E	E	Schedule 1	X		
Myotis septentrionalis	Northern Myotis	S3	END	E	E	Schedule 1	X		
Perimyotis subflavus	Tri-colored Bat	S3?	END	E	E	Schedule 1	X		
Lagomorpha	**Rabbits and Hares**								
Lepus americanus	Snowshoe Hare	S5					X		
Lepus europaeus	European Hare	SNA					X		
Sylvilagus floridanus	Eastern Cottontail	S5					X		X
Rodentia	**Rodents**								
Castor canadensis	Beaver	S5					X		
Erethizon dorsatum	Porcupine	S5					X		
Glaucomys sabrinus	Northern Flying Squirrel	S5					X		
Marmota monax	Woodchuck	S5					X		
Microtus pennsylvanicus	Meadow Vole	S5					X		
Microtus pinetorum	Woodland Vole	S3?	SC	SC	SC	Schedule 1	X		
Mus musculus	House Mouse	SNA					X		
Napaeozapus insignis	Woodland Jumping Mouse	S5					X		
Ondatra zibethicus	Muskrat	S5					X		
Peromyscus leucopus	White-footed Mouse	S5					X		
Peromyscus maniculatus	Deer Mouse	S5					X		
Rattus norvegicus	Norway Rat	SNA					X		
Sciurus carolinensis	Eastern Gray Squirrel	S5					X		
Synaptomys cooperi	Southern Bog Lemming	S4					X		
Tamias striatus	Eastern Chipmunk	S5					X		
Tamiasciurus hudsonicus	Red Squirrel	S5					X		
Zapus hudsonius	Meadow Jumping Mouse	S5					X		
Canidae	**Canines**								
Canis latrans	Coyote	S5					X		
Vulpes vulpes	Red Fox	S5					X		
Felidae	**Felines**								
Lynx rufus	Bobcat	S4					X		
Mephitidae	**Skunks and Stink Badgers**								
Mephitis mephitis	Striped Skunk	S5					X		
Mustelidae	**Weasels and Allies**								
Mustela richardsonii	American Ermine	S5					X		
Neogale frenata	Long-tailed Weasel	S4					X		
Neogale vison	American Mink	S4					X		
Taxidea taxus jacksoni	American Badger (Southwestern Ontario p	S1	END	E	E	Schedule 1	X		
Procyonidae	**Raccoons and Allies**								
Procyon lotor	Northern Raccoon	S5					X		
Ursidae	**Bears**								
Ursus americanus	American Black Bear	S5	NAR	NAR	NS	No schedule	X		
Artiodactyla	**Deer and Bison**								
Odocoileus virginianus	White-tailed Deer	S5					X		X
Total							**46**	**0**	**2**

*Mammal Atlas Square Number: NU
**NHIC Atlas Squares: 17NJ7012, 17NJ7013

Mammal Species Reported from the Study Area - Puslinch Logistics Facility (Project #3370)

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Appendix VI
Butterfly Species Lists

Butterfly Species Reported from the Study Area - Puslinch Logistics Facility (Project #3370)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	iNaturalist	Ontario Butterfly Atlas*	NHIC Data**
		MNRF 2023a	MECP 2024	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	iNaturalist 2024	Macnaughton et al. 2023	MNRF 2023b
Hesperiidae	**Skippers**								
Anatrytone logan	Delaware Skipper	S4						X	
Ancyloxypha numitor	Least Skipper	S5						X	
Epargyreus clarus	Silver-spotted Skipper	S4						X	
Erynnis baptisiae	Wild Indigo Duskywing	S4						X	
Erynnis icelus	Dreamy Duskywing	S5						X	
Erynnis juvenalis	Juvenal's Duskywing	S5						X	
Euphyes conspicua	Black Dash	S3						X	
Euphyes dion	Dion Skipper	S4						X	
Euphyes vestris	Dun Skipper	S5						X	
Poanes viator	Broad-winged Skipper	S4						X	
Polites mystic	Long Dash Skipper	S5						X	
Polites origenes	Crossline Skipper	S4						X	
Polites themistocles	Tawny-edged Skipper	S5						X	
Thorybes pylades	Northern Cloudywing	S5						X	
Thymelicus lineola	European Skipper	SNA						X	
Papilionidae	**Swallowtails**								
Heraclides cresphontes	Giant Swallowtail	S4						X	
Papilio polyxenes	Black Swallowtail	S5						X	
Pieridae	**Whites and Sulphurs**								
Colias eurytheme	Orange Sulphur	S5						X	
Colias philodice	Clouded Sulphur	S5						X	
Pieris oleracea	Mustard White	S4						X	
Pieris rapae	Cabbage White	SNA						X	
Pieris virginiensis	West Virginia White	S3	SC					X	
Lycaenidae	**Harvesters, Coppers, Hairstreaks, Blues**								
Callophrys niphon	Eastern Pine Elfin	S5						X	
Celastrina lucia	Northern Spring Azure	S5						X	
Celastrina sp.	Azure species	SNA						X	
Cupido comyntas	Eastern Tailed Blue	S5						X	
Glaucopsyche lygdamus	Silvery Blue	S5						X	
Satyrium acadica	Acadian Hairstreak	S4						X	
Satyrium calanus	Banded Hairstreak	S4						X	
Satyrium caryaevorus	Hickory Hairstreak	S4						X	
Satyrium titus	Coral Hairstreak	S5						X	
Nymphalidae	**Brush-footed Butterflies**								
Aglais milberti	Milbert's Tortoiseshell	S5						X	
Boloria bellona	Meadow Fritillary	S5						X	
Cercyonis pegala	Common Wood-Nymph	S5						X	
Coenonympha california	Common Ringlet	S5						X	
Danaus plexippus	Monarch	S2N,S4B	SC	E	E	Schedule 1		X	
Euphydryas phaeton	Baltimore Checkerspot	S4						X	
Junonia coenia	Common Buckeye	SNA						X	
Lethe anthedon	Northern Pearly-Eye	S5						X	
Lethe appalachia	Appalachian Brown	S4						X	
Lethe eurydice	Eyed Brown	S5						X	
Limenitis archippus	Viceroy	S5						X	
Limenitis arthemis arthemis	White Admiral	S5						X	
Limenitis arthemis astyanax	Red-spotted Purple	S5						X	
Megisto cymela	Little Wood-Satyr	S5						X	

Butterfly Species Reported from the Study Area - Puslinch Logistics Facility (Project #3370)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	iNaturalist	Ontario Butterfly Atlas*	NHIC Data**
		MNRF 2023a	MECP 2024	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	iNaturalist 2024	Macnaughton et al. 2023	MNRF 2023b
Nymphalis antiopa	Mourning Cloak	S5						X	
Nymphalis l-album	Compton Tortoiseshell	S5						X	
Phyciodes cocyta	Northern Crescent	S5					X	X	
Phyciodes tharos	Pearl Crescent	S4						X	
Polygonia comma	Eastern Comma	S5						X	
Polygonia interrogationis	Question Mark	S5						X	
Polygonia progne	Gray Comma	S5						X	
Vanessa atalanta	Red Admiral	S5B						X	
Vanessa cardui	Painted Lady	S5B						X	
Vanessa virginiensis	American Lady	S5						X	
Total							**1**	**55**	**0**

*TEA Atlas Square: Square 17NJ71
**NHIC Atlas Square: Square 17NJ7012, 17NJ7013

References

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Appendix VII
Species at Risk Encounter Protocol Brochure

Site Requirements

All workers on site are responsible for being familiar with the requirements of protecting wildlife, particularly Species at Risk.

All workers must review the material in this pamphlet and sign-off that they have read and understand the response protocol.

All workers must ensure that best practices are followed during construction, including checking under and around vehicles to ensure there is no wildlife present

All workers must ensure that the wildlife exclusion fencing is in place and functioning, if the fence is damaged repair the fence and/or notify a supervisor who should contact NRSI for further instructions

UPON ENCOUNTERING A POTENTIAL SPECIES AT RISK:

1. Immediately stop work in the area
2. Immediately contact:
   - **NRSI Environmental Monitor – Jennifer Pedersen: 519-807-0961 (cell)**

     or
   - **NRSI Project Manager – Mike Dungey: 519-502-3773 (cell)**
3. If a live individual is encountered, a qualified biologist will relocate it to the closest, most appropriate habitat, outside the construction area.
4. If an injured individual is encountered, a qualified biologist will transport it to a veterinarian or wildlife rehabilitation center for treatment.
5. If a deceased individual is encountered, a qualified biologist will document in detail the circumstances and apparent cause of death before relocating the individual.
6. NRSI will notify the Ministry of Environment, Conservation, and Parks within 24 hours.
7. The biologist will survey the area to ensure it is safe to continue construction and identifying deficiencies in the exclusion measures requiring attention before work resumes.

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

7504 McLean Road, Puslinch

Species at Risk Response Protocol

(Crowley 2014)

SNAPPING TURTLE

Species at Risk in the Area

JEFFERSON SALAMANDER

Size:

- Adults: length of **10 - 20cm**
- Juveniles: length of **4 - 7cm**

Description:

- **Black/grey-brown**, with small, blue/grey spots along sides
- Long limbs and tail

Where you are likely to find it:

- **Woodland habitats**, under leaf litter, logs, etc. near the planned restoration areas
- Breed in **wetlands**: small temporary ponds to large permanent swamps or marshes
- Migrate overland to and from breeding wetlands and overwintering sites in the forest

When you are likely to find it:

- **March to October**
- May migrate during breeding season in March-April, and in fall in October

Other Species:

SNAPPING TURTLE

- Length up to **40cm** (shell only)
- **Olive to black**
- **Large head, very long tail**

PAINTED TURTLE

- Up to **15cm** (shell only)
- **Olive to black**
- **Red and yellow stripes** on head, neck

Where you are likely to find them:

- **In/around wetlands**
- Nest in open, sandy/gravelly areas

When you are likely to find them:

- **April to October**
- On land mid-May to end of June to nest

Other Species:

Eastern Milksnake

- Length of **60 - 90cm**
- **Grey or tan**,
- **Alternating reddish-brown blotches** along back and sides
- Distinct light-coloured ‘Y’ or ‘V’ shaped marking on back of head

Where you are likely to find them:

- **Farmlands, meadows, hardwood forest**
- Communal nester

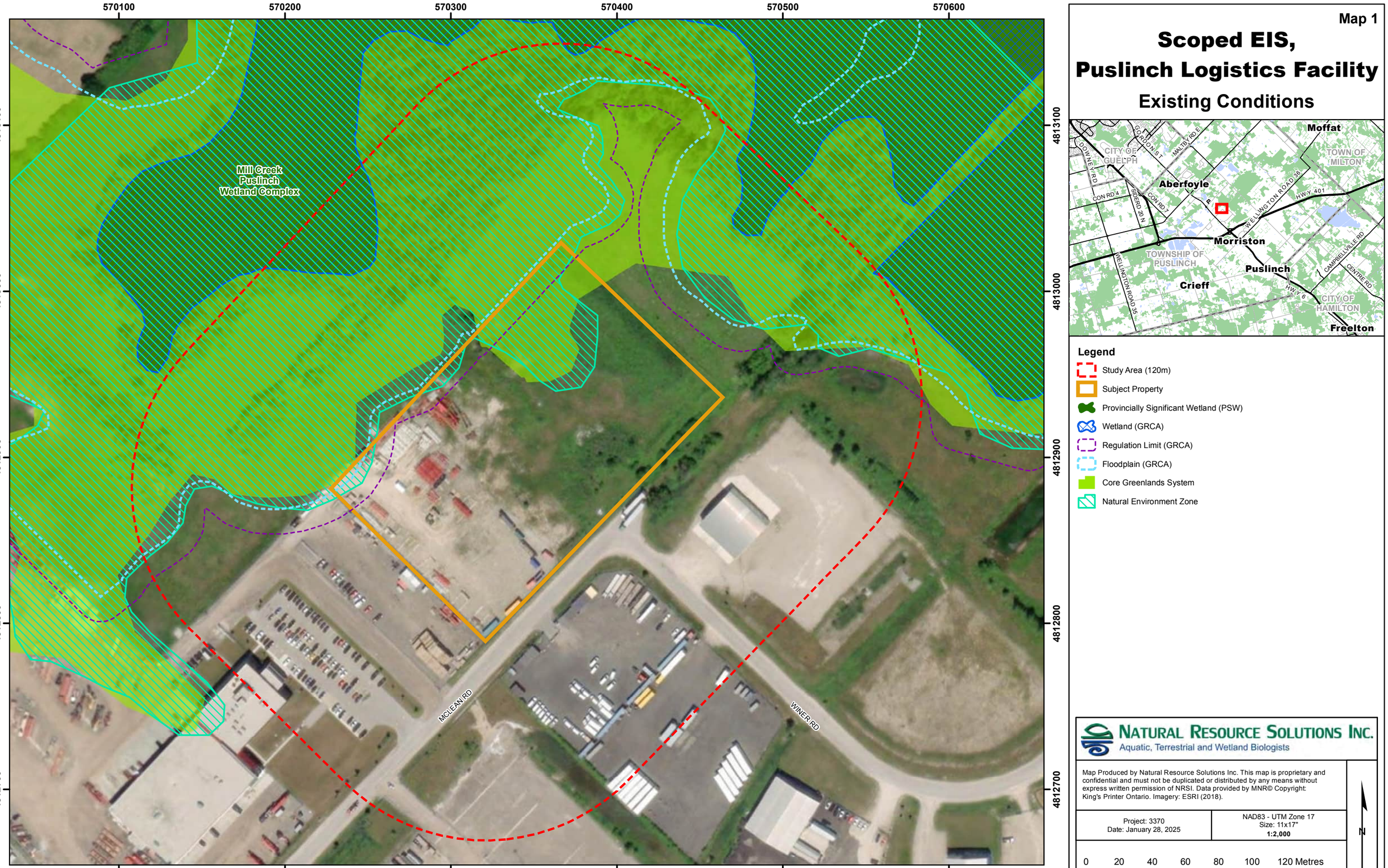
When you are likely to find them:

- **April to October**

Map 1

Scoped EIS, Puslinch Logistics Facility

Existing Conditions



Legend

- Study Area (120m)
- Subject Property
- Provincially Significant Wetland (PSW)
- Wetland (GRCA)
- Regulation Limit (GRCA)
- Floodplain (GRCA)
- Core Greenlands System
- Natural Environment Zone

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Project: 3370
Date: January 28, 2025

NAD83 - UTM Zone 17
Size: 11x17"
1:2,000

0 20 40 60 80 100 120 Metres

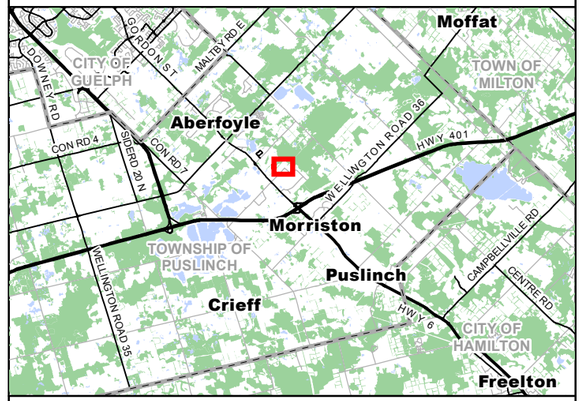
N

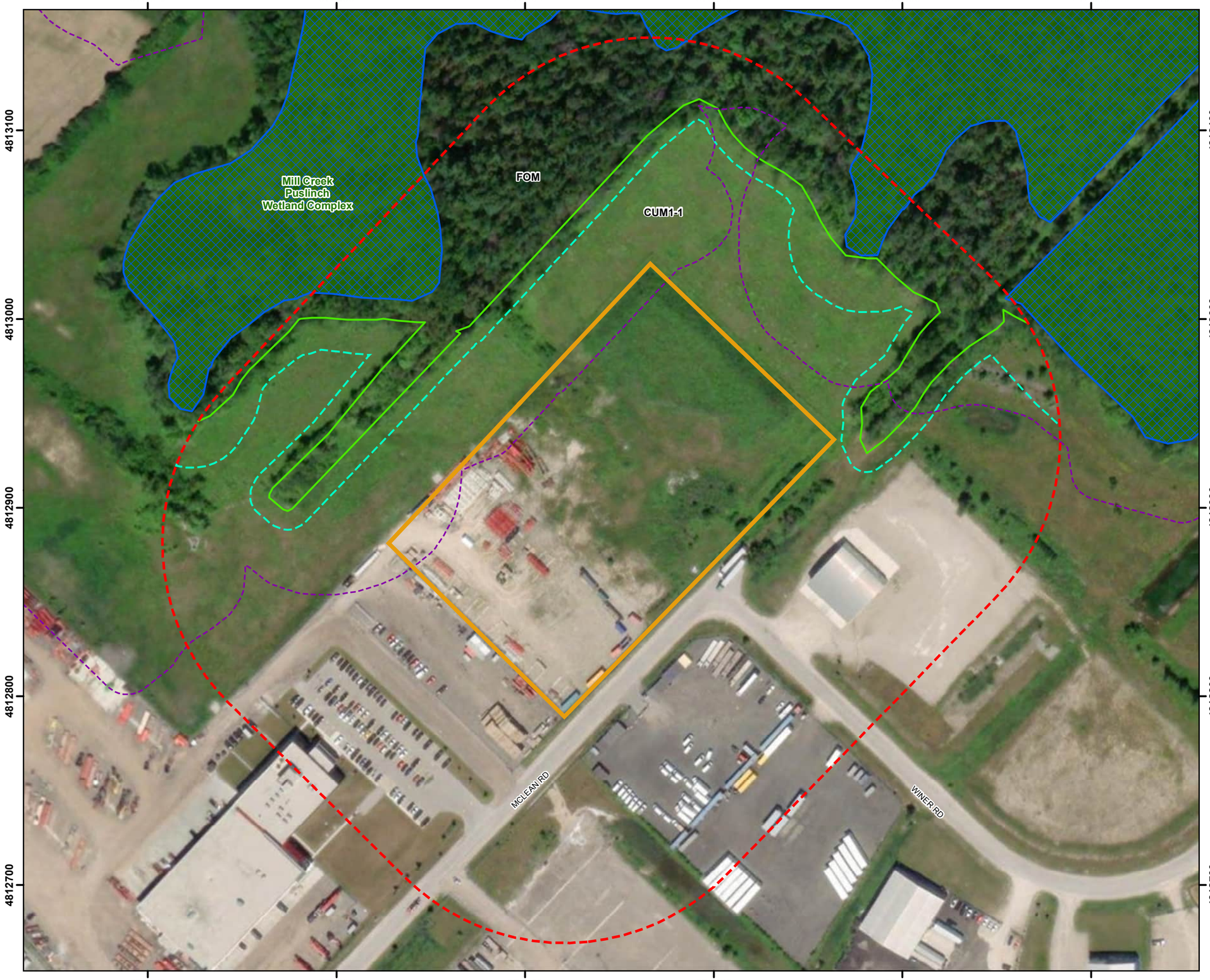
Path: X:\3370_ScopedEIS_PuslinchLogisticsFacility\NRSI_3370_Map1_ExistingConditions_2K_2025_01_28_KEF.mxd

Map 2

Scoped EIS, Puslinch Logistics Facility

Natural Features





Legend

- Study Area (120m)
- Subject Property
- Woodland Dripline
- Provincially Significant Wetland (PSW)
- Wetland (GRCA)
- Natural Feature Setback (10m Woodland, 30m PSW)
- Regulation Limit (GRCA)

Ecological Land Classification (ELC)

(CUM1-1) Cultural Mineral Meadow Ecosite

(FOM) Mixed Forest Ecosite

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Project: 3370
Date: May 13, 2025

NAD83 - UTM Zone 17
Size: 11x17"
1:2,000

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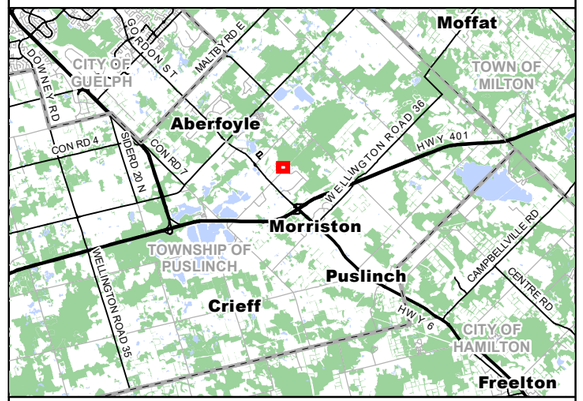
Path: X:\3370_ScopedEIS_PuslinchLogisticsFacility\NRSI_3370_Map2_NaturalFeatures_2K_2025_05_13_KEF.mxd

Map 3

Scoped EIS, Puslinch Logistics Facility

Proposed Development



Legend

- Subject Property
- Proposed Development
- Proposed Grading
- Proposed Services
- Proposed Retaining Wall
- Erosion and Sediment Control Fencing (MTE 2024)
- SWM Ponding (5 Year, 100 Year)
- Existing Fencing
- Existing Conditions
- Contour
- Woodland Dripline
- Woodland Setback (10m)
- Regulation Limit (GRCA)
- Floodplain (GRCA)

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Project: 3370
Date: May 30, 2025

NAD83 - UTM Zone 17
Size: 11x17"
1:1,000

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N

570200 570250 570300 570350 570400 570450 570500

4813000 4812950 4812900 4812850 4812800

PROPOSED BUILDING FFE=535.50

MCLEAN RD

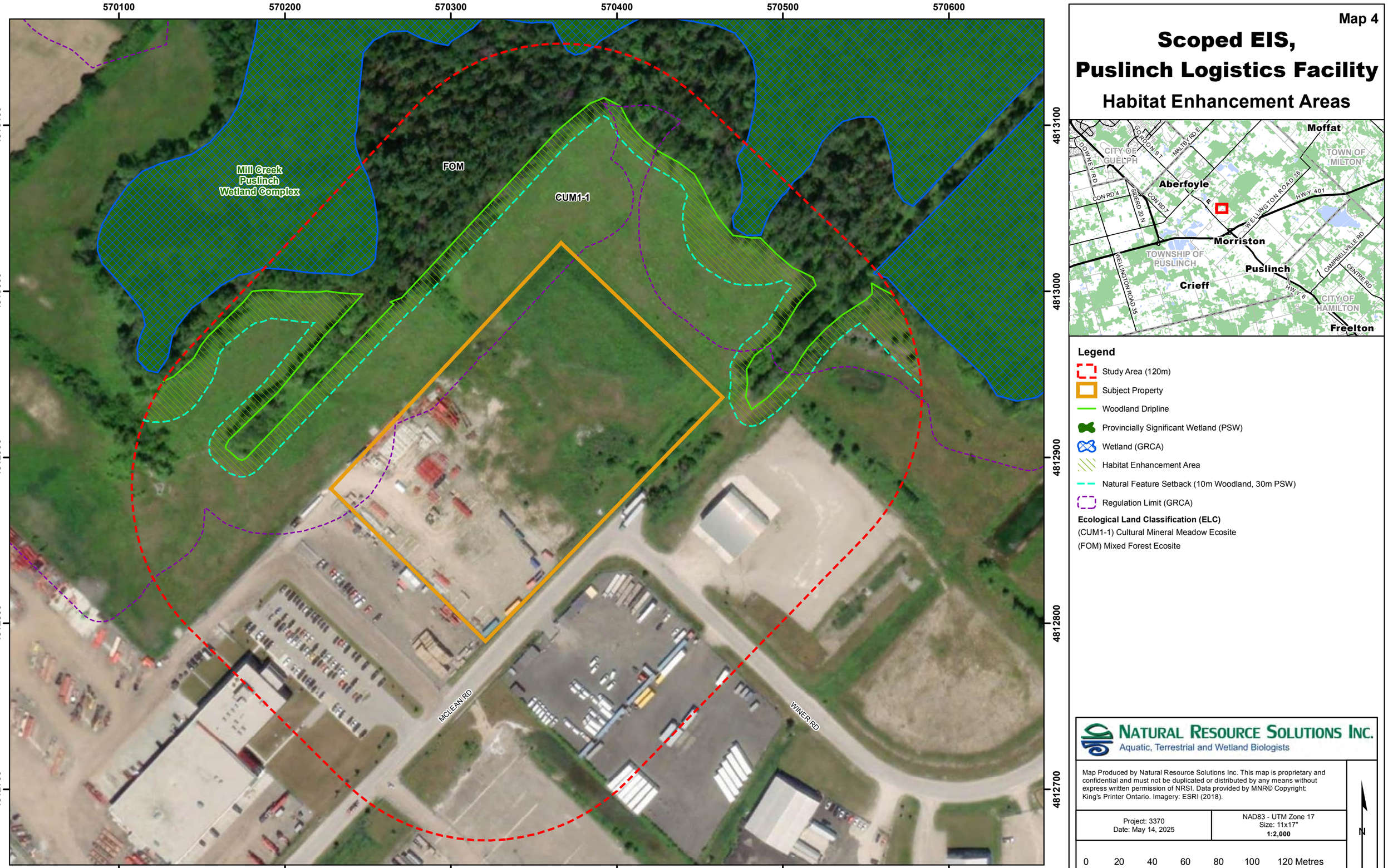
WINER RD

Path: X:\3370_ScopedEIS_PuslinchLogisticsFacility\NRSI_3370_Map3_ProposedDevelopment_1K_2025_05_30_MV.mxd

Map 4

Scoped EIS, Puslinch Logistics Facility

Habitat Enhancement Areas



Legend

- Study Area (120m)
- Subject Property
- Woodland Dripline
- Provincially Significant Wetland (PSW)
- Wetland (GRCA)
- Habitat Enhancement Area
- Natural Feature Setback (10m Woodland, 30m PSW)
- Regulation Limit (GRCA)

Ecological Land Classification (ELC)

(CUM1-1) Cultural Mineral Meadow Ecosite

(FOM) Mixed Forest Ecosite

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Project: 3370
Date: May 14, 2025

NAD83 - UTM Zone 17
Size: 11x17"
1:2,000

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NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

September 5, 2025 Project No.3370

Bikram Dhillon
BVD Real Estate Inc.
130 Delta Park Blvd. Brampton ON L6T 5E7

RE: Puslinch Logistics Facility
Tree Management Plan

Natural Resource Solutions Inc. (NRSI) was retained by BVD Real Estate Inc. to complete a Scoped Environmental Impact Study (EIS) in support of the proposed construction of a logistics facility at 7504 McLean Road East in the Township of Puslinch, County of Wellington, Ontario, herein referred to as 'the subject property'.

The subject property is approximately 2.7ha in size and is bounded by McLean Road to the southeast and industrial facilities to the south and southwest. Small areas of cultural meadow lie immediately to the northwest and northeast of the subject property. Beyond these cultural meadows, a wooded natural feature containing portions of the Mill Creek Puslinch Wetland Complex lies approximately 30m from the northwest and northeast property boundaries. These natural features are addressed in the context of the proposed development, in an EIS completed by NRSI (separate cover).

The subject property has previously been graded and is comprised of an area of gravel fill surrounded by soil berms vegetated with weedy early-succession plant species. No natural features exist on the subject property itself, however there are trees adjacent to the property that have the potential have their root zones impacted by construction activities.

The County of Wellington's Conservation and Sustainable Use of Woodlands By-law (no. 5115-09) (2009) states that the destruction or injury of any living tree is prohibited. However, the proposed industrial development is exempt under Section 3d:

> "*The injuring or destruction of trees imposed as a condition to the approval of a site plan, a plan of a subdivision or a consent under section 41, 41, or 53, respectively of the Planning Act or as a requirement of a site plan agreement or subdivision agreement entered into under those sections*."

This report provides the findings of a tree inventory, analysis of the proposed plans against existing health and structural integrity of trees, protection measures for trees to be retained, and recommended mitigation measures. The tree data and mapping have been compared to the site plan provided by Kalp Architect Inc. (2025) (Map 1). These maps show the tree inventory data overlaid on the proposed development (including grading) to determine whether existing trees may be impacted by the proposed undertaking. Avoidance, mitigation, and protection measures for trees were examined to determine which trees would be impacted and which could be retained.

Tree Inventory Methodology

All trees were inventoried that had the potential to be impacted by the proposed development. This included trees that were off-property, but were near any proposed works. The following information was recorded for inventoried trees:

- Tree location;
- Tag number/alphanumeric identifier;
- Species (common and scientific name);
- DBH (cm);
- Number of stems;
- Crown radius (metres);
- General health (excellent, good, fair, poor, very poor, snag);
- Potential for structural failure (Improbable, Possible, Probable, Imminent); and
- General comments (i.e., disease, aesthetic quality, development constraints, prune to reduce structural failure, sensitivity to development, etc.).

The overall health of each tree and potential for structural failure was assessed based on the criteria outlined in Appendix I (Dunster 2009, Dunster et al. 2013). In carrying out these assessments, NRSI has exercised a reasonable standard of care, skill and diligence as would be customarily and normally provided in carrying out these assessments. The assessments have been made using accepted arboricultural techniques. These include a visual examination of each tree for structural defects, scars, external indications of decay such as fungal fruiting bodies, evidence of insect attack, the condition of any visible root structures, the degree and direction of lean (if any), the general condition of the tree(s) and the surrounding site, and the current or planned proximity of property and people. None of the trees examined were dissected, cored, probed or climbed and detailed root examinations involving excavation were not undertaken. The conditions for this assessment, including restrictions, professional responsibility and third-party liability can be found in Appendix I.

Summary of Tree Inventory Findings

The subject property contained no trees. However, some grading is proposed outside of the subject property, and adjacent natural areas are in close proximity to the proposed works. A dripline was collected for the natural feature to ensure its protection during construction. Additionally, trees were inventoried if there was a potential for impact by the proposed development. This comprised only two trees (Map 1).

Table 1: Summary of Tree Inventory

Map ID	Common Name *Scientific Name*	Native Status	DBH (cm)	Crown Radius	Potential for Structural Failure	Overall Health	Comments
1	Balsam Poplar *Populus balsamifera*	Native	21	3	Improbable	Fair	Extensive vines in lower crown. Crown itself is healthy.
2	Manitoba Maple *Acer negundo*	Native	25	5	Possible	Fair	Sprawling crown. Major debris all around base and area.

Tree Retention Analysis

The tree inventory data was compared to the development layout. The tree removal and retention analysis in this report is based on the following considerations:

1. Trees identified as being dead, very poor / poor condition with an imminent or probable potential for structural failure, etc.

2. Trees that require removal based on the proposed development plan.

Of the two trees inventoried, one will require removal (Tree 1). Tree 2 will be protected in entirety during development.

The Township of Puslinch and the County of Wellington do not have a specific requirement in regards to compensation planting; however, it is recommended that the tree is replaced at a ratio of 2:1. Through any required landscaping plans for the proposed development, two additional native trees should be included.

Plantings should not include any species that are listed as introduced or invasive (i.e., Norway Maple). The use of hardy species will ensure successful early establishment and minimize the potential for invasive species proliferation. Native species that are more tolerant to urban conditions (i.e., salt, compaction, drought) should be considered to increase overall survival.

Protection Measures and Recommended Mitigation

Timing Windows

Migratory Birds Convention Act

The removal of trees and all vegetated areas (i.e., meadow) within the extent of the disturbance proposed for the development has the potential to disrupt nesting birds. The *Migratory Birds Convention Act* (MBCA, Government of Canada 1994) identifies a list of migratory bird species that are protected. It prohibits the destruction of nests, individuals and activities that would cause an adult bird to abandon a nest. Tree and vegetation removal is to occur outside of the core nesting period for migratory birds as established by the Canadian Wildlife Service (CWS) which extends from approximately April 1 – August 31 (Government of Canada 2018). Every developer, consultant, contractor, etc. is legally obliged to carry out due diligence to protect migratory birds from harm during all construction projects.

Should vegetation/tree removal be required to occur within the breeding bird window, nest surveys may be conducted by qualified biologists within simple habitat just prior to the removal activity (less than 48 hours prior to) to ensure that nesting birds are not present. Should any nest be identified in a vegetated area or tree(s) to be removed, there shall be no removal or construction activity until sign-off is obtained from the qualified biologist that the nest is no longer active. Vegetated areas and tree(s) identified as having no nesting activity can be removed; however, removal is to occur within 48 hours of the nest search. If removal does not occur within this time frame, additional nest searches are to be conducted.

Potential Bat Habitat

Species at risk bats have the potential to use trees with cavities, loose bark, or dead leaf clusters for roosting habitat. Ideally, tree removal should avoid the period from March 15 to

November 30 to avoid impacts to species at risk bats. Should removal of the tree be required within this period, it is recommended that a consultant is included in the process to reduce potential contravention of the *Endangered Species Act*.

During Construction

The recommended Tree Protection Fence (TPF) shown on Map 1 is to be maintained by the Client or its agents during the entire construction period to ensure that trees being retained (including their root systems) are protected. Minor construction damage (e.g., damage to limbs or roots) to trees to be retained must be pruned using proper arboricultural techniques. Root pruning, if necessary, should be performed by a Certified Arborist or Registered Professional Forester (RPF) using an appropriate implement to make proper pruning cuts and encourage callous root growth. Should any of the trees intended to be retained be seriously damaged or die as a result of construction activities, the Township should be consulted to determine adequate steps, such as treatment or compensation.

Areas protected by TPF shall remain undisturbed and shall not be used for temporary storage, placement or excavation of fill or top soil, the storage of construction materials or equipment, or the storage of debris. Recognizing the root system of a tree often extends well beyond its dripline (i.e., outside the protected area), construction contaminants such as fuels, oils, etc. should be kept clear of areas protected by the TPF.

Post-Construction

It is recommended that the TPF be removed upon completion of construction activities and adjacent areas are stabilized with a suitable vegetative cover to the satisfaction of a qualified professional. If disturbance occurs within the root zones of retained trees, these root zones will be restored with native topsoil, and re-seeded. Revegetation, following removal of TPF, will permit increased root development for the remaining trees.

Should you have any questions or comments regarding this letter, please do not hesitate to contact me.

Sincerely,
Natural Resource Solutions Inc.

Jeremy Bannon
Terrestrial & Wetland Biologist | Certified Arborist

Appendix I
Conditions of Tree Assessment

Limitations
This tree inventory and assessment is based on the circumstances and observations by Natural Resource Solutions Inc. (NRSI) as they existed at the time of the site inspection(s) of the Client's Property as described in this report (the "Property") and the trees situated thereon, and upon information provided by the Client to NRSI. The opinions in this assessment are given based on observations made and using generally accepted professional judgment, however, because trees are living organisms and subject to change, damage and disease, the results, observations, recommendations, and analysis as set out in this assessment are valid only at the date any such observations and analysis took place. No guarantee, warranty, representation or opinion is offered or made by NRSI as to the length of the validity of the results, observations, recommendations and analysis contained within this assessment. As a result, the Client shall not rely upon this assessment, save and except for representing the circumstances and observations at the date of site inspection(s), and the analysis and recommendations made in relation to the proposed undertaking. It is recommended that the inventoried trees discussed in this assessment should be re-assessed periodically, where required (i.e., after 2 years).

Further Services
Neither NRSI, nor any assessor employed or retained by NRSI (the "Assessor") for the purpose of preparing or assisting in the preparation of this assessment shall be required to provide any further consultation or services to the Client including, without limitation, acting as an expert witness or witness in any court in any jurisdiction unless the Client has first made specific arrangements with respect to such further services, including providing payment of the Assessor's regular hourly billing fees.

NRSI accepts no responsibility for the implementation of all or any part of this report, unless specifically requested to examine the implementation of such activities recommended herein. Any request for the inspection or supervision of all or part of the implementation shall be made in writing and the details agreed to in writing by both parties.

Assumptions
The Client is hereby notified that where any of the information set out and referenced in this assessment are based on assumptions, facts or information provided to NRSI, NRSI will in no way be responsible for the veracity or accuracy of any such information. Further, the Client acknowledges and agrees that NRSI has, for the purposes of preparing their assessment, assumed that the Property is in full compliance with all applicable federal, provincial, municipal and local statutes, regulations, by-laws, guidelines and other related laws. NRSI explicitly denies any legal liability for any and all issues with respect to non-compliance with any of the above-referenced statutes, regulations, by-laws, guidelines and laws as it may pertain to or affect the Property.

Restriction of Assessment
The assessment carried out was restricted to the areas as described in this report. NRSI is not legally liable for any other trees except those expressly discussed herein. The conclusions of this assessment do not apply to any areas, trees, or any other property not covered or referenced in this assessment.

Professional Responsibility
In carrying out this assessment, NRSI and any Assessor appointed for and on behalf of NRSI to perform and carry out the assessment has exercised a reasonable standard of care, skill and diligence. The assessment has been made using accepted arboricultural techniques. These include a visual examination of each tree for structural defects, scars, external indications of decay such as fungal fruiting bodies, evidence of insect attack, discolored foliage (during the leaf-on period), the condition of any visible root structures, the degree and direction of lean (if any), the general condition of the tree(s) and the surrounding site, and the current or planned proximity of property and people. Except where specifically noted in the assessment, none of the trees examined on the property were dissected, cored, probed, or climbed, and detailed root crown examinations involving excavation were not undertaken.

No guarantees are offered, or implied, that trees recommended for retention, or all parts of them, will remain standing. It is professionally impossible to predict with absolute certainty the behaviour of any single tree or group of trees, or all their component parts, in all given circumstances. Inevitably, a standing tree will always pose some risk. Most trees have the potential to fall, lean, or otherwise pose a danger to property and persons in the event of extreme weather conditions, and this risk can only be eliminated if the tree is removed.

Without limiting the foregoing, no liability is assumed by NRSI or its directors, officers, employers, contractors, agents or Assessors for:

a) Any legal description provided with respect to the Property;
b) Issues of title and/or ownership with respect to the Property;
c) The accuracy of the Property line locations or boundaries with respect to the Property; and
d) The accuracy of any other information provided to NRSI by the Client or third parties;
e) Any consequential loss, injury or damages suffered by the Client or any third parties, including but not limited to replacement costs, loss of use, earnings and business interruption; and,
f) The unauthorized distribution of the assessment.

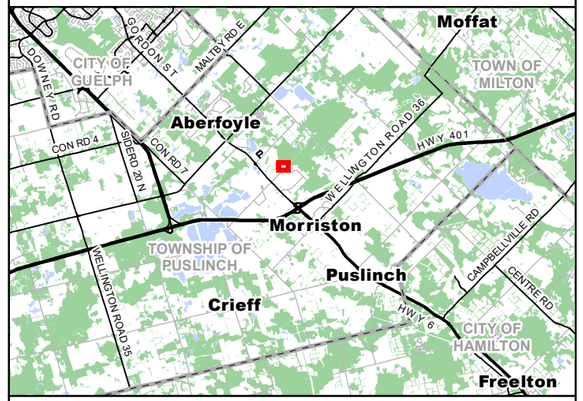
Third Party Liability
This assessment was prepared by NRSI for the Client. The data collected reflect NRSI's best assessment of the inventoried trees situated on the Property with the information available at the time of observation. Data analysis and the assessment of potential impacts to inventoried trees is specific to the proposed undertaking as described in this report. NRSI accepts no responsibility for any damages or loss suffered by any third party or by the Client as a result of decisions made or actions based upon the use of this assessment for purposes unrelated to the proposed undertaking.

General
Any plans and/or illustrations in this assessment are included only to help the Client visualize the issues in this assessment and shall not be relied upon for any other purpose.

This report shall be considered as a whole, no sections are severable, and the assessment shall be considered incomplete if any pages are missing.

Puslinch Logistics Facility

Tree Management Plan



Legend

- Subject Property
- Inventoried Tree to be Retained (Crown to Scale)
- Inventoried Tree To be Removed (Crown to Scale)
- Proposed Grading
- Proposed Site Plan
- Mud Mat
- Services
- Silt Fence
- Tree Protection Fence (TPF)
- Woodland Dripline
- Woodland Setback (10m)
- Regulation Limit (GRCA)

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Map Produced by Natural Resource Solutions Inc. This map is proprietary and confidential and must not be duplicated or distributed by any means without express written permission of NRSI. Data provided by MNR© Copyright: King's Printer Ontario. Imagery: ESRI (2018).

Project: 3370 Date: September 4, 2025	NAD83 - UTM Zone 17 Size: 11x17" **1:1,000**

0 10 20 30 40 50 60 Metres

N

570200 570250 570300 570350 570400 570450 570500

4813000 4812950 4812900 4812850 4812800

Path: X:\3370_ScopedEIS_PuslinchLogisticsFacility\NRSI_3370_TreeManagementPlan_1K_2025_09_04_LRC.mxd

Preliminary Geotechnical Engineering Report
7504 McLean Rd., Puslinch, ON

Report #8296 – BVD Puslinch
July 3, 2024

Prepared for:
Mr. Chirag Patel
BVD – Bikram Dhillon
[redacted]

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1.0 INTRODUCTION

1.1 Proposed Construction

Mr. Chirag Patel, BVD Bikram Dhillon, (the client), retained the services of A & A Environmental Consultants Inc. (A&A) to conduct a preliminary geotechnical investigation for a proposed commercial (Transportation Depot) development located at 7504 McLean Rd., Puslinch, Ontario. Two (2) boreholes were to be advanced and sampled for this geotechnical investigation. In addition to the information of nine (9) boreholes (Boreholes BH1 to BH9) provided in Terraprobe Geotechnical Investigation Report dated January 29, 2021 (Ref.: 1-20-0525-01) and provided by the client to A&A to be used as data source for completing this preliminary geotechnical investigation. The information obtained is used to provide recommendations that will allow for the design of foundations at the subject site. See Section 4.0 for additional details of the proposed development.

1.2 Purpose and Limitations of Report

The purpose of this study is to provide geotechnical information, recommendations, and comments for the design and construction of the proposed development. The number of boreholes has been selected to provide representative information sufficient to determine parameters needed for design, specifications, and construction of the proposed development. Conditions elsewhere near or beneath the footprint of the structures may be found to differ, during construction, from those at the borehole locations. Should this occur, the contractor should contact the design engineer for recommendations as how to best proceed and what changes if any, should be made.

The information in this report is intended for these specific proposed structures and has been prepared for the client, and their nominated engineers and designers. It is assumed that the designers will use all appropriate contemporary standards, governing regulations, and codes in the performance of their work. Third party use or reproduction, in part or in full, of this report is prohibited without written authorization from A&A. This report is also subject to the Statement of Limitations which from an integral part of this document.

1.3 Liaison during design and/or Construction

On-going liaison with A&A during the final design and construction phases of the project is recommended to confirm that they are in keeping with the intentions of this report.

2.0 SCOPE OF WORK

2.1 Proposed Scope of Work

The scope of work for the geotechnical investigation of the proposed development is as follows:

- Advanced two (2) boreholes to sample for geotechnical analysis. These boreholes were advanced to a maximum depth of 7.6 meters below the existing ground level (mbgl).
- Review the Geotechnical Investigation Report completed by Terraprobe Consultant dated January 29, 2021 (Ref.: 1-20-0525-01) to be used the nine (9) boreholes information available in Terraprobe report to complete this geotechnical investigation.
- Submit select soil samples to a geotechnical laboratory to provide information for the soil samples recovered.
- Prepare a geotechnical report summarizing the results of the field investigation and laboratory testing program, to include discussion of specific concerns that need to be addressed during design and/or construction. Specifically, the report is to include:
    - Site plan showing locations of the boreholes.
    - Borehole records.
    - Recommendations for:
        - Site preparation.
        - Construction dewatering if required.
        - Earthworks.
        - Potential reuse of existing fill materials and/or native soils indicated in the boreholes.
        - Excavation requirements.
        - Geotechnical resistances for foundation designs at ULS and SLS conditions.
        - Lateral earth pressure coefficients for existing soils and typical imported materials.

3.0 SITE DESCRIPTION

3.1 Current Land Use and Location

The site is a vacant land located at the northwest side of McLean Road and surrounded with vacant lands and industrial buildings. The approximate location of the subject site is shown in **Figure 1**, (Appendix A). The approximate UTM coordinates of the site are Zone 17T; 570380.95 m E; 4812857.13 m N. The site inspected is a rectangular shaped with the municipal address of 7504 McLean Road, Puslinch, Ontario.

3.2 Site Topography and Regional Geology

The current topography of the subject site is approximately flat with gentle slope towards the southeast of the site. Based on Toporama map, it is recorded the average elevation at the subject site area is ranged from 320 to 330 m (mASL), approximately. The groundwater flow is expected to be directed to southeast direction towards the Lake Ontario. The groundwater flow direction

may also be influenced by utility trenches and other subsurface structures and may migrate in the bedding stone of nearby subsurface utility trenches. Groundwater flow direction can only be confirmed with the long-term measurement of groundwater elevations at the project site.

The site is located in the physiographic region known as Horseshoe Moraines and the physiographic landforms in which the site exists are Till Moraines. The site is situated in surficial geology region, which is comprised stone-poor, sandy silt to silty sand-textured till on Paleozoic terrain.

4.0 PROPOSED DEVELOPMENT

Based on the drawings and information provided by the client, A&A understands that the proposed commercial development (Transportation Depot) includes a two-storey building with a warehouse on the first floor, offices on the second floor, and no basement. The development also comprises truck and trailer parking areas, car parking, roads, a sewer system area, a water pond, and watermains. The general arrangement of the proposed development, as provided by the client, is shown in **Appendix E**.

5.0 METHOD OF INVESTIGATION

5.1 Field Investigation

A&A engaged a utility locating company to map locations of public and private underground utilities. A&A then scheduled the drilling of boreholes for sampling in accordance with the borehole drilling and sampling plan.

The geotechnical investigation for the planned development consisted of the following activities:

- In the month of June 2024, A&A attended the site located at 7504 McLean Road, Puslinch, Ontario.
- Boreholes were advanced using a track mounted drill unit with 152.4 mm (6 inch) diameter continuous flight hollow stem auger at locations as shown in **Figure 2.**
- Sampling of the overburden materials encountered in the boreholes was carried out at regular intervals using a drive open conventional spoon sampler in conjunction with standard penetration testing (SPT) “N” values. The SPT were conducted following the standard method ASTM D1586 and the results of SPT, in terms of the number of blows per 0.3 m of split-spoon sampler penetration, were provided in borehole logs. **Table 1** shows the borehole advanced depth and location. **Figure 2** in **Appendix A** depicts the locations of the boreholes in relation to the proposed development. Samples submitted for analysis are to be representative of the boreholes and their locations within the

proposed development.

- Two (2) boreholes (BH24-01 and BH24-02) were used for the geotechnical investigation and two (2) soil samples were selected for soil gradation and index testing. In addition to the nine (9) boreholes (BH1 to BH9) information provided in Terraproble Geotechnical Report (Terraprobe Ref.: 1-20-0525-01) were also used in this geotechnical investigation. These boreholes were drilled and completed by Terraprobe Consultant to depths ranged from 5.0 to 6.6 m (mbgl), approximately.

Table 1 - Borehole Advanced Depths and Location

Borehole	UTM Coordinates – UTM 17T		Depth (m)
	Northing	Easting	
BH24-1/MW	4812824	570329	7.6
BH24-5	4812895	570369	7.6
*BH1	4812876	570245	6.4
* BH2	4812955	570323	5.0
* BH3	4812969	570342	5.0
*BH4	4812831	570290	5.0
*BH5	4812905	570354	5.0
* BH6	4812937	570393	5.0
*BH7	4812842	570338	6.1
* BH8	4812892	570375	6.6
*BH9	4812931	570436	5.0

Note: *Boreholes/Monitoring wells installed by Terraprobe Consultant as provided in Terraprobe Geotechnical Report (Terraprobe Ref.: 1-20-0525-01)

The borehole elevations were interpreted from the site plan survey provided by the client to A&A. Note, these elevations are approximate and only for the purpose of relating borehole soil stratigraphy and should not be used or relied on for other purposes.

5.2 Sampling Procedures

Select samples recovered from the geotechnical investigation were submitted for geotechnical laboratory testing. The scope of the geotechnical laboratory testing program includes the following:

- Water moisture content per ASTM D2216.
- Grain size analyses per ASTM D422 & D2217.
- Atterberg Limits per ASTM 4318.

The results of the laboratory tests are discussed in the text of this report. The results of laboratory tests are presented in **Appendix C**.

6.0 LABORATORY TESTING AND RESULTS OF INVESTIGATION

6.1 Subsurface Conditions Overview

The borehole logs provided in **Appendix B** summarize the soil types observed during drilling. Explanation of the symbols and terms used to describe the borehole logs are also included in **Appendix B**.

Select bagged samples taken from the boreholes were analyzed for grain size analysis and Atterberg limits. All soil samples tested for natural moisture content.

It should be noted that the boundaries between the strata on the borehole records have been inferred from drilling observations and non-continuous sampling. The boundaries generally represent a transition from one soil type to another and should not be inferred to represent an exact plane of geological change. Further, conditions will vary between and beyond the boreholes.

The two (2) boreholes were advanced to a maximum depth of 7.6 m (mbgl). The strength variations are detailed in the borehole logs in **Appendix B**.

The combination of lab results and standard penetration test N values were used to estimate geotechnical resistance values. This translation was based on generally accepted, recorded correlations from thousands of similar tests. Soil characteristics for each hole may be found in **Appendices B & C**.

6.2 Detailed Summary

Both two (2) boreholes explored in this investigation and the nine (9) boreholes provided in Terraproble Geotechnical Report (Terraprobe Ref.: 1-20-0525-01) revealed underlain the surface to be characterised as follows:

- **Fill**
  Fill materials were encountered in all boreholes (BH24-1 and BH24-5), extending to approximate depths ranging from 1.5 to 2.2 m (mbgl). The explored fill is generally loose to compact and predominantly consists of gravel and sand to gravelly silty sand, with trace of clay, damp to moist, and no odour. In the Terraprobe Geotechnical report, fill was

encountered in BH1 to BH3, BH6, BH8, and BH9, extending to depths ranging from 1.5 to 2.5 m (mbgl). This fill comprised clayey silt to sandy silt/sand, moist to wet, firm to stiff in consistency, and compact. It should be noted that the thickness of fill could vary between boreholes, and this should be considered when estimating fill quantities and associated costs.

- **Glacial Till Deposits**
  Glacial till deposits were encountered in all boreholes beneath the fill material at depths ranging from 1.5 to 2.5 m (mbgl), extending to the maximum explored borehole depth of 7.6 m (mbgl). These deposits comprised gravelly silty sand trace clay to silty sand some gravel trace clay, occasionally rock fragments (grey, flaks), moist to wet, and compact to very dense.

- **Bedrock**
  Auger refusal encountered at BH24-1 at a depth of 7.6 m (mbgl) indicates the possibility of bedrock existence. However, bedrock confirmation by coring was not completed as it is beyond the scope of work.

6.3 Summary of Subsurface Conditions to Anticipated Depths of Construction

In the following tables (**Tables 2-3**), the relevant properties of the various deposits are briefly described. For details of the subsurface conditions, reference should be made to the individual borehole logs. The "Notes on Sample Description" preceding the borehole logs are an integral part of and should be read in conjunction with this report.

Table 2 - Typical Values of Atterberg Limits (%)

BH # / Sample No.	Depth (m)	Soil Description	Atterberg Limits		
			W_L	W_P	I_P
BH24-1 SS2	0.8 – 1.4	Gravel and Sand, some Silt, trace Clay	--		
BH24-4 SS5	3.0 – 3.6	Gravelly Silty Sand, trace Clay	--		

Table 3 - Sieve and Hydrometer Analysis

BH # / Sample No.	Depth (m)	Grain Size Content (%)				Soil Description
		Gravel	Sand	Silt	Clay	
BH24-1 SS2	0.8 – 1.4	44	38	13	5	Gravel and Sand, some Silt, trace Clay
BH24-4 SS5	3.0 – 3.6	28	44	24	4	Gravelly Silty Sand, trace clay

6.4 Groundwater Conditions

Groundwater observations and measurements were obtained in the open boreholes at the completion of drilling and are summarized on the appended borehole logs. The average groundwater level, measured in the recent boreholes, including the installed well BH24-1/MW and existing wells installed by Terraprobe, ranges from 2.1 to 6.5 m (mbgl). Perched groundwater may occur above this depth particularly following heavy rainfall or snowmelt. It should be noted that groundwater levels vary and are subjected to seasonal fluctuations and can respond to major precipitation events. The depth of groundwater table can also be influenced by the presence of underground features such as utility trenches. To obtain further information on groundwater table fluctuations and flow directions, it is highly recommended to conduct a hydrogeological investigation for this project.

7.0 DESIGN DISCUSSION AND RECOMMENDATIONS

7.1 General Considerations

The recommendations presented in the following sections of this report are based on the information available regarding the proposed construction, the results obtained from the Preliminary Geotechnical Investigation, Terraprobe Geotechnical Repot, and A&A's experience with similar projects. Since the investigation only represents a portion of the subsurface conditions, it is possible that soil conditions may be encountered during construction that are substantially different than those encountered during the investigation. If these situations are encountered, adjustments to the design may be necessary. A qualified geotechnical engineer should be on-Site during the foundation preparation to ensure the subsurface conditions are the same/similar to what was observed during the investigation.

Contractors and/or subcontractors bidding on or undertaking the work should seek permission from owners to access the site for their own type of investigations, as well may make their own interpretations of the factual borehole results contained in this report. The following general comments are provided with respect to the conditions encountered and the intended scope of development.

A&A understands that the proposed development (Transportation Depot) includes a two-storey building with a warehouse on the first floor, offices on the second floor, and no basement. The development also comprises truck and trailer parking areas, car parking, roads, a sewer system area, a water pond, and watermains.

7.2 Foundations

In accordance with the 2010 National Building Code of Canada (NBCC), the use of Limit States

Design (LSD) is required for the design of buildings and their structural components including foundations. The limit states of LSD design are classified into two groups: the Ultimate Limit States (ULS) and the Serviceability Limit States (SLS). The recommended geotechnical resistances for the building foundations are presented for ULS and SLS conditions.

The values given for SLS geotechnical resistances are based on settlement values of less than 25 mm. Total differential settlements within a building should also be less than 19 mm.

Relevant information for the final design purposes, including proposed final grades, finished floor elevations, drainage system, and proposed underside of foundations, has not been confirmed to A&A at the time of writing this report. Therefore, A&A's geotechnical engineers will need to review the recommended options presented in the following sections of the foundation design once these development parameters are confirmed.

7.2.1 Foundations on Native Soil

The proposed structure foundations can be supported on conventional spread and/or strip footings founded on the undisturbed native deposits for a geotechnical reaction of 120 kPa at the Serviceability Limit States (SLS) and a factored geotechnical resistance of 180 kPa at the Ultimate Limit State (ULS). The recommended founding levels and geotechnical resistance for the proposed building structure will need to be confirmed by A & A at the time of construction.

7.2.2 Foundations on Engineered Fill

Alternatively, the proposed structures can be supported by conventional spread and/or strip footings founded on engineered fill for a geotechnical reaction of 150 kPa at Serviceability Limit States (SLS) and for a factored geotechnical resistance (with geotechnical resistance factor of 0.5) of 200 kPa at the Ultimate Limit States (ULS), provided all requirements in **Appendix D** are adhered to. The first initial layer (350 mm thick) should consist of course 100 mm maximum size crushed stone to stabilize the wet subgrade for construction traffic or alternatively the use of geogrid must be considered. The fill required to raise the grade can consist of inorganic soil, placed in shallow lifts, and compacted to 98-100 percent of Standard Proctor Maximum Dry Density (SPMDD). The footings placed on engineered fill must be structurally reinforced. All footing bases must be inspected by A&A prior to placement of concrete.

Prior to the placement of the engineered fill, all the existing fill and surficial softened native soils must be removed, and the exposed surface proof rolled. Any soft spots revealed during proof rolling must be sub-excavated and re-engineered. To reduce the risk of improperly placed engineered compacted fill, full-time supervision of the contractor is essential. Despite full time supervision, it has been found that contractors frequently bulldoze loose fill into areas and compact only the surface. The inspector, either busy on other portions of the site or absent

during “off hours” will be unaware of this condition. For this reason, we cannot guarantee the performance of the engineered fill, and this guarantee must be the responsibility of the contractor. The owner and his representatives must accept the risk involved in the use of engineered fill and offset this risk with the monetary savings of avoiding deep foundations. This potential problem must be recognized and discussed at a pre-construction meeting. Procedures can then be instigated to reduce the risk of settlement resulting from un-compacted fill. During the construction of the engineered fill, all existing fill and soft/loose native soil must be removed.

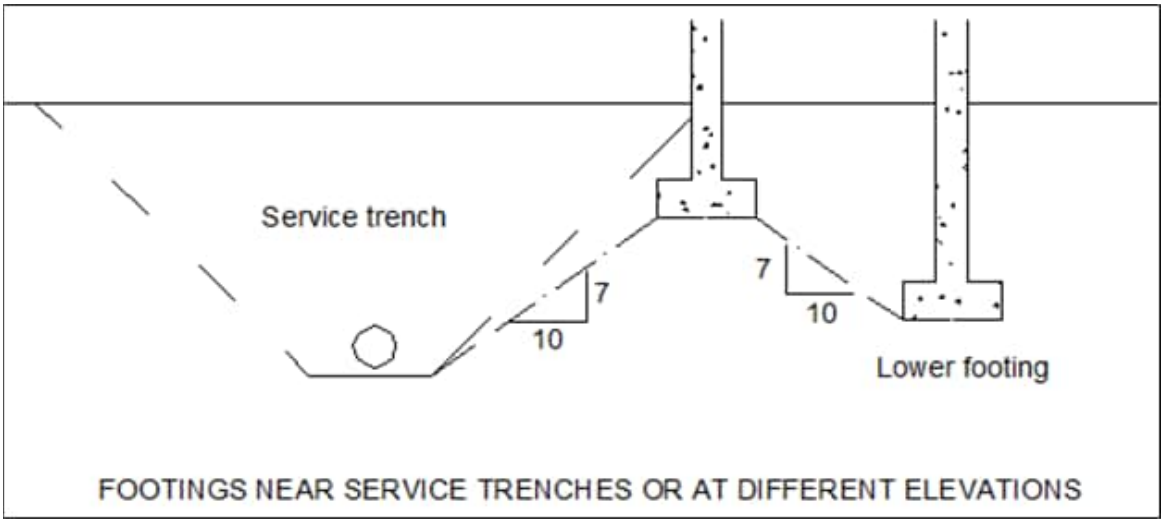
7.2.3 General Foundation Considerations

In the vicinity of the existing buried utilities, all footings must be lowered to undisturbed soils, or alternatively, the services must be structurally bridge. The footings should not be lowered to wet sandy deposits, if any.

If applicable, where the footing extends to the cohesionless soils, the base of footings can easily be disturbed by foot traffic and should be covered by 50 mm of skim coat concrete immediately after cleaning and inspection.

During winter construction, foundations and slab on grade must not be poured on frozen soil. Foundations must always be adequately protected from cold weather and freezing conditions.

Where it is necessary to place footings at different levels, the upper footing must be founded below an imaginary 10 horizontal to 7 vertical line drawn up from the base of the lower footing. The lower footing must be installed first to help minimize the risk of undermining the upper footing. Should any excavation extend below the existing footing within the influence zone of imaginary 10 horizontal to 7 vertical line from the base of the existing footing, underpinning will be required.



FOOTINGS NEAR SERVICE TRENCHES OR AT DIFFERENT ELEVATIONS

The recommended bearing capacities and the corresponding founding elevations would need to be confirmed by the representative of A&A during construction. It should be noted that the recommended bearing capacities have been calculated by A&A from the borehole information for the design stage only. The investigation and comments are necessarily on-going as new information of the underground conditions becomes available. For example, more specific information is available with respect to conditions between boreholes when foundation construction is underway. The interpretation between boreholes and the recommendations of this report must therefore be checked through field inspections provided by A&A to validate the information for use during the construction stage.

Backfilling of foundations shall be carried out with approved OPSS Granular B material provided. It can be placed in maximum 300 mm loose lifts and compacted to a minimum of 98% SPMDD. Filling should continue until the design subgrade elevations are obtained.

7.2.4 Underground Storage Tank

Considering the purpose of the development, it is anticipated that underground storage tanks will be necessary. However, there is currently no information or details available regarding the size, volume, and depth of the proposed underground storage tanks for the development. The proposed underground tank is expected to be installed below the groundwater table at the subject site, then the proposed underground tank may subject to uplift pressure depending on the size and depth of the proposed tanks.

The underground storage tanks can be installed in the native deposits below the water table. Drainage systems at the base level of the underground storage tank are not recommended, due to the concern of loss of fines. The underground storage tank can be designed as a water-tight structure, and water pressure on the tank walls should be considered, assuming the average water table at the level of 2.0 m below the existing grade.

As the depth of underground tank base is not available at the time of writing this report and geotechnical investigation. Consequently, the recommended bearing pressure for the underground tank will need to be confirmed by drilling one or two boreholes to a depth more than the depth of the underground storage tank base with a 2.0 m, minimum.

7.3 Frost Considerations

For any shallow structures, all exterior foundations and foundations in unheated areas must be provided with a minimum soil cover of 1.5 m or equivalent insulation for frost protection. The foundation depths recommended below are with respect to final grading levels. A perimeter drain tile, leading to an outward discharge, should be placed at the exterior face of the foundation wall where any high-water table can cause freeze thaw damage or unacceptable infiltration to the foundation.

7.4 Slab-On-Grade Floor Using Engineered Fill

Prior to construction of the floor slab, all topsoil, and surficial weak/softened native soil (if any) are removed and the base thoroughly proof rolled. The floor area should then be raised to within 200 mm underside of the floor slab using OPSS Granular B engineered fill or equivalent, placed in maximum 300 mm loose lifts and compacted to 98% SPMDD. To create a stable working surface and to distribute loadings, compacted OPSS Granular A or equivalent should be placed over the Granular B materials, below all floor slabs. The compacted OPSS Granular A or equivalent should be 200 mm thick at minimum, compacted to 100% of Standard Proctor Maximum Dry Density (SPMDD).

Floor slabs below unheated buildings or equipment should be provided with adequate insulation to prevent cracking from potential frost heave unless the compacted Granular A base is placed on clean limestone bedrock. A 100 mm thickness of high-density Styrofoam insulation, extending horizontally 1.8 m beyond the building/slab footprint, should be adequate to prevent frost heave where necessary.

The estimated modulus of subgrade reaction (ks) equal to 25 MN/m^3 may be used for the design of slab-on-grade supported on native soils, provided that the construction is in accordance with the recommendations provided herein. If the engineered fill (Granular A or B Type II) having minimum thickness of 300 mm, this value can be increased to 30 MN/m^3. The estimated value provided above may need to be adjusted based on the structure size and locations of detail design.

The floor slabs should not be tied to any load-bearing walls or columns unless they have been designed accordingly. Contraction/expansion joints should be provided for the slabs as required by the structural engineer.

It should be noted that permanent, fail-safe drainage should be designed around any depressed areas such as below grade pits, as well as behind retaining walls (if applicable).

7.5 Earthquake Design Parameters

Based on the borehole information and according to Table 4.1.8.4.A of OBC 2012, the subject site for the proposed structure can be classified as Class '**D**' for seismic site response. Accordingly, the foundation factors Fa can be obtained from Table 4.1.8.4.B and Fv from Table 4.1.8.4.C for the design of the proposed structure.

Consideration may be given to conduct an earthquake site assessment with the use of in-situ testing of the seismic characteristics (i.e., Geophysical testing) which may lead to an improved site classification, if required.

7.6 Lateral Earth Pressure on Walls

The structures should be designed to withstand lateral earth pressure using the following equation:

$$p = k(\gamma h + q)$$

Where p is lateral earth pressure, k is coefficient of lateral earth pressure assumed to be 0.5 for at-rest condition, γ is backfill unit weight assumed to be 20 kN/m^3, h is depth from the ground surface and q is surcharge at ground surface adjacent to the wall. The above expression assumes that backfill consisting of free-draining granular material with a drainage system to prevent the build-up of hydrostatic pressure behind the wall. The granular backfill should be compacted to at least 98% SPMDD, placed in maximum 200 mm lifts.

7.7 Groundwater Control

For foundation excavations extending below the groundwater level (if any), it will be necessary to lower and maintain the groundwater level one meter below the excavation base. Seepage at the interface of weathered/disturbed native soils and undisturbed native soil should be expected but in all likelihood water seepage should be controllable using conventional pumping from collection sumps and ditches for most excavations. As the groundwater at the site may fluctuate seasonally it can be expected to be even higher in response to major precipitation events. Therefore, the proposed structures of the development should be designed to handle the fluctuating groundwater levels, both seasonally and during major precipitation events.

The magnitude of the hydrostatic uplift may be calculated using the following formula:

$$P = \gamma_w d$$

Where:
P = hydrostatic uplift pressure acting on the base of the structure (kPa)
γ_w = unit weight of water (9.8 kN/m^3)
d = depth of base of structure below the design high water level (m)

The resistance of gross uplift of the structure can be increased by simply increasing the mass of the structure.

7.8 Foundation Drainage

A conventional, perforated corrugated polyethylene drainage pipe (100 mm minimum), pre-wrapped with geotextile knitted sock conforming to OPSS 1840 should be embedded in a 300 mm layer of 19 mm clear crushed stone, and set adjacent to the perimeter footings. The drainage pipe should be connected positively to a suitable outlet, such as a sump pit or storm sewer.

In order to minimize ponding of water adjacent to the foundation walls, roof water should be controlled by a roof drainage system that directs water away from the building to prevent ponding of water adjacent to the foundation wall. The exterior grade should be sloped away from the building to promote water drainage away from the foundation walls.

7.9 Site Grading and Engineered Fill Construction

Site grading operations involving "cut and fill" procedures in the order of ± 1 m are expected through the site. It is recommended to construct engineered fill in areas to be raised in order to suitably support the future fire route, infrastructure servicing, and lightly loaded building structures.

It is noted that topsoil stripping operations should be conducted when the ground is not wet and will support large scale construction equipment. Over-stripping can result when the ground conditions are wet and unstable.

Any shortfall of fill material required for site grading operations may be made with similarly graded imported soils for the various purposes described above. It is recommended that any proposed imported source materials be tested prior to importing, in order to ensure that the environmental quality of the imported fill meets all environmental approval criteria and to ensure that the natural moisture content of the fill is suitable for compaction.

It is recommended that engineered fill construction be conducted during the summer and early fall months when drier warmer weather conditions typically exist as the onsite soils are sensitive to moisture and will become difficult to handle and compact to the specified degree of compaction when wet.

The onsite deposits are frost-susceptible. Constructing engineered fill, backfilling footings, foundation walls and service trenches using these finer grained soils during the winter months is not advisable, unless suitable weather conditions prevail, the soils are at suitable moisture content, and strict procedures are followed and monitored on a full-time basis by the geotechnical engineer.

The onsite soils are susceptible to softening and deformation when exposed to excessive moisture and construction traffic. As a result, it is imperative that the grading/filling operations are planned and maintained to direct surface water run-off to low points and then be positively drained by suitable means. During periods of wet weather, construction traffic should be directed along the designated construction routes so as not to disturb and rut the exposed subgrade soil. Temporary construction roads consisting of clear crushed material (such as crushed stone or recycled concrete) may be required during poor weather conditions such as a wet spring or fall.

7.10 Site Servicing

7.10.1 Excavation Conditions

Based on the borehole information, excavations can be carried out with heavy hydraulic backhoe and dewatering will be required prior to any excavation below the water level (if any). It is anticipated that municipal watermain and sewer servicing will generally be in the range of 2 to 4 m below final design grades. The excavations will penetrate soft to compact dense fill materials and compact to very dense glacial till (cohesionless) soils.

All excavations must be carried out in accordance with the most recent Occupational Health and Safety Act (OHSA). In accordance with OHSA, on-site fill and compact to very dense glacial till (gravelly silty sand to silty sand some gravel with trace clay) above groundwater table can be generally classified as Type 3 soils and Type 4 soils below the ground water table. Native deposits consisting of silt and clay soils (if any) be classified as Type 3 soils above or below groundwater level.

As a general rule, the excavations in Type 3 soils can be carried out without support using side slopes 1H: 1V with no vertical cut. The excavations in Type 4 soils will require minimum flatter side slopes of 3H to 1V. These slopes should be visually monitored for any movement especially if workers are present within the excavation. These temporary slopes should only be utilized for a short duration (not more than a day). If an excavation contains more than one type of soil, the soil shall be classified as the type with the highest number among the types of presents.

Above the groundwater table, rainwater or local perched groundwater can be controlled by pumping from filtered sump pits as and where required. It is recommended that excavation for the future development be done during the typically drier summer months when groundwater conditions would be expected to lie at lower elevations.

Dewatering will be required for any excavations carried out below the water table, as the fine granular soils will become “quick” and lose its integrity to support loads. The groundwater table (if any) must be lowered and controlled to at least one (1) meter below the excavation level to facilitate the excavation and construction of raft foundation, footings and walls to be carried out in the dry condition.

In wet to saturated subgrade condition, it will be necessary to excavate below founding level and pour 50 to 100 mm thick mud slab of lean concrete to protect the founding soil from disturbance during the installation of reinforcing steel bars and form work.

For the conventional excavation depth, it is anticipated to encounter major water flow into the excavation. Should unstable and/or wet conditions be encountered, side slopes are to be

flattened to a stable configuration. Note that Type 3 soil exerts substantial fluid pressure on its supporting system. The geotechnical engineer should be retained to examine and inspect cut slopes to ensure construction safety.

7.10.2 Pipe Bedding

The native and re-compacted fill soil will generally provide suitable subgrade support to sewer and watermain servicing provided that the integrity of the base of the trench excavations can be maintained during construction. Any unsuitable soils exposed at the pipe subgrade should be sub-excavated and replaced with a minimum 150 mm bedding thickness of OPSS Granular A, compacted to at least 98% SPMDD. The bedding requirements for the services should be in accordance with Ontario Provincial Standard Drawings (OPSD) standards and the town Standards. Granular "A" should be used to backfill around the pipe to at least 150 mm above the top of the pipe. From the springline to 300 mm above the obvert of the pipe, sand cover shall be used. Particular attention should be given to ensure material placed beneath the haunches of the pipe is adequately compacted.

7.10.3 Trench Backfill

Backfilling of service trenches under proposed pavement areas shall be carried out using approved imported soils or imported approved Granular B materials that meet the backfill materials outlined in OPSS.MUNI 1010. These materials shall be placed in maximum 300 mm lifts and compacted to a minimum of 98% SPMDD. The onsite fill materials (if any) may not meet compaction requirements or may contain substantial amounts of silt or clay and therefore, are not considered suitable to be used as backfill. It is expected that most material will have to be imported. Materials such as organic soils, overly wet soils, boulders and frozen materials (if work is carried out in the winter months) should not be used for backfilling. Backfilling operations should follow closely after excavation so that only a minimal length of trench slope is exposed at any one time to minimize potential problems. This will potentially minimize over-wetting of the subgrade material. Particular attention should be given to make sure frozen material is not used as backfill should construction extend into the winter season.

Proctor compaction tests must show that the soil is capable of being compacted to a satisfactory density; results submitted to A&A for approval and then be delivered on site within 2% of its optimum moisture content. Materials that have been imported and approved for use that are stored onsite should be maintained within 2% of their optimum moisture content. They should also be protected from the weather with tarps.

7.10.4 Pavement Structures

It is our understanding from the proposed development that new roadways/driveways/parking area/truck parking/trailer parking/loading areas will be constructed for this project. Detailed traffic loads not been provided at the time of writing this report, the following recommendations for pavement structure based on experience with similar projects. The recommended pavement structure is outlined in **Table 4**, based upon an estimate of the subgrade soil properties determined from visual examination and textural classification of the soil samples. The recommended pavement structure should be considered for preliminary design purposes only. A functional design life of 8 to 10 years has been used to establish the pavement recommendations. This represents the number of years to the first rehabilitation, assuming regular maintenance is carried out. If required, a more refined pavement structure design can be performed based on specific traffic data and design life requirements and will involve specific laboratory tests to determine frost susceptibility and strength characteristics of the subgrade soils, as well as specific data input from the client. Regular maintenance will be required due to the nature of the underlying fill material.

Table 4 - Recommended Pavement Structure Thickness

Pavement Layer	Compaction Requirements	Light Duty Parking (Cars)	Heavy-Duty Parking Area
Asphaltic Concrete (wearing course)	92 to 96.5% SPMDD*	40mm OPSS HL3	40mm OPSS HL3
Asphaltic Concrete (binder course)		40mm OPSS HL8	80mm OPSS HL8
OPSS Granular **A** Base (or 20mm Crushed Limestone)	100% SPMDD*	150mm	150mm
OPSS Granular B Subbase (or 50mm Crusher Run Limestone)	100% SPMDD*	250mm	350mm
* Standard Proctor Maximum Dry Density, ASTM-D698			

Alternatively, consideration should be given to the use of rigid Portland Cement Concrete pavement where there is intense truck use, parking and turning of vehicles. **Table 5** provides the minimum recommended rigid pavement structure.

Table 5 - Minimum Rigid Concrete Pavement Structure

Pavement Layer	Compaction Requirements	Heavy Duty Pavement
Portland Cement Concrete (CAN3-CSA A23.1) - Class C-2	CAN3-CSA A23.1	225mm
Base Course: Granular A (OPSS 1010) or 19 mm Crusher Run Limestone	100% Standard Proctor Maximum Dry Density (ASTM-D698)	150mm

It must be noted that this structure does not provide full protection of the subgrade from frost penetration; therefore, the pavement slabs must be separated from the building structure.

Concrete should be proportioned, mixed, placed and cured in accordance with the requirements of CSA Standard CAN/CSA-A23.1-14 for class C-2 exposure, with the following key requirements:

- Minimum 28-day compressive strength: 32 MPa
- Air entrainment (14-20mm): 5 to 8 %
- Maximum water/cementing material ratio: 0.45

Concrete should be placed and spread in a manner which avoids segregation. It should be consolidated with a vibratory screed or internal vibrators. Consolidation close to form edges must be given special consideration.

Concrete should be finished to a thickness tolerance of 0 to plus 10 mm. Concrete must be cured adequately to provide durability and strength. Curing can be accomplished by wet blankets, sprinkling, plastic sheets and curing compounds. Curing should begin immediately after the loss of bleed water.

Concrete pavement should be provided with joints to control stresses and prevent the formation of irregular cracks. Recommended joint spacing is 24 to 30 times slab thickness to a maximum dimension of about 4.0m. We would also recommend that load transfer dowels be placed at 50 mm spacing at the joints.

Sawed joints should be cut before random cracking occurs in the slab, usually within 6 to 18 hours after concrete placement. The maximum thickness (aperture) of control joints should be 6mm, while the depth of control joints should be about 1/4th of the slab thickness.

The pavement should be closed to traffic until a minimum flexural strength of 2MPa is attained or an approximate compressive strength of 20MPa. This minimum strength is generally reached when the concrete can be saw cut without ravelling.

Additional comments on the construction of parking areas and access roadways are as follows:

- As part of the subgrade preparation, proposed parking areas and access roadways should be stripped of all topsoil, loose to very loose fill and/or native soil materials within a minimum depth of 0.6m below the underside of the designed subbase and then thoroughly proof rolled by using a loaded truck or a roller with a minimum rated capacity of 20 tons, under the full-time supervision of A&A. Any localized soft or unstable areas detected must be further sub-excavated and bridged by using clean fill materials like adjacent areas placed in shallow lifts (maximum 200mm thick and at or near "±2%" optimum moisture contents) and compacted to at least 98 percent of Standard Proctor Maximum Dry Density (SPMDD). Similarly, the fill required to raise the grade should consist of inorganic soil, placed in the shallow lifts, and compacted to the aforementioned SPMDD requirements.
- The long-term performance of the pavement structure is highly dependent upon the subgrade support conditions. Stringent construction control procedures should be maintained to ensure uniform subgrade moisture and density conditions are achieved. In addition, the need for adequate drainage cannot be over-emphasized. The finished pavement surface and underlying subgrade should be free of depressions and should be sloped (preferably at a minimum grade of two percent) to provide effective surface drainage toward catch basins. Surface water should not be allowed to pond adjacent to the outside edges of pavement areas. Continuous pavement subdrains should be provided along both sides of the driveway/access routes and drained into respective catch basins to facilitate drainage of the subgrade and granular materials. This is particularly important in heavy-duty pavement areas. The subdrain invert should be maintained at least 0.3m below subgrade level. Subdrains should also be provided at all catch basins within the parking area.
- The locations and extent of sub-drainage required within the paved areas should be reviewed by this office in conjunction with the proposed lot grading. Assuming that satisfactory crossfalls in the order of two percent have been provided, subdrains extending from and between catch basins may be satisfactory. If shallower crossfalls are considered, a more extensive system of sub-drainage may be necessary and should be reviewed by A&A.
- The above pavement structure considers that construction will be carried out during the dry period of the year. If the subgrade becomes excessively wet or rutted during construction activities, additional sub-base material or placement of geogrids may be required. The need for additional sub-base material and/or placement of geogrids

including filter fabric to stabilize the base is best determined during construction. It is recommended that the existing subgrade be heavily proof rolled prior to placement and any areas showing excessive deflection be replaced prior to placing the granular sub-base material.

- The most severe loading conditions on light-duty pavement areas and the subgrade may occur during construction. Consequently, special provisions such as restricted access lanes, half-loads during paving, etc., may be required, especially if construction is carried out during unfavourable weather.
- It is recommended that A&A be retained to review the final pavement structure designs and drainage plans prior to construction to ensure that they are consistent with the recommendations.

7.10.5 Curbs and Sidewalks

The concrete for any new exterior curbs and sidewalks should be proportioned, mixed, placed, and cured in accordance with the requirements of OPSS 353, OPSS 1350 and the municipality. During cold weather, the freshly placed concrete should be covered with insulating blankets to protect against freezing. The subgrade for the sidewalks should consist of undisturbed natural soil or well compacted fill. A minimum 100 mm thick layer of compacted (minimum 98% SPMDD) Granular A is recommended below sidewalk slabs.

8.0 LIMITATIONS OF REPORT

This report has been prepared for Mr. Chirag Patel, BVD Bikram Dhillon, (the client), who retained the services of A&A to conduct a preliminary geotechnical investigation for a proposed commercial development (Transportation Depot) located at 7504 McLean Road, Puslinch, ON. Further dissemination of this report is not permitted without A&A's prior written approval. A&A has carefully assessed all information provided to them during this investigation but makes no guarantees or warranties as to the accuracy or completeness of this provided information.

The comments given in this report are intended only for the guidance of design engineers and architects. Contractors bidding on or undertaking the work, should in this light, decide that further field investigations, and interpretations of the factual borehole results are necessary to draw their own conclusions as to how the subsurface conditions may affect them. Should soil conditions during excavation for the foundations prove to be different than what have been described in this report, the author of this report should be notified as soon as possible. No liability or claims may be made by owners or third parties against A&A for factors outside (A&A's) control. An independent quality control firm must be made available for all concrete and

compaction testing associated with construction. All testing results should be made available to the owner, designers, consultant, and general contractor.

The site investigation and recommendations follow generally accepted practice for Geotechnical Consultants in Ontario. Materials testing has been completed in accordance with ASTM or CSA Standards or modifications of these standards that have become standard practice.

For and on behalf of A&A Environmental Consultants Inc.

[redacted]

Thomas Demers, BASc. (Hons. Env.), P Eng., QP_{ESA}
Project Manager

Reviewed by:

[redacted]

Aly Ahmed, Ph. D., P.Eng., QP_{ESA}
Principal Engineer

9.0 REFERENCES

Bowles, & E., J. (1996). *Foundation Analysis and Design.* McGraw Hill Inc.

Canadian foundation engineering manual. 5th Edition. (2023): Canadian Geotechnical Society.

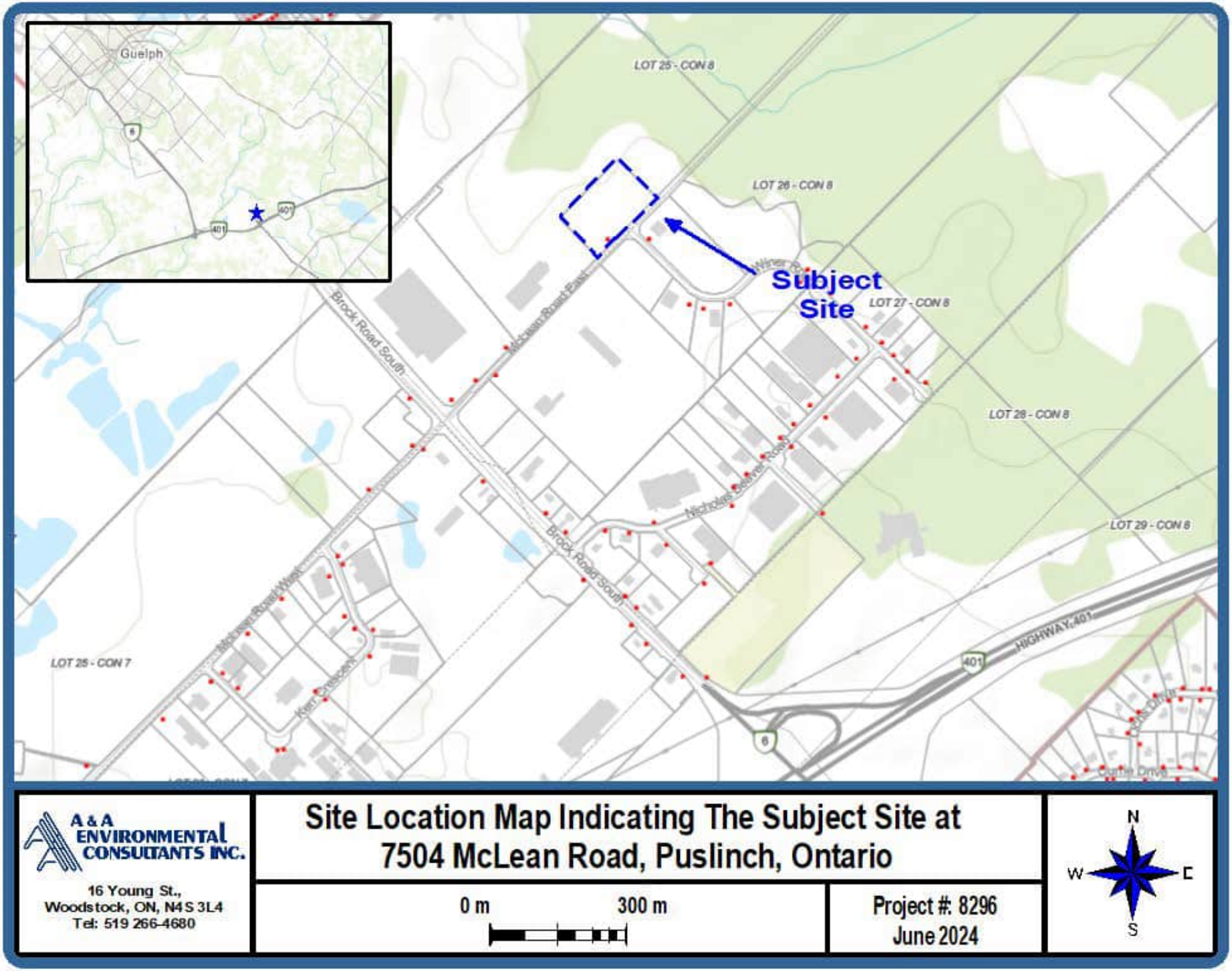
Sowers, G. (1979). *Introductory Soil Mechanics and Foundations: Geotechnical Engineering.* New York: MacMillan.

Terzaghi, K., & Peck, R. (1967). *Soil Mechanics in Engineering Practice.* New York: John Wiley.

Cambium Inc., May 16, (2017). *Geotechnical Investigation Report, 489-517 Bloor Street East, Oshawa, Ontario*. Cambium Reference No.: 5529-001, Prepared for: Beachgrove Development Ltd.

APPENDIX A – Site Drawings

Figure 1 – Approximate Site Location Map for 7504 McLean Rd., Puslinch, ON



A&A ENVIRONMENTAL CONSULTANTS INC.
16 Young St.,
Woodstock, ON, N4S 3L4
Tel: 519 266-4680

Site Location Map Indicating The Subject Site at 7504 McLean Road, Puslinch, Ontario

0 m 300 m

Project #: 8296
June 2024

N
W E
S

Figure 2 - Approximate Geotechnical Borehole Location Plan

A&A ENVIRONMENTAL CONSULTANTS INC.
16 Young St,
Woodstock, ON, N4S 3L4
Tel: 519 266-4680

Satellite Image Indicating Geotechnical Borehole Locations at 7504 McLean Road East, Puslinch, Ontario

0 m — 60 m

Project: 8296
June 2024

N
W E
S

APPENDIX B – Borehole Logs, Explanation of Terms and Symbols, and Cambium Borehole Locations/Logs

LOG OF BOREHOLE BH/MW1

PROJECT: Geotechnical Investigation for Proposed Tansportion Depot Develop.
CLIENT: BVD - Bikram Dhillon
PROJECT LOCATION: 7504 McLean Road, Puslinch ON
DATUM: Geodetic
BH LOCATION: Refer to Borehole Location Plan (Drawing 2) N 4812824 E 570329

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-24-2024

PROJECT NO.: 8296
DRAWING NO.: 1

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION	GR	SA	SI	CL
324.8									
0.0	**Fill:** Gravel and sand to gravelly silty sand, trace clay, damp to moist, no odour, compact.	1	SS	15	324				
		2	SS	19		44	38	13	5
323.3									
1.5	**Glacial Till:** Gravelly silty sand trace clay to silty sand some gravel, trace clay, rock fragments, moist, compact to very dense.	3	SS	52	323				
		4	SS	20	322				
		5	SS	19	321				
		6	SS	27					
		7	SS	31	320				
		8	SS	11	319				
	very dense	9	SS	50/150mm					
		10	SS	50/150mm	318				
317.2									
7.6	**End of Borehole:**								

Notes:
Auger refustal at 7.6 m
Water Levels:
(i) During Drilling : 0
(ii) At Completion: wet bottom

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%): 10 20 30
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)
REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH5

PROJECT: Geotechnical Investigation for Proposed Tansportion Depot Develop.
CLIENT: BVD - Bikram Dhillon
PROJECT LOCATION: 7504 McLean Road, Puslinch ON
DATUM: Geodetic
BH LOCATION: Refer to Borehole Location Plan (Drawing 2) N 4812895 E 570369

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-24-2024

PROJECT NO.: 8296
DRAWING NO.: 5

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
324.6												
0.0	**Fill:** Gravel and sand to silty sand, trace clay, damp to moist, no odour, loose to compact		1	SS	8		324					
1			2	SS	9							
			3	SS	11		323					
2												
322.4												
2.2	**Glacial Till:** Gravelly silty sand, trace clay, rock fragments, moist to wet, compact to very dense.		4	SS	12		322					
3			5	SS	11							28 44 24 4
			6	SS	57		321					
4												
			7	SS	20		320					
5												
			8	SS	27		319					
6	fragments of bedrock (grey, flaks)		9	SS	37	▽						
							W. L. 318.1 m Jun 24, 2024					
7			10	SS	64							
317.0												
7.6	**End of Borehole:**											

Notes:
Water Levels:
(i) During Drilling : 6.5 m

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

Explanation of Terms and Symbols

The terms and symbols used on the borehole logs to summarize the results of field investigation and subsequent laboratory testing are described in these pages.

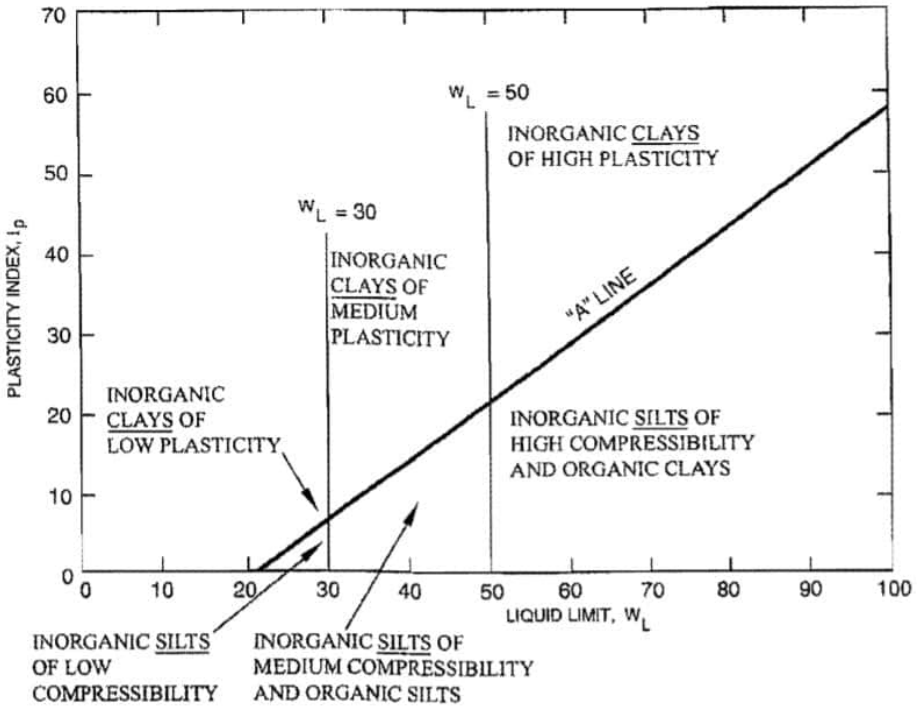
Abbreviations, graphic symbols and relevant test method designations are as follows:

w	Water Content
w_L, LL	Liquid Limit
w_p, PL	Plastic Limit
I_p	Plasticity Index
γ	Soil unit weight
K	Coefficient of Lateral earth pressure
K_s	Module of vertical subgrade reaction
P	Lateral earth pressure
Q	Surcharge load
H	Depth from the ground surface
B	Width of rectangular footing
P	Hydrostatic uplift pressure
d	Depth of structure's base below the design water level
γ_w	Unit weight of water
Φ	Geotechnical resistance factor
ϕ	Internal friction angle of soil
c	Cohesion
c_u, S_u	Undrained shear strength
V_s	Shear wave velocity
SPT-N	Penetration resistance
SPMMD	Standard Proctor Maximum Dry Density
MRD	Marshal Maximum Relative Density

Soils are classified and described according to their engineering properties and behaviours.

Noun	gravel, sand, silt, clay	**> 35 % and main fraction**
"and"	and gravel, and silt, etc.	**>35 %**
Adjective	gravelly, sandy, silty, clayey, etc.	**20 to 35 %**
"some"	some sand, some silt, etc.	**10 to 20%**
"trace"	trace sand, trace silt, etc.	**1 to 10 %**

The plasticity chart (after Casagrande, 1948):



Correlation of soil parameters with uncorrected SPT values for: a) cohesionless soils and b) cohesive soil

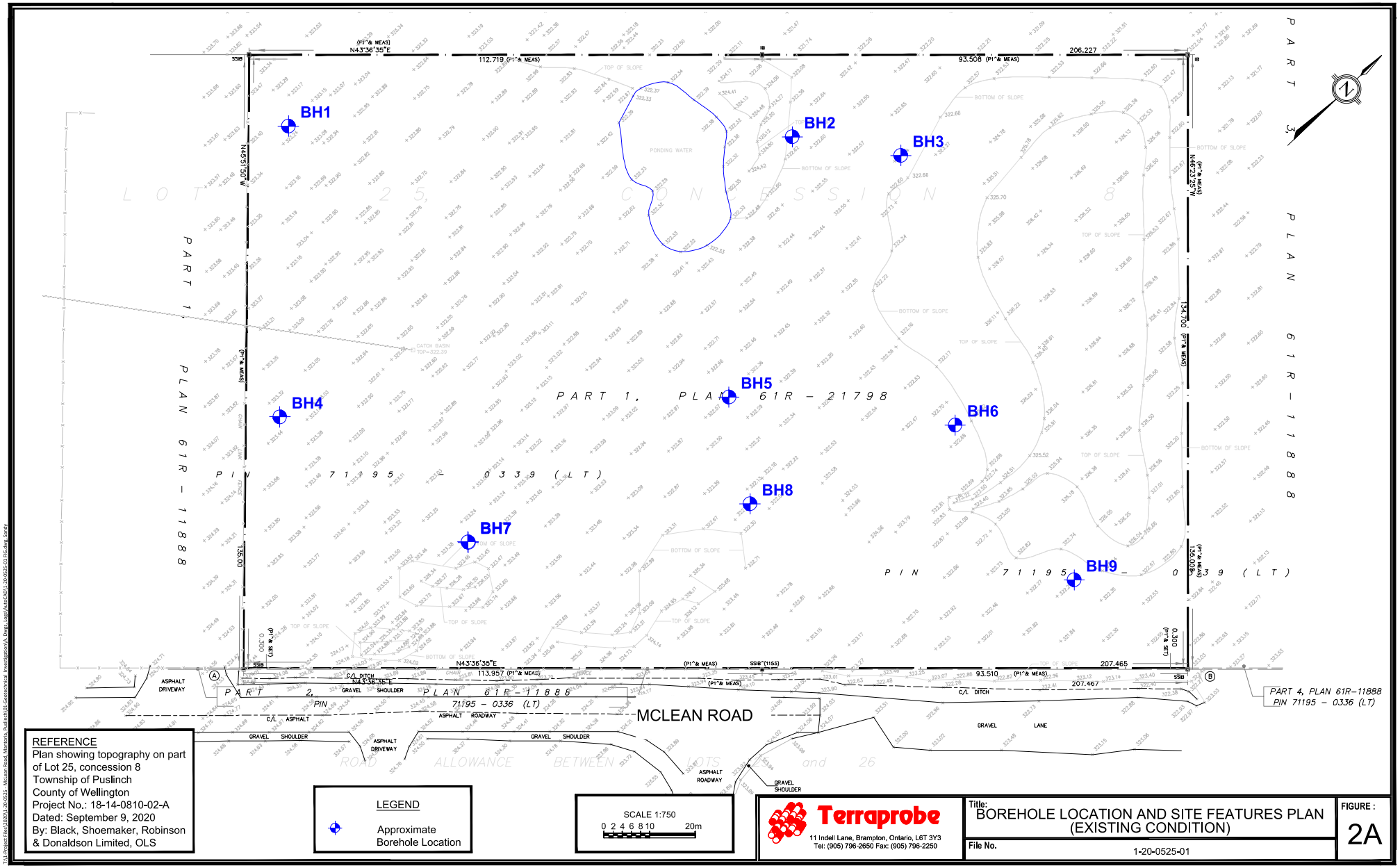
Compactness Condition	SPT N-INDEX (blows per 0.3 m)
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	>50

(a)

Consistency	Undrained Shear Strength (kPa)	SPT N-INDEX (blows per 0.3 m)
Very soft	< 12	0 to 2
Soft	12 - 25	2 to 4
Firm	25-50	4 to 8
Stiff	50 - 100	8 to 15
Very stiff	100 - 200	15 to 30
Hard	>200	>30

(b)

- *Standard Penetration Tests (SPT); followed the methods described in ASTM Standard D1586-08a. The number of blows by a 63.5 kg (140 lb) hammer dropped from 760 mm (30 in.) is recorded for a depth of 460 mm (18"). The last two 150 mm distances (total = 300 mm) are used to calculate the SPT-N index.*



REFERENCE
Plan showing topography on part of Lot 25, concession 8
Township of Puslinch
County of Wellington
Project No.: 18-14-0810-02-A
Dated: September 9, 2020
By: Black, Shoemaker, Robinson & Donaldson Limited, OLS

LEGEND
Approximate Borehole Location

SCALE 1:750
0 2 4 6 8 10 20m

Terraprobe
11 Indell Lane, Brampton, Ontario, L6T 3Y3
Tel: (905) 796-2650 Fax: (905) 796-2250

Title:
BOREHOLE LOCATION AND SITE FEATURES PLAN (EXISTING CONDITION)

File No.
1-20-0525-01

FIGURE :
2A

T:\Project Files\2020\1-20-0525- McLean Road, Morriston, Puslinch\00-Geotechnical Investigation\A_Dwgs (cad)\AutoCAD\1-20-0525-01 BH Key Sketch

LOG OF BOREHOLE 1

Terraprobe

Project No. : 1-20-0525-01	Client : NC Warehouse Inc c/o Reinders + Law Ltd	Originated by : AAS
Date started : January 4, 2021	Project : Mclean Road, Mantoria Warehouse	Compiled by : AAS
Sheet No. : 1 of 1	Location : Puslinch, Ontario	Checked by : AR

Position : E: 570245, N: 4812876 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
	323.2	**GROUND SURFACE**				
0		30mm **TOPSOIL**				
		FILL, sand, some silt, some gravel, trace clay, stone fragments, compact, brown, moist		1	SS	14
1				2	SS	16
	321.7					
	1.5	**SILTY SAND to SAND AND SILT**, some gravel, trace to some clay, compact, brown, moist (GLACIAL TILL)		3	SS	20
2				4	SS	26
3				5	SS	29
4						
		...at 4.6 m, stone fragments, very dense below		6	SS	57
5						
6		...at 6.1 m, wet		7	SS	90 / 175mm
	316.8					
	6.4	**END OF BOREHOLE**				

Elevation Scale (m): 323, 322, 321, 320, 319, 318, 317

Penetration Test Values (Blows / 0.3m): × Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): ○ Unconfined + Field Vane ⊖ Pocket Penetrometer ■ Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit | Natural Water Content | Liquid Limit; PL MC LL; 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR SA SI CL

15 43 33 9

...at 3.4m, auger grinding

...at 4.0m, auger grinding

...at 4.9m, auger grinding

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 8, 2021	dry	n/a
Jan 14, 2021	dry	n/a
Jan 21, 2021	dry	n/a

file: 1-20-0525-01 bh logs.gpj

LOG OF BOREHOLE 2

Terraprobe

Project No. : 1-20-0525-01	Client : NC Warehouse Inc c/o Reinders + Law Ltd	Originated by : AAS
Date started : January 5, 2021	Project : Mclean Road, Mantoria Warehouse	Compiled by : AAS
Sheet No. : 1 of 1	Location : Puslinch, Ontario	Checked by : AR

Position : E: 570323, N: 4812955 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	322.6	**GROUND SURFACE**				
		50mm **TOPSOIL**				
		FILL, clayey silt, trace to some sand, trace to some gravel, firm to stiff, brown, moist		1	SS	7
1				2	SS	9
		...at 1.5 m, wet		3	SS	8
2						
	320.1			4	SS	6
	2.5	**SILTY SAND to SAND AND SILT**, some gravel, trace to some clay, stone fragments, compact, brown, wet (GLACIAL TILL)				
3				5	SS	13
4		...at 4.6 m, dense		6	SS	48
	317.6					
5	5.0	**END OF BOREHOLE**				

Elevation Scale (m): 322, 321, 320, 319, 318

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40, 80, 120, 160

Moisture / Plasticity — Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL): 10, 20, 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) — GR SA SI CL

Unstabilized water level measured at 4.3 m below ground surface; borehole was open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 8, 2021	2.1	320.5
Jan 14, 2021	2.4	320.2
Jan 21, 2021	2.4	320.2

file: 1-20-0525-01 bh logs.gpj

LOG OF BOREHOLE 3

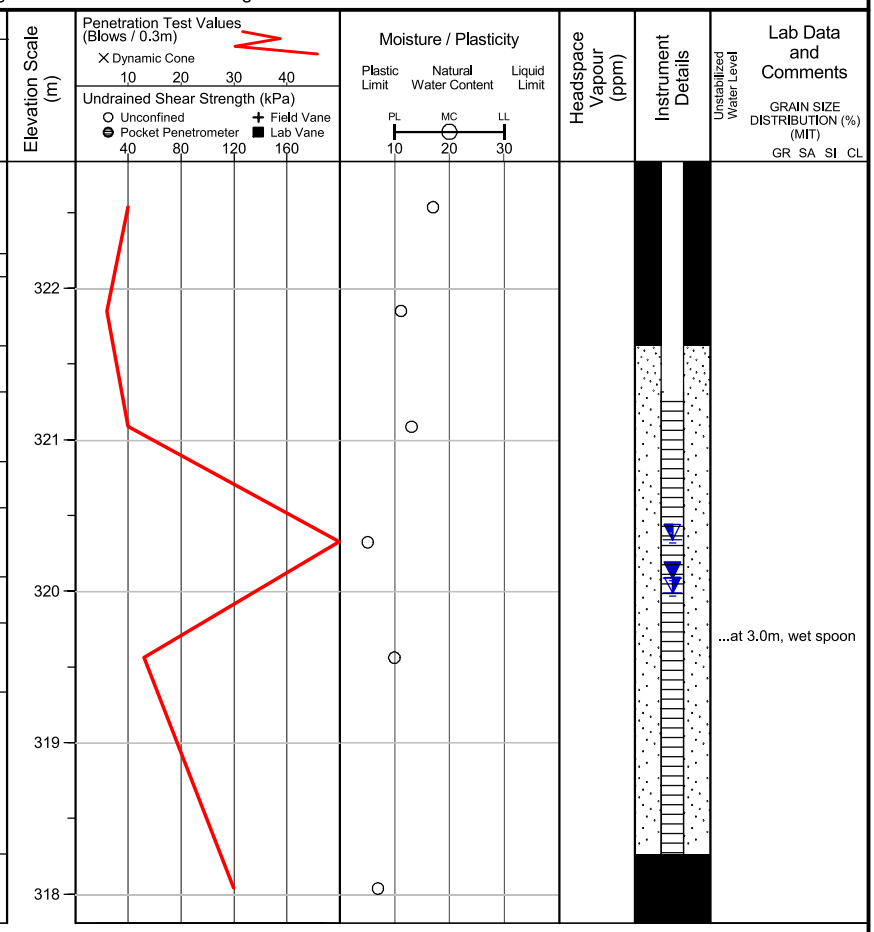
Terraprobe

Project No. : 1-20-0525-01	Client : NC Warehouse Inc c/o Reinders + Law Ltd	Originated by : AAS
Date started : January 6, 2021	Project : Mclean Road, Mantoria Warehouse	Compiled by : AAS
Sheet No. : 1 of 1	Location : Puslinch, Ontario	Checked by : AR

Position : E: 570342, N: 4812969 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
	322.8	**GROUND SURFACE**				
0		50mm **TOPSOIL**		1	SS	10
		FILL, clayey silt, trace sand, trace gravel, stone fragments, trace organics, firm to stiff, dark brown, moist				
1				2	SS	6
		...at 1.5 m, some sand		3	SS	10
2						
	320.5					
	2.3	**SILTY SAND to SAND AND SILT**, some gravel, trace to some clay, stone fragments, compact to very dense, brown, moist (GLACIAL TILL)		4	SS	58
3		...at 3.0 m, wet below		5	SS	13
4						
				6	SS	30
	317.8					
5	5.0					



END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 8, 2021	2.5	320.3
Jan 14, 2021	2.9	320.0
Jan 21, 2021	2.8	320.1

file: 1-20-0525-01 bh logs.gpj

LOG OF BOREHOLE 4

Terraprobe

Project No. : 1-20-0525-01	Client : NC Warehouse Inc c/o Reinders + Law Ltd	Originated by : AAS
Date started : January 4, 2021	Project : Mclean Road, Mantoria Warehouse	Compiled by : AAS
Sheet No. : 1 of 1	Location : Puslinch, Ontario	Checked by : AR

Position : E: 570290, N: 4812831 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	323.3	**GROUND SURFACE**				
		(WEATHERED/DISTURBED)		1	SS	28
				2	SS	5
				3	SS	6
2	321.0					
	2.3	**SILTY SAND to SAND AND SILT**, some gravel, trace to some clay, stone fragments, compact, brown, wet (GLACIAL TILL)		4	SS	12
				5	SS	27
4						
				6	SS	17
5	318.3					
	5.0	**END OF BOREHOLE**				

Elevation Scale (m): 323, 322, 321, 320, 319

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Borehole was dry and caved to 4.4 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 8, 2021	dry	n/a
Jan 14, 2021	4.7	318.6
Jan 21, 2021	dry	n/a

file: 1-20-0525-01 bh logs.gpj

LOG OF BOREHOLE 5

Terraprobe

Project No. : 1-20-0525-01	Client : NC Warehouse Inc c/o Reinders + Law Ltd	Originated by : AAS
Date started : January 5, 2021	Project : Mclean Road, Mantoria Warehouse	Compiled by : AAS
Sheet No. : 1 of 1	Location : Puslinch, Ontario	Checked by : AR

Position : E: 570354, N: 4812905 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
	322.3	**GROUND SURFACE**				
0	322.1	200mm **TOPSOIL**				
	0.2	(WEATHERED/DISTURBED)		1	SS	17
	321.5					
	0.8	**SILTY SAND to SAND AND SILT**, some gravel, trace to some clay, stone fragments, compact to dense, brown, moist (GLACIAL TILL)		2	SS	20
1		...at 1.5 m, gravelly sand, wet below		3	SS	41
2				4	SS	34
3				5	SS	27
4				6	SS	36
5	317.3					
	5.0	**END OF BOREHOLE**				

Elevation Scale (m): 322, 321, 320, 319, 318

Penetration Test Values (Blows / 0.3m): Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) Natural Water Content (MC) Liquid Limit (LL); 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT): GR SA SI CL

Unstabilized water level measured at 4.3 m below ground surface; borehole was open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 8, 2021	2.0	320.3
Jan 14, 2021	3.3	319.0
Jan 21, 2021	3.4	318.9

file: 1-20-0525-01 bh logs.gpj

LOG OF BOREHOLE 6

Terraprobe

Project No. : 1-20-0525-01	Client : NC Warehouse Inc c/o Reinders + Law Ltd	Originated by : AAS
Date started : January 6, 2021	Project : Mclean Road, Mantoria Warehouse	Compiled by : AAS
Sheet No. : 1 of 1	Location : Puslinch, Ontario	Checked by : AR

Position : E: 570393, N: 4812937 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
0	322.7	**GROUND SURFACE**										
		125mm **TOPSOIL**										
		FILL, sandy silt, some gravel, trace gravel, trace clay, trace organics, compact, brown, moist		1	SS	20						...at 0.0m, boulder zone to 1.5m
1				2	SS	28	322					...at 0.6m, auger grinding to 1.5m
	321.2 / 1.5											
		SILTY SAND to SAND AND SILT, some gravel, trace to some clay, stone fragments, compact, brown, moist (GLACIAL TILL)		3	SS	13	321					
2		...at 2.3 m, wet below		4	SS	10						...at 2.3m, wet spoon
							320					
3				5	SS	13						
							319					
4												
		...at 4.6 m, sandy gravel, trace silt, trace clay, very dense		6	SS	50 / 125mm	318					
	317.9 / 4.8											
		END OF BOREHOLE										

Borehole was dry and open upon completion of drilling.

Penetration Test Values (Blows / 0.3m): × Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): ○ Unconfined ⊖ Pocket Penetrometer + Field Vane ■ Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) Natural Water Content (MC) Liquid Limit (LL); 10 20 30

Unstabilized Water Level

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

file: 1-20-0525-01 bh logs.gpj

LOG OF BOREHOLE 7

Terraprobe

Project No. : 1-20-0525-01	Client : NC Warehouse Inc c/o Reinders + Law Ltd	Originated by : AAS
Date started : January 4, 2021	Project : Mclean Road, Mantoria Warehouse	Compiled by : AAS
Sheet No. : 1 of 1	Location : Puslinch, Ontario	Checked by : AR

Position : E: 570338, N: 4812842 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	323.4	**GROUND SURFACE**				
		(WEATHERED/DISTURBED)		1	SS	23
	322.6					
	0.8	**SILTY SAND to SAND AND SILT**, some gravel, trace to some clay, stone fragments, compact to dense, brown, moist (GLACIAL TILL)		2	SS	20
1		...at 1.5 m, wet below		3	SS	48
2				4	SS	44
3				5	SS	74
4				6	SS	77
5						
6	317.3			7	SS	50 / 50mm
	6.1	**END OF BOREHOLE**				

Elevation Scale (m): 323, 322, 321, 320, 319, 318

Penetration Test Values (Blows / 0.3m): × Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): ○ Unconfined + Field Vane ⊖ Pocket Penetrometer ■ Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) Natural Water Content (MC) Liquid Limit (LL); 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

...at 1.2m, auger grinding

...at 2.4m, auger grinding

...at 3.7m, auger grinding

...at 5.2m, auger grinding

Borehole was dry and caved to 5.0 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 8, 2021	dry	n/a
Jan 14, 2021	dry	n/a
Jan 21, 2021	dry	n/a

file: 1-20-0525-01 bh logs.gpj

LOG OF BOREHOLE 8

Terraprobe

Project No. : 1-20-0525-01	Client : NC Warehouse Inc c/o Reinders + Law Ltd	Originated by : AAS
Date started : January 5, 2021	Project : Mclean Road, Mantoria Warehouse	Compiled by : AAS
Sheet No. : 1 of 1	Location : Puslinch, Ontario	Checked by : AR

Position : E: 570375, N: 4812892 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value	Elevation Scale (m)
0	322.0	**GROUND SURFACE**					322
		FILL, clayey silt, some sand, trace to some gravel, stone fragments, firm to stiff, dark brown, moist		1	SS	9	
1				2	SS	10	321
	320.5 / 1.5						
		SILTY SAND to SAND AND SILT, some gravel, trace to some clay, compact to very dense, brown, wet (GLACIAL TILL)		3	SS	11	
2							320
				4	SS	41	
3							319
				5	SS	31	
4							318
				6	SS	59	
5							317
6		...at 6.1 m, sandy gravel, trace silt, trace clay, stone fragments		7	SS	65	316
	315.4 / 6.6						

Penetration Test Values (Blows / 0.3m): × Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): ○ Unconfined + Field Vane ● Pocket Penetrometer ■ Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit | Natural Water Content | Liquid Limit; PL MC LL; 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR SA SI CL

17 45 31 7

...at 3.7m, auger grinding

...at 4.6m, auger grinding

...at 5.2m, auger grinding

END OF BOREHOLE

Unstabilized water level measured at 3.0 m below ground surface; borehole was open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 8, 2021	2.9	319.1
Jan 14, 2021	3.5	318.6
Jan 21, 2021	3.1	318.9

file: 1-20-0525-01 bh logs.gpj

LOG OF BOREHOLE 9

Terraprobe

Project No. : 1-20-0525-01	Client : NC Warehouse Inc c/o Reinders + Law Ltd	Originated by : AAS
Date started : January 6, 2021	Project : Mclean Road, Mantoria Warehouse	Compiled by : AAS
Sheet No. : 1 of 1	Location : Puslinch, Ontario	Checked by : AR

Position : E: 570436, N: 4812932 (UTM 17T) Elevation Datum : Geodetic

Rig type : Track-mounted Drilling Method : Hollow stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	322.4	**GROUND SURFACE**				
		FILL, clayey silt, trace sand, trace gravel, trace organics, stone fragments, stiff to very stiff, brown, moist		1	SS	11
1				2	SS	26
	320.9					
	1.5	**SILTY SAND to SAND AND SILT**, some gravel, trace to some clay, compact to very dense, brown, moist (GLACIAL TILL)		3	SS	27
2				4	SS	45
		...at 3.0 m, wet below		5	SS	61
3						
4		...at 4.6 m, sandy gravel, trace silt, trace clay, stone fragments		6	SS	99 / 225mm
	317.4					
	5.0	**END OF BOREHOLE**				

Elevation Scale (m): 322, 321, 320, 319, 318

Penetration Test Values (Blows / 0.3m): × Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): ○ Unconfined ⊖ Pocket Penetrometer + Field Vane ■ Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) Natural Water Content (MC) Liquid Limit (LL); 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR SA SI CL

...at 2.3m, auger grinding

...at 3.0m, auger grinding to 4.6m

65 28 6 1

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 8, 2021	3.0	319.4
Jan 14, 2021	3.2	319.2
Jan 21, 2021	3.1	319.3

file: 1-20-0525-01 bh logs.gpj

APPENDIX C – Grain Size Distribution and Test Results

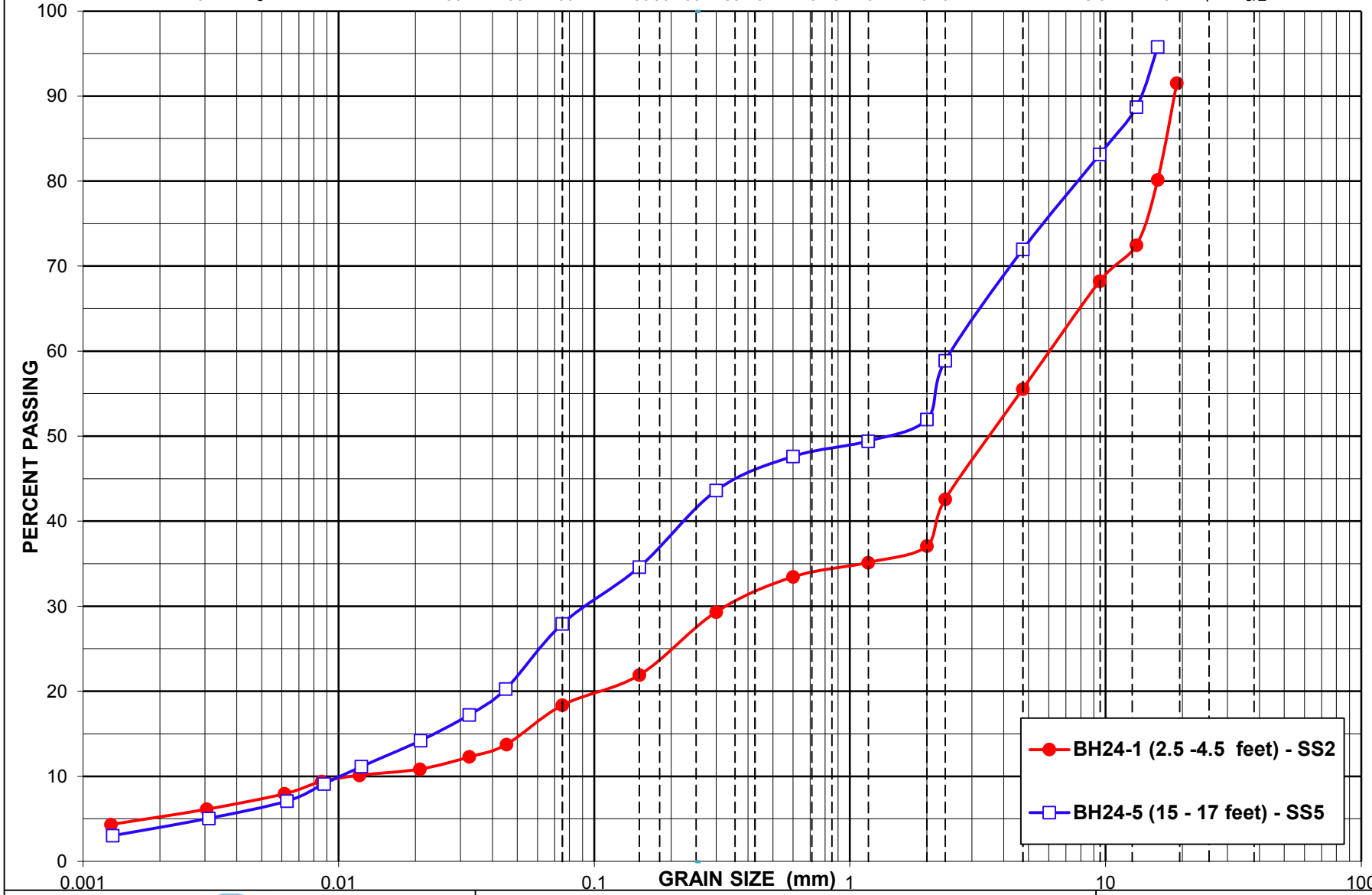
LS 702/D 422

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY AND SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

GRAIN SIZE IN MICROMETERS: 1 3 5 1 30 50 200

SIEVE DESIGNATION NOMBER (Imperial): 100 80 60 50 40 25 20 16 10 8 4 3/8" 1/2" 3/4" 1" 3/2"



GEOTRUST ENGINEERING LIMITED

GRAIN SIZE DISTRIBUTION

Drawing No.: 1	1
PROJECT No. :	GT23001TA
DATE :	July 1, 2024

APPENDIX D – General Arrangements for Engineered Fill

GENERAL REQUIREMENTS FOR ENGINEERED FILL

Compacted imported soil that meets specific engineering requirements and is free of organics and debris and that has been continually monitored on a full-time basis by a qualified geotechnical representative is classified as engineered fill. Engineered fill that meets these requirements and is bearing on suitable native subsoil can be used for the support of foundations.

Imported soil used as engineered fill can be removed from other portions of a site or can be brought in from other sites if suitable. In general, most of Ontario soils are too wet to achieve the 100% Standard Proctor Maximum Dry Density (SPMDD) and will require drying and careful site management if they are to be considered for engineered fill. Imported non-cohesive granular soil is preferred for all engineered fill. For engineered fill, A&A recommends use of OPSS Granular 'B' sand and gravel fill material only.

Adverse weather conditions such as rain make the placement of engineered fill to the required degree of density difficult or impossible; engineered fill should not be placed during freezing conditions, i.e., normally not between December 15 and April 1 of each year. If the project demands placement of engineered fill in winter (December 15-April1) it can be placed only under the following conditions:

- All frozen material and or snow must be removed before placement of engineered fill on a daily basis
- Only Granular B Type 2 or Granular A (including crushed concrete or crushed limestone)
- The fill placement must be supervised on a full-time basis by a geotechnical consultant

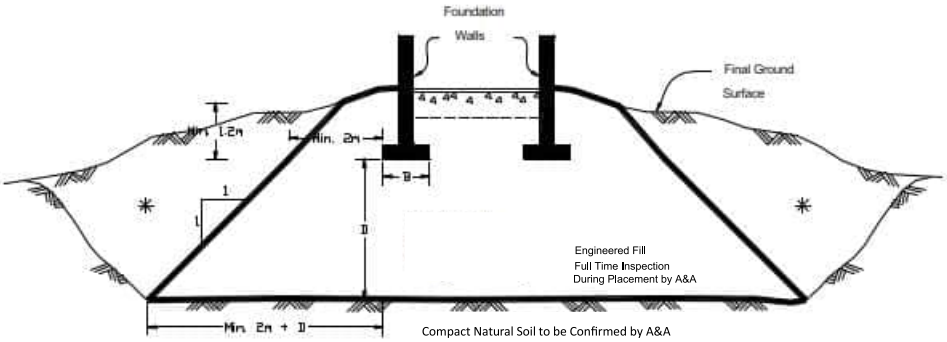
The location of the foundations on the engineered soil pad is critical and certification by a qualified surveyor that the foundations are within the stipulated boundaries is mandatory. Since layout stakes are often damaged or removed during fill placement, offset stakes must be installed and maintained by the surveyors during the course of fill placement so that the contractor and engineering staff are continually aware of where the engineered fill limits lie.

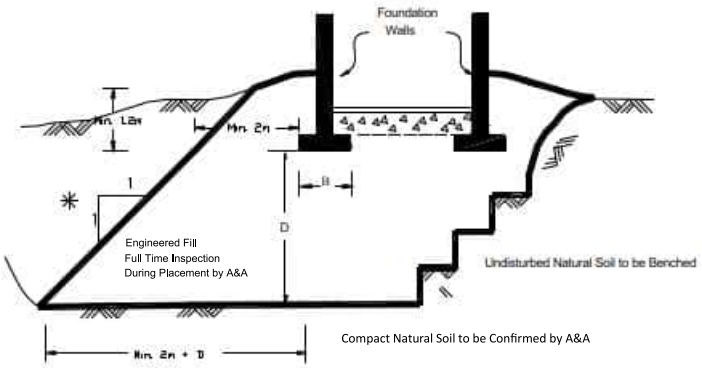
Foundations placed within the engineered soil pad must be backfilled with the same conditions and quality control as the original pad.

To perform satisfactorily, engineered fill requires the cooperation of the designers, engineers, contractors, and all parties must be aware of the requirements. The minimum requirements are as follows; however, the geotechnical report must be reviewed for specific information and requirements.

1. Prior to site work involving engineered fill, a site meeting to discuss all aspects must be convened. The surveyor, contractor, design engineer and geotechnical engineer must attend the meeting. At this meeting, the limits of the engineered fill will be defined. The contractor must make known where all fill material will be obtained and samples must be provided to the geotechnical engineer for review, and approval before filling begins.
2. Detailed drawings indicating the lower boundaries as well as the upper boundaries of the engineered fill must be available at the site meeting and be approved by the geotechnical engineer.
3. The building footprint and base of the pad, including basements, garages, etc. must be defined by offset stakes that remain in place until the footings and service connections are all constructed. Confirmation that the footings are within the pad, service lines are in place, and that the grade conforms to drawings, must be obtained by the owner in writing from the surveyor and A&A Consultants. Without this confirmation no responsibility for the performance of the structure can be accepted by A& A. Survey drawing of the pre and post fill location and elevations will also be required.
4. The area must be stripped of all topsoil and fill materials. Subgrade must be proof rolled. Soft spots must be dug out. The stripped native subgrade must be examined and approved by an A&A engineer prior to placement of fill.
5. The approved engineered fill must be compacted to 100% Standard Proctor Maximum Dry Density throughout. Granular Fill preferred. Engineered fill should not be placed (where it will support footings) during the winter months. Engineered fill compacted to 100% SPMDD will settle under its own weight approximately 0.5% of the fill height and the structural engineer must be aware of this settlement. In addition to the settlement of the fill, additional settlement due to consolidation of the underlying soils from the structural and fill loads will occur and should be evaluated prior to placing the fill.

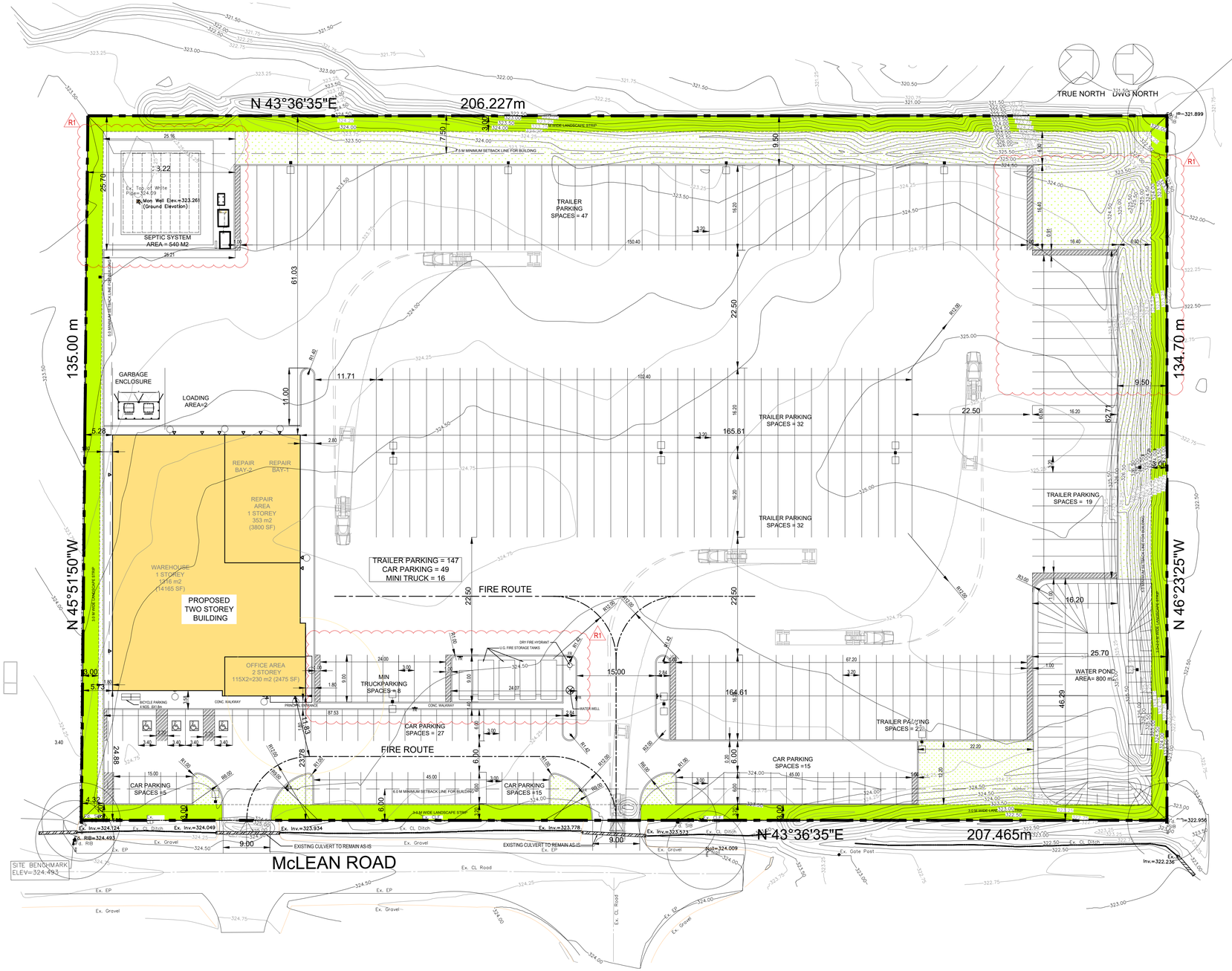
6. Full-time geotechnical inspection by A&A during placement of engineered fill is required. Work cannot commence or continue without the presence of the A&A representative.
7. The fill must be placed such that the specified geometry is achieved. Refer to sketches for minimum requirements. Take careful note that the projection of the compacted pad beyond the footing at footing level is a minimum of 2 m. The base of the compacted pad extends 2 m plus the depth of excavation beyond the edge of the footing.
8. The allowable bearing pressure provided in the accompanying report may be used provided that all conditions outlined above are adhered to. A minimum footing width of 500 mm (20 inches) is suggested, and footings must be provided with nominal steel reinforcement.
9. All excavations must be done in accordance with the Occupational Health and Safety Regulations of Ontario.
10. After completion of the pad a second contractor may be selected to install footings. The prepared footing bases must be evaluated by engineering staff from A&A prior to footing concrete placements. All excavations must be backfilled under full time A&A supervision by A&A to the same degree as the engineered fill pad. Surface water cannot be allowed to pond in excavations or to be trapped in clear stone backfill. Clear stone backfill can only be used with the approval of A&A Consultants.
11. After completion of compaction, the surface of the pad must be protected from disturbance from traffic, rain, and frost. During the course of fill placement, the engineered fill must be smooth-graded, proof rolled and sloped/crowned at the end of each day, prior to weekends and any stoppage in work in order to promote rapid runoff of rainwater and to avoid any ponding surface water. Any stockpiles of fill intended for use as engineered fill must also be smooth-bladed to promote runoff and/or protected from excessive moisture take up.
12. If there is a delay in construction, the engineered fill pad must be inspected and accepted by the geotechnical engineer. The location of the structure must be reconfirmed that it remains within the pad.
13. The geometry of the engineered fill as illustrated in these General Requirements is general in nature. Each project will have its own unique requirements. For example, if perimeter sidewalks are to be constructed around the building, then the projection of the engineered fill beyond the foundation wall may need to be greater.
14. These guidelines are to be read in conjunction with A&A report attached.





* Backfill in this area to be as per the A&A report

APPENDIX E – General Arrangements of the Proposed Development (Client Provided Drawings)



1 SP-01

SITE PLAN

SCALE 1:400

SITE STATISTICS
7504 McLEAN ROAD, PUSLINCH, ON

ZONE - IND

LOT AREA	MIN. REQD.	AVAILABLE
	0.4 Ha	2.79 Ha

LOT FRONTAGE	MIN. REQD.	AVAILABLE
	30 m	207.46 m

SETBACKS	MIN. REQD.	PROPOSED
FRONT YARD	6.0 m	23.78 m
SIDE YARD - INTERIOR N	5.0 m	164.6 m
SIDE YARD - INTERIOR S	5.0 m	5.28 m
REAR YARD	7.5 m	61.0 m

BUILDING AREA LOT COVERAGE	MAX. ALLOWED	PROPOSED
1784 M2	75%	6.36 %

BUILDING HEIGHT	MAX. ALLOWED	PROPOSED
	25.0 m	8.0 m

BUILDING AREA CALCULATION (m2)

FLOOR	USE	GROSS AREA m2
GR FL	TRANSPORT	353
	WARE HOUSE	1316
	OFFICE (BUSINESS)	115
2ND FL	OFFICE (BUSINESS)	115
TOTAL (GR FL+ 2ND FL)		1899 m2

PARKING STATISTICS

CAR PARKING SPACES

USE	GROSS AREA	RATE	REQUIRED	PROVIDED
TRANSPORT	353 1 / 100 m2	3.53		
WAREHOUSE	1316 1 / 200 m2	6.58		
OFFICE	230 1 / 40 m2	5.75		
TOTAL		15.86	16	49

CAR PARKING SPACE DIMENSIONS - 3.0 m X 6.0 m;
MINI-TRCK PARKING SPACE DIMENSION - 3.0mx9.0m
MINI-TRUCK SIZE 7.9m X 2.44m

ACCESSIBLE PARKING SPACES	REQUIRED	PROVIDED
FOR 26- 62 CARS	1+3% of 62= 2.86=3	4

ACCESSIBLE PARKING SPACE DIMENSIONS
TYPE-A 3.4X5.5m
TYPE-B 2.4X5.5m
ACCESS AISLE 2.0m WIDE

LOADING SPACES	REQUIRED	PROVIDED
FOR NET FLOOR AREA		
- 250 m2 TO 2500 m2	1	2

LOADING SPACE DIMENSIONS - 3.5 m X 10.0 m

BICYCLE PARKING SPACES	REQUIRED	PROVIDED
FOR INDUSTRIAL USE 2/1000m2	4	4

BICYCLE PARKING SPACE DIMENSIONS - 0.6 X1.8m

PARKING SPACES CALCULATIONS

PARKING AREA	TRAILERS	CARS	MINI-TRUCKS
TOTAL	151	62	8

R1

LOT AREA	27923 M2
BUILDING AREA	1784 M2
POND AREA	800 m2
SEWER SYSTEM	540 m2
LANDSCAPE AREA	5469 m2 19.6%
PAVED AREA	19330 m2
TOTAL	27923 m2

LEGEND:

- LIGHTING STANDARD- DOUBLE HEADS
- LIGHTING STANDARD - SINGLE HEAD
- WALL PACK LIGHTS

KEY PLAN SCALE N.T.S.

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PUSLINCH, ON

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Small Scale Hydrogeological Assessment
Proposed Commercial Development
7504 McLean Road,
Puslinch, Ontario

Report #8296 – BVD Puslinch HG – VER 2.0
July 25, 2025

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EXECUTIVE SUMMARY

A & A Environmental Consultants Inc. (A&A) was retained by BVD (the client), to evaluate the potential impact from the proposed development of a commercial property (Transportation Depot) on local groundwater/surface water resources by conducting a small-scale hydrogeological study. The site is bound by vacant land to the northeast and northwest and industrial buildings to the southwest and southeast. The subject site is located at 7504 McLean Road, Puslinch, Ontario. The area of the site is approximately 27,923 m^2 (6.90 acres). At the time of the investigation, the site was vacant land.

The topography in the vicinity of the subject site (a 100-meter radius) ranges from approximately 330 masl to the southeast to 320 masl to the northwest of the site and was observed to be generally flat with a gentle slope towards the southwest corner of the site. A tributary of Mill Creek-Grand River is southwest of the southwest boundary of the subject site. The tributary flows southwest and drains into Grand River. Groundwater flow direction may also be influenced by utility trenches or other subsurface structures and may preferentially migrate in these subsurface utility trenches.

Geological maps identified the site to be terminal moraine characterized by sandy-silt and silty-sand deposits. The physiographic landform of the site is identified as Till Moraines within the Horseshoe Moraines Region. The surficial geology identified the site as till characterized by stone-poor, and sandy silt to silty sand- textured till on Paleozoic terrain. Bedrock in the area of the site is part of the Guelph formation characterized by sandstone, shale, dolostone and siltstone.

A search of the Ministry of Environment, Conservation, and Parks (MECP) well records show a total of 27 wells located within 500 meters of the subject site, consisting of two no use, two commercial, 6 domestic, one domestic commercial, one domestic industrial, three industrial, nine monitoring, one livestock domestic, one other well and one test hole.

It is clear from the MECP water well database and the information obtained during the field survey that the local residents obtain their water from domestic wells in Puslinch, ON. The subject

site is also expected to utilize the domestic wells when redeveloped. The MECP well records show groundwater was found between 3.96 – 6.71 mbgs, for a well drilled in the unconfined aquifer to approximately between 3.96 – 7.62 mbgs. The drilling program completed at this site shows the groundwater was measured between 2.1 – 6.5 mbgs for monitoring wells drilled between 4.57-7.521 mbgs.

The water table in the study area was defined by installing a total of three monitoring wells and one existing monitoring well in the area of the proposed redevelopment and monitoring those wells on the subject site. The selection of the monitoring wells was based on the predicted water flow direction, taking into consideration the site location and accessibility for the drill crew. The three monitoring wells installed by A&A was drilled to a maximum depth of 7.521 mbgs. There were four groundwater monitoring events that took place on June 25, 2024, July 17, 2024, July 30, 2024, and August 23, 2024. Not all wells contained water in each of the seven monitoring events as MW24-1 was dry at every monitoring event. It was concluded that the seasonally high groundwater levels present on site were at elevations between 255.536 – 315.323 masl. A&A understands that four seasons of groundwater monitoring is needed and will continue monitoring on site. The monitoring will continue in September 2024 and repeat every month until the last monitoring in May/June 2025.

A groundwater contour map was plotted using “Golden Software” (Surfer 8) and the measurements of groundwater levels taken on July 17, 2024 from three monitoring wells. This map shows well EMW-1 being at the lowest water elevation compared with the other wells used. The general direction of groundwater flow was found to be in a southwest direction.

The total precipitation (rainfall plus snowfall) in 2023 was 826 mm, with the greatest amounts falling in March and July. July and August show the highest mean daily temperatures during the year and the lowest temperatures were recorded in February. The average annual precipitation from 1981 – 2010 was calculated using historical data collected at the meteorological station “Waterloo Wellington A” located in Breslau, Ontario. The average annual precipitation over the thirty-year period was 916 mm. For the same period, it was calculated that approximately 553

mm/year would be lost to evapotranspiration (Environment Canada, 2024); leaving a total of approximately 363 mm/year available for groundwater recharge and surface runoff.

Based on the water balance assessment, high changes are anticipated in the infiltration and runoff due to the proposed redevelopment at the subject site. A stormwater management plan, is recommended to manage the increased stormwater runoff on site.

The analysis results indicate that all health and non-health related parameters recorded levels below the ODWS (Ontario Drinking Water Standards (Objectives)) except for: hardness, turbidity, total sodium, arsenic, chromium, iron, lead, and manganese. These parameters are known to be naturally occurring in hard rock areas of Ontario and would not have a negative impact on the groundwater.

RECOMMENDATION

Based on the obtained information from this study, A&A has the following recommendations:

1. Due to the increased runoff rate on site post development, a stormwater management plan is recommended. Proper planning as well as implementing LIDs will mitigate the stormwater that accumulates.

2. Due to the water levels being below the foundation bottom, the excavation area will NOT need to undergo short-term dewatering. The groundwater levels are below the finished floor elevation and footings, therefore long-term dewatering will NOT be required.

3. No adverse impact on the groundwater resources is expected to occur during the redevelopment of the subject site with the implementations of these recommended actions.

4. Any unused wells must be abandoned by a licensed well contractor in accordance with R.R.O. 1990, Reg. 903: Wells.

5. Any import/export of fill/soil from the site must be conducted in accordance with O. Reg. 406/19: On-Site and Excess Soil Management, the Rules for Soil Management and Excess Soil Quality Standards (Soil Rules) and O. Reg. 153/04, as amended.

1.0 INTRODUCTION

A & A Environmental Consultants Inc. (A&A) was retained by BVD (the client), to evaluate the potential impact from the proposed commercial development (Transportation Depot) on local groundwater/surface water resources by conducting a small-scale hydrogeological study. The subject site is located at 7504 McLean Road, Puslinch, Ontario (Figure 1). The area of the site is approximately 27,923 m^2 (6.90 acres). At the time of the investigation, the site was vacant land.

This study describes a small-scale hydrogeological study to obtain a better understanding of the groundwater resources within the study area and includes the characterization of the site using all available geological and hydrogeological information; a discussion of the groundwater quality and a report for the site with conclusions and recommendations.

There is no relationship between the client and A&A other than third-party independent assessor.

1.1 Scope of Work

The scope of work included the following where applicable:

- Perform visual/olfactory examination of the site and a walk-through inspection of the property to look for signs of any environmental issues.
- Characterize the site's geological, topography, meteorology, hydrogeology, and groundwater conditions.
- Determination of current activities at the site.
- Obtain utility line locates for all public and private utility lines.
- Drill five boreholes to a maximum depth of 7.521 m in selected locations. The boreholes will be drilled with a hydraulic soil drill fitted with 4-inch augers. Two boreholes were used solely for the geotechnical investigation completed by A&A on the site.
- Install three groundwater monitoring wells. The wells will be constructed of 38 mm (1.5") PVC risers with 3.05m long Schedule 40 PVC slotted well screen. EMW1 was constructed with 51 mm (2") PVC risers. Slip end cap will be installed at the end of the riser pipe with threaded drive-points at the bottom of the well. The borehole annulus will be backfilled

with silica sand to approximately 0.3 m above the well screen. A bentonite seal will be placed on the sand pack with a second seal at about 0.3 mbgs. The well will be fitted with a dedicated peristaltic low-flow sample tubing. The well will be installed by a licensed well technician, tagged in accordance with Regulation 903 and recorded on the Ministry of the Environment, Conservation and Park's (MECP) water well information system (WWIS).

- A level survey will be conducted at the site, which consists of measuring the elevation of the top of the well, relative to an arbitrary benchmark. This level survey will be conducted to provide the information used to calculate the groundwater table elevation.
- The groundwater will be sampled and analyzed for selected parameters of concerns.
- Groundwater samples will be evaluated using information obtained from the newly installed monitoring wells following MECP sampling protocol and procedures.
- Evaluate the potential impact of the proposed development on the ground water and surface water resources and their users.
- Provision of a reasonable conclusion regarding the environmental condition of the site.
- Development of recommendations for follow-up investigations if needed.

1.2 Changes to Scope of Work

One monitoring well, EMW-1, was found in the west corner of the subject site. This allowed A&A to only install three monitoring wells and not four as it was planned.

2.0 DESCRIPTION OF THE SUBJECT SITE

The subject site is a rectangular shaped lot with an area of 27,923 m^2. The site lies in the central area of Puslinch, Ontario at 7504 McLean Road. The site is bound by vacant land located northeast and northwest and industrial buildings to the southwest and southeast of the site. The subject study area is located within the Grand River watershed, Mill Creek Subwatershed which contains Mill Creek and the Grand River.

The approximate UTM coordinates are Zone 17T; 570380.95 m Easting; 4812857.13 m Northing. The site is zoned as being "Industrial" as quoted from the Township of Puslinch Comprehensive Zoning By-law No. 023-18 as amended, and is located on the northwest side of McLean Road. The site is currently vacant land.

3.0 DEVELOPMENT PLAN

It is understood that the proposed commercial property will consist of the following:

- A two-storey building with a warehouse on the first floor, offices on the second floor, and no basement
- A water pond
- Infrastructure: Includes roads, parking areas, sewer system, and watermains.

The general arrangement of the proposed development is illustrated in Figure 6 (Appendix A).

The total site area is 27,923 m^2 with a total of 20,980 m^2 being developed as impermeable surfaces.

4.0 PHYSICAL SETTING

4.1 Topography

The regional topography, which is an area within a 5 km radius from the site, has a slope towards Mill Creek. The Township of Puslinch would slope towards Mill Creek, which is southwest of the township. The site sits in the Mill Creek-Grand River watershed that consists of the Mill Creek, Grand River, and its small tributaries. The Mill Creek-Grand River Watershed drains an area of 105 km^2 and flows southwest to empty into the Grand River near Cambridge and eventually will drain into Lake Erie (Lake Erie Source Protection Region Technical Team, 2008). Mill Creek - Grand River Watershed ranges from 320 meters above sea level (masl) to 174 masl (Grand River Conservation Authority, 2024).

The topography in the vicinity of the subject site (a 100-meter radius) ranges from approximately 330 masl to the southeast to 320 masl to the north, northeast, and northwest and the site was observed to be generally flat with a slight slope towards the southwest corner of the site. Aberfoyle creek is located northeast of the subject site with surface topography sloping towards Aberfoyle creek. A tributary of Mill Creek is southwest of the southwest boundary. The tributary flows southwest and drains into the Grand River.

4.2 Geology

The surface deposit in this region, like all of Ontario, was once covered by massive glaciers during the late Wisconsin glacial period. The grinding action of the moving ice masses produced a considerable amount of rock materials, ranging in size from boulders to rock flour which was distributed over the landscape.

Quaternary Geology: The sedimentary record of southern Ontario provides evidence for three distinct climatic stages during the Quaternary period: the Illinoisan glacial stage (130-180,000 years before present (y.b.p), Sangamonian interglacial stage (110-130,000 y.b.p.) and the Wisconsinan glacial stage (110-10,000 y.b.p; Johnson et al, 1997).

The Quaternary geology identified the site to be terminal moraine characterized by sandy-silt and silty-sand deposits.

Paleozoic Geology: Bedrock in the area of the site is part of the Guelph formation characterized by sandstone, shale, dolostone and siltstone.

Physiography of Southern Ontario: The physiography of southern Ontario was altered considerably by the glacial and interglacial episodes that took place throughout the Quaternary period (2 million years to present). Southern Ontario's glacial history is very complex and has been interpreted and discussed by many (Barnett 1992; Karrow 1967; Chapman and Putnam 1984; Dreimanis and Goldthwait 1973; etc.). The site is in the Till Moraines within the Horseshoe Moraines region.

Surficial Geology: The site is identified as Till characterized by stone-poor, and sandy silt to silty sand-textured till on Paleozoic terrain.

Bedrock Geology of Ontario: The site is part of the Guelph Formation, characterized as dolomitic limestones.

4.2.1 Overburden Detailed Summary

The drilling program conducted for this study indicates the overburden deposits are generally consistent across the property. All boreholes revealed underlain the surface to be characterized as follows:

- **Fill**
  - Fill material was encountered in all boreholes (BH24-1 to 5), extending to depths ranging from 1.5 to 2.0 m (mbgl). Fill material was loose to compact, consists of gravel and sand to gravelly silty sand, with trace clay, damp to moist and no odour. This fill comprised clayey silt to sandy silt/sand, moist to wet, firm to stiff in consistency, and compact. The data provided here pertaining to the fill thickness is confirmed at the borehole locations only and may vary between and beyond the boreholes.

- **Glacial Till Deposits**
  - Underneath the fill material, glacial till deposits were encountered in all the boreholes at depths ranging from 1.5 to 2.5 m (mbgl), extending to the maximum explored depth of 7.62 m (mbgl). These deposits consisted of gravelly silty sand trace clay to silty sand some gravel trace clay, occasionally cobble and cobble fragments, moist to wet, and compact to very dense. Auger refusal encountered at BH24-1 at a depth of 7.62 m (mbgl).

5.0 HYDROGEOLOGICAL CONDITIONS

5.1 Hydrogeology

Groundwater and surface water are expected to flow towards the natural slope of the ground surface. Although the surface topography typically has great influence on the groundwater flow it has been observed in several areas that lithology also has a significant influence on the flow, in some cases more so than surface topography. In the latter case, this is believed to be due to relatively transmissive bedrock underlying a silt overburden. Based on the regional topography, groundwater flow is inferred to be in a north-northwest direction towards Aberfoyle Creek. After groundwater was monitored, it was found that groundwater flows in a southwest direction. The groundwater flow direction may also be influenced by future developments to the subject site by utility trenches and other subsurface structures.

During the hydrogeological investigation on the site, three groundwater monitoring wells and one existing monitoring well were installed within the annulus of five boreholes (Figure 4). The well was constructed of 38 mm (1.5") PVC risers with a 3.05m long Schedule 40 PVC slotted well screen. The existing monitoring well was constructed with 51 mm (2”) PVC risers. A ‘J-plug’ secure end cap was installed at the top of the riser pipe with a threaded drive-point at the bottom of the well screen. The borehole annulus was backfilled with silica sand to approximately 0.3m above the well screen. A bentonite seal was placed on the sand pack to about 0.3mbgs. The well was fitted with a dedicated low-flow sampling tubing and a protective, a steel well protector was installed around the riser. The wells were installed by A&A Environmental Consultants, licensed well technicians in accordance with Ontario Regulation 903.

These wells are used to determine the direction of groundwater flow and quality of the groundwater. A level survey was conducted at the site, which consisted of measuring the elevation of the top of the well casings, relative to a benchmark. This level survey was conducted to provide information used to calculate the groundwater table elevation, hydraulic gradient and flow direction. Groundwater levels were obtained from each monitoring well during the year-long monitoring as shown in Table 2. They were recorded to the nearest 0.01 m accuracy, using

an electronic water-table level tape. The total depth of each well was measured and recorded. The groundwater elevations are shown in the well logs (see Tables 1-2 below). These show the highest elevation near MW24-3 on the north west corner of the site and the lowest at EMW-1 on the west corner of the subject site.

Groundwater flow direction was determined using the groundwater elevation of the of the site on July 17, 2024 groundwater monitoring event.

Table 1 – Monitoring Well Details July 17, 2024

Project #8296-BVD Puslinch				
7504 McLean Road, Puslinch, Ontario				
Date Logged: July 17, 2024		**Logged by: E. Fulsom**		
Monitoring Well #	**MW24-1**	**MW24-2**	**MW24-3**	**EMW-1**
Location	South Corner of Site	East Corner of Site	North Corner of Site	West Corner of the site
Pipe Size (mm)	38	38	38	51
UTM Zone	17T	17T	17T	17T
Easting	570329	570427	570309	570246
Northing	4812824	4812938	4812988	4812875
Top of Pipe (masl)	323.668	323.656	323.653	322.161
Water Level (m)	Dry	2.938	0.649	6.25
Water Level (masl)	Dry	320.718	323.004	315.911
Total Depth (m)	7.521	5.49	3.773	6.406
BM = 322.90 masl, Culvert at site entrance				

Table 2 – Groundwater Monitoring Program Levels

Monitoring Well	Elevation (masl)	Groundwater Elevations (masl)						
		20-Dec-24	24-Jan-25	20-Feb-25	21-Mar-25	10-Apr-25	25-Apr-25	01-Jun-25
MW24-1	323.668	316.147*	316.147*	316.147*	316.147*	316.147*	316.147*	316.147*
MW24-2	323.656	318.166*	318.232	318.166*	319.638	319.815	318.467	318.275
MW24-3	323.653	322.965	322.377	322.623	322.879	322.965	322.821	322.866
EMW-1	322.161	315.755*	315.755*	315.755*	315.755*	315.755*	315.755*	315.755*

Monitoring Well	Elevation (masl)	Groundwater Elevations (masl)						
		24-Jun-24	17-Jul-24	30-Jul-24	23-Aug-24	20-Sep-24	25-Oct-24	22-Nov-24
MW24-1	323.668	316.147*	316.147*	316.147*	316.147*	316.147*	316.147*	316.147*
MW24-2	323.656	319.076	320.718	319.026	318.322	318.236	318.296	318.388
MW24-3	323.653	322.941	323.004	322.808	322.880	322.378	322.083	322.980
EMW-1	322.161	315.835	315.911	315.946	315.755*	315.952	315.755*	315.755*

*Denotes Dry Measurement, water level inferred to be below bottom elevation of well

The seasonal change in groundwater hydraulic gradient due to rainfall and spring runoff have a significant influence on the groundwater flow velocities. The groundwater flow velocities were calculated using a hydraulic gradient of 0.155 m/m (MW-3 to EMW-1) using July 17, 2024 groundwater elevation and the hydraulic conductivity of 1 x 10^{-5} cm/s for silty sand materials, with an estimated porosity of 35% (Fetter 2001). The average linear velocity can thus be calculated using the following equation:

$$v = \frac{ki}{n}$$

Where "k" is the hydraulic conductivity, "i" is the hydraulic gradient, and "n "the porosity. By using the above information, the average linear velocities for the silty sand materials are estimated to be 1.40 m/year.

A groundwater contour map, shown below in Figure 5, Appendix A, was plotted using Golden Surfer™ (Surfer 8) and the measurements of groundwater levels taken on July 17, 2024 from three monitoring wells installed in the unconfined aquifer. This map shows well EMW-1 being at the lowest water elevation compared with the other wells used. The general direction of groundwater flow was found to be in a southwest direction.

Due to the importation of unknown fill to the subject site, this non-native soil can influence the subject site groundwater in unpredictable ways such as MW24-1 being dry during every water monitoring. The yearly monitoring does confirm that the groundwater does flow southwest.

5.2 Meteorological Conditions

Meteorological conditions, such as precipitation (rainfall and snowfall) and temperature are of particular interest for understanding the existing surface water regime; the amount of water available for groundwater recharge; and for developing a surface water management system at the subject site. Data for 2023 describing the climatic variables was obtained from the Environment Canada meteorological station "Guelph Turfgrass Institute", located in Guelph, Ontario (Table 3). However, climate varies across large area both spatially and temporally with

local variation created by such factors as topography and prevailing winds. Human activities can also affect local climate. Deforestation may increase stream and peak flood flows while decreasing evapotranspiration. Urbanization can increase cloudiness, precipitation and extreme winter temperatures while decreasing relative humidity, incident radiation and wind speed (Phillips and McCulloch, 1972).

The total precipitation (rainfall plus snowfall) in 2023 was 826 mm, with the greatest amounts falling in March and July. July and August show the highest mean daily temperatures during the year and the lowest temperatures were recorded in February.

Table 3 – 2023 Meteorological Data (Guelph, ON)

MONTH	TOTAL PRECIPITATION (mm)	MEAN TEMPERATURE (°C)
JANUARY	**63.0**	**-2.1**
FEBRUARY	**73.9**	**-2.9**
MARCH	**90.2**	**-0.6**
APRIL	**82.2**	**7.6**
MAY	**30.8**	**11.9**
JUNE	**81.7**	**17.2**
JULY	**149.7**	**19.6**
AUGUST	**81.6**	**17.8**
SEPTEMBER	**17.8**	**16.4**
OCTOBER	**42.3**	**10.8**
NOVEMBER	**49.2**	**2.4**
DECEMBER	**63.4**	**1.7**
SUM	**826**	
AVERAGE		**8.3**

*Denotes incomplete data

Climate is usually defined as normals (or averages) of weather variable over a 30-year period as defined by the World Meteorological Organization (WMO). These "climate normals" refer to arithmetic calculations based on observed climate values for a given location over a specified time period. Climate normals are often used to classify a region's climate and for research in many environmental fields. There are many ways to calculate "climate normals" and the most

useful ones adhere to accepted standards. The WMO considers thirty years long enough to eliminate year-to-year variations. Thus, the WMO climatological standard period for normals' s calculations are computed over a 30-year period of consecutive records, starting January 1st and ending December 31st. In addition, the WMO established that normal's should be arithmetic means calculated for each month of the year form daily data with a limited number of allowable missing values.

The average annual precipitation from 1981-2010 was calculated using historical data collected at the "Waterloo Wellington A" meteorological station, located in Breslau, ON. The average annual precipitation was used to estimate the total amount of water available for surface water and groundwater resources. The average annual precipitation over the thirty-year period was 916mm. For the same period, it was calculated that approximately 553 mm/year would be lost to evapotranspiration leaving a total of approximately 363 mm/year available for groundwater recharge and surface runoff (Environment Canada, 2024).

The natural freeze-thaw cycle, which occurs each year in southern Ontario, significantly impacts the rate and timing of surface water runoff and groundwater recharge. Typically, watercourses in the Puslinch area are frozen over by late January and clear by late March to mid April. There is usually snow on the ground by the end of December, with the greatest accumulations in January and February. By late March, warmer spring temperatures melt the snow pack and normally there is little or no snow cover remaining by the end of April. From January to early March surficial soils are normally frozen and relatively impervious to infiltration. Most of the spring melt waters end up as surface runoff, contributing to high flows in the water bodies near the site.

Climate change has had a significant impact on this region and other regions of Canada. In recent years, it has been noted that snow does not accumulate on the ground until January, rather than in late December. In a warming climate, more precipitation will fall in the form of rain rather than snow, filling reservoirs to capacity earlier than normal. Additionally, a warming climate will result in snow melting earlier in the year than in previous decades, disrupting the traditional timing of melt water runoff. Together, these changes mean less snow accumulation in the winter and

earlier snow-derived water runoff in the spring, challenging the capacities of existing water reservoirs.

5.3 Groundwater Recharge

Recharge or infiltration to the groundwater system occurs by the migration of precipitation through the surficial soil. The amount of recharge or infiltration at a specific site depends on the amount of precipitation evaporated back into the atmosphere, the amount of water transpired from natural vegetation to the air, site topography, type of vegetation and surficial soil type. Surficial geology influences recharge rates. Areas of hummocky topography exhibit higher recharge rates since soil run-off collects in depressions where it can then infiltrate through the surficial soils. Reduction in recharge within urban settings occur due to paved driveways/roads or impermeable rooftop surfaces. As stated in the previous section, 363 mm/year available for groundwater recharge.

5.4 Hydraulic Properties

The amount and rate of groundwater flow through porous media is determined by the hydraulic properties of the unit, particularly hydraulic conductivity (K), the hydraulic gradient and porosity. The response of a flow system to various stresses is largely determined by the previously mentioned parameters along with storage. Hydraulic conductivity is a key hydraulic parameter that can be estimated by numerous field and laboratory methods including formula calculation, documentation, slug tests, and pumping tests.

5.5 Site-Level Water Balance

The basic water balance for a particular area can be expressed as:

$$P = ET + R + I + \Delta S$$

(Thornthwaite and Mather, 1957)

Where:

P = Precipitation (mm/year)

ET = Evapotranspiration (mm/year)

R = Runoff (mm/year)

I = Infiltration (mm/year)

ΔS = Change in groundwater storage (taken as zero under steady state conditions) (mm/year)

Based on the Thornthwaite and Mather methodology, the water balance is accounting water in the hydrologic cycle. Precipitation (P) falls as rain and snow. It can run off towards lakes and streams (R), infiltrate to the groundwater table (I), or evaporate from surface water and vegetation (ET). When long-term average values of P, R, I, and ET are used there is minimal or no net change to groundwater storage (ΔS).

5.5.1 Precipitation and Evapotranspiration

Based on the Canada Climate Normals data from Environment Canada for "Waterloo Wellington A" station between 1981 and 2010 (Environment Canada, 2024); the average annual precipitation was 916 mm. For the same period, it was calculated that approximately 553 mm/year would be lost to evapotranspiration; leaving a total of approximately 363 mm/year available for groundwater recharge and surface runoff.

5.5.2 Infiltration and Runoff

As indicated, there is a water surplus of 363 mm/year at the site, which becomes the infiltration and runoff components of the water balance. The rate of infiltration at a site is expected to vary, based on a number of factors to be considered in any infiltration model. To partition the available water surpluses into infiltration and surface runoff, the MECP infiltration factor was used. The MECP Stormwater Management (SWM) Planning and Design Manual (2003) methodology for calculating total infiltration based on topography, soil type and land cover was used and a corresponding runoff component was calculated for the soil moisture storage conditions. The calculated volumes of infiltration and runoff in the stage of pre-development and post-development are presented in Appendix F and are discussed as follows.

5.5.2.1 Pre – Development

Considering the fact that the site is fairly level, a combination of silt, sand and gravel, and is currently a vacant property; the site may have an infiltration factor of 0.5, i.e., 50% of water

surplus (181.5 mm/year). In the meantime, a total of 181.8 mm/year will become the runoff. Based on the site's area of 27,923 m^2, a total of 5068 m^3 per year will infiltrate, while a total volume of 5068 m^3 per year will become runoff.

5.5.2.2 Post – Development

Based on the information provided by the site plan, it is anticipated that after development, approximately 75% of the site area will be the impervious and hard surface area occupied by the buildings and parking area and 25% will be the pervious area, unpaved areas represent landscaped and green area.

Assuming that 20% of the precipitation will become the evaporation in the non-permeable surface areas, the infiltration volume was calculated to be 1260.2 m^3 per year, which is a deficit of 3807.9 m^3 per year after the development, while the runoff volume was calculated to be 16634 m^3 per year, which is a surplus of 11566.3 m^3 per year after the development.

Based on the water balance assessment, high changes are anticipated in the infiltration and runoff due to the proposed redevelopment at the subject site. There will be an increase in surface runoff due to the redevelopment on-site. A stormwater management plan, will be needed to manage the stormwater runoff on site.

5.5.2.3 Low Impact Developments (LIDs)

Low impact development (LID) practices have been used to reduce peak storm flows, provide water retention and water quality treatment. From a SWM plan, an LID can be used to alter the post development water balance. This will reduce the post-development impact by increasing the infiltration and reducing the runoff. With the implementation of LIDs, the LID infiltration rate will need to be 11566.3 m^3 per year or more. This will increase the total post-development infiltration to 12826.4 m^3 per year and reduce the runoff to 5068.0 m^3 per year, providing the site with infiltration rates and runoff rates that are equivalent or better than the pre-development conditions.

5.6 Groundwater Discharge

As part of the water cycle, groundwater is a major contributor to flow in many streams and rivers and strongly influences river and wetland habitats for plants and animals. Groundwater enters the ground in recharge areas and leaves the ground at discharge points. Discharge is continuous as long as sufficient water is available above the discharge point. The most visible evidence of groundwater discharge occurs as seepage or springs along watercourse banks and is also noted within stream beds as upwellings and boiling creek bed sediments. Based on the groundwater elevation encountered during this investigation groundwater discharge will not be required during the construction at this site.

5.6.1 Construction Dewatering Requirements

Construction dewatering is intended to lower the groundwater levels in the excavation areas in order to provide a "dry" working condition for excavations and construction of foundations and/or associated sewer systems.

The construction dewatering generally depends on the design specifications of the foundation and footings, and the proposed sewer system (invert elevation, length and size of underground utility pipes), and the site hydrogeological conditions such as existing ground water levels and flow regime. Drawdown levels are not required and dewatering discharge rates are not needed to achieve the required drawdown levels for maintaining a dry working condition and stable excavation bottom and slopes for the subject site.

5.6.2 Pre-construction Dewatering

Based on the proposed design plan, the new development consists of construction of a two (2) storey building consisting of a warehouse on the first floor and offices on the second floor, a water pond, and infrastructure. The building will be built with no basement. The developed area at the site is approximately 27,923 m^2. The ground surface is estimated to be at between 323.5 masl

5.6.3 In-Construction (Short – Term) Dewatering

Based on the proposed development, the excavation for construction will mainly take place in the glaciofluvial deposits. The glaciofluvial deposit as described before is characterized by predominantly silty sand matrix. The lowest proposed underside footing elevation is at 322.3 masl. The highest water level measured in the till deposits within the vicinity of the building was 316.147 masl at Monitoring Well EMW-1, which is below the proposed underside of footing elevation and the target water level for construction. Given this, there will be no groundwater intrusion into the excavation pit, no in-construction (short term) dewatering is needed.

5.6.4 Post-Construction (Long – Term) Dewatering

Based on the proposed development, the excavation for construction will mainly take place in the glaciofluvial deposits. The glaciofluvial deposit as described before is characterized by predominantly silty sand matrix. The highest water level measured in the till deposits within the vicinity of the building was 316.147 masl at Monitoring Well EMW-1, which is above the proposed finished floor elevation. Given this, there will be no groundwater intrusion into the excavation pit, no post-construction (long term) dewatering is needed.

5.7 Permit-To-Take-Water/EASR Posting

Any construction dewatering or water takings in Ontario is governed by Ontario Regulation 387/04 – the Water Taking and Transfer, an Ontario Regulation made under the Ontario Water Resources Act (OWRA), and/or Ontario Regulation 63/16 – Registrations under Part II.2 of the Act – Water Taking, made under Environmental Protection Act.

According to O. Reg. 387/04, any water taking over 50,000 litres per day should not take place without a valid permit, which shall be applied in accordance with the MECP's Permit-to-Take-Water (PTTW) Manual, dated April 2005. According to O. Reg. 63/16, the construction site dewatering between 50,000 L/day and 400,000 L/day shall be registered through Environmental Activity and Sector Registry (EASR).

Based on the site condition, positive dewatering will not be workable at the site for the building footings construction. The construction dewatering (likely by sump pumping) and post construction drainage were evaluated to be in an amount below 50,000 L/day. Therefore, a PTTW or EASR posting will not be required.

5.8 Soil Characteristics for Drainage, Infiltration and Percolation

Using the geotechnical soil sample results from the geotechnical investigation prepared by A&A, the grain size analysis and moisture content can give us details on the soil characteristics for drainage, infiltration and percolation. This report also had details from a previous geotechnical report and a sample analyzed by Terraprobe. Laboratory data can be found in Appendix D.

Table 4 – Soil Characteristics and Grain Size Analysis

BH #	Moisture Content (%)	Grain Size Content (%)				Sample Depth	Sample Description
		Gravel	Sand	Silt	Clay	Ft (m)	
BH24-1 (SS2)	10.7	44	38	13	5	2.6-4.6 (0.8-1.4)	Gravel and sand, some silt, trace clay
BH24-4 (SS5)	9.3	28	44	24	4	9.8-11.8 (3.0-3.6)	Gravelly silty sand, trace clay
Terraprobe BH-1 (SS5)	9.2	15	43	33	9	10.8 (3.3)	Silty Sand, some gravel, trace clay

The soil in this area can be seen as silty sand with some gravel.

Using the laboratory results above, hydraulic conductivity can be calculated using Hazen's empirical formula (Fetter, 2007):

$$K = C(d_{10})^2$$

Where K = hydraulic conductivity (cm/s)

d_{10} = grain size of the 10th percentile (cm)

C = constant according to the following table:

Very fine sand, poorly sorted = 40-80

Fine sand with many fines = 40-80

Medium sand, well sorted = 80-120

Coarse sand, poorly sorted = 80-120

Coarse sand, well sorted = 120-150

If your sample is poorly sorted, you will have relatively equal mass fractions in a variety of different sizes and your histogram will look fairly even. The values for the borehole locations and depth can be seen in Table 5. *C* for this sample will be between 40-80 as they are considered fine sands, silts and clays. The *T-time* or *percolation time* can be calculated from the hydraulic conductivity. This is using the following formulas:

$$Approximate\ infiltration\ rate^{(1)} = \left(\frac{K}{6 \times 10^{-11}}\right)^{\frac{1}{3.7363}} \quad mm/hr$$

$$Percolation\ Time\ = \ (infilration\ rate\ )^{-1} \times (60\ min/hr) \times (10\ mm/cm)\ \ min/cm$$

Note (1) Ontario Ministry of Municipal Affairs and Housing (OMMAH). 1997.

Table 5 – Hydraulic Conductivity and Percolation Time

BH #	Depth (m)	D_{10} (cm)	C	K (cm/s)	Approximate Infiltration Rate (mm/hr)	T-time/ Percolation Time (min/cm)	Notes
BH24-1 (SS2)	1.4	0.001	80	$8.0x10^{-5}$	43.581	13.767	Gravel and sand, some silt, trace clay
BH24-4 (SS5)	3.6	0.001	80	$8.0x10^{-5}$	43.581	13.767	Gravelly silty sand, trace clay
Terrap robe BH-1 (SS5)	3.3	0.0035	80	$1.2x10^{-5}$	26.372	22.755	Silty Sand, some gravel, trace clay

The infiltration rate of 26 mm/hr and percolation time of 23 min/cm can be used for design purposes based upon the values above.

6.0 POTENTIAL CONSTRUCTION DEWATERING IMPACTS

6.1 Local Water Use

A search of the MECP well records show a total of 27 wells located within 500 meters of the subject site as follows:

- Two wells with no use listed,
- Two commercial wells,
- Six domestic wells,
- One domestic commercial well,
- One domestic industrial well,
- Three industrial wells,
- Nine monitoring wells,
- One livestock domestic well,
- One other well, and
- One test hole

It is clear from the MECP water well database and the information obtained during the field survey that the local residents obtain their water from domestic wells in Puslinch. Table 6 presents the summary of the wells from the well records, showing the UTM coordinates, drilling date, total depth and water found elevation. The MECP well records show groundwater was found between 3.96 – 6.71 mbgs, for a well drilled in the unconfined aquifer to approximately between 3.96 – 7.62 mbgs. It should be noted that the water levels provided in these tables do not represent current water level depths because those wells more likely measured at the time of drilling. However, the drilling program completed at this site show the groundwater was found between 2.1– 6.5 mbgs for monitoring wells drilled between 4.57 – 7.62 mbgs. Newly constructed supply wells for the site should be either installed in the upper bedrock aquifer or appropriately cased and sealed into the lower aquifer, in accordance with R.R.O. 1990, Reg. 903: Wells, to minimize potential groundwater movement between the upper and lower bedrock aquifers. This ensures no wells are installed that connect the two aquifers.

The site and the surrounding properties are expected to be serviced by the domestic wells. Therefore, the domestic wells need to be taken into consideration during construction to make sure they are not impacted by the development.

Table 6 – Water Wells on and within 0.5 km of the Proposed Development

Well No.	UTM Coordinate Zone 17T		Date Drilled	Total Depth	Water Level	Water Use
	Easting	Northing		(mbgs)	(mbgs)	
7291402	569850	4812531	2017	N/A	N/A	Not listed
7199708	569956	4812447	2012	N/A	N/A	Not listed
6709384	570809	4812624	1988	50.29	48.77	Commercial
6708700	570797	4812633	1986	40.54	39.62	Commercial
6703496	569944	4812433	1969	25.91	25.30	Domestic
6709478	570658	4812485	1988	56.69	38.10	Domestic
7214833	570123	4812596	2013	61.26	48.77	Domestic
7214832	570160	4812622	2013	60.96	60.96	Domestic
6715246	570450	4812869	2004	42.98	31.39	Domestic
6716008	570566	4812683	2006	74.37	74.37	Domestic
7341679	570718	4812446	2019	79.25	54.86	Domestic Commercial
6714198	570790	4812414	2002	48.77	48.16	Domestic Industrial
6710048	570834	4812414	1989	37.49	36.58	Industrial
6711872	570240	4812553	1995	73.15	67.06	Industrial
7046280	570583	4812680	2007	42.67	42.67	Industrial
7122497	569890	4812610	2008	7.62	N/A	Monitoring
7214719	570082	4813059	2013	3.96	N/A	Monitoring
7214720	570126	4813068	2013	3.96	N/A	Monitoring
7214721	570071	4813023	2013	3.96	N/A	Monitoring
7214722	570126	4813068	2013	5.79	N/A	Monitoring
7394717	569861	4812403	2021	10.67	6.40	Monitoring
7412599	570282	4812616	2022	15.24	12.80	Monitoring
7412600	570246	4812408	2022	16.76	15.24	Monitoring
7412601	570380	4812541	2022	16.76	N/A	Monitoring
7201847	569892	4812501	2013	21.95	N/A	Other
6707585	569874	4812423	1981	28.96	27.43	Livestock Domestic
7159585	570072	4812572	2011	8.84	N/A	Test hole

6.2 Hydrological Evaluation

6.2.1 Wellhead Protection Sensitivity Area

The site and the neighbouring properties are not located within a wellhead protection area.

6.2.2 Surface Water

During the site visits, no standing water was visible. After redevelopment of this site, a high increase to the amount of runoff water will be created. This should be considered during the creation of a SWM plan.

6.2.3 Potential Sources of Contamination

No sources of apparent environmental concern were noted on the site.

6.2.4 Ground Subsidence in Adjacent Structures

Under certain conditions, dewatering activities can cause ground settlement which results from the increase in effective stresses caused by the lowering of groundwater level and subsequent decrease in pore pressure. Based on obtained groundwater levels during this investigation, no influence is anticipated due to the new development.

6.2.5 Hydrological Features and Measures

Within the vicinity of the subject site, the feature that could be impacted by development is a tributary of Mill creek, Aberfoyle Creek, and the provincially significant wetland (PSW) located to the north of the subject site. This tributary creek is downgradient and approximately 3.53 km southwest from the subject site. Silt fences at the southwest boundary of the subject site should mitigate any overland flow of run-off water and any transfer of soils. The distance alone from the subject site should allow for no ill-effect on the tributary. Aberfoyle creek is located north of the subject site. The PSW is located north of the subject site and is at a lower elevation. Ensuring the proper stormwater management on site will mitigate the impact of the surface water runoff to Aberfoyle creek and the PSW. The groundwater flow direction is to the southwest so no impact to either of these features from the groundwater will occur. This development should not have any adverse effects on the Hydrological Feature or on the related ecological functions.

7.0 GROUNDWATER QUALITY

7.1 Groundwater Sampling Protocol

Groundwater samples were collected from the monitoring wells using dedicated inertial samplers. Clean nitrile gloves were used to minimize the potential for secondary contamination of the samples. Sampling of the monitoring well, MW-3 was conducted July 30, 2024. The groundwater sampling was compared to Ontario Drinking Water Standards (ODWS).

Specific Quality Assurance/Quality Control (QA/QC) measures were undertaken to ensure that the groundwater samples collected and the subsequent chemical analysis of the samples provided representative results. Upon arrival at each well site, the well was inspected for signs of damage or interference, the well cap removed and the top-of-pipe depth to the water table and to the bottom of the well measured using a Solinst electric depth meter. The top-of-pipe to ground level was also measured. This data was recorded on the field monitoring log sheets and any abnormalities were noted. The volume of the water in the well was calculated and three times this volume was purged from the well using the pre-installed Waterra low-flow tubing. The samples were taken using low-flow peristaltic pumps. All samples were collected into the appropriate bottles, each supplied by the laboratory. Groundwater samples were kept on ice in coolers until delivered to AGAT Laboratories Ltd. (AGAT), of Mississauga, Ontario. AGAT is accredited by the Standards Council of Canada (SCC) and Canadian Association of Laboratory Accreditation (CALA) and is licensed for these tests by the MECP. All samples submitted to the laboratory were identified by a unique sample number. In addition, the laboratory carried out its own internal QA/QC procedures. The results of the chemical analyses are shown in the Certificates of Analysis in Appendix C**.**

7.2 Assessment of Water Quality

The health-related parameters tested were Arsenic; Cadmium; Chromium; Lead; and Fluoride. The non-health related parameters tested were pH; Total dissolved Solids; Aluminum; Copper; Manganese; Titanium and Zinc. Results of analysis were compared to the ODWS.

7.2.1 Health Related Parameters

- **Total Arsenic:** Arsenic is a semi-metal, a member of the nitrogen family occurring naturally in the environment. It is odorless and tasteless. Consumption in food and water are the major sources of arsenic exposure for the majority of North American citizens. People may also be exposed from industrial sources, as arsenic is used in semiconductor manufacturing, petroleum refining, wood preservatives, animal feed additives, and herbicides. Arsenic can combine with other elements to form inorganic and organic arsenicals. In general, inorganic derivatives are regarded as more toxic than the organic forms and it is primarily the inorganic forms which are present in water. Exposure to arsenic at high levels poses serious health effects as it is a known human carcinogen. In addition, it has been reported to affect the vascular system in humans and has been associated with the development of diabetes. MW-3 have levels above the guideline standard but due to no current or historical sources, this is naturally occurring and would not have a negative impact on the groundwater.
- **Total Cadmium:** Cadmium is a rare element that is extremely unlikely to be present as a significant natural contaminant in drinking water. Cadmium compounds used in electroplated materials and electroplating wastes may be a significant source of drinking water contamination. Other than occupational exposure and inhalation from cigarette smoke, food is the main source of cadmium intake. In the monitoring well, indication of levels of cadmium were below the ODWS.
- **Total Chromium:** If Chromium is present in raw water, it may be oxidized to a more harmful hexavalent form during chlorination. Chromium in the more highly oxidized form may be present in older yellow paints and in residues from plating operations and around old re-circulating water cooling systems. In the monitoring well, indication of levels of cadmium were below the ODWS.
- **Lead:** Lead is typically only present as a result of corrosion of lead solder, lead containing brass fittings or lead pipes which are found close to or in domestic plumbing and the service connection to buildings. Lead ingestion should be avoided particularly by pregnant women and young children, who are the most susceptible. It is recommended that only

the cold-water supply be used for drinking/consumption and only after five minutes of flushing to rid the system of standing water. Corrosion inhibitor addition or other water chemistry adjustments may be made at the treatment plant to reduce lead corrosion rates where necessary. MW-3 have levels above the guideline standard but due to no current or historical sources, this is naturally occurring and would not have a negative impact on the groundwater.

- **Fluoride:** When fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5-0.8 mg/L, the optimum level for control of tooth decay. Where supplies contain naturally occurring fluoride at levels higher than 1.5 mg/L but less than 2.4 mg/L the Ministry of the Health and Long-Term Care recommends an approach through local boards of health to raise public and professional awareness to control excessive exposure to fluoride from other sources. In the monitoring well, indication of levels of fluoride where non-detect of the laboratory's reporting detection limit (RDL).

7.2.2 Non-health Related Parameters

- **pH:** pH is a parameter that indicates the acidity of a water sample. The principal objective in controlling pH is to produce a water that is neither corrosive nor produces incrustation. In the monitoring well tested, indication of pH levels fell within the appropriate range set out by the ODWS.
- **Total Dissolved Solids (TDS):** TDS comprise of inorganic salts and small amount of organic matter that is dissolved in water. TDS can originate from natural sources, sewage, urban and agricultural runoff and industrial wastewater. High TDS levels can change the taste and texture of the water making it unfit for consumption. In the monitoring well tested, indication of TDS levels fell within the appropriate range set out by the ODWS.
- **Total Aluminum:** Aluminum in untreated water is present in the form of fine particles of alumino-silicate clay. These clay particles are effectively removed in coagulation/filtration. Aluminum found in coagulant treated water is due to the presence of aluminum left over from use of the coagulant. High aluminum can cause coating of the pipes resulting in increased energy requirements for pumping, interference with certain industrial processes and flocculation. Medical studies have not provided clear evidence

that residual aluminum has any effect on health. MW-3 have levels above the guideline standard but due to no current or historical sources, this is naturally occurring and would not have a negative impact on the groundwater.

- **Total Copper:** Copper occurs naturally in the environmental but is rarely present in raw water. Copper is used extensively in domestic plumbing in tubing and fittings and is an essential trace component in food. Although the intake of large doses of copper has resulted in adverse health effects such as stomach upsets, the levels at which this occurs are much higher than regulated limits. In the monitoring well tested, indication of copper levels fell within the appropriate range set out by the ODWS.
- **Total Manganese:** Manganese is objectionable in water supplies because it stains black and produces an undesirable taste. Manganese is present in some groundwater because of chemically reducing underground conditions coupled with presence of manganese mineral deposits. Manganese is also occasionally present, seasonally, in surface waters when anaerobic decay processes in sediments occurring. The monitoring well has levels above the guideline standard but due to no current or historical sources, this is naturally occurring and would not have a negative impact on the groundwater.
- **Total Titanium:** Titanium is an element found naturally in many igneous and sedimentary rocks. Titanium compounds are stable in soil, so only small amounts of titanium end up in water from the weathering of rocks. Titanium may also be present in groundwater due to manufacturing effluent. Titanium is relatively non-toxic. It does not accumulate in the human body. In the monitoring well tested, indication of titanium levels fell within the appropriate range set out by the ODWS.
- **Total Zinc:** Zinc occurs in small amounts in almost all igneous rocks. The natural zinc content in soil is estimated to be 1-300 mg/kg. Zinc can impart an undesirable taste to drinking water. In natural surface water the concentration of zinc is usually below 10µg/L and in groundwater is between 10-40 µg/L. Acute toxicity can occur in humans if excessive amounts of zinc are ingested. In the monitoring well tested, indication of zinc levels fell within the appropriate range set out by the ODWS.

Results of analysis were compared to ODWS The results can be found below in Table 8.

Table 7 – Summary of Groundwater Samples

Sample Description	**6040869**			
Date Sampled	**07/30/2024**			
Parameter	**Unit**	**G / S**	**RDL**	**MW-3**
Water Quality Assessment				
Electrical Conductivity	µS/cm		2	1070
pH	pH Units	6.5-8.5[1]	NA	7.52
Saturation pH (Calculated)				6.64
Langelier Index (Calculated)				0.877
Hardness (as CaCO3) (Calculated)	mg/L	80-100[1]	0.5	468
Total Dissolved Solids	mg/L	500[1]	10	620
Alkalinity (as CaCO3)	mg/L	30-500[1]	5	377
Bicarbonate (as CaCO3)	mg/L		5	377
Carbonate (as CaCO3)	mg/L		5	<5
Hydroxide (as CaCO3)	mg/L		5	<5
Fluoride	mg/L	1.5[2]	0.02	<0.05
Chloride	mg/L	250[1]	0.10	19.1
Nitrate as N	mg/L	10[2]	0.02	<0.05
Nitrite as N	mg/L	1[2]	0.000002	<0.05
Bromide	mg/L		0.05	<0.05
Sulphate	mg/L	500[1]	0.05	181
Ortho Phosphate as P	mg/L		0.05	<0.10
Ammonia as N	mg/L		0.12	4.82
Total Phosphorus	mg/L		0.10	0.72
True Colour	TCU	5[1]	2.50	13.4
Turbidity	NTU	5[1]	0.87	507
Total Calcium	mg/L		0.004	102
Total Magnesium	mg/L		0.003	51.9
Total Potassium	mg/L		0.006	46.3
Total Sodium	mg/L	200[1] 20[2]	0.004	35.6
Aluminum-dissolved	mg/L	0.1[1]	0.002	41.1
Total Antimony	mg/L	0.006[2]	0.020	<0.003
Total Arsenic	mg/L	0.01[2]	0.0002	0.028
Total Barium	mg/L	1.0[2]	0.40	0.280
Total Beryllium	mg/L		0.006	<0.002
Total Boron	mg/L	5[2]	0.0010	0.208
Total Cadmium	mg/L	0.005[2]	0.004	0.0009
Total Chromium	mg/L	0.05[2]	0.100	0.048
Total Cobalt	mg/L		0.0010	0.0282
Total Copper	mg/L	1[1]	0.20	0.077
Total Iron	mg/L	0.3[1]	0.004	61.5

Sample Description	6040869			
Date Sampled	07/30/2024			
Parameter	**Unit**	**G / S**	**RDL**	**MW-3**
Total Lead	mg/L	0.010[2]	0.0001	0.189
Total Manganese	mg/L	0.05[1]	0.004	4.10
Dissolved Mercury	mg/L	0.001[2]	0.006	<0.0001
Total Molybdenum	mg/L		1.00	0.013
Total Nickel	mg/L		0.004	0.045
Total Selenium	mg/L	0.05[2]	0.20	<0.004
Total Silver	mg/L		0.0002	<0.0002
Total Strontium	mg/L		0.010	0.325
Total Thallium	mg/L		0.0006	<0.0006
Total Tin	mg/L		0.004	<0.004
Total Titanium	mg/L		0.20	0.526
Total Tungsten	mg/L		0.020	<0.020
Total Uranium	mg/L	0.02[2]	0.0010	0.0016
Total Vanadium	mg/L		0.004	0.070
Total Zinc	mg/L	5[1]	0.040	0.882
Total Zirconium	mg/L		0.008	<0.008

[1] Ontario Regulation 169/03 Aesthetic Objectives (AO) & Operational Guidelines (OG) Standards
[2] Ontario Regulation 169/03 Maximum Acceptable Concentration (MAC) Interim Maximum Acceptable Concentration (IMAC) Standards
NOTE: Exceedances to either standard is hi-lighted in red

The analysis results indicate that all health and non-health related parameters recorded levels below the ODWS (Ontario Drinking Water Standards (Objectives)) except for: hardness, turbidity, total sodium, arsenic, chromium, iron, lead, and manganese. These parameters are known to be naturally occurring in hard rock areas of Ontario and would not have a negative impact on the groundwater.

8.0 SEPTIC SERVICING STRATEGY

A septic system will be used to service the proposed development's wastewater. A water quality impact assessment will be completed to assess the risk of the presence of the septic system on site and if it impacts off-site.

8.1 Water Quality Impact Risk Assessment

According to the MECP's "Individual On-Site Sewage System: Water Quality Impact Risk Assessment" (Procedure D-5-4), which is in place to protection of the environment and public health by ensuring that development utilizing individual on-site sewage systems proceeds at a density and scale which will not cause degradation of the surface and groundwater resources in exceedance of acceptable limits. The lot size plays a vital role in the impact assessment and since the size of the proposed development is more than one hectare the guideline indicates that a detailed hydrogeological assessment may not be required if the study area is not hydrogeological sensitive. Compliance with acceptable limits shall be demonstrated through a prediction of the development's nitrate impact on the groundwater at the development boundary.

The groundwater impact assessment will address the ability of the lands to treat sewage effluent to meet acceptable limits. This will require determination of the representative existing background nitrate levels in the receiving groundwater. This determination will involve the collection of groundwater samples from various locations on the development site. A discussion of the existing background nitrate concentrations relative to nitrate sources, and susceptibility of groundwater to contamination will be provided. For the purposes of this assessment the ODWS of 10 mg/L of nitrate will be used as an indicator of groundwater impact potential.

8.2 Lot Size Consideration

The entire subject site is 27,923 m^2. For the proposed development of the building, the area is approximately 1,316 m^2.

8.3 Results of Analysis of Nitrate

Groundwater samples were collected from the monitoring wells on July 30, 2024. The groundwater sampling was compared to the ODWS. The groundwater sampling was compared to the ODWS.

Table 8 – Summary of Results of Analysis for Nitrate Compared to ODWS

Parameter	Unit	ODWS	RUC	MW-3
Inorganic Water Chemistry				
Nitrate as N	mg/L	10	6.3	<0.05

8.4 Nitrate Dilution Calculations

The study area for this investigation is one lot that is undeveloped with one sewage systems on site. The lot area is 27,923 m^2. Table 8 shows the concentrations of nitrate on the subject site from MW-3. The highest concentration is all monitoring wells is <0.05 mg/L, therefore the value of 0.05 mg/L will be used. This allows the following calculations to be made:

$$Property\ Area\ (Lot)\ = 27{,}923\ m^2$$

$$Recharge\ Rate = \ 0.181 \frac{m}{year}$$

$$Recharge\ = 27{,}923\ m^2 \times 0.181\ m/yr = 5{,}054.06\ m^3/year = 13.85\ m^3/day$$

$$Existing\ Nitrate\ level\ of\ groundwater\ (Lot)\ = 0.05\ mg/L\ as\ N$$

$$Natural\ Nitrate\ Loading\ (Lot)\ = 11.9\ g/day$$

$$Sewage\ Output = 10000\ l/day = 10\ m^3/day$$

$$Nitrate\ Loading\ from\ sewage\ system = 40 g/day$$

$$Average\ Nitrate\ level\ of\ water\ leaving\ the\ property$$

$$= \frac{40 \frac{g}{day} + 10.9 \frac{g}{day}}{13.85 \frac{m^3}{day} + 10 \frac{m^3}{day}} = 2.176\ mg/l$$

According to the nitrate loading assessment, average nitrate levels in water leaving the study area are less than 3 mg/L. This level is below the 10 mg/L ODWS indicating there is no significant impact on the water quality. From this assessment, as well as the soil characteristics and

percolation time, ideal conditions exist on-site to allow for the installation of an on-site septic system.

8.5 Conclusions of the Impact Risk Assessment

Due to the lot size consideration, groundwater flow direction and the current levels of nitrate, A&A believes that the groundwater system would not be impacted by the development of an on-site sewage system.

9.0 CONCLUSIONS AND RECOMMENDATION

The assessment of the available data indicates that:

- A & A Environmental Consultants Inc. (A&A) was retained by BVD (the client), to evaluate the potential impact from the proposed development of a commercial development (Transportation depot) on local groundwater/surface water resources by conducting a small-scale hydrogeological study. The subject site is located at 7504 McLean Road, Puslinch, Ontario. The area of the site is approximately 27,923 m^2 (6.90 acres). At the time of the investigation, the site was vacant.

- The topography in the vicinity of the subject site (a 100-meter radius) ranges from approximately 330 masl to the southeast to 320 masl to the northwest of the site and was observed to be generally flat with a slight slope toward the southwest corner of the site.

- The MECP well records show groundwater was found between 3.96 – 6.71 mbgs, for a well drilled in the unconfined aquifer to approximately between 3.96 – 7.62 mbgs. The drilling program completed at this site shows the groundwater was measured between 2.1– 6.5 mbgs for monitoring wells drilled between 4.57-7.521 mbgs.

- The water table in the study area was defined by installing a total of three monitoring wells and one existing monitoring well in the area of the proposed redevelopment and monitoring those wells on the subject site. The three monitoring wells installed by A&A were drilled to a maximum depth of 7.521 mbgs. Not all wells contained water in each of the seven monitoring events as MW24-1 was dry at every monitoring event. It was concluded that the seasonally high groundwater levels present on site were at elevations between 255.536 – 315.323 masl. A&A understands that four seasons of groundwater monitoring is needed and will continue monitoring on site. The monitoring will continue in September 2024 and repeat every month until the last monitoring in May/June 2025.

- A groundwater contour map was plotted using "Golden Software" (Surfer 8) and the measurements of groundwater levels taken on July 17, 2024 from three monitoring wells and one existing monitoring well. This map shows well EMW-1 being at the lowest water elevation compared with the other wells used. The general direction of groundwater flow was found to be in a southwest direction.
- The total precipitation (rainfall plus snowfall) in 2023 was 826 mm. The average annual precipitation over the thirty-year period was 916.5 mm. For the same period, it was calculated that approximately 553 mm/year would be lost to evapotranspiration; leaving a total of approximately 363.5 mm/year available for groundwater recharge and surface runoff.
- Based on the water balance assessment, high changes are anticipated in the infiltration and runoff due to the proposed redevelopment at the subject site. A stormwater management plan, is recommended to manage the increased stormwater runoff on site.
- The analysis results indicate that all health and non-health related parameters recorded levels below the ODWS (Ontario Drinking Water Standards (Objectives)) except for: hardness, turbidity, total sodium, arsenic, chromium, iron, lead, and manganese. These parameters are known to be naturally occurring in hard rock areas of Ontario and would not have a negative impact on the groundwater.

Based on the obtained information from this study, A&A has the following recommendations:

1. Due to the increased runoff rate on site post development, a stormwater management plan is recommended. Proper planning as well as implementing LIDs will mitigate the stormwater that accumulates.

2. Due to the water levels being below the foundation bottom, the excavation area will NOT need to undergo short-term dewatering. The groundwater levels are below the finished floor elevation and footings, therefore long-term dewatering will NOT be required.

3. No adverse impact on the groundwater resources is expected to occur during the redevelopment of the subject site with the implementations of these recommended actions.

4. Any unused wells must be abandoned by a licensed well contractor in accordance with R.R.O. 1990, Reg. 903: Wells.

5. Any import/export of fill/soil from the site must be conducted in accordance with O. Reg. 406/19: On-Site and Excess Soil Management, the Rules for Soil Management and Excess Soil Quality Standards (Soil Rules) and O. Reg. 153/04, as amended.

6.

SIGNED:

Thomas Demers, P. Eng., QP_{ESA}
Project Manager

SIGNED:

Dr. Ali A. Rasoul, Ph.D., EP, P. Geo.
Senior Hydrogeologist

10.0 REFERENCES

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11.0 QUALIFICATIONS OF THE ASSESSORS

A & A Environmental Consultants Inc. is a multi-disciplinary environmental consulting firm offering consulting services in the fields of site assessments (Phase I-II), cleanups, water resource studies, aggregate permitting, landfill design and monitoring, geotechnical studies, air quality studies, designated substances surveys and environmental impact studies. A&A has more than 20 years of experience in environmental consulting in the province of Ontario, Alberta, Saskatchewan, British Columbia and have preformed thousands of projects from small scale Phase I ESAs to large scale landfill design, hydro-geological studies and groundwater management plans. We have a number of senior, experienced staff who consult in a variety of disciplines and offer our clients expert knowledge in both the technical aspects of a project and the environmental regulations applicable.

Dr. Ali A. Rasoul, Ph.D., EP, P. Geo., QP

Principal Consultant

The report was reviewed by Dr. Ali A. Rasoul, a Principal Consultant with A&A. He has over 20 years experience in his field. He has completed hundreds of environmental projects including Phase I/II/III ESAs, mould assessments, hydrogeological investigations, designated substances surveys and water management plans. He is a licensed Professional Geoscientist with the Association of Professional Geoscientists of Ontario and a licensed Well Technician in the Province of Ontario (Ministry of the Environment, Conservation and Parks). He is also a licensed Professional Geoscientist in Alberta, Saskatchewan and British Columbia. Dr. Rasoul is registered as a “Qualified Person” for conducting ESAs as defined under Ontario Regulation 153/04 and 511/09.

12.0 LIMITATIONS

The report was prepared for the exclusive use of the client. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from A&A will be required. With respect to third parties, A&A has no liability or responsibility for losses of any kind whatsoever including direct or consequential financial effects on transactions or property values, or requirement for follow-up actions and costs.

The investigation undertaken by A&A with respect to this report and any conclusions or recommendations made in this report reflect A&A's judgment based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observations of the site as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, or portions of the site, which were unavailable for direct investigation. A&A has used professional judgment in analysing this information and formulating these conclusions.

A&A makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.

APPENDIX A – Site Maps

Figure 1 – Map Showing the Site Location

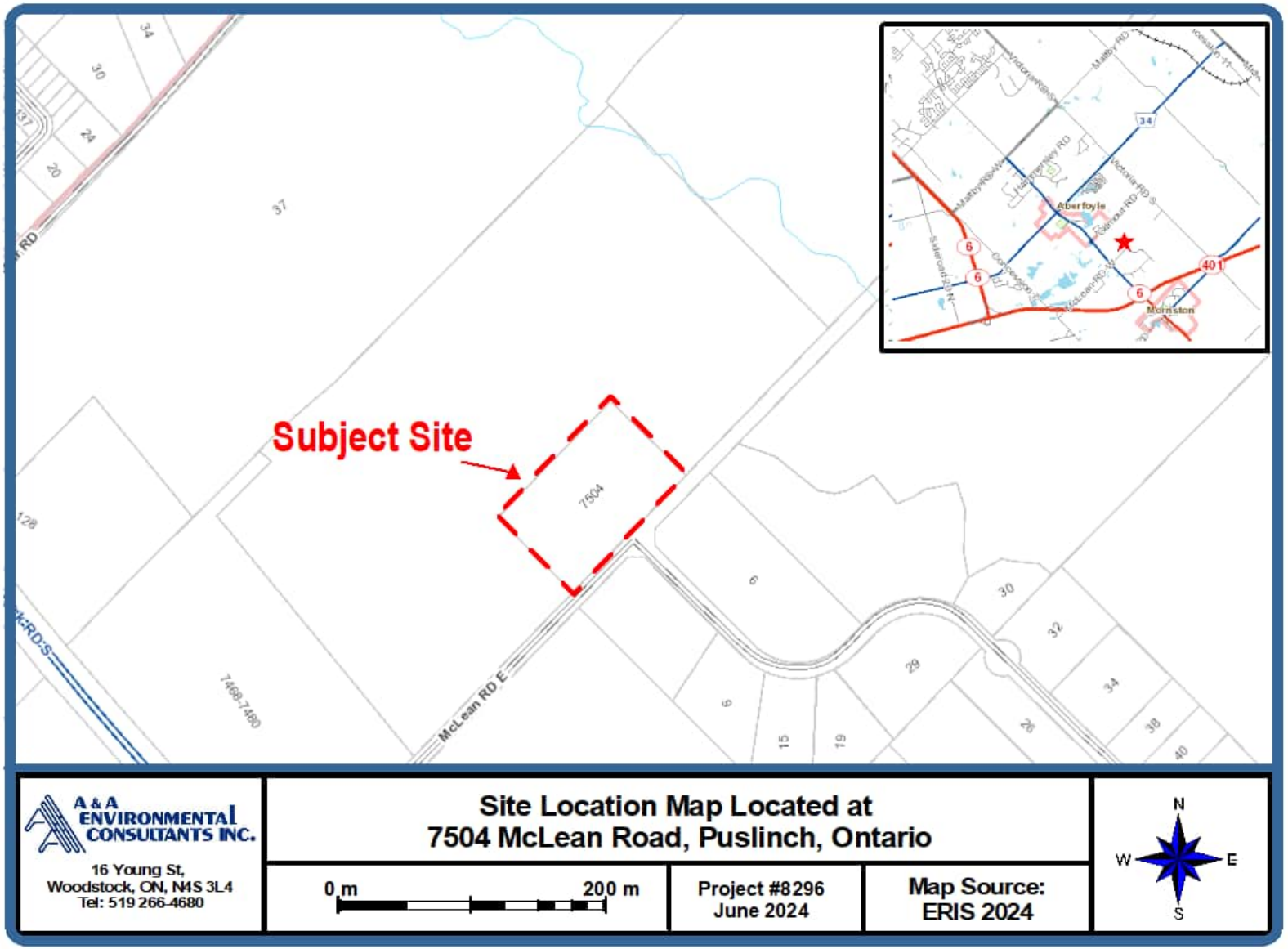


Figure 2 – Satellite Map of Site and Subject Study Area

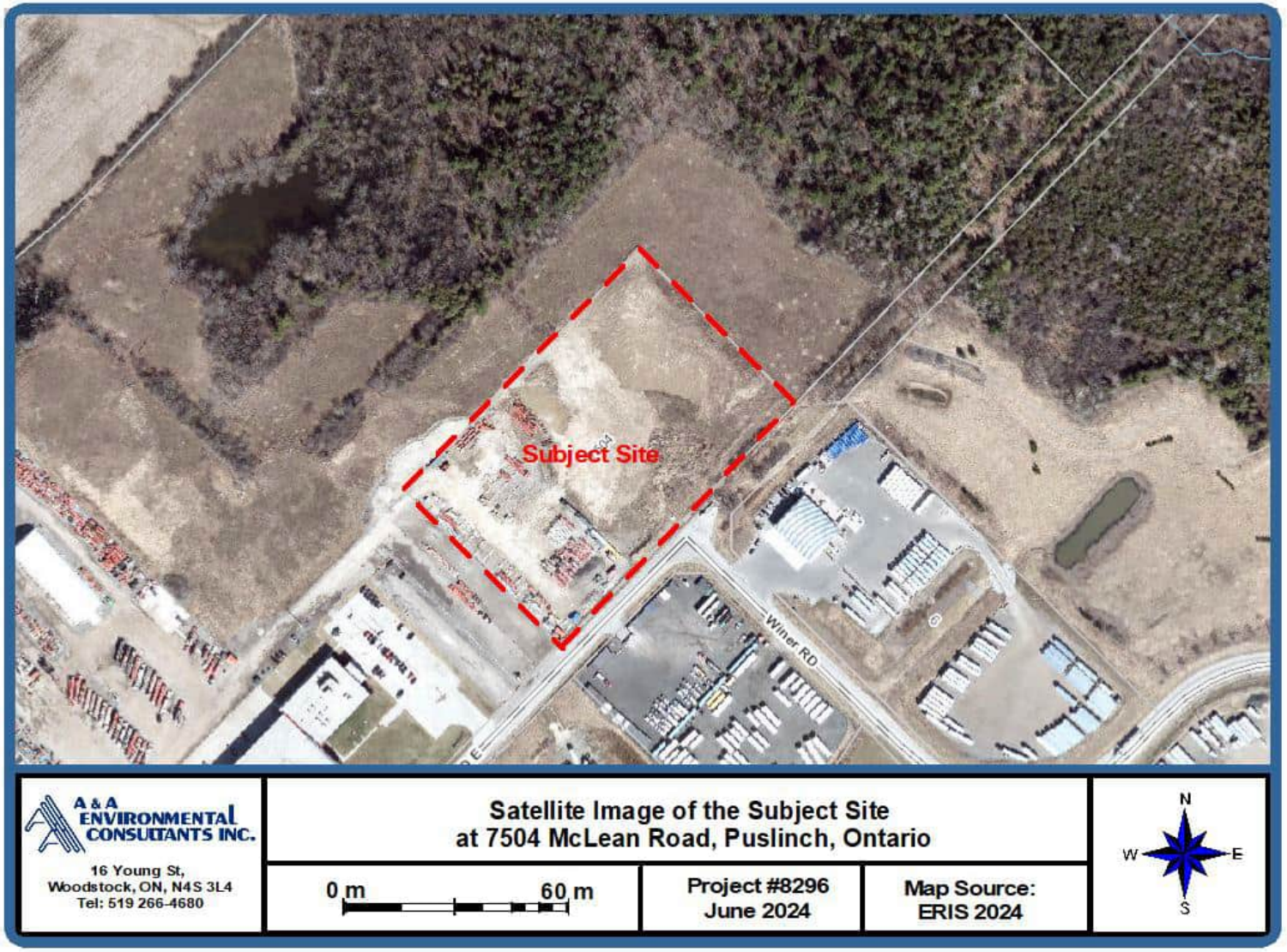


Figure 3 – Topographic Map

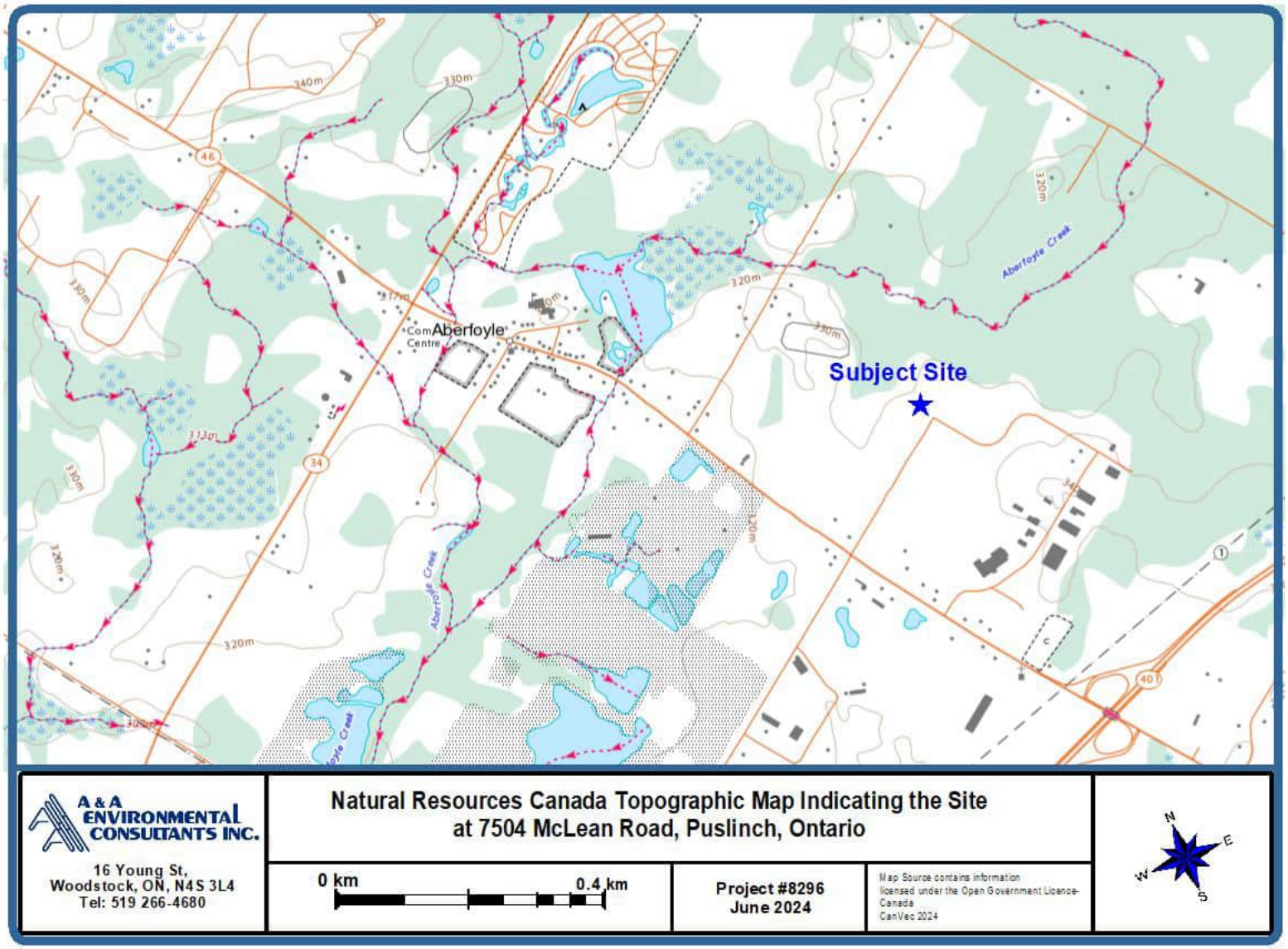


Figure 4 – Monitoring Wells Location Map – Satellite Image

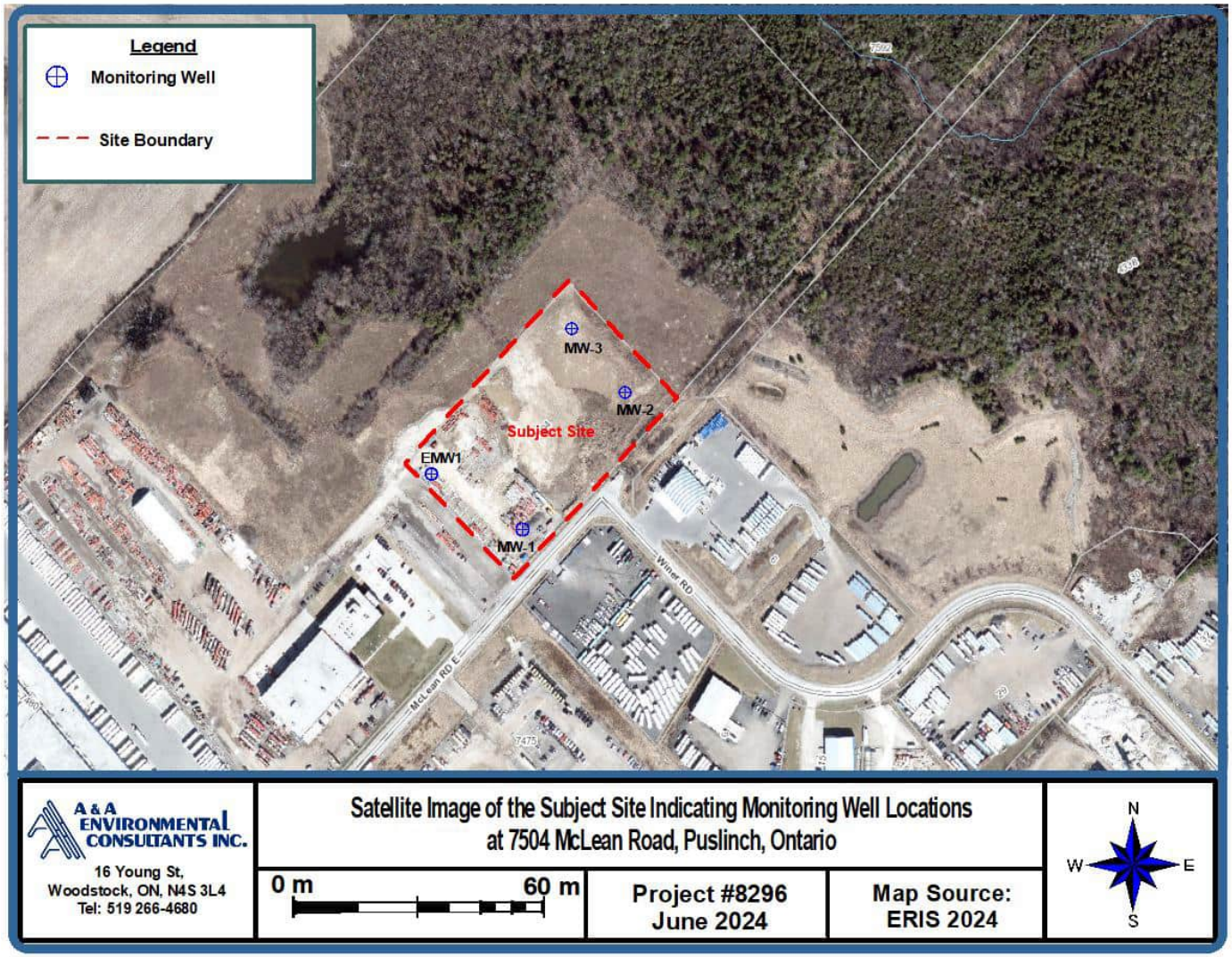


Figure 5 – Groundwater Contour Map

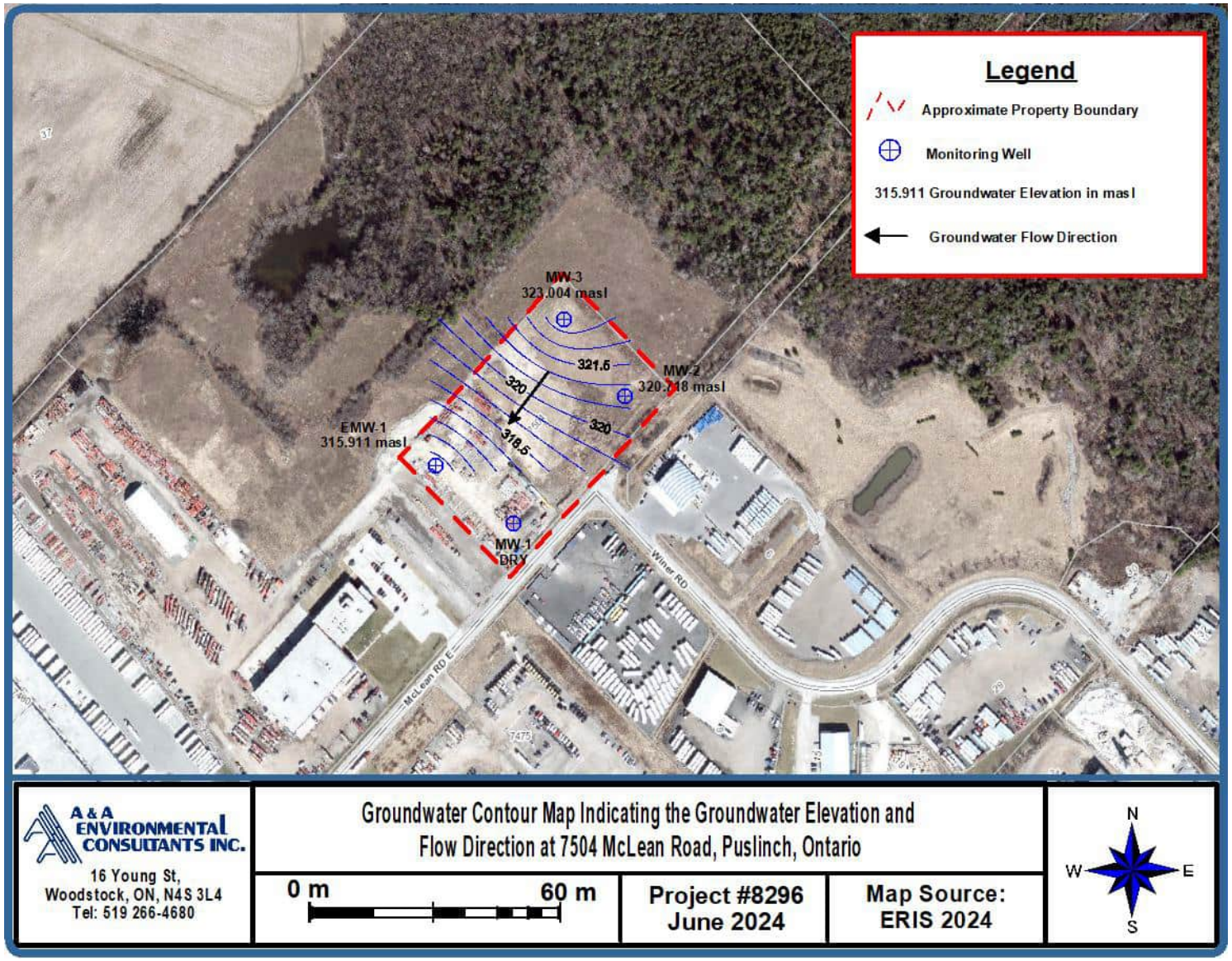
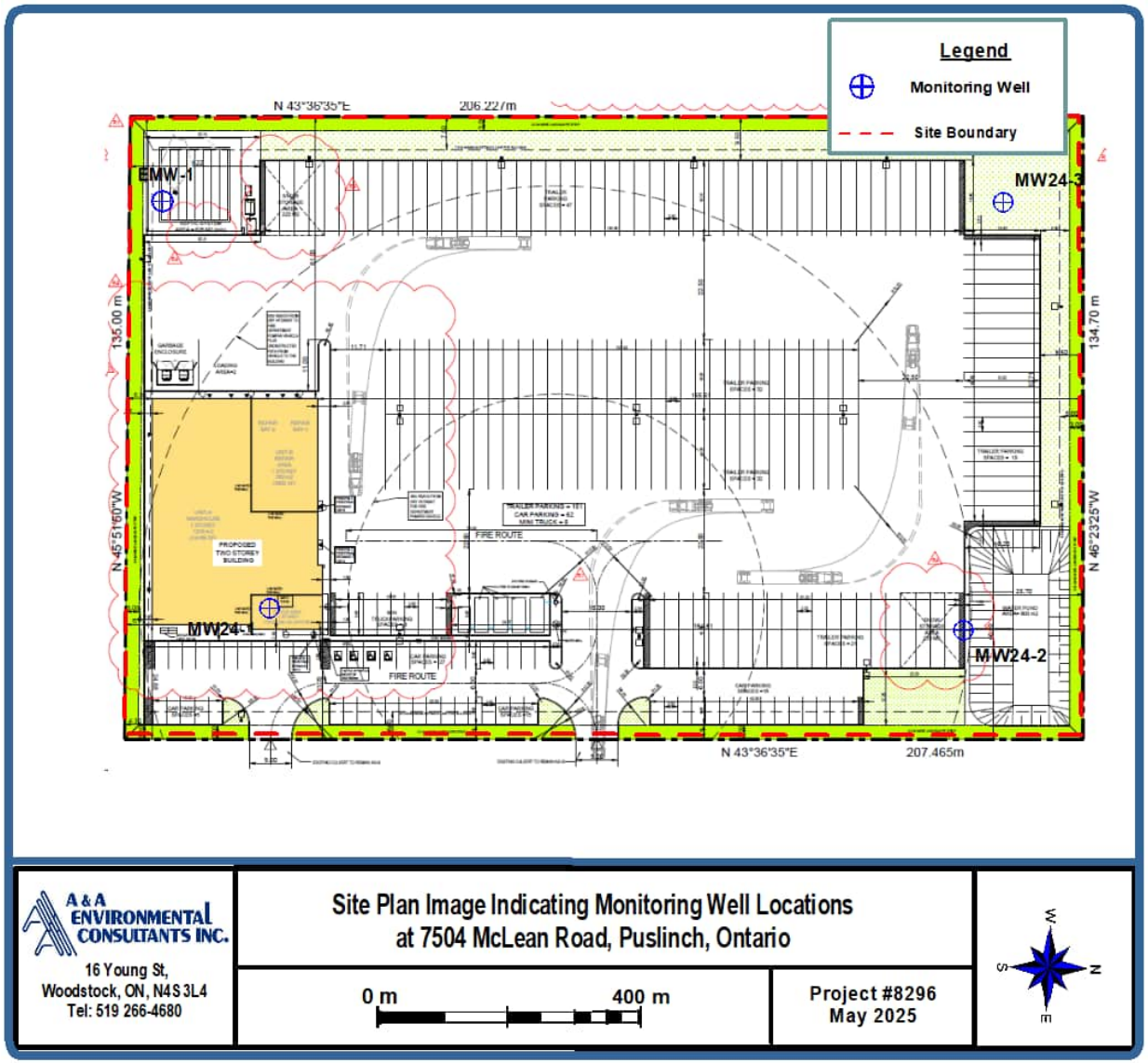
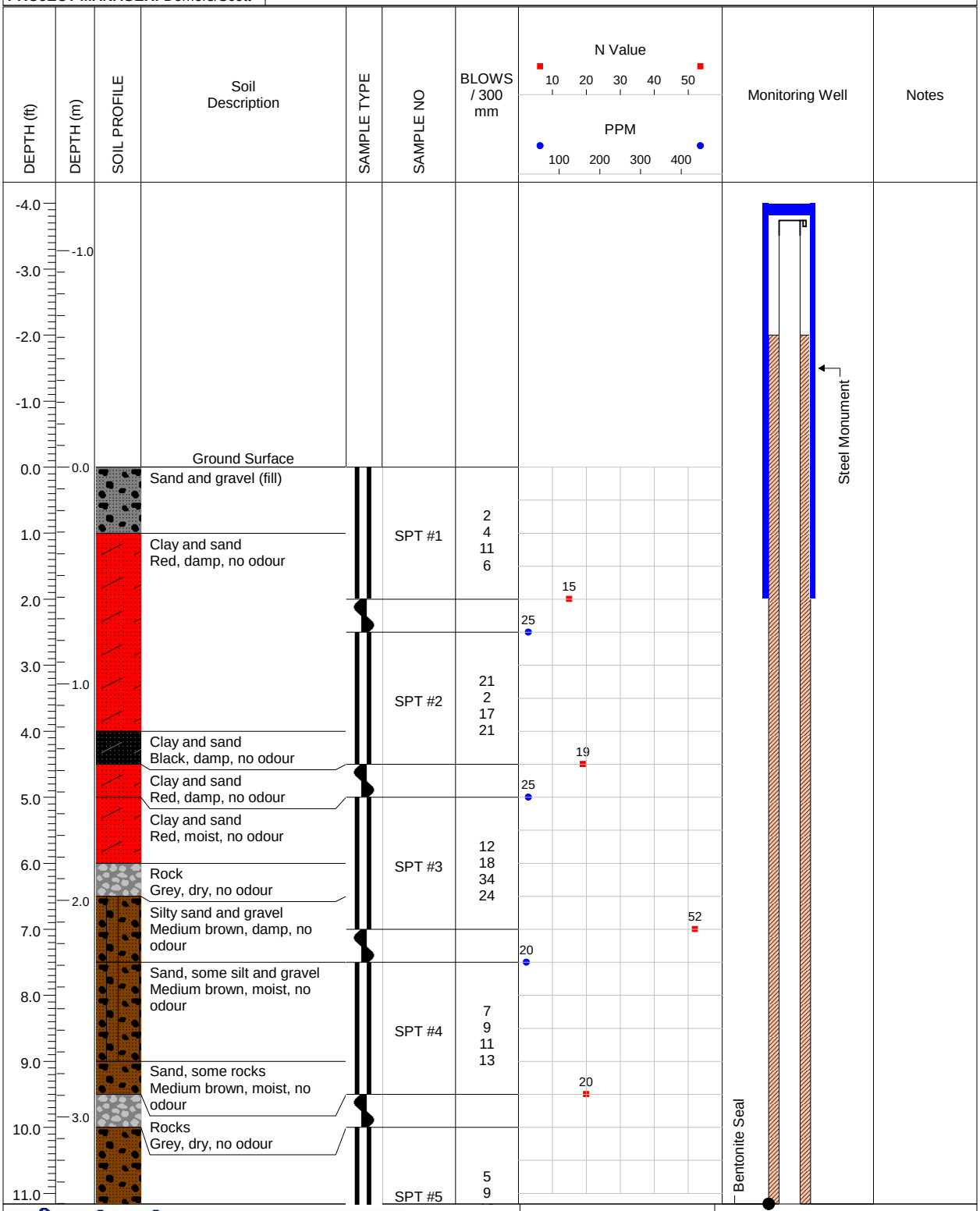


Figure 6 – Monitoring Wells Location Map – Site Plan Image



APPENDIX B – Borehole Logs

PROJECT: BVD Puslinch	**BH LOCATION:** SW corner of site, in line w/ storage facility entrance	**BOREHOLE NO: BH/MW1**
PROJECT NO: 8296/8368	**LOCATION:** 7504 McLean Rd., Puslinch	
PROJECT MANAGER: Demers/Scott	**COMPANY NAME:** A&A Environmental Consultants Inc.	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 25.5 Feet
REVIEWED BY: A. Rasoul	**DRILL METHOD:** SPT
DRILL DATE: Jun 24, 2024	**PAGE:** 1 of 2

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch	**BH LOCATION:** SW corner of site, in line w/ storage facility entrance	**BOREHOLE NO: BH/MW1**
PROJECT NO: 8296/8368	**LOCATION:** 7504 McLean Rd., Puslinch	
PROJECT MANAGER: Demers/Scott	**COMPANY NAME:** A&A Environmental Consultants Inc.	

DEPTH (ft)	DEPTH (m)	Soil Description	SAMPLE NO	BLOWS / 300 mm	N Value / PPM	Monitoring Well
12.0		Sand, some rocks Medium brown, moist, no odour	SPT #5	10 6	19	Bentonite Seal
13.0	4.0	Sand, some gravel Medium brown, moist, no odour	SPT #6	9 10 12 18		
14.0		Sand, some gravel Medium brown, moist-to-wet, no odour			22	
15.0						
16.0			SPT #7	12 17 14 12		
16.0	5.0	Gravel Grey, damp, no odour			31	Silica Sand
17.0		Sand, trace gravel Medium brown, moist-to-wet, no odour				
18.0		Sand, trace gravel Medium brown, wet, no odour	SPT #8	4 5 6 7		
19.0					11	
20.0	6.0	Rock Grey, dry, no odour				
21.0			SPT #9	35 50+		
22.0					>60	
23.0	7.0	No recovery @ 22.5-25ft. SPT refusal @ 21ft., augered through SPT refusal @ 22.5ft., augered through, SPT ref @ 25ft.	SPT #10	50+		
24.0					>60	
25.0			SPT #11	50+	>60	
26.0		End of Log				10 ft Well Screen

N Value: 10 20 30 40 50

PPM: 100 200 300 400

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 25.5 Feet
REVIEWED BY: A. Rasoul	**DRILL METHOD:** SPT
DRILL DATE: Jun 24, 2024	**PAGE:** 2 of 2

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch	**BH LOCATION:** NE corner of site	**BOREHOLE NO: BH/MW2**
PROJECT NO: 8296/8368	**LOCATION:** 7504 McLean Rd., Puslinch	
PROJECT MANAGER: Demers/Scott	**COMPANY NAME:** A&A Environmental Consultants Inc.	

DEPTH (ft)	DEPTH (m)	Soil Description	SAMPLE NO	BLOWS / 300 mm	N Value / PPM
0.0	0.0	Ground Surface			
0.0–2.0	0.0–0.6	Rocks and brick, some sand (fill) Brown/red, moist, no odour			
2.0–3.0	0.6–1.0	Clayey sand and gravel Brown, moist, no odour		95	
3.0–9.0	1.0–2.7	Silty clay, trace gravel Dark brown, moist, no odour		0	
9.0–10.0	2.7–3.0	Rocks Brown/grey, damp, no odour		0	
10.0–13.0	3.0–4.0	Sand, some rocks Brown/grey, moist-to-wet, no odour		15	
13.0–14.0	4.0–4.3	Rocks Brown/grey, moist-to-wet, no odour			
14.0–18.0	4.3–5.5	Rocks, some sand Medium brown/grey, moist, no odour Refusal @ 18			
18.0	5.5	End of Log			

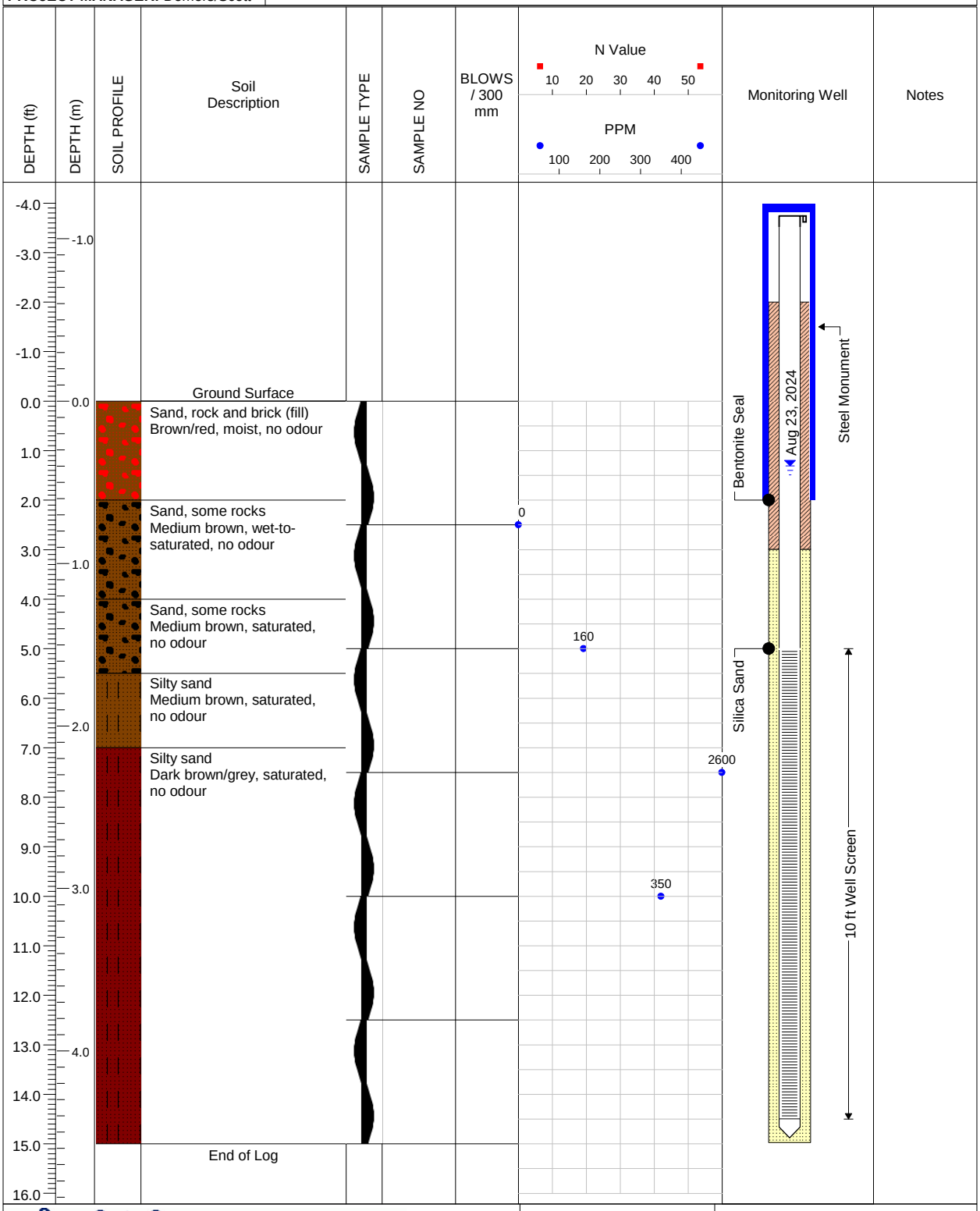
Monitoring Well: Steel Monument; Concrete; Bentonite Seal; Silica Sand; 10 ft Well Screen; Aug 23, 2024

Notes:

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 18 Feet
REVIEWED BY: A. Rasoul	**DRILL METHOD:** S.S.A.
DRILL DATE: Jun 24, 2024	**PAGE:** 1 of 1

PROJECT: BVD Puslinch	**BH LOCATION:** N corner of site	**BOREHOLE NO: BH/MW3**
PROJECT NO: 8296/8368	**LOCATION:** 7504 McLean Rd., Puslinch	
PROJECT MANAGER: Demers/Scott	**COMPANY NAME:** A&A Environmental Consultants Inc.	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 15 Feet
REVIEWED BY: A. Rasoul	**DRILL METHOD:** S.S.A.
DRILL DATE: Jun 24, 2024	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

APPENDIX C – Certificate of Chemical Analysis

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
16 Young Street
WOODSTOCK, ON N4S3L4
(519) 266-4680

ATTENTION TO: Ali Rasoul

PROJECT: 8296 BVD Puslinch

AGAT WORK ORDER: 24T179849

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Lab Operation Manager

DATE REPORTED: Aug 08, 2024

PAGES (INCLUDING COVER): 10

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

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Western Enviro-Agricultural Laboratory Association (WEALA)
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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 24T179849

PROJECT: 8296 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E. Fulson

TOC

DATE RECEIVED: 2024-07-30

DATE REPORTED: 2024-08-08

		SAMPLE DESCRIPTION:		MW 3
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2024-07-30
Parameter	Unit	G / S	RDL	6040869
Total Organic Carbon	mg/L		0.5	23

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON 169/03 AO&OG
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 24T179849

PROJECT: 8296 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E. Fulson

Water Quality Assessment (mg/L)

DATE RECEIVED: 2024-07-30

DATE REPORTED: 2024-08-08

		SAMPLE DESCRIPTION:		MW 3
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2024-07-30
Parameter	Unit	G / S	RDL	6040869
Electrical Conductivity	µS/cm		2	1070
pH	pH Units	6.5-8.5	NA	7.52
Saturation pH (Calculated)				6.64
Langelier Index (Calculated)				0.877
Hardness (as CaCO3) (Calculated)	mg/L	80-100	0.5	468
Total Dissolved Solids	mg/L	500	10	620
Alkalinity (as CaCO3)	mg/L	30-500	5	377
Bicarbonate (as CaCO3)	mg/L		5	377
Carbonate (as CaCO3)	mg/L		5	<5
Hydroxide (as CaCO3)	mg/L		5	<5
Fluoride	mg/L		0.05	<0.05
Chloride	mg/L	250	0.12	19.1
Nitrate as N	mg/L		0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05
Bromide	mg/L		0.05	<0.05
Sulphate	mg/L	500	0.10	181
Ortho Phosphate as P	mg/L		0.10	<0.10
Ammonia as N	mg/L		0.03	4.82
Total Phosphorus	mg/L		0.02	0.72
True Colour	TCU	5	2.50	13.4
Turbidity	NTU	5	0.5	507
Total Calcium	mg/L		0.40	102
Total Magnesium	mg/L		0.20	51.9
Total Potassium	mg/L		1.00	46.3
Total Sodium	mg/L	200	0.20	35.6
Total Aluminum	mg/L	0.1	0.10	41.1
Total Antimony	mg/L		0.003	<0.003
Total Arsenic	mg/L		0.006	0.028
Total Barium	mg/L		0.004	0.280
Total Beryllium	mg/L		0.002	<0.002

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 24T179849

PROJECT: 8296 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E. Fulson

Water Quality Assessment (mg/L)

DATE RECEIVED: 2024-07-30

DATE REPORTED: 2024-08-08

		SAMPLE DESCRIPTION:		MW 3
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2024-07-30
Parameter	Unit	G / S	RDL	6040869
Total Boron	mg/L		0.020	0.208
Total Cadmium	mg/L		0.0002	0.0009
Total Chromium	mg/L		0.006	0.048
Total Cobalt	mg/L		0.0010	0.0282
Total Copper	mg/L	1	0.004	0.077
Total Iron	mg/L	0.3	0.100	61.5
Total Lead	mg/L		0.0010	0.189
Total Manganese	mg/L	0.05	0.004	4.10
Total Mercury	mg/L		0.0001	<0.0001
Total Molybdenum	mg/L		0.004	0.013
Total Nickel	mg/L		0.006	0.045
Total Selenium	mg/L	0.01	0.004	<0.004
Total Silver	mg/L		0.0002	<0.0002
Total Strontium	mg/L		0.010	0.325
Total Thallium	mg/L		0.0006	<0.0006
Total Tin	mg/L		0.004	<0.004
Total Titanium	mg/L		0.020	0.526
Total Tungsten	mg/L		0.020	<0.020
Total Uranium	mg/L		0.0010	0.0016
Total Vanadium	mg/L		0.004	0.070
Total Zinc	mg/L	5	0.040	0.882
Total Zirconium	mg/L		0.008	<0.008

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON 169/03 AO&OG
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6040869 Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Exceedance Summary

AGAT WORK ORDER: 24T179849

PROJECT: 8296 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
6040869	MW 3	ON 169/03 AO&OG	Water Quality Assessment (mg/L)	Hardness (as CaCO3) (Calculated)	mg/L	80-100	468
6040869	MW 3	ON 169/03 AO&OG	Water Quality Assessment (mg/L)	Total Aluminum	mg/L	0.1	41.1
6040869	MW 3	ON 169/03 AO&OG	Water Quality Assessment (mg/L)	Total Dissolved Solids	mg/L	500	620
6040869	MW 3	ON 169/03 AO&OG	Water Quality Assessment (mg/L)	Total Iron	mg/L	0.3	61.5
6040869	MW 3	ON 169/03 AO&OG	Water Quality Assessment (mg/L)	Total Manganese	mg/L	0.05	4.10
6040869	MW 3	ON 169/03 AO&OG	Water Quality Assessment (mg/L)	True Colour	TCU	5	13.4
6040869	MW 3	ON 169/03 AO&OG	Water Quality Assessment (mg/L)	Turbidity	NTU	5	507

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
AGAT WORK ORDER: 24T179849

PROJECT: 8296 BVD Puslinch
ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch
SAMPLED BY:E. Fulson

Water Analysis

RPT Date: Aug 08, 2024

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Water Quality Assessment (mg/L)															
Electrical Conductivity	6039135		298	303	1.7%	< 2	104%	90%	110%						
pH	6039135		7.50	7.66	2.1%	NA	100%	90%	110%						
Total Dissolved Solids	6039135		162	172	6.0%	< 10	94%	80%	120%						
Alkalinity (as CaCO3)	6039135		92	94	2.2%	< 5	94%	80%	120%						
Bicarbonate (as CaCO3)	6039135		92	94	2.2%	< 5	NA								
Carbonate (as CaCO3)	6039135		<5	<5	NA	< 5	NA								
Hydroxide (as CaCO3)	6039135		<5	<5	NA	< 5	NA								
Fluoride	6037312		<0.05	<0.05	NA	< 0.05	98%	70%	130%	97%	80%	120%	94%	70%	130%
Chloride	6037312		217	219	0.9%	< 0.10	95%	70%	130%	100%	80%	120%	NA	70%	130%
Nitrate as N	6037312		1.73	1.75	1.1%	< 0.05	101%	70%	130%	100%	80%	120%	99%	70%	130%
Nitrite as N	6037312		<0.05	<0.05	NA	< 0.05	95%	70%	130%	99%	80%	120%	98%	70%	130%
Bromide	6037312		<0.05	<0.05	NA	< 0.05	99%	70%	130%	99%	80%	120%	97%	70%	130%
Sulphate	6037312		46.5	47.0	1.1%	< 0.10	96%	70%	130%	98%	80%	120%	96%	70%	130%
Ortho Phosphate as P	6037312		<0.10	<0.10	NA	< 0.10	99%	70%	130%	96%	80%	120%	99%	70%	130%
Ammonia as N	6040869	6040869	4.82	4.81	0.2%	< 0.02	108%	70%	130%	99%	80%	120%	118%	70%	130%
Total Phosphorus	6039135		0.53	0.52	1.9%	< 0.02	102%	70%	130%	96%	80%	120%	94%	70%	130%
True Colour	6039135		<2.50	<2.50	NA	< 2.5	105%	90%	110%	NA			NA		
Turbidity	6039135		<0.5	0.9	NA	< 0.5	111%	80%	120%						
Total Calcium	6039135		25.6	26.9	5.0%	< 0.20	91%	70%	130%	88%	80%	120%	89%	70%	130%
Total Magnesium	6039135		9.09	9.21	1.3%	< 0.10	107%	70%	130%	101%	80%	120%	107%	70%	130%
Total Potassium	6039135		1.59	1.73	NA	< 0.50	106%	70%	130%	100%	80%	120%	102%	70%	130%
Total Sodium	6039135		14.5	15.0	3.4%	< 0.10	110%	70%	130%	101%	80%	120%	108%	70%	130%
Total Aluminum	6039135		0.035	0.036	NA	< 0.010	92%	70%	130%	92%	80%	120%	100%	70%	130%
Total Antimony	6039135		<0.003	<0.003	NA	< 0.003	104%	70%	130%	103%	80%	120%	104%	70%	130%
Total Arsenic	6039135		<0.003	<0.003	NA	< 0.003	98%	70%	130%	101%	80%	120%	103%	70%	130%
Total Barium	6039135		0.021	0.021	0.0%	< 0.002	100%	70%	130%	100%	80%	120%	102%	70%	130%
Total Beryllium	6039135		<0.001	<0.001	NA	< 0.001	96%	70%	130%	92%	80%	120%	96%	70%	130%
Total Boron	6039135		0.044	0.045	NA	< 0.010	96%	70%	130%	101%	80%	120%	103%	70%	130%
Total Cadmium	6039135		<0.0001	<0.0001	NA	< 0.0001	101%	70%	130%	101%	80%	120%	103%	70%	130%
Total Chromium	6039135		<0.003	<0.003	NA	< 0.003	98%	70%	130%	97%	80%	120%	99%	70%	130%
Total Cobalt	6039135		<0.0005	<0.0005	NA	< 0.0005	103%	70%	130%	100%	80%	120%	101%	70%	130%
Total Copper	6039135		0.007	0.010	NA	< 0.002	99%	70%	130%	100%	80%	120%	98%	70%	130%
Total Iron	6039135		<0.050	<0.050	NA	< 0.050	100%	70%	130%	101%	80%	120%	101%	70%	130%
Total Lead	6039135		0.0007	0.0007	NA	< 0.0005	100%	70%	130%	96%	80%	120%	99%	70%	130%
Total Manganese	6039135		<0.002	<0.002	NA	< 0.002	97%	70%	130%	99%	80%	120%	99%	70%	130%
Total Mercury	6039135		<0.0001	<0.0001	NA	< 0.0001	102%	70%	130%	97%	80%	120%	96%	70%	130%
Total Molybdenum	6039135		<0.002	<0.002	NA	< 0.002	100%	70%	130%	99%	80%	120%	105%	70%	130%
Total Nickel	6039135		<0.003	<0.003	NA	< 0.003	99%	70%	130%	96%	80%	120%	101%	70%	130%
Total Selenium	6039135		<0.002	<0.002	NA	< 0.002	102%	70%	130%	104%	80%	120%	104%	70%	130%

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
AGAT WORK ORDER: 24T179849
PROJECT: 8296 BVD Puslinch
ATTENTION TO: Ali Rasoul
SAMPLING SITE:7504 McLean Rd., Puslinch
SAMPLED BY:E. Fulson

Water Analysis (Continued)

RPT Date: Aug 08, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Silver	6039135		0.0013	0.0014	7.4%	< 0.0001	106%	70%	130%	100%	80%	120%	101%	70%	130%
Total Strontium	6039135		0.177	0.183	3.3%	< 0.005	98%	70%	130%	101%	80%	120%	104%	70%	130%
Total Thallium	6039135		<0.0003	<0.0003	NA	< 0.0003	97%	70%	130%	93%	80%	120%	95%	70%	130%
Total Tin	6039135		<0.002	<0.002	NA	< 0.002	110%	70%	130%	101%	80%	120%	103%	70%	130%
Total Titanium	6039135		<0.010	<0.010	NA	< 0.010	102%	70%	130%	105%	80%	120%	104%	70%	130%
Total Tungsten	6039135		<0.010	<0.010	NA	< 0.010	102%	70%	130%	99%	80%	120%	102%	70%	130%
Total Uranium	6039135		<0.0005	<0.0005	NA	< 0.0005	97%	70%	130%	99%	80%	120%	104%	70%	130%
Total Vanadium	6039135		<0.002	<0.002	NA	< 0.002	105%	70%	130%	105%	80%	120%	108%	70%	130%
Total Zinc	6039135		<0.020	<0.020	NA	< 0.020	100%	70%	130%	97%	80%	120%	95%	70%	130%
Total Zirconium	6039135		<0.004	<0.004	NA	< 0.004	100%	70%	130%	97%	80%	120%	100%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

TOC															
Total Organic Carbon	6041185		0.9	0.8	NA	< 0.5	102%	80%	120%	99%	80%	120%	97%	80%	120%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By:

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 24T179849

PROJECT: 8296 BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E. Fulson

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Saturation pH (Calculated)		SM 2320 B	CALCULATION
Langelier Index (Calculated)		SM 2330B	CALCULATION
Hardness (as CaCO3) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	Modified from SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
Total Phosphorus	INOR-93-6057	modified from LACHAT 10-115-01-3A	LACHAT FIA
True Colour	INOR-93-6074	modified from SM 2120 B	LACHAT FIA
Turbidity	INOR-93-6000	modified from SM 2130 B	PC TITRATE
Total Calcium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Total Magnesium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Total Potassium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Total Sodium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Total Aluminum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Barium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Beryllium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Boron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 24T179849

PROJECT: 8296 BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E. Fulson

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Iron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Strontium	INOR-93-6003	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Thallium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tungsten	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Uranium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Vanadium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zirconium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only
Work Order #: 24T179849
Cooler Quantity: 1 med
Arrival Temperatures: 15.3 | 15.9 | 15.8
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes: Loose ice

Report Information:
Company: A & A Environmental Consultants Inc.
Contact: Dr. Ali Rasoul
Address: 16 Young St
Woodstock, ON
Phone: 519-266-4680 Fax: 519-266-3666
Reports to be sent to:
1. Email: arasoul@aaenvironmental.ca, vsowden@"
2. Email: sscott@"; tdemers@" ; ckennedy@"

Regulatory Requirements: ☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☑ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary ☐ Storm
Region (Indicate One)
☐ MISA

☐ Regulation 558
☐ CCME
☑ Prov. Water Quality Objectives (PWQO)
☐ Other
(Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Turnaround Time (TAT) Required:
Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CPM

Project Information:
Project: 8296 BVD Puslinch
Site Location: 7504 McLean Rd., Puslinch
Sampled By: E. Fulsom
AGAT Quote #: 16288129079 PO: 8296
Please note: if quotation number is not provided, client will be billed full price for analysis.

Invoice Information:
Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

Sample Matrix Legend
B Biota
GW Ground Water
O Oil
P Paint
S Soil
SD Sediment
SW Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN⁻ ☐ Cr⁶⁺ ☑ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☑ M&I ☑ VOCs ☑ ABNs ☑ B(a)P ☑ PCBs	Sewer Use	WQA - 93179	Metals Water 93-196	CCME F1-F4/VOCs Soil 91-248	CCME F1-F4/VOCs Water 91-249	CCME F1-F4/ BTEX Water 91-315	Sieve & texture (75 Micron)
MW3	7/30/24		7	GW		N																☑					

Samples Relinquished By (Print Name and Sign): E. Fulsom [redacted] Date: 7/30/24 Time: 3:45pm
Samples Received By (Print Name and Sign): [redacted] Date: July 30 Time: 3:54pm
Samples Relinquished By (Print Name and Sign): Date: Time:
Samples Received By (Print Name and Sign): Date: Time:
Samples Relinquished By (Print Name and Sign): Date: Time:
Samples Received By (Print Name and Sign): Date: Time:

Page 1 of 1

Document ID: DIV-78-1511.015

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

Date Issued: March 16, 2018

APPENDIX D – MECP Well Records

Water Well Records - Report #8296

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
PUSLINCH TOWNSHIP	17 569850 4812531 W	2017-06 7610						7291402 (Z254573) A	
PUSLINCH TOWNSHIP CON 08 025	17 569956 4812447 W	2012-04 1737						7199708 (Z145690) A	
									2
PUSLINCH TOWNSHIP CON 08 028	17 570809 4812624 W	1988-06 4207	6	FR 0160	51/165/30/1:0	CO		6709384 (20187)	GREY LMSN 0110 LMSN 0165
PUSLINCH TOWNSHIP CON 08 028	17 570797 4812633 W	1986-07 4207	6 6	FR 0130	60/133/7/1:0	CO		6708700 (NA)	BRWN CLAY GRVL STNS 0060 GREY CLAY GRVL STNS 0086 GREY LMSN 0133
									CO 2
PUSLINCH TOWNSHIP CON 08 025	17 569944 4812433 W	1969-11 4208	6	FR 0083	54/60/20/1:0	DO		6703496 ()	BRWN CLAY STNS 0010 GREY CLAY STNS 0079 GREY LMSN 0085
PUSLINCH TOWNSHIP CON 08 027	17 570658 4812485 W	1988-11 2336	6 6	FR 0125 FR 0185	58/80/20/1:	DO		6709478 (37335)	BRWN CLAY STNS 0020 BRWN SAND GRVL 0040 BRWN CLAY GRVL 0070 BRWN ROCK 0120 BRWN ROCK 0135 GREY ROCK 0145 GREY ROCK 0150 BRWN ROCK 0160 GREY ROCK 0186
PUSLINCH TOWNSHIP CON 08 025	17 570123 4812596 W	2013-07 2663	6.25 6.11	UT 0160 UT 0201	47/50/30/1:	DO		7214833 (Z172142) A148670	BRWN CLAY 0045 GRVL SAND 0066 BRWN LMSN 0110 GREY LMSN 0201
PUSLINCH TOWNSHIP CON 08 025	17 570160 4812622 W	2013-08 2663	6.25 6.11	UT 0200	44/46/30/1:	DO		7214832 (Z172165) A148676	BRWN CLAY GRVL 0010 BRWN CLAY BLDR 0025 BRWN GRVL SAND 0065 BRWN LMSN 0135 BRWN LMSN 0200
PUSLINCH TOWNSHIP 08 026	17 570450 4812869 W	2004-12 7154	6.21	FR 0103 FR 0136	26/109/10/2:0	DO		6715246 (Z16971) A006831	BRWN GRVL SAND 0054 GREY CLAY STNS 0079 BRWN LMSN 0119 GREY LMSN 0141

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
PUSLINCH TOWNSHIP 004	17 570566 4812683 W	2006-11 2663	6.25	FR 0244	44/122/18/1:	DO		6716008 (Z41595) A039541	BRWN GRVL CLAY 0030 BRWN CLAY STNS 0067 GREY LMSN 0085 BRWN LMSN 0244
									DO 6
PUSLINCH TOWNSHIP CON 08 027	17 570718 4812446 W	2019-08 7385	6.11 6.11	FR 0180 FR 0255	85/89/15/1:	DO CO		7341679 (Z311062) A268738	BRWN CLAY STNS 0010 GREY CLAY GRVL 0070 GREY CLAY SAND GRVL 0107 BRWN ROCK 0145 BRWN ROCK 0180 GREY ROCK 0255 BLUE SHLE 0260
									DO CO 1
PUSLINCH TOWNSHIP CON 08 027	17 570790 4812414 W	2002-08 2336	6 6	FR 0158 FR 0160	80/94/15/1:0	DO IN		6714198 (237507)	BRWN CLAY STNS 0055 BRWN CLAY GRVL 0085 GREY CLAY GRVL 0108 BRWN ROCK FCRD 0111 BRWN ROCK 0160
									DO IN 1
PUSLINCH TOWNSHIP CON 08 027	17 570834 4812414 W	1989-08 4552	6	FR 0120	90/100/10/1:	IN		6710048 (45396)	CLAY GRVL 0102 YLLW LMSN 0123
PUSLINCH TOWNSHIP CON 08 026	17 570240 4812553 W	1995-10 2336	6 6	FR 0220 FR 0240	43/103/40/1:0	IN		6711872 (163117)	BRWN CLAY STNS 0025 BRWN SAND GRVL 0050 GREY CLAY STNS 0065 BRWN CLAY SAND GRVL 0074 BRWN ROCK 0180 GREY ROCK 0220 BRWN ROCK 0240
PUSLINCH TOWNSHIP 08 028	17 570583 4812680 W	2007-06 2336	6	FR 0140	35/75/10/1:0	IN		7046280 (Z59179) A044206	BRWN CLAY BLDR 0015 BRWN GRVL SAND 0030 GREY CLAY SAND GRVL 0066 BRWN ROCK 0140
									IN 3
PUSLINCH TOWNSHIP CON 08 025	17 569890 4812610 W	2008-07 1129	1.97			MO		7122497 (M03703) A077778	BRWN SAND SILT TILL 0025
PUSLINCH TOWNSHIP CON 08 025	17 570082 4813059 W	2013-12 7366	1.5			MO	0003 10	7214719 (Z178896) A159684	BLCK LOAM 0001 BRWN SAND GRVL 0008 BRWN SILT 0013
PUSLINCH TOWNSHIP CON 08 025	17 570126 4813068 W	2013-12 7366	1.5			MO	0003 10	7214720 (Z178898) A159682	BLCK LOAM 0001 BRWN SAND GRVL 0008 BRWN SILT 0013

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
PUSLINCH TOWNSHIP CON 08 025	17 570071 4813023 W	2013-12 7366	1.5			MO	0003 10	7214721 (Z178894) A159685	BLCK LOAM 0001 BRWN SAND GRVL 0008 BRWN SILT 0013
PUSLINCH TOWNSHIP CON 08 025	17 570126 4813068 W	2013-12 7366	0.99			MO	0009 10	7214722 (Z178895) A159683	BLCK LOAM 0001 BRWN SAND GRVL 0008 BRWN SILT 0015 BLCK SAND 0019
PUSLINCH TOWNSHIP CON 07 025	17 569861 4812403 W	2021-06 7675	2	UT 0021	///:	MO	0030 5	7394717 (MIIOHQ93) A323497	BRWN SAND GRVL DNSE 0021 GREY SAND GRVL DNSE 0035
PUSLINCH TOWNSHIP CON 08 026	17 570282 4812616 W	2022-02 7747	2 6	UT 0042	42///:	MO	0040 10	7412599 (VNOA2FCJ) A321539	BLCK DNSE 0000 BRWN SILT TILL DNSE 0022 BRWN SAND STNS DNSE 0050
PUSLINCH TOWNSHIP CON 08 026	17 570246 4812408 W	2022-02 7747	2 6	UT 0050	50///:	MO	0045 10	7412600 (53Z2NP8H) A329963	BLCK DNSE 0000 BRWN SAND GRVL DNSE 0002 BRWN CLAY TILL DNSE 0027 BRWN SAND GRVL DNSE 0055
PUSLINCH TOWNSHIP CON 08 026	17 570380 4812541 W	2022-02 7747	2 6		///:	MO	0045 10	7412601 (TIF9KD2F) A329964	BRWN SAND FILL DNSE 0005 BRWN CLAY TILL DNSE 0025 GREY SAND STNS DNSE 0055
									MO 9
PUSLINCH TOWNSHIP CON 08 025	17 569892 4812501 W	2013-04 4011	4.71 39.3			OT		7201847 (Z159895) A	BLUE 0008 0061 0072
									OT 1
PUSLINCH TOWNSHIP CON 07 025	17 569874 4812423 W	1981-03 4208	6 5	FR 0090	15/90/8/1:0	ST DO		6707585 ()	BRWN CLAY SNDY 0008 GREY GRVL 0030 GREY CLAY SNDY 0045 GREY GRVL 0046 GREY LMSN 0095
									ST DO 1
PUSLINCH TOWNSHIP	17 570072 4812572 W	2011-01 7215				TH	0014 15	7159585 (Z127139) A111976	BRWN SAND STNS LOOS 0010 BRWN SILT SAND STNS 0029
									TH 1

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION

Total Wells: 27

Notes:
UTM: UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
DATE CNTR: Date Work Completedand Well Contractor Licence Number
CASING DIA: .Casing diameter in inches
WATER: Unit of Depth in Fee. See Table 4 for Meaning of Code

PUMP TEST: Static Water Level in Feet / Water Level After Pumping in Feet / Pump Test Rate in GPM / Pump Test Duration in Hour : Minutes
WELL USE: See Table 3 for Meaning of Code
SCREEN: Screen Depth and Length in feet
WELL: WEL (AUDIT #) Well Tag . A: Abandonment; P: Partial Data Entry Only
FORMATION: See Table 1 and 2 for Meaning of Code

1. Core Material and Descriptive terms

Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
BLDR	BOULDERS	FCRD	FRACTURED	IRFM	IRON FORMATION	PORS	POROUS	SOFT	SOFT
BSLT	BASALT	FGRD	FINE-GRAINED	LIMY	LIMY	PRDG	PREVIOUSLY DUG	SPST	SOAPSTONE
CGRD	COARSE-GRAINED	FGVL	FINE GRAVEL	LMSN	LIMESTONE	PRDR	PREV. DRILLED	STKY	STICKY
CGVL	COARSE GRAVEL	FILL	FILL	LOAM	TOPSOIL	QRTZ	QUARTZITE	STNS	STONES
CHRT	CHERT	FLDS	FELDSPAR	LOOS	LOOSE	QSND	QUICKSAND	STNY	STONEY
CLAY	CLAY	FLNT	FLINT	LTCL	LIGHT-COLOURED	QTZ	QUARTZ	THIK	THICK
CLN	CLEAN	FOSS	FOSILIFEROUS	LYRD	LAYERED	ROCK	ROCK	THIN	THIN
CLYY	CLAYEY	FSND	FINE SAND	MARL	MARL	SAND	SAND	TILL	TILL
CMTD	CEMENTED	GNIS	GNEISS	MGRD	MEDIUM-GRAINED	SHLE	SHALE	UNKN	UNKNOWN TYPE
CONG	CONGLOMERATE	GRNT	GRANITE	MGVL	MEDIUM GRAVEL	SHLY	SHALY	VERY	VERY
CRYS	CRYSTALLINE	GRSN	GREENSTONE	MRBL	MARBLE	SHRP	SHARP	WBRG	WATER-BEARING
CSND	COARSE SAND	GRVL	GRAVEL	MSND	MEDIUM SAND	SHST	SCHIST	WDFR	WOOD FRAGMENTS
DKCL	DARK-COLOURED	GRWK	GREYWACKE	MUCK	MUCK	SILT	SILT	WTHD	WEATHERED
DLMT	DOLOMITE	GVLY	GRAVELLY	OBDN	OVERBURDEN	SLTE	SLATE		
DNSE	DENSE	GYPS	GYPSUM	PCKD	PACKED	SLTY	SILTY		
DRTY	DIRTY	HARD	HARD	PEAT	PEAT	SNDS	SANDSTONE		
DRY	DRY	HPAN	HARDPAN	PGVL	PEA GRAVEL	SNDY	SANDYOAPSTONE		

2. Core Color

Code	Description
WHIT	WHITE
GREY	GREY
BLUE	BLUE
GREN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLCK	BLACK
BLGY	BLUE-GREY

3. Well Use

Code	Description	Code	Description
DO	Domestic	OT	Other
ST	Livestock	TH	Test Hole
IR	Irrigation	DE	Dewatering
IN	Industrial	MO	Monitoring
CO	Commercial	MT	Monitoring TestHole
MN	Municipal		
PS	Public		
AC	Cooling And A/C		
NU	Not Used		

4. Water Detail

Code	Description	Code	Description
FR	Fresh	GS	Gas
SA	Salty	IR	Iron
SU	Sulphur		
MN	Mineral		
UK	Unknown		

APPENDIX E – Water Balance Calculation

	Area (m^2)	Infiltration Factors				Precipitation Data		Calculated	
		Topography	Soil	Cover	Accumulative Infiltration Factors	P (mm/y) (m^3/y)	E (mm/y) (m^3/y)	I (mm/y) (m^3/y)	R (mm/y) (m^3/y)
Pre-development									
Impervious Area	0					916	183	0	733
						0.0	0.0	0.0	0.0
Pervious Area	27,923	0.20 (Moderately Flat)	0.2 (gravelly silty sand)	0.10	0.50	916	553	181.5	181.5
						25577.5	15441.4	5068.0	5068.0

Inputs	m^3/year	Outputs	m^3/year
Total Precipitation	25577.5	Total Evapotranspiration	15441.4
		Total Infiltration	5068.0
		Total Runoff	5068.0
Total	25577.5	Total	25577.5
Difference (Inputs-Outputs)		0	

	Area (m^2)	Infiltration Factors				Precipitation Data		Calculated	
		Topography	Soil	Cover	Accumulative Infiltration Factors	P (mm/y) (m^3/y)	E (mm/y) (m^3/y)	I (mm/y) (m^3/y)	R (mm/y) (m^3/y)
Post Development									
Impervious Area	20,980					916	183	0	733
						19217.7	3843.5	0.0	15374.1
Pervious Area	6,943	0.2 (Moderately Flat)	0.2 (gravelly silty sand)	0.10	0.5	916	553	181.5	181.5
						6359.8	3839.5	1260.2	1260.2

Inputs	m^3/year	Outputs	m^3/year
Total Precipitation	25577.5	Total Evapotranspiration	7683.0
		Total Infiltration	1260.2
		Total Runoff	16634.3
Total	25577.5	Total	25577.5
Difference (Inputs-Outputs)		0	

Developmental Impacts	Infiltration	Runoff
Sub-Total Post-Development (m^3/year)	1260.2	16634.3
Impacts from Pre to Post Development (m^3/year)	-3807.9	11566.3
Low-Impact Development (LID) - Design	11566.3	
Impacts from Pre to Post Development with LID (m^3/year)	12826.4	5068.0

APPENDIX F – Geotechnical Testing Report Data

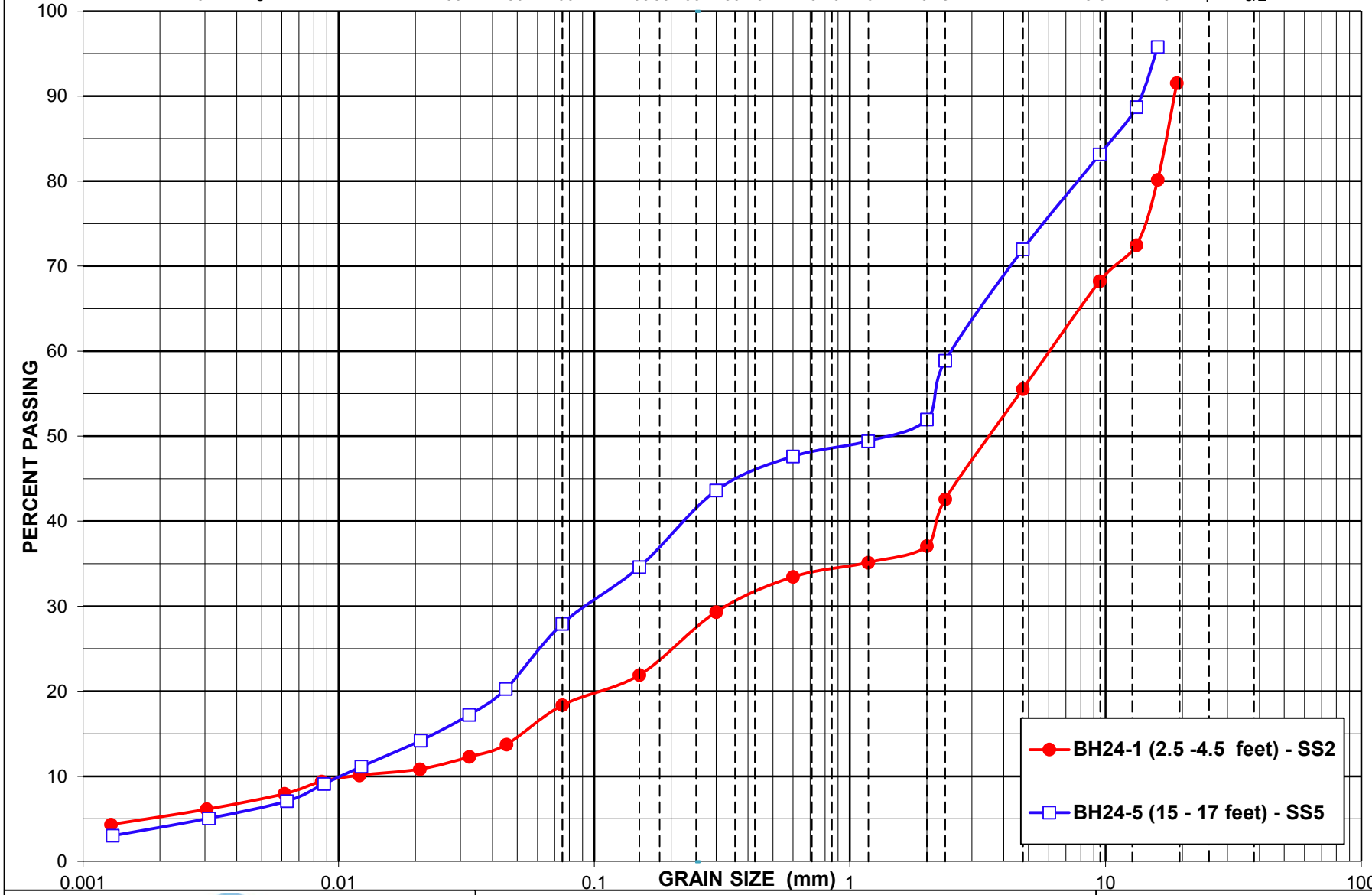
LS 702/D 422

UNIFIED SOIL CLASSIFICATION SYSTEM

CLAY AND SILT	SAND			GRAVEL	
	Fine	Medium	Coarse	Fine	Coarse

GRAIN SIZE IN MICROMETERS: 1 3 5 1 30 50 200

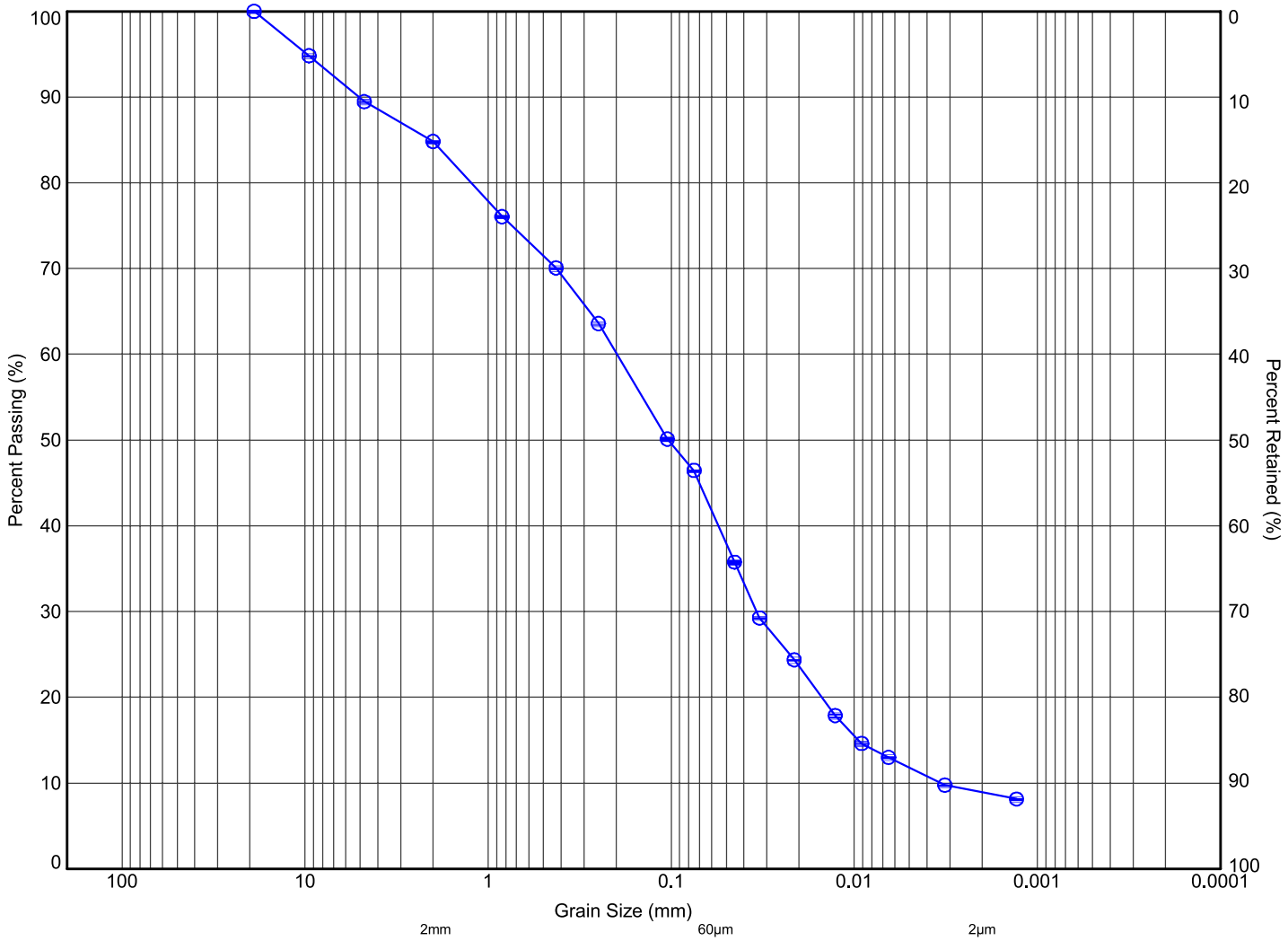
SIEVE DESIGNATION NOMBER (Imperial): 100 80 60 50 40 25 20 16 10 8 4 3/8" 1/2" 3/4" 1" 3/2"



GEOTRUST ENGINEERING LIMITED

GRAIN SIZE DISTRIBUTION

Drawing No.: 1	1
PROJECT No. :	GT23001TA
DATE :	July 1, 2024



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
⊖	**1**	SS5	3.3	319.9	15	43	33	9	

Terraprobe
11 Indell Lane, Brampton Ontario L6T 3Y3
(905) 796-2650

Title:

GRAIN SIZE DISTRIBUTION
SILTY SAND, SOME GRAVEL, TRACE CLAY

File No.: **1-20-0525-01**

Soil Identification & Characterization Report
7504 McLean Road,
Puslinch, Ontario

Report #8368 – BVD Puslinch
March 6, 2024

Prepared for:
BVD Real Estate Inc.
[redacted]

Prepared by:
A & A Environmental Consultants Inc.
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Woodstock, ON N4S 3L4
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1.0 Soil Identification Characterization Report

A & A Environmental Consultants Inc. (A&A) was retained by BVD (the client) to conduct a due diligence Soil Investigation & Characterization Report (SICR) for the subject site at 7504 McLean Road, Puslinch, Ontario (the project area).

Table 1 – Project area Information

Municipal Address	7504 McLean Road, Puslinch, Ontario
Site Zoning	IND – Industrial
Area	The subject site has an area of 27,923 m^2
UTM (NAD 83)	Zone 17T; 570327m Easting and 4812908m Northing
Client	BVD Real Estate Inc.

The purpose of the Soil Identification & Characterization Report (SICR) is to confirm the Sampling and Analysis Plan (SAP) identified the quality of the soil in the Project Area (PA) within the APEC identified by in the SAP.

As it is detailed within the sampling analysis plan, this SICR is to confirm the quality of the approximate 24,000 m^3 of imported fill that was brought to the subject site. This cut/fill analysis can be seen in the SAP.

1.1 Areas of Potential Environmental Concern

The SAP and historical information identified the past impacts of the project area and potentially contaminating activities which were inferred to create areas of potential environmental concern.

Table 2 – APEC Table

Area of Potential Environmental Concern[1]	Location of Area of Potential Environmental Concern on Phase One Property	Potentially Contaminating Activity[2]	Location of PCA (on-site or off-site)	Contaminants of Potential Concern[3]	Media Potentially Impacted (Ground water, Soil and/or Sediment)
#1	Entire Project Area	# 30 - Importation of Fill Material of Unknown Quality	On-site	Soil: Metals & ORPs, PHCs, VOCs, PAHs	Soil

Notes:
*- Potentially Contaminating Activities listed in Table 2, Appendix D, of the Ontario Regulation 153/04, as amended
VOCs- volatile organic compounds
PHCs- petroleum hydrocarbons F1-F4
VOCs- volatile organic compounds
PAHs- polycyclic aromatic hydrocarbons
OCPs- organochlorine and organophosphate pesticides

Each sampling location will be considered to include the APEC. The project area is identified as the entire area of the subject site. Based upon prior and current surveys of the subject site, it was determined that approximately 24,000 m^3 of imported fill was brought to the subject site. This cut/fill analysis can be seen in Appendix A.

1.2 Locations Subject to Sampling at the Project Area

The entire project area (27,923 m^2) was subject to in situ sampling to 3.1 meters below ground surface (mbgs).

1.3 APECs Subject to Sampling at the Project Area

Sampling at APEC #1 was completed on the top 3.01 mbgs of soil across the site. Eighty-eight boreholes were drilled across the subject site.

1.4 Investigation Method at the Project Area

1.4.1 General Method

Soil sampling was completed at the project area using a borehole drilling method. This was completed using an a Geoprobe 7822 equipped with 4" solid stem augers and standard 1.5 m long direct push rods, fitted with plastic macro-liners. All soil samples taken were *in situ* samples from undisturbed soil. No stockpiles or sediment samples were taken.

1.4.2 Drilling Program

The drilling program was arranged (including locates and health & safety requirements) by A&A Environmental Consultants. The drill and drill crew conducted the drilling of the eighty-eight boreholes within the APEC as described in the SAP prepared for the project area. Boreholes will be drilled to a depth of 3.06 mbgs (10 feet below ground surface (fbgs)). Composite soil samples will be collected every 0.76 m (2.5 feet).

A Quality Assurance/Quality Control (QA/QC) program was completed to ensure the integrity of the sampling methodology and analytical testing. Potential cross-contamination of samples will be reduced by using cleaned drilling and sampling equipment. Soil samples will be retrieved from the macro-liners using clean nitrile gloves and placed in new zip-top bags. Loose soil will be brushed from the auger flights between boreholes. The steel rods will be washed using a solution of Alconox and municipal tap water and rinsed with municipal tap water between samples. Soil samples were collected every 0.76m and field tested for organic vapours. The program included: Logging subsurface conditions and sampling of environmental media; Recording the results of field testing; Placing samples into labeled laboratory-supplied containers with unique IDs; Transporting samples to the laboratory in chilled coolers using chain-of-custody procedures; Using a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory that is qualified to analyze the samples; and Requiring review of the analysis tables. To assess for analytical QC, 10% + 1 duplicate soil samples were taken. Duplicates were analyzed for the

associated COPCs. The number of samples, degree of agreement of duplicates, location of samples and remaining data investigated during the sampling program is considered sufficient to identify the worst-case contamination and to characterize the project area.

1.4.3 Soil Sampling Equipment

At each sampling location, the area was inspected for signs of previous interference or any unusual characteristics. The data was recorded on the field log sheets and any abnormalities noted. Samples were collected from the new plastic macro-liners. Alconox was used between samples to prevent any potential cross contamination. Soil samples were collected every 0.76m and field tested for organic vapours using a PID. The maximum vapour reading obtained after 15 seconds was recorded on the field logs which are attached in the appendices.

1.4.3.1 Geological Description of Samples

The borehole drilling easily identified the stratigraphy of soil at the project area. No staining, odours or discolouration of any soil was observed that might indicate impairment. The drilling program conducted for this study indicates the overburden deposits are generally consistent across the property.

No staining, odours or discolouration of any soil was observed that might indicate impairment. An excavator with operator was provided to advance test pits in APECs as described in the SAP prepared for the project area. Boreholes were advanced to a maximum depth of 3.01 mbgs.

1.4.4 Field Screening Equipment

Soil samples were collected every 0.76m and field tested for organic vapours using a RAE Systems, Type Ultra Rae 3000 PID which measures total VOCs. The maximum vapour reading obtained after 15 seconds was recorded on the field logs which are attached in the appendices. The PID measures VOC concentration with a range of 0 – 10,000ppm and a resolution of 0.025 ppm up to 100 ppm. The PID is calibrated at the service provider. During sampling, the PID was field calibrated with isobutylene with results marked on field sheets.

Select samples were submitted for laboratory analysis in accordance with the sampling plan and MECP Guidance.

1.4.4.1 Field Screening Measurements

At each sampling location, the area was inspected for signs of previous interference or any unusual characteristics. The data was recorded on the field log sheets and any abnormalities noted. Samples were collected from the excavator bucket at the selected depths using a spade which was cleaned with Alconox between uses to prevent any potential cross contamination. Soil samples were collected every 0.76m and field tested for organic vapours using a PID.

The highest VOC reading observed from the soil samples was +1000ppm. The readings were included in the test pit logs. No VOC concentrations were observed that required a change in the proposed sampling locations as identified in the SAP.

1.4.5 Ground Water Monitoring Well Installation

No groundwater monitoring wells were installed during the SAP.

1.4.5.1 Development of Ground Water Monitoring Wells

No groundwater monitoring wells were installed during the SAP.

1.4.5.2 Ground Water Field Measurement

No groundwater monitoring wells were installed during the SAP.

1.4.5.3 Ground Water Sampling

No groundwater monitoring wells were installed during the SAP.

1.4.6 Sediment Sampling

No sediment was encountered during the SAP.

1.4.7 Analytical Testing

In accordance with O. Reg 153/04 Section 47 (Analytical procedures) of O. Reg. 153/04, samples were placed into labeled laboratory-supplied containers and directly placed into ice chilled coolers with unique IDS using applicable chain-of-custody procedures. Samples were analyzed at AGAT Labs Inc., a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory that is qualified to analyze the samples in accordance with "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" published by the ministry and dated March 9, 2004, as amended.

To assess for analytical QC, one duplicate sample was taken per 10 samples submitted. Duplicates were analyzed for the associated COPCs during the ESA. The number of samples, degree of agreement of duplicates, location of samples and remaining data investigated during the sampling program is considered sufficient to identify the worst-case contamination and to characterize the project area.

1.4.8 Quality Control

Potential cross-contamination of samples was reduced by cleaning sampling equipment between locations. Soil samples were retrieved using disposable nitrile gloves and placed in zipper lock bags. Sampling equipment was washed using a solution of Alconox and municipal tap water and rinsed between samples.

A Quality Assurance/Quality Control (QA/QC) program was completed to ensure the integrity of the sampling methodology and analytical testing. The QA/QC program was used to provide representative samples, minimize the potential for cross contamination and reduce the potential for systematic bias. The program included: Logging subsurface conditions and sampling of environmental media; Recording the results of field testing; Use of clean, new PPE at each sampling location; Placing samples into labeled laboratory-supplied containers; Transporting samples to the laboratory in chilled coolers using chain-of-custody procedures; Using a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory that is qualified to analyze

the samples; and Requiring review of the analysis tables. To assess for analytical QC, one duplicate sample was taken per 10 samples submitted. Duplicates were analyzed for the associated COPCs during the ESA. The number of samples, degree of agreement of duplicates, location of samples and remaining data investigated during the sampling program is considered sufficient to identify the worst-case contamination and to characterize the project area.

1.5 Stratigraphy

The drilling program easily identified the stratigraphy of soil at the project area. The drilling program conducted for this study indicates the overburden deposits are generally consistent across the property. All boreholes revealed underlain the surface to be characterized as follows:

- **Fill**
  - Fill material was encountered in all boreholes (BH24-1 to 5), extending to depths ranging from 1.5 to 2.0 m (mbgl). Fill material was loose to compact, consists of gravel and sand to gravelly silty sand, with trace clay, damp to moist and no odour. This fill comprised clayey silt to sandy silt/sand, moist to wet, firm to stiff in consistency, and compact. The data provided here pertaining to the fill thickness is confirmed at the borehole locations only and may vary between and beyond the boreholes.
- **Glacial Till Deposits**
  - Underneath the fill material, glacial till deposits were encountered in all the boreholes at depths ranging from 1.5 to 2.5 m (mbgl), extending to the maximum explored depth of 7.62 m (mbgl). These deposits consisted of gravelly silty sand trace clay to silty sand some gravel trace clay, occasionally rock fragments (grey, flaks), moist to wet, and compact to very dense.

1.6 Depth to Ground Water Table

Based on the hydrogeological investigation completed in 2023 by A&A, there was no groundwater within the depths of the soil to be sampled on the project area. Groundwater is

anticipated to be deeper than 3.01 mbgs. No groundwater monitoring wells were installed during the SAP. There were no fully saturated soil samples within the project area.

1.7 Soil Sampling Details

Sampling at APEC #1 (imported fill over the entire project area) was considered within the top 2.29 mbgs.

The following table summarizes the sampling details of the SAP with the sampling locations being depicted in figures in the appendices.

Table 3 – Summary of Soil & Groundwater Sampling

Proposed Sample Location	APECs	Sampling Frequency	Sampling Depth (mbgs)	Screen Interval	Sample Media	COPCs & # samples analyzed							Rationale
						PAH	Metals	Hydrides	PHC F1-F4	VOCs	pH/EC/SAR Sodium	# Samples	
BH-1 to BH-88	APEC 1	every 0.762 m	2.133 m	NA	Soil	x	x	x	x	x	x	1	Determine quality of soil in each borehole for APEC#1.
Total # soil samples												88	

NOTES: PHC – petroleum hydrocarbons, VOCs – volatile organic compounds, OCP – organochlorine pesticides
PAHs – polycyclic aromatic hydrocarbons

1.7.1 Number of Soil Samples Submitted for Analysis

Eighty-eight plus + eight duplicate soil samples were taken at locations and depths identified in the soil sampling and analysis plan. Twelve composite samples were submitted for Synthetic Precipitation Leaching Procedure. Samples for laboratory analysis were collected from the undisturbed soil at select depths of each borehole. The sampling locations identified the stratigraphy of the project area. All samples met the applicable site condition standards and the more stringent Table 1: Ceiling Values for Excess Soil Reuse.

1.7.2 Location and Depth of Soil Samples Submitted for Analysis

Soil samples were taken every 0.76m from the eighty-eight borehole at depths identified in the in the SAP. Boreholes were advanced to a maximum depth of 3.01 mbgs in APEC as required by the SAP. The sampling locations identified the stratigraphy of the project area.

1.7.3 Rationale for Parameters Groups Analyzed

All parameters analyzed were taken from the guidance document; Revised Reg 153/04, *List of Testing Requirements for Various Types of Industrial and Commercial Operations*. Contaminants of Potential Concern (COPCs) on the site include: Metals & other related parameters (ORPs), Base, Neutral & Acid Extractables (includes PAHs, OC Pesticides and phenols) petroleum hydrocarbons (PHCs), OC Pesticides (OCPs), and volatile organic compounds (VOCs).

1.7.4 Date of Sample Collection

The advancement of the borehole drilling was completed at the project area on January 14th, 2025, January 17th, 2025, January 20th, 2025, and January 21, 2025 as supervised by A&A. All samples were immediately placed in coolers with ice and transferred to a dedicated refrigerator for storage. Samples were shipped to the lab to be received one day after the drilling was completed on each day. A&A also submitted composite samples for analysis based on the requirement of a minimum of twelve SPLP samples.

1.7.5 Date of Analysis

Samples shipped to the lab to be received by January 15, 2025 were reported on January 23, 2025. Samples shipped to the lab to be received by January 16, 2025, were reported on January 27, 2025. Samples shipped to the lab to be received by January 17, 2025 were reported on January 27, 2025. Samples shipped to the lab to be received by January 22, 2025 were reported on January 30, 2025. Samples shipped to the lab, for the SPLPs to be received by February 6, 2025 were reported on February 18, 2025

1.7.6 Rationale for Parameters Groups Analyzed

All parameters analyzed were taken from the guidance document; Revised Reg 153/04, *List of Testing Requirements for Various Types of Industrial and Commercial Operations* COPCs on the site include; Metals & ORPs, Base, Neutral & Acid Extractables (includes PAHs, OCPs and phenols) PHCs, OCPs, and VOCs.

1.7.7 Leachate Sampling

Twelve composite samples were submitted for Synthetic Precipitation Leaching Procedure at AGAT Labs Inc., a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory that is qualified to analyze the samples in accordance with "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" published by the ministry and dated March 9, 2004, as amended. All leachate samples met the applicable site condition standards and the more stringent Table 1: Ceiling Values for Excess Soil Reuse.

1.8 Results of Analysis

The results of the analysis resulted in exceedances in the soil for the following samples:

- BH24-3 @ 5-7.5 fbgl for zinc (678 µg/g result for 290 µg/g guideline value);
- BH25-5 @5-10 fbgl for zinc (302 µg/g result for 290 µg/g guideline value);
- DUP 8 (duplicate of BH25-8 @7.5-10 fbgl sample) for zinc (304 µg/g result for 290 µg/g guideline value);

- BH25-10 @7.5-10 fbgl for zinc (308 µg/g result for 290 µg/g guideline value);
- DUP 10 (duplicate sample of BH25-10 @7.5-10 fbgl) for zinc (360 µg/g result for 290 µg/g guideline value);
- BH25-13 @7.5-10 fbgl for electrical conductivity (0.836 mS/cm result for 0.57 mS/cm guideline value);
- BH25-19 @2.5-5 fbgl for electrical conductivity (0.802 mS/cm result for 0.57 mS/cm guideline value);
- BH25-21 @5-10 fbgl; for PHC F4 Fraction (439 µg/g result for 120 µg/g guideline value);
- DUP 25-21 (Duplicate sample of BH25-21 @5-10 fbgl) for PHC F4 Fraction (397 µg/g result for 120 µg/g guideline value);
- BH25-23 @5-7.5 fbgl for zinc (393 µg/g result for 290 µg/g guideline value);
- BH25-59 @0-2.5 fbgl for lead (130 µg/g result for 120 µg/g guideline value) and zinc (349 µg/g result for 290 µg/g guideline value);
- BH25-65 @5-7.5 fbgl for zinc (336 µg/g result for 290 µg/g guideline value);
- BH25-69 @7.5-10 fbgl for zinc (341 µg/g result for 290 µg/g guideline value);
- BH25-70 @5-7.5 fbgl for electrical conductivity (0.802 mS/cm result for 0.57 mS/cm guideline value) and Sodium Adsorption Ratio (SAR) (3.07 result for 2.4 guideline value);
- BH25-73 @5-7.5 fbgl for zinc (292 µg/g result for 290 µg/g guideline value);
- BH25-74 @5-7.5 fbgl for zinc (350 µg/g result for 290 µg/g guideline value);
- BH25-75 @5-7.5 fbgl for zinc (340 µg/g result for 290 µg/g guideline value);
- BH25-78 @5-7.5 fbgl for electrical conductivity (0.916 mS/cm result for 0.57 mS/cm guideline value);
- BH25-81 @7.5-10 fbgl for zinc (342 µg/g result for 290 µg/g guideline value);
- BH25-82 @5-10 fbgl for zinc (329 µg/g result for 290 µg/g guideline value);
- BH25-86 @7.5-10 fbgl for zinc (315 µg/g result for 290 µg/g guideline value);
- BH25-87 @7.5-10 fbgl for zinc (335 µg/g result for 290 µg/g guideline value);

All other samples were less than the guideline values for all parameters.

Synthetic Precipitation Leaching Procedure results met Table 1 SCS where applicable.

A summary of all analysis and the laboratory certificates of analysis for all samples analyzed are attached in the appendices. A table of maximum concentrations analyzed for all COPC is presented below.

Table 4 – Maximum Concentrations of COPCs Including SPLP Analysis in Soil

Contaminant Name	Maximum Concentration	T1 S RPI/ICC	Unit	Location
PAHs (Soil)				
Naphthalene	<0.05	0.09	ug/g	all samples
Acenaphthylene	<0.05	0.093	ug/g	all samples
Acenaphthene	<0.05	0.072	ug/g	all samples
Fluorene	0.06	0.12	ug/g	BH25-55@5-7.5
Phenanthrene	0.29	0.69	ug/g	BH25-55@5-7.5
Anthracene	0.1	0.16	ug/g	BH25-10@5-7.5
Fluoranthene	0.37	0.56	ug/g	BH25-20@5-7.5
Pyrene	0.27	1	ug/g	BH25-20@5-7.5
Benzo(a)anthracene	0.11	0.36	ug/g	BH25-20@5-7.5
Chrysene	0.13	2.8	ug/g	BH25-20@5-7.5
Benzo(b)fluoranthene	0.20	0.47	ug/g	DUP 25-21
Benzo(k)fluoranthene	0.08	0.48	ug/g	DUP 25-21
Benzo(a)pyrene	0.13	0.3	ug/g	DUP 25-21
Indeno(1,2,3-cd)pyrene	0.08	0.23	ug/g	DUP 25-21
Dibenz(a,h)anthracene	<0.05	0.10	ug/g	all samples
Benzo(g,h,i)perylene	0.130	0.68	ug/g	DUP 25-21
2-and 1-methyl Naphthalene	<0.05	0.59	ug/g	all samples
Naphthalene-d8	<0.1	77	ug/g	all samples
Naphthalene-d8	<0.1	97	ug/g	all samples
Acridine-d9	<0.1	130	ug/g	all samples
Terphenyl-d14	<0.1	135	ug/g	all samples
Metals & ORPs (Soil)				
Antimony	<0.8	1.3	ug/g	all samples
Arsenic	12.0	18	ug/g	BH25-36@2.5-5
Barium	109.0	220	ug/g	BH25-13@2.5-5
Beryllium	1.3	2.5	ug/g	BH25-38@0-2.5
Boron	27.0	36	ug/g	BH 25-60@0-2.5
Boron (Hot Water Soluble)	1.9	NA	ug/g	BH 25-60@0-2.5
Cadmium	1.0	1.2	ug/g	BH25-69@7.5-10

Contaminant Name	Maximum Concentration	T1 S RPI/ICC	Unit	Location
Chromium	32.0	70	ug/g	BH25-38@0-2.5
Cobalt	18.5	21	ug/g	BH25-38@0-2.5
Copper	48.8	92	ug/g	BH25-17@0-2.5
Lead	130.0	120	ug/g	BH25-59@0-2.5
Molybdenum	1.3	2	ug/g	BH25-17@0-2.5
Nickel	39.0	82	ug/g	BH25-38@0-2.5
Selenium	<0.8	1.5	ug/g	all samples
Silver	<0.5	0.5	ug/g	all samples
Thallium	<0.5	1	ug/g	all samples
Uranium	1.47	2.5	ug/g	BH25-8@7.5-10
Vanadium	39.5	86	ug/g	BH25-39@0-2.5
Zinc	678.0	290	ug/g	BH25-3@5-7.5
Chromium, Hexavalent	<0.2	0.66	ug/g	all samples
Cyanide, WAD	<0.04	0.051	ug/g	all samples
Mercury	0.18	0.27	ug/g	25-59 @ 0-2.5
Electrical Conductivity (2:1)	0.916	0.57	mS/cm	BH25-78@5-7.5
Sodium Adsorption Ratio (2:1) (Calc.)	3.07	2.4	N/A	BH25-70@5-7.5
pH, 2:1 CaCl2 Extraction	NA		pH Units	BH25-60@0-2.5
PHCs F1 - F4 (with PAHs and VOC) (Soil)				
F1 (C6 - C10)	<5	25	ug/g	all samples
F1 (C6 to C10) minus BTEX	<5	25	ug/g	all samples
F2 (C10 to C16)	<10	10	ug/g	all samples
F2 (C10 to C16) minus Naphthalene	<10		ug/g	all samples
F3 (C16 to C34)	235	240	ug/g	BH25-21@5-10
F4 (C34 to C50)	439	120	ug/g	BH25-21@5-10
F3 (C16 to C34) minus PAHs	234		ug/g	BH25-21@5-10
Gravimetric Heavy Hydrocarbons	NA	120	ug/g	all samples
VOCs (with PHC) (Soil)				
Dichlorodifluoromethane	<0.05	0.05	ug/g	all samples
Vinyl Chloride	<0.02	0.02	ug/g	all samples
Bromomethane	<0.05	0.05	ug/g	all samples
Trichlorofluoromethane	<0.05	0.25	ug/g	all samples
Acetone	<0.50	0.5	ug/g	all samples
1,1-Dichloroethylene	<0.05	0.05	ug/g	all samples
Methylene Chloride	<0.05	0.05	ug/g	all samples
Trans- 1,2-Dichloroethylene	<0.05	0.05	ug/g	all samples
Methyl tert-butyl Ether	<0.05	0.05	ug/g	all samples
1,1-Dichloroethane	<0.02	0.05	ug/g	all samples
Methyl Ethyl Ketone	<0.50	0.5	ug/g	all samples

Contaminant Name	Maximum Concentration	T1 S RPI/ICC	Unit	Location
Cis- 1,2-Dichloroethylene	<0.02	0.05	ug/g	all samples
Chloroform	<0.04	0.05	ug/g	all samples
1,2-Dichloroethane	<0.03	0.05	ug/g	all samples
1,1,1-Trichloroethane	<0.05	0.05	ug/g	all samples
Carbon Tetrachloride	<0.05	0.05	ug/g	all samples
Benzene	<0.02	0.02	ug/g	all samples
1,2-Dichloropropane	<0.03	0.05	ug/g	all samples
Trichloroethylene	<0.03	0.05	ug/g	all samples
Bromodichloromethane	<0.05	0.05	ug/g	all samples
Methyl Isobutyl Ketone	<0.50	0.5	ug/g	all samples
1,1,2-Trichloroethane	<0.04	0.05	ug/g	all samples
Toluene	<0.05	0.2	ug/g	all samples
Dibromochloromethane	<0.05	0.05	ug/g	all samples
Ethylene Dibromide	<0.04	0.05	ug/g	all samples
Tetrachloroethylene	<0.05	0.05	ug/g	all samples
1,1,1,2-Tetrachloroethane	<0.04	0.05	ug/g	all samples
Chlorobenzene	<0.05	0.05	ug/g	all samples
Ethylbenzene	<0.05	0.05	ug/g	all samples
m & p-Xylene	<0.05		ug/g	all samples
Bromoform	<0.05	0.05	ug/g	all samples
Styrene	<0.05	0.05	ug/g	all samples
1,1,2,2-Tetrachloroethane	<0.05	0.05	ug/g	all samples
o-Xylene	<0.05		ug/g	all samples
1,3-Dichlorobenzene	<0.05	0.05	ug/g	all samples
1,4-Dichlorobenzene	<0.05	0.05	ug/g	all samples
1,2-Dichlorobenzene	<0.05	0.05	ug/g	all samples
Xylenes (Total)	<0.05	0.05	ug/g	all samples
1,3-Dichloropropene (Cis + Trans)	<0.05	0.05	ug/g	all samples
n-Hexane	<0.05	0.05	ug/g	all samples
O. Reg. 406/19 - SPLP BNA				
Bis(2-chloroethyl)ether Leachate	<0.5	0.5	ug/L	all samples
Bis(2-chloroisopropyl)ether Leachate	<0.5	0.5	ug/L	all samples
p-Chloroaniline Leachate	<1.0	0.5	ug/L	all samples
3,3'-Dichlorobenzidine Leachate	<0.5	1.0	ug/L	all samples
Diethyl phthalate Leachate	<0.5	0.5	ug/L	all samples
Dimethylphthalate Leachate	<0.5	0.5	ug/L	all samples
2,4-Dinitrophenol Leachate	<10	10	ug/L	all samples
2,4-Dinitrotoluene Leachate	<0.5	0.5	ug/L	all samples
2,6-Dinitrotoluene Leachate	<0.5	0.5	ug/L	all samples

Contaminant Name	Maximum Concentration	T1 S RPI/ICC	Unit	Location
Dinitrotoluene (2,4 & 2,6) Leachate	<0.5	0.5	ug/L	all samples
2,4,6-Trichlorophenol Leachate	<0.2	0.75	ug/L	all samples
O. Reg. 406/19 SPLP Metals				
Antimony Leachate	<0.6	1.3	ug/L	COMP 2
Arsenic Leachate	<5	18	ug/L	all samples
Barium Leachate	<100	220	ug/L	all samples
Beryllium Leachate	<0.8	2.5	ug/L	all samples
Boron Leachate	<500	36	ug/L	all samples
Cadmium Leachate	<0.20		ug/L	all samples
Chromium Leachate	<10	1.2	ug/L	all samples
Cobalt Leachate	<0.3	70	ug/L	all samples
Copper Leachate	<6.9	21	ug/L	all samples
Lead Leachate	2.1	92	ug/L	all samples
Molybdenum Leachate	<1.5	120	ug/L	all samples
Nickel Leachate	<10	2	ug/L	all samples
Selenium Leachate	<5.0	82	ug/L	all samples
Silver Leachate	<0.10	1.5	ug/L	all samples
Thallium Leachate	<0.5	0.5	ug/L	all samples
Uranium Leachate	<2	1	ug/L	all samples
Vanadium Leachate	10.2	2.5	ug/L	BH25-70
Zinc Leachate	<20	86	ug/L	all samples
O. Reg. 406/19 - SPLP VOCs				
1,1,1,2-Tetrachloroethane Leachate	<0.10	0.05	ug/L	all samples
1,1,2,2-Tetrachloroethane Leachate	<0.10	0.05	ug/L	all samples
1,1,2-Trichloroethane Leachate	<0.20	0.05	ug/L	all samples
1,1-Dichloroethane Leachate	<0.30	0.05	ug/L	all samples
1,1-Dichloroethylene Leachate	<0.30	0.05	ug/L	all samples
1,2-Dichlorobenzene Leachate	<0.10	0.05	ug/L	all samples
1,2-Dichloroethane Leachate	<0.20	0.05	ug/L	all samples
1,2-Dichloropropane Leachate	<0.20	0.05	ug/L	all samples
1,3-Dichloropropene Total Leachate	<0.30	0.05	ug/L	all samples
1,4-Dichlorobenzene Leachate	<0.10	0.05	ug/L	all samples
Bromomethane Leachate	<0.20	0.05	ug/L	all samples
Carbon Tetrachloride Leachate	<0.20	0.05	ug/L	all samples
Chloroform Leachate	<0.20	0.05	ug/L	all samples
Cis 1,2-Dichloroethylene Leachate	<0.20	0.05	ug/L	all samples
Ethylene Dibromide Leachate	<0.10	0.05	ug/L	all samples
Tetrachloroethylene Leachate	<0.20	0.05	ug/L	all samples
Trans 1,2-Dichloroethylene Leachate	<0.20	0.05	ug/L	all samples

Contaminant Name	Maximum Concentration	T1 S RPI/ICC	Unit	Location
Trichloroethylene Leachate	<0.20	0.05	ug/L	all samples

1.10 Soil Disposal

The intent is to keep all soil remaining on site. no soil will be removed from the subject site. the site will be redeveloped for a commercial trucking facility.

1.10.1 Delineation of Contaminated Soil

Based upon the number of samples found during the completion of the SAP, the entire site had been covered with the SAP. No delineation is required as the areas impacted have been identified. The project site will undergo a risk assessment in order to satisfy the requirements of the township of Puslinch.

1.11 Background Information & Site Alteration Permit Application

Prior to the soil investigation on the subject site, exploratory investigations were completed for site plan approval. In 2024, A&A completed a hydrogeological investigation and a geotechnical investigation concurrently on site. During these investigations, 5 boreholes were drilled on site in order to understand the geotechnical characteristics of the current soil conditions on site. this included the soil conditions of the imported fill as well as the native soil. During the borehole drilling, three monitoring wells were installed on site for the hydrogeological investigation. These three monitoring wells are in addition to the one existing monitoring well found on site named EMW-1. The borehole map from the geotechnical investigation and the monitoring well map from the hydrogeological investigation can be found in Figure 7 and Figure 8, respectively. These will outline the locations of the exploratory boreholes and monitoring wells. During these investigations, analysis was completed to gain background information on the environmental condition of the soil on the site. This would give us the basis for the completion of the sampling and analysis plan for the soil investigation and characterisation report.

Using the O. Reg. 153/04 guidelines, six soil samples were submitted to the laboratory from the five boreholes drilled for the geotechnical investigation, including one duplicate sample. The analysis was for O. Reg 153 metals, volatile organic compounds, petroleum hydrocarbons, electrical conductively, and pH. The results of the analysis are compared to O. Reg. 406/19 – table 1- RPIC. The exceedances in the soil are the following:

- BH1 @0-2.5 fbgl and Duplicate (BH1) for selenium;
- BH2 @0-2.5 fbgl for electrical conductivity, PHC F3, PHC F4;
- BH3 @2.5-5 fbgl for selenium, and electrical conductivity;
- BH3 @5-7.5 fbgl for selenium;

The full certificate of analysis can be found in Appendix D. Also, during these investigations, groundwater was sampled from the three newly installed wells and one existing well on site. The analysis was for O. Reg 153 metals, volatile organic compounds, petroleum hydrocarbons, electrical conductively, and pH. The results of the analysis are compared to O. Reg. Table 1 for Groundwater. The exceedances in the groundwater are as follows:

- MW-2 and Duplicate (for MW-2) for copper;
- MW-3 for Cobalt;

The full certificate of analysis can be found in Appendix D. A few metals exceeded the detection limit but were generally less than 40% of the Table 1 SCS and are considered to be naturally occurring.

From the background information found from the preliminary soil samples during the exploratory investigations, A&A then completed and carried out the SAP. From this, contamination was found from the imported fill. In order to satisfy the township of Puslinch, a risk assessment is to be completed on site. This will allow for the impacted, imported soil to remain on site as well as reduce the risk of the contamination affecting the conditions on the subject site.

The desired outcome of these investigations and the upcoming risk assessment is to obtain a site alteration permit from the township of Puslinch. The site alteration permit requires a site to have

no impacted soil. Through this SICP, it is understood that a RA is required in order to satisfy the Township which will then allow for a site alteration permit on the basis that the RA mitigates risk and the impacted, imported soil can remain on the subject site.

2.0 CONCLUSIONS AND RECOMMENDATIONS

2.1 Conclusions

The results of the analysis resulted in exceedances in the soil for the following samples:

- BH25-3@5-75 for zinc (678 µg/g result for 290 µg/g guideline value);
- BH25-5@5-10 for zinc (302 µg/g result for 290 µg/g guideline value);
- DUP 8 (duplicate of BH25-8@7.5-10 sample) for zinc (304 µg/g result for 290 µg/g guideline value);
- BH25-10@7.5-10 for zinc (308 µg/g result for 290 µg/g guideline value);
- DUP 10 (duplicate sample of BH25-10@7.5-10) for zinc (360 µg/g result for 290 µg/g guideline value);
- BH25-13@7.5-10 for electrical conductivity (0.836 mS/cm result for 0.57 mS/cm guideline value);
- BH25-19@2.5-5 for electrical conductivity (0.802 mS/cm result for 0.57 mS/cm guideline value);
- BH25-21@5-10; for PHC F4 Fraction (439 µg/g result for 120 µg/g guideline value);
- DUP 25-21 (Duplicate sample of BH25-21@5-10) for PHC F4 Fraction (397 µg/g result for 120 µg/g guideline value);
- BH25-23@5-7.5 for zinc (393 µg/g result for 290 µg/g guideline value);
- BH25-59@0-2.5 for lead (130 µg/g result for 120 µg/g guideline value) and zinc (349 µg/g result for 290 µg/g guideline value);
- BH25-65@5-7.5 for zinc (336 µg/g result for 290 µg/g guideline value);
- BH25-69@7.5-10 for zinc (341 µg/g result for 290 µg/g guideline value);
- BH25-70@5-7.5 for electrical conductivity (0.802 mS/cm result for 0.57 mS/cm guideline value) and Sodium Adsorption Ratio (SAR) (3.07 result for 2.4 guideline value);
- BH25-73@5-7.5 for zinc (292 µg/g result for 290 µg/g guideline value);
- BH25-74@5-7.5 for zinc (350 µg/g result for 290 µg/g guideline value);
- BH25-75@5-7.5 for zinc (340 µg/g result for 290 µg/g guideline value);

- BH25-78@5-7.5 for electrical conductivity (0.916 mS/cm result for 0.57 mS/cm guideline value);
- BH25-81@7.5-10 for zinc (342 µg/g result for 290 µg/g guideline value);
- BH25-82@5-10 for zinc (329 µg/g result for 290 µg/g guideline value);
- BH25-86@7.5-10 for zinc (315 µg/g result for 290 µg/g guideline value);
- BH25-87@7.5-10 for zinc (335 µg/g result for 290 µg/g guideline value);

All other samples were less than the guideline values for all parameters.

Due to the of contamination on the subject site, and the desire to keep all soil on the subject site, a risk assessment is to be completed to mitigate the risk to health and human life.

2.2 Recommendations

The soil is to remain on site and be used for the redevelopment of the subject site. In order to satisfy the township of Puslinch, a risk assessment (RA) will be completed on the site. This will allow for the imported fill to remain on the subject site and be used for redevelopment, there be no impact on health or human life as the risk will be mitigated by the risk assessment, for a site alteration permit to go ahead in order to allow for the redevelopment of the subject site.

SIGNED:

Thomas Demers, P.Eng., QP_{ESA}.
Senior Project Manager

SIGNED:

Dr. Ali A. Rasoul, Ph.D., EP, P. Geo., Q.P.
Senior Environmental Consultant

3.0 QUALIFICATIONS OF ASSESSORS

A & A Environmental Consultants Inc. is a multi-disciplinary environmental consulting firm offering consulting services in the fields of site assessments (Phase I-III), cleanups, water resource studies, aggregate permitting, landfill design and monitoring, geotechnical studies, air quality studies, designated substances surveys and environmental impact studies. A&A has more than 20 years of experience in environmental consulting in the province of Ontario, Alberta, Saskatchewan, British Columbia and have preformed thousands of projects from small scale Assessment of Property Uses to large scale landfill design, hydro-geological studies and groundwater management plans. We have a number of seniors, experienced staff who consult in a variety of disciplines and offer our clients expert knowledge in both the technical aspects of a project and the environmental regulations applicable.

Dr. Ali A. Rasoul, Ph.D., EP, P. Geo., QP

Principal Consultant

The report was reviewed by Dr. Ali A. Rasoul, a Principal Consultant with A&A. He has over 20 years experience in his field. He has completed hundreds of environmental projects including Phase I/II/III ESAs, mould assessments, hydrogeological investigations, designated substances surveys and water management plans. He is a licensed Professional Geoscientist with the Association of Professional Geoscientists of Ontario and a licensed Well Technician in the Province of Ontario (Ministry of the Environment, Conservation and Parks). He is also a licensed Professional Geoscientist in Alberta, Saskatchewan and British Columbia. Dr. Rasoul is registered as a “Qualified Person” for conducting ESAs as defined under Ontario Regulation 153/04 and 511/09.

4.0 LIMITATIONS

The report was prepared for the exclusive use of the client. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. Should additional parties require reliance on this report, written authorization from A&A will be required. With respect to third parties, A&A has no liability or responsibility for losses of any kind whatsoever including direct or consequential financial effects on transactions or property values, or requirement for follow-up actions and costs.

The investigation undertaken by A&A with respect to this report and any conclusions or recommendations made in this report reflect A&A's judgment based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observations of the site, subsurface investigations at discrete locations and depths, and specific analysis of chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site, which were unavailable for direct investigation, subsurface locations, which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. A&A has used professional judgment in analysing this information and formulating these conclusions.

A&A makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.

APPENDIX A – Analysis Results Tables

Table 5 – Summary of Analysis for Soil Samples

Exceeds Guideline	Within Guideline														
				25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-1@0-2.5	BH25-2@0-5	BH25-3@5-7.5	BH25-4@2.5-5	BH25-5@5-10	BH25-6@5-7.5	BH25-7@5-7.5	BH25-8@7.5-10	DUP 8	BH25-9@5-7.5	BH25-10@7.5-10	DUP 10
Parameter Name	**Unit**	**RDL**	**G / S**	**6459609**	**6459610**	**6459611**	**6459612**	**6459613**	**6459614**	**6459615**	**6459616**	**6459617**	**6459618**	**6459619**	**6459620**
Antimony	µg/g	0.8	1.3	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	1	18	3	4	5	6	6	4	4	4	4	6	4	4
Barium	µg/g	2	220	17.8	16.2	17.8	21.4	21.5	21.4	23.9	20.3	22.8	30.3	20.5	19.2
Beryllium	µg/g	0.5	2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	µg/g	5	36	6	9	9	8	10	9	9	8	9	11	8	7
Boron (Hot Water Soluble)	µg/g	0.1	NA	<0.10	0.2	0.11	<0.10	0.22	0.25	<0.10	<0.10	<0.10	0.17	<0.10	<0.10
Cadmium	µg/g	0.5	1.2	<0.5	<0.5	0.6	<0.5	0.6	<0.5	<0.5	0.5	0.6	<0.5	0.7	0.7
Chromium	µg/g	5	70	8	11	8	10	9	9	8	7	8	14	8	8
Cobalt	µg/g	0.8	21	3.4	4.9	4.5	4.8	5.4	4.1	4.1	3.5	3.8	6.4	3.9	4.3
Copper	µg/g	1	92	10.5	12.4	25.5	24.5	17.6	14.2	13.4	12.9	13.4	18.6	14.1	14.9
Lead	µg/g	1	120	13	11	25	20	28	22	26	25	22	21	26	30
Molybdenum	µg/g	0.5	2	0.8	<0.5	0.6	<0.5	0.6	0.7	0.5	<0.5	<0.5	1	<0.5	<0.5
Nickel	µg/g	1	82	5	8	7	8	9	6	6	5	5	12	6	7
Selenium	µg/g	0.8	1.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	0.5	2.5	<0.50	0.53	0.5	<0.50	0.54	<0.50	0.5	1.47	<0.50	0.57	0.54	0.52
Vanadium	µg/g	2	86	19	20.3	16.2	18.8	17.7	16.4	16.3	15.6	16.3	26.5	15.5	15.8
Zinc	µg/g	5	290	94	87	678	187	302	215	249	264	304	166	308	360

Exceeds Guideline	Within Guideline														
				25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-1@0-2.5	BH25-2@0-5	BH25-3@5-7.5	BH25-4@2.5-5	BH25-5@5-10	BH25-6@5-7.5	BH25-7@5-7.5	BH25-8@7.5-10	DUP 8	BH25-9@5-7.5	BH25-10@7.5-10	DUP 10
Chromium, Hexavalent	µg/g	0.2	0.66	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.04	0.051	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.1	0.27	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.005	0.57	0.144	0.166	0.147	0.191	0.123	0.345	0.121	0.126	0.085	0.211	0.106	0.145
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	N/A	2.4	0.725	0.708	1.59	1.71	1.45	0.554	0.859	0.279	0.206	0.691	1.29	1.23
pH, 2:1 CaCl2 Extraction	pH Units	NA		7.7	7.66	7.64	7.63	7.61	10.3	7.53	8.2	7.59	7.86	7.62	7.79
Naphthalene	µg/g	0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.05	0.093	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.05	0.072	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.05	0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.05	0.69	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.05	0.16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.05	0.56	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	0.05	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.05	0.36	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	0.05	2.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-1@0-2.5	BH25-2@0-5	BH25-3@5-7.5	BH25-4@2.5-5	BH25-5@5-10	BH25-6@5-7.5	BH25-7@5-7.5	BH25-8@7.5-10	DUP 8	BH25-9@5-7.5	BH25-10@7.5-10	DUP 10
Benzo(b)fluoranthene	µg/g	0.05	0.47	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.05	0.48	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.05	0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.05	0.23	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.05	0.68	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.05	0.59	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene-d8		1													
Naphthalene-d8	%	1		70	70	65	70	65	70	65	80	70	65	65	70
Acridine-d9	%	1		60	110	85	115	85	85	105	75	100	105	85	95
Terphenyl-d14	%	1		70	75	80	75	65	75	70	80	70	65	70	80
Moisture Content	%	0.1		9.4	7.4	9.8	8	8.5	9.2	8.6	8	8	9.8	8	8
F1 (C6 to C10)	µg/g	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	5	25	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene-d8	%	1		96	100	91	96	93	92	94	98	95	94	92	98
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

Exceeds Guideline	Within Guideline														
				25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-1@0-2.5	BH25-2@0-5	BH25-3@5-7.5	BH25-4@2.5-5	BH25-5@5-10	BH25-6@5-7.5	BH25-7@5-7.5	BH25-8@7.5-10	DUP 8	BH25-9@5-7.5	BH25-10@7.5-10	DUP 10
F2 (C10 to C16) minus Naphthalene	µg/g	10		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	50	240	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	50	240	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	50	120	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	50		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%	0.1		9.4	7.4	9.8	8	8.5	9.2	8.6	8	8	9.8	8	8
Terphenyl	%	1		98	100	87	78	98	80	81	95	74	99	76	86
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.05	0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-1@0-2.5	BH25-2@0-5	BH25-3@5-7.5	BH25-4@2.5-5	BH25-5@5-10	BH25-6@5-7.5	BH25-7@5-7.5	BH25-8@7.5-10	DUP 8	BH25-9@5-7.5	BH25-10@7.5-10	DUP 10
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.05	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-1@0-2.5	BH25-2@0-5	BH25-3@5-7.5	BH25-4@2.5-5	BH25-5@5-10	BH25-6@5-7.5	BH25-7@5-7.5	BH25-8@7.5-10	DUP 8	BH25-9@5-7.5	BH25-10@7.5-10	DUP 10
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-1@0-2.5	BH25-2@0-5	BH25-3@5-7.5	BH25-4@2.5-5	BH25-5@5-10	BH25-6@5-7.5	BH25-7@5-7.5	BH25-8@7.5-10	DUP 8	BH25-9@5-7.5	BH25-10@7.5-10	DUP 10
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene-d8	% Recovery	1		96	100	91	96	93	92	94	98	95	94	92	98
4-Bromofluorobenzene	% Recovery	1		100	98	94	92	90	96	92	92	96	93	94	92
Moisture Content	%	0.1		9.4	7.4	9.8	8	8.5	9.2	8.6	8	8	9.8	8	8

Exceeds Guideline	Within Guideline														
				25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T239421	25T239421	25T239421	25T239421	25T239421
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-11@5-7.5	DUP 11	BH25-12@5-7.5	BH25-13@2.5-5	BH25-14@5-7.5	BH25-15@2.5-5	BH25-16@5-7.5	BH25-17 @ 0-2.5	BH25-18 @ 7.5-10	DUP 25-18	BH25-19 @2.5-5	BH25-20 @ 5-7.5
Parameter Name	**Unit**	**RDL**	**G / S**	**6459621**	**6459622**	**6459623**	**6459624**	**6459625**	**6459626**	**6459627**	**6461794**	**6461795**	**6461796**	**6461797**	**6461798**
Antimony	µg/g	0.8	1.3	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	1	18	4	4	5	6	3	4	4	9	4	5	9	3
Barium	µg/g	2	220	19.4	19.3	28.2	109	25.1	48	36.2	75.3	21.8	20.6	56.8	22.4
Beryllium	µg/g	0.5	2.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	1	<0.5
Boron	µg/g	5	36	9	9	14	18	9	14	11	15	9	8	17	9
Boron (Hot Water Soluble)	µg/g	0.1	NA	0.15	<0.10	0.78	1.29	0.13	0.23	0.26	0.46	<0.10	<0.10	0.73	0.59
Cadmium	µg/g	0.5	1.2	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.8	0.7	<0.5	<0.5
Chromium	µg/g	5	70	8	8	16	24	10	13	11	15	8	7	24	11
Cobalt	µg/g	0.8	21	4.3	4.1	7.6	12.3	4.5	6.3	4.6	9	3.9	3.9	14.4	4.7
Copper	µg/g	1	92	15.2	14.9	20.4	24.2	17.7	18.5	15.7	48.8	16.5	16.8	39.8	12.8
Lead	µg/g	1	120	27	27	18	13	28	23	29	72	29	27	13	15
Molybdenum	µg/g	0.5	2	0.5	<0.5	0.8	0.9	<0.5	0.7	0.6	1.3	<0.5	<0.5	0.7	0.6
Nickel	µg/g	1	82	7	6	15	25	10	14	10	16	7	7	30	10
Selenium	µg/g	0.8	1.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	0.5	2.5	<0.50	0.5	0.58	0.65	<0.50	0.52	0.52	<0.50	<0.50	<0.50	0.6	<0.50
Vanadium	µg/g	2	86	15.9	16.7	28.7	31.3	17.6	21.8	17.1	22.3	13.8	12.6	29.7	16.7
Zinc	µg/g	5	290	202	258	150	74	196	159	217	232	264	253	88	108

Exceeds Guideline	Within Guideline														
				25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T239421	25T239421	25T239421	25T239421	25T239421
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-11@5-7.5	DUP 11	BH25-12@5-7.5	BH25-13@2.5-5	BH25-14@5-7.5	BH25-15@2.5-5	BH25-16@5-7.5	BH25-17 @ 0-2.5	BH25-18 @ 7.5-10	DUP 25-18	BH25-19 @2.5-5	BH25-20 @ 5-7.5
Chromium, Hexavalent	µg/g	0.2	0.66	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.04	0.051	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.1	0.27	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.13	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.005	0.57	0.105	0.135	0.158	0.836	0.157	0.178	0.152	0.203	0.213	0.145	0.802	0.137
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	N/A	2.4	0.503	0.612	0.747	2.11	1.05	0.359	0.487	0.328	0.412	0.394	1.13	0.802
pH, 2:1 CaCl2 Extraction	pH Units	NA		7.31	6.23	7.28	7.44	7.41	7.45	7.48	8.1	7.44	7.15	7.3	7.1
Naphthalene	µg/g	0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.05	0.093	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.05	0.072	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.05	0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.05	0.69	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.05	0.16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.05	0.56	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	0.05	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.05	0.36	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T239421	25T239421	25T239421	25T239421	25T239421
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-11@5-7.5	DUP 11	BH25-12@5-7.5	BH25-13@2.5-5	BH25-14@5-7.5	BH25-15@2.5-5	BH25-16@5-7.5	BH25-17 @ 0-2.5	BH25-18 @ 7.5-10	DUP 25-18	BH25-19 @2.5-5	BH25-20 @ 5-7.5
Chrysene	µg/g	0.05	2.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.05	0.47	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.05	0.48	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.05	0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.05	0.23	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.05	0.68	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.05	0.59	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene-d8		1													
Naphthalene-d8	%	1		70	75	80	65	85	65	70	65	65	55	70	60
Acridine-d9	%	1		75	65	115	95	105	100	100	115	115	105	100	85
Terphenyl-d14	%	1		75	85	80	75	95	85	80	125	105	120	100	105
Moisture Content	%	0.1		9.2	9.2	8.2	9.6	6.6	11.1	7.9	11.3	8.6	8.2	7.8	8.1
F1 (C6 to C10)	µg/g	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	5	25	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene-d8	%	1		93	96	95	98	95	94	97	102	100	97	99	91

Exceeds Guideline	Within Guideline														
				25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T239421	25T239421	25T239421	25T239421	25T239421
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-11@5-7.5	DUP 11	BH25-12@5-7.5	BH25-13@2.5-5	BH25-14@5-7.5	BH25-15@2.5-5	BH25-16@5-7.5	BH25-17 @ 0-2.5	BH25-18 @ 7.5-10	DUP 25-18	BH25-19 @2.5-5	BH25-20 @ 5-7.5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g	10		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	50	240	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	50	240	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	50	120	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	74
Gravimetric Heavy Hydrocarbons	µg/g	50		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%	0.1		9.2	9.2	8.2	9.6	6.6	11.1	7.9	11.3	8.6	8.2	7.8	8.1
Terphenyl	%	1		83	84	83	96	89	75	98	92	88	99	80	98
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.05	0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T239421	25T239421	25T239421	25T239421	25T239421
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-11@5-7.5	DUP 11	BH25-12@5-7.5	BH25-13@2.5-5	BH25-14@5-7.5	BH25-15@2.5-5	BH25-16@5-7.5	BH25-17 @ 0-2.5	BH25-18 @ 7.5-10	DUP 25-18	BH25-19 @2.5-5	BH25-20 @ 5-7.5
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T239421	25T239421	25T239421	25T239421	25T239421
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-11@5-7.5	DUP 11	BH25-12@5-7.5	BH25-13@2.5-5	BH25-14@5-7.5	BH25-15@2.5-5	BH25-16@5-7.5	BH25-17 @ 0-2.5	BH25-18 @ 7.5-10	DUP 25-18	BH25-19 @2.5-5	BH25-20 @ 5-7.5
Methyl Isobutyl Ketone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.05	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T238982	25T239421	25T239421	25T239421	25T239421	25T239421
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-11@5-7.5	DUP 11	BH25-12@5-7.5	BH25-13@2.5-5	BH25-14@5-7.5	BH25-15@2.5-5	BH25-16@5-7.5	BH25-17 @ 0-2.5	BH25-18 @ 7.5-10	DUP 25-18	BH25-19 @2.5-5	BH25-20 @ 5-7.5
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene-d8	% Recovery	1		93	96	95	98	95	94	97	102	100	97	99	91
4-Bromofluorobenzene	% Recovery	1		97	92	94	90	92	91	101	80	73	75	74	74
Moisture Content	%	0.1		9.2	9.2	8.2	9.6	6.6	11.1	7.9	11.3	8.6	8.2	7.8	8.1

Exceeds Guideline	Within Guideline													
				25T239421	25T239421	25T239421	25T239421	25T239421	25T239421	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-21 @ 5-10	DUP 25-21	BH25-22 @ 7.5-10	DUP 25-22	BH25-23 @ 5-7.5	BH25-24 @ 2.5-7.5	BH25-25 @ 7.5-10	BH25-26 @ 7.5-10	BH25-27 @ 5-7.5	BH25-28 @ 7.5-10	BH25-29 @ 2.5-7.5	BH25-30 @ 0-5
Parameter Name	**Unit**	**RDL**	**G / S**	**6461799**	**6461800**	**6461801**	**6461802**	**6461803**	**6461804**	**6463158**	**6463162**	**6463163**	**6463164**	**6463165**	**6463166**
Antimony	µg/g	0.8	1.3	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	1	18	3	3	4	4	4	7	4	4	4	4	5	7
Barium	µg/g	2	220	20.1	17.8	19.8	20.7	20.5	46.7	19.5	21.5	20.1	19.1	47	37.2
Beryllium	µg/g	0.5	2.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	0.5	0.6
Boron	µg/g	5	36	7	8	9	9	9	9	6	7	6	7	18	18
Boron (Hot Water Soluble)	µg/g	0.1	NA	0.46	0.32	0.13	<0.10	0.15	0.16	<0.10	0.15	0.25	0.18	1.84	0.49
Cadmium	µg/g	0.5	1.2	<0.5	<0.5	0.5	0.7	0.7	<0.5	0.5	<0.5	<0.5	0.6	<0.5	<0.5
Chromium	µg/g	5	70	8	8	8	9	8	17	7	8	7	7	16	20
Cobalt	µg/g	0.8	21	3.4	3.3	4.3	4.8	3.7	7.6	3.5	4	3.8	4.1	7.7	10
Copper	µg/g	1	92	14.5	14.7	15.9	20.6	16.7	25.4	16	15.6	15.8	17.5	22.3	46.7
Lead	µg/g	1	120	52	25	26	25	23	40	30	27	27	30	9	11
Molybdenum	µg/g	0.5	2	0.9	0.7	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	0.8	0.7
Nickel	µg/g	1	82	7	6	8	8	7	17	6	7	7	7	16	21
Selenium	µg/g	0.8	1.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	0.5	2.5	<0.50	<0.50	<0.50	<0.50	<0.50	0.56	<0.50	<0.50	<0.50	<0.50	1.09	0.57
Vanadium	µg/g	2	86	17.5	15.1	13	14	12.6	27.4	11.5	12.9	12.9	12.9	21.3	26.2
Zinc	µg/g	5	290	137	144	217	258	393	279	233	222	184	288	77	81

Exceeds Guideline	Within Guideline														
				25T239421	25T239421	25T239421	25T239421	25T239421	25T239421	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-21 @ 5-10	DUP 25-21	BH25-22 @ 7.5-10	DUP 25-22	BH25-23 @ 5-7.5	BH25-24 @ 2.5-7.5	BH25-25 @ 7.5-10	BH25-26 @ 7.5-10	BH25-27 @ 5-7.5	BH25-28 @ 7.5-10	BH25-29 @ 2.5-7.5	BH25-30 @ 0-5
Chromium, Hexavalent	µg/g	0.2	0.66	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.04	0.051	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.1	0.27	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.005	0.57	0.217	0.197	0.162	0.146	0.156	0.187	0.486	0.12	0.153	0.102	0.233	0.233
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	N/A	2.4	0.495	0.562	1.87	1.04	0.63	0.54	0.991	0.618	0.437	0.562	0.586	0.477
pH, 2:1 CaCl2 Extraction	pH Units	NA		7	6.95	6.87	6.85	6.88	7	6.88	6.86	6.87	6.85	7.26	10.4
Naphthalene	µg/g	0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.05	0.093	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.05	0.072	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.05	0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.05	0.69	0.25	0.24	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.05	0.16	0.1	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.05	0.56	0.37	0.35	<0.05	<0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	0.05	1	0.27	0.25	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T239421	25T239421	25T239421	25T239421	25T239421	25T239421	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-21 @ 5-10	DUP 25-21	BH25-22 @ 7.5-10	DUP 25-22	BH25-23 @ 5-7.5	BH25-24 @ 2.5-7.5	BH25-25 @ 7.5-10	BH25-26 @ 7.5-10	BH25-27 @ 5-7.5	BH25-28 @ 7.5-10	BH25-29 @ 2.5-7.5	BH25-30 @ 0-5
Benzo(a)anthracene	µg/g	0.05	0.36	0.11	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	0.05	2.8	0.13	0.13	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.05	0.47	0.15	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.05	0.48	0.06	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.05	0.3	0.12	0.13	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.05	0.23	0.06	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.05	0.68	0.11	0.13	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.05	0.59	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene-d8		1			77										
Naphthalene-d8	%	1		70		55	63	61	70	75	80	80	80	75	85
Acridine-d9	%	1		90	114	85	61	94	110	90	75	95	90	90	85
Terphenyl-d14	%	1		85	75	105	67	99	65	75	105	105	95	95	90
Moisture Content	%	0.1		8.1	6	10.4	7	8.9	15.4	10.5	8.7	9	9.9	10.2	9.4
F1 (C6 to C10)	µg/g	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

Exceeds Guideline	Within Guideline														
				25T239421	25T239421	25T239421	25T239421	25T239421	25T239421	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-21 @ 5-10	DUP 25-21	BH25-22 @ 7.5-10	DUP 25-22	BH25-23 @ 5-7.5	BH25-24 @ 2.5-7.5	BH25-25 @ 7.5-10	BH25-26 @ 7.5-10	BH25-27 @ 5-7.5	BH25-28 @ 7.5-10	BH25-29 @ 2.5-7.5	BH25-30 @ 0-5
F1 (C6 to C10) minus BTEX	µg/g	5	25	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene-d8	%	1		93	97	97	96	101	96	103	106	103	105	104	107
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g	10		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	50	240	235	194	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	50	240	234	193	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	50	120	439	397	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	50		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%	0.1		8.1	6	10.4	7	8.9	15.4	10.5	8.7	9	9.9	10.2	9.4
Terphenyl	%	1		99	120	130	110	94	92	77	95	85	90	86	84
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.05	0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Exceeds Guideline	Within Guideline														
				25T239421	25T239421	25T239421	25T239421	25T239421	25T239421	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-21 @ 5-10	DUP 25-21	BH25-22 @ 7.5-10	DUP 25-22	BH25-23 @ 5-7.5	BH25-24 @ 2.5-7.5	BH25-25 @ 7.5-10	BH25-26 @ 7.5-10	BH25-27 @ 5-7.5	BH25-28 @ 7.5-10	BH25-29 @ 2.5-7.5	BH25-30 @ 0-5
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Exceeds Guideline	Within Guideline														
				25T239421	25T239421	25T239421	25T239421	25T239421	25T239421	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-21 @ 5-10	DUP 25-21	BH25-22 @ 7.5-10	DUP 25-22	BH25-23 @ 5-7.5	BH25-24 @ 2.5-7.5	BH25-25 @ 7.5-10	BH25-26 @ 7.5-10	BH25-27 @ 5-7.5	BH25-28 @ 7.5-10	BH25-29 @ 2.5-7.5	BH25-30 @ 0-5
1,2-Dichloropropane	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.05	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T239421	25T239421	25T239421	25T239421	25T239421	25T239421	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-21 @ 5-10	DUP 25-21	BH25-22 @ 7.5-10	DUP 25-22	BH25-23 @ 5-7.5	BH25-24 @ 2.5-7.5	BH25-25 @ 7.5-10	BH25-26 @ 7.5-10	BH25-27 @ 5-7.5	BH25-28 @ 7.5-10	BH25-29 @ 2.5-7.5	BH25-30 @ 0-5
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene-d8	% Recovery	1		93	97	97	96	101	96	103	106	103	105	104	107
4-Bromofluorobenzene	% Recovery	1		71	74	73	74	73	74	91	86	90	95	94	88

Exceeds Guideline	Within Guideline														
				25T239421	25T239421	25T239421	25T239421	25T239421	25T239421	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
				BH25-21 @ 5-10	DUP 25-21	BH25-22 @ 7.5-10	DUP 25-22	BH25-23 @ 5-7.5	BH25-24 @ 2.5-7.5	BH25-25 @ 7.5-10	BH25-26 @ 7.5-10	BH25-27 @ 5-7.5	BH25-28 @ 7.5-10	BH25-29 @ 2.5-7.5	BH25-30 @ 0-5
Moisture Content	%	0.1		8.1	6	10.4	7	8.9	15.4	10.5	8.7	9	9.9	10.2	9.4

Exceeds Guideline	Within Guideline													
				25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T240863	25T240863	25T240863	25T240863
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-17	2025-01-17	2025-01-17	2025-01-17
				BH25-31 @ 7.5-10	BH25-32 @ 5-7.5	BH25-33 @ 7.5-10	BH25-34 @ 7.5-10	BH25-35 @ 7.5-10	BH25-36 @ 2.5-5	BH25-37 @ 5-7.5	BH25-38 @ 0-2.5	25-39 @ 0-2.5	25-40 @ 7.5-10	25-41 @ 7.5-10	25-42 @ 2.5-5
Parameter Name	**Unit**	**RDL**	**G / S**	**6463167**	**6463168**	**6463169**	**6463170**	**6463171**	**6463172**	**6463173**	**6463174**	**6472466**	**6472473**	**6472474**	**6472475**
Antimony	µg/g	0.8	1.3	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	1	18	4	4	4	4	4	12	5	9	8	3	3	6
Barium	µg/g	2	220	21.4	19.2	19.5	18.9	17.9	42.7	28.5	35.5	45.4	22.8	20.8	50
Beryllium	µg/g	0.5	2.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	1.3	1.1	<0.5	<0.5	0.6
Boron	µg/g	5	36	10	9	8	9	8	25	12	25	25	7	7	8
Boron (Hot Water Soluble)	µg/g	0.1	NA	<0.10	<0.10	<0.10	0.11	<0.10	1.11	0.55	1.62	1.5	0.12	<0.10	0.63
Cadmium	µg/g	0.5	1.2	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6
Chromium	µg/g	5	70	8	8	7	8	7	28	13	32	30	8	7	16
Cobalt	µg/g	0.8	21	4	3.5	3.6	4.1	4	16.9	6.2	18.5	17	3.7	3.5	7.8
Copper	µg/g	1	92	15.8	14.8	13.9	18.8	16.3	30	23.5	42.1	30.7	13.4	13.9	22.9
Lead	µg/g	1	120	32	25	25	31	26	38	29	6	19	24	29	44
Molybdenum	µg/g	0.5	2	<0.5	0.6	<0.5	0.5	<0.5	0.9	<0.5	<0.5	0.6	<0.5	<0.5	0.6
Nickel	µg/g	1	82	7	6	8	8	8	34	13	39	35	5	5	16
Selenium	µg/g	0.8	1.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	0.5	2.5	<0.50	<0.50	<0.50	<0.50	<0.50	0.57	<0.50	0.67	0.74	0.51	<0.50	0.63
Vanadium	µg/g	2	86	13.8	13	12.1	13.7	13.1	35.1	20.1	37.4	39.5	15	12.8	24.9
Zinc	µg/g	5	290	219	211	207	250	233	123	154	85	93	151	200	215

Exceeds Guideline	Within Guideline													
				25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T240863	25T240863	25T240863
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-17	2025-01-17	2025-01-17
				BH25-31 @ 7.5-10	BH25-32 @ 5-7.5	BH25-33 @ 7.5-10	BH25-34 @ 7.5-10	BH25-35 @ 7.5-10	BH25-36 @ 2.5-5	BH25-37 @ 5-7.5	BH25-38 @ 0-2.5	25-39 @ 0-2.5	25-40 @ 7.5-10	25-41 @ 7.5-10	25-42 @ 2.5-5
Chromium, Hexavalent	µg/g	0.2	0.66	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.04	0.051	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.1	0.27	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.005	0.57	0.212	0.106	0.126	0.133	0.129	0.175	0.24	0.322	0.22	0.113	0.153	0.174
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	N/A	2.4	0.513	0.223	0.234	0.178	0.129	0.648	0.859	0.821	0.674	0.496	0.347	0.591
pH, 2:1 CaCl2 Extraction	pH Units	NA		7.89	7.37	7.11	6.96	6.9	6.87	6.88	6.82	7.55	7.7	7.77	7.6
Naphthalene	µg/g	0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.05	0.093	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.05	0.072	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.05	0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.05	0.69	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.05	0.16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.05	0.56	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	0.05	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline													
				25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T240863	25T240863	25T240863	25T240863
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-17	2025-01-17	2025-01-17	2025-01-17
				BH25-31 @ 7.5-10	BH25-32 @ 5-7.5	BH25-33 @ 7.5-10	BH25-34 @ 7.5-10	BH25-35 @ 7.5-10	BH25-36 @ 2.5-5	BH25-37 @ 5-7.5	BH25-38 @ 0-2.5	25-39 @ 0-2.5	25-40 @ 7.5-10	25-41 @ 7.5-10	25-42 @ 2.5-5
Benzo(a)anthracene	µg/g	0.05	0.36	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	0.05	2.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.05	0.47	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.05	0.48	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.05	0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.05	0.23	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.05	0.68	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.05	0.59	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene-d8		1													
Naphthalene-d8	%	1		85	75	85	70	90	85	85	70	65	70	70	65
Acridine-d9	%	1		100	85	115	85	110	110	105	100	70	65	65	60
Terphenyl-d14	%	1		70	100	80	85	90	80	90	100	90	90	90	100
Moisture Content	%	0.1		9.8	7.1	9.8	11.8	8.1	7.6	8.3	8.9	7.8	7.8	8.7	13.3
F1 (C6 to C10)	µg/g	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

Exceeds Guideline	Within Guideline													
				25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T240863	25T240863	25T240863
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-17	2025-01-17	2025-01-17
				BH25-31 @ 7.5-10	BH25-32 @ 5-7.5	BH25-33 @ 7.5-10	BH25-34 @ 7.5-10	BH25-35 @ 7.5-10	BH25-36 @ 2.5-5	BH25-37 @ 5-7.5	BH25-38 @ 0-2.5	25-39 @ 0-2.5	25-40 @ 7.5-10	25-41 @ 7.5-10	25-42 @ 2.5-5
F1 (C6 to C10) minus BTEX	µg/g	5	25	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene-d8	%	1		106	106	96	107	105	102	102	104	99	106	103	103
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g	10		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	50	240	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	50	240	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	50	120	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	50		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%	0.1		9.8	7.1	9.8	11.8	8.1	7.6	8.3	8.9	7.8	7.8	8.7	13.3
Terphenyl	%	1		88	87	93	80	84	98	99	84	70	85	66	78
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.05	0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Exceeds Guideline	Within Guideline													
				25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T240863	25T240863	25T240863	25T240863
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-17	2025-01-17	2025-01-17	2025-01-17
				BH25-31 @ 7.5-10	BH25-32 @ 5-7.5	BH25-33 @ 7.5-10	BH25-34 @ 7.5-10	BH25-35 @ 7.5-10	BH25-36 @ 2.5-5	BH25-37 @ 5-7.5	BH25-38 @ 0-2.5	25-39 @ 0-2.5	25-40 @ 7.5-10	25-41 @ 7.5-10	25-42 @ 2.5-5
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Exceeds Guideline	Within Guideline														
				25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T240863	25T240863	25T240863	25T240863
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-17	2025-01-17	2025-01-17	2025-01-17
				BH25-31 @ 7.5-10	BH25-32 @ 5-7.5	BH25-33 @ 7.5-10	BH25-34 @ 7.5-10	BH25-35 @ 7.5-10	BH25-36 @ 2.5-5	BH25-37 @ 5-7.5	BH25-38 @ 0-2.5	25-39 @ 0-2.5	25-40 @ 7.5-10	25-41 @ 7.5-10	25-42 @ 2.5-5
1,2-Dichloropropane	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.05	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T240863	25T240863	25T240863	25T240863
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-17	2025-01-17	2025-01-17	2025-01-17
				BH25-31 @ 7.5-10	BH25-32 @ 5-7.5	BH25-33 @ 7.5-10	BH25-34 @ 7.5-10	BH25-35 @ 7.5-10	BH25-36 @ 2.5-5	BH25-37 @ 5-7.5	BH25-38 @ 0-2.5	25-39 @ 0-2.5	25-40 @ 7.5-10	25-41 @ 7.5-10	25-42 @ 2.5-5
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene-d8	% Recovery	1		106	106	96	107	105	102	102	104	99	106	103	103
4-Bromofluorobenzene	% Recovery	1		90	88	92	92	92	97	87	93	86	85	88	88

Exceeds Guideline	Within Guideline														
				25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T239704	25T240863	25T240863	25T240863	25T240863
				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-17	2025-01-17	2025-01-17	2025-01-17
				BH25-31 @ 7.5-10	BH25-32 @ 5-7.5	BH25-33 @ 7.5-10	BH25-34 @ 7.5-10	BH25-35 @ 7.5-10	BH25-36 @ 2.5-5	BH25-37 @ 5-7.5	BH25-38 @ 0-2.5	25-39 @ 0-2.5	25-40 @ 7.5-10	25-41 @ 7.5-10	25-42 @ 2.5-5
Moisture Content	%	0.1		9.8	7.1	9.8	11.8	8.1	7.6	8.3	8.9	7.8	7.8	8.7	13.3

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
				25-43 @ 2.5-5	25-43 DUP	25-44 @ 7.5-10	25-45 @ 7.5-10	25-45 DUP	25-46 @ 5-7.5	25-47 @ 2.5-5	25-48 @ 2.5-5	25-49 @ 7.5-10	25-50 @ 5-7.5	25-51 @ 7.5-10	25-52 @ 7.5-10
Parameter Name	**Unit**	**RDL**	**G / S**	**6472476**	**6472477**	**6472478**	**6472479**	**6472671**	**6472672**	**6472673**	**6472674**	**6472675**	**6472676**	**6472677**	**6472678**
Antimony	µg/g	0.8	1.3	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	1	18	5	7	4	4	5	6	6	5	5	4	6	6
Barium	µg/g	2	220	56.1	46.8	44.1	43.2	48.1	54.9	75.7	41.9	52.7	54.4	58.7	59.4
Beryllium	µg/g	0.5	2.5	0.6	0.9	<0.5	<0.5	<0.5	0.8	0.8	<0.5	0.6	0.5	0.5	0.5
Boron	µg/g	5	36	10	21	7	7	8	18	19	9	12	11	8	8
Boron (Hot Water Soluble)	µg/g	0.1	NA	0.59	1.9	0.14	0.26	0.19	1.25	1.45	0.77	0.38	0.36	0.58	0.5
Cadmium	µg/g	0.5	1.2	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	0.6
Chromium	µg/g	5	70	16	28	14	14	15	24	23	13	19	17	16	17
Cobalt	µg/g	0.8	21	7.9	16.8	6.2	5.3	5.2	11.8	11.9	6.6	8.7	8.1	6.9	7.2
Copper	µg/g	1	92	20.6	25	20	14	15.7	29.6	24	18.5	22	20.2	22.1	21.7
Lead	µg/g	1	120	42	6	117	42	37	23	27	37	26	27	69	47
Molybdenum	µg/g	0.5	2	0.6	<0.5	<0.5	<0.5	0.5	0.7	1	0.6	0.7	0.6	0.7	0.6
Nickel	µg/g	1	82	16	32	12	11	12	24	25	15	17	16	14	15
Selenium	µg/g	0.8	1.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	0.5	2.5	0.68	0.68	<0.50	0.59	0.61	0.7	0.63	0.56	0.63	0.6	0.63	0.7
Vanadium	µg/g	2	86	26.2	36.7	23.4	24	24.9	33.9	32.8	21.6	27.5	26.3	27.1	28.4
Zinc	µg/g	5	290	196	71	168	190	203	129	105	193	140	143	286	214
Chromium, Hexavalent	µg/g	0.2	0.66	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
				25-43 @ 2.5-5	25-43 DUP	25-44 @ 7.5-10	25-45 @ 7.5-10	25-45 DUP	25-46 @ 5-7.5	25-47 @ 2.5-5	25-48 @ 2.5-5	25-49 @ 7.5-10	25-50 @ 5-7.5	25-51 @ 7.5-10	25-52 @ 7.5-10
Cyanide, WAD	µg/g	0.04	0.051	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.1	0.27	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.005	0.57	0.249	0.162	0.174	0.122	0.18	0.221	0.284	0.184	0.194	0.13	0.204	0.142
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	N/A	2.4	0.542	1.16	0.271	0.144	0.118	0.876	1.07	1.14	0.621	0.341	0.17	0.164
pH, 2:1 CaCl2 Extraction	pH Units	NA		7.73	7.94	7.58	7.37	7.42	6.51	7.67	7.47	7.69	7.74	7.48	7.51
Naphthalene	µg/g	0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.05	0.093	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.05	0.072	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.05	0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.05	0.69	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.05	0.16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.05	0.56	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	0.05	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.05	0.36	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	0.05	2.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.05	0.47	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
				25-43 @ 2.5-5	25-43 DUP	25-44 @ 7.5-10	25-45 @ 7.5-10	25-45 DUP	25-46 @ 5-7.5	25-47 @ 2.5-5	25-48 @ 2.5-5	25-49 @ 7.5-10	25-50 @ 5-7.5	25-51 @ 7.5-10	25-52 @ 7.5-10
Benzo(k)fluoranthene	µg/g	0.05	0.48	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.05	0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.05	0.23	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.05	0.68	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.05	0.59	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene-d8		1													
Naphthalene-d8	%	1		65	65	65	65	70	65	70	70	65	65	60	65
Acridine-d9	%	1		70	65	65	70	65	100	85	125	125	130	115	105
Terphenyl-d14	%	1		115	115	115	110	125	115	120	135	130	120	115	110
Moisture Content	%	0.1		11.5	9.7	16.3	11.1	9.4	13.9	8.9	8.4	11.5	15.6	13.6	16.5
F1 (C6 to C10)	µg/g	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	5	25	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene-d8	%	1		100	102	103	102	106	101	105	105	98	100	103	102
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g	10		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	50	240	56	<50	<50	<50	<50	<50	130	<50	<50	<50	<50	<50

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
				25-43 @ 2.5-5	25-43 DUP	25-44 @ 7.5-10	25-45 @ 7.5-10	25-45 DUP	25-46 @ 5-7.5	25-47 @ 2.5-5	25-48 @ 2.5-5	25-49 @ 7.5-10	25-50 @ 5-7.5	25-51 @ 7.5-10	25-52 @ 7.5-10
F3 (C16 to C34) minus PAHs	µg/g	50	240	56	<50	<50	<50	<50	<50	130	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	50	120	<50	<50	<50	<50	<50	<50	92	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	50		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%	0.1		11.5	9.7	16.3	11.1	9.4	13.9	8.9	8.4	11.5	15.6	13.6	16.5
Terphenyl	%	1		68	81	79	92	85	71	76	68	86	90	75	69
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.05	0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
				25-43 @ 2.5-5	25-43 DUP	25-44 @ 7.5-10	25-45 @ 7.5-10	25-45 DUP	25-46 @ 5-7.5	25-47 @ 2.5-5	25-48 @ 2.5-5	25-49 @ 7.5-10	25-50 @ 5-7.5	25-51 @ 7.5-10	25-52 @ 7.5-10
Methyl Ethyl Ketone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.05	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
				25-43 @ 2.5-5	25-43 DUP	25-44 @ 7.5-10	25-45 @ 7.5-10	25-45 DUP	25-46 @ 5-7.5	25-47 @ 2.5-5	25-48 @ 2.5-5	25-49 @ 7.5-10	25-50 @ 5-7.5	25-51 @ 7.5-10	25-52 @ 7.5-10
Ethylene Dibromide	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
				25-43 @ 2.5-5	25-43 DUP	25-44 @ 7.5-10	25-45 @ 7.5-10	25-45 DUP	25-46 @ 5-7.5	25-47 @ 2.5-5	25-48 @ 2.5-5	25-49 @ 7.5-10	25-50 @ 5-7.5	25-51 @ 7.5-10	25-52 @ 7.5-10
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene-d8	% Recovery	1		100	102	103	102	106	101	105	105	98	100	103	102
4-Bromofluorobenzene	% Recovery	1		94	94	86	86	90	93	92	94	90	95	87	95
Moisture Content	%	0.1		11.5	9.7	16.3	11.1	9.4	13.9	8.9	8.4	11.5	15.6	13.6	16.5

Exceeds Guideline	Within Guideline													
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-20
				DUP 25-52	25-53 @ 7.5-10	25-54 @ 5-7.5	25-55 @ 5-7.5	25-56 @ 5-7.5	25-57 @ 2.5-5	25-58 @ 2.5-5	25-59 @ 0-2.5	25-60 @ 0-2.5	25-61 @ 2.5-5	25-62 @ 7.5-10	DUP 25-62
Parameter Name	**Unit**	**RDL**	**G / S**	**6472679**	**6472680**	**6472681**	**6472682**	**6472683**	**6472684**	**6472685**	**6472686**	**6472687**	**6472688**	**6472689**	**6472719**
Antimony	µg/g	0.8	1.3	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	1	18	6	4	6	5	3	6	2	10	5	9	5	6
Barium	µg/g	2	220	56.2	34.4	59	51	23.9	46.1	15.3	81.3	72.3	55.1	53.3	46.1
Beryllium	µg/g	0.5	2.5	0.5	<0.5	0.6	0.5	<0.5	0.7	<0.5	0.8	1	1.2	0.6	0.6
Boron	µg/g	5	36	9	8	12	14	9	12	<5	19	27	25	8	10
Boron (Hot Water Soluble)	µg/g	0.1	NA	0.57	0.31	0.62	0.75	0.18	0.76	0.54	0.41	0.32	1.88	0.34	0.31
Cadmium	µg/g	0.5	1.2	0.6	<0.5	0.6	0.5	<0.5	0.8	<0.5	0.7	<0.5	<0.5	0.6	0.6
Chromium	µg/g	5	70	16	11	17	16	9	15	8	19	25	30	16	15
Cobalt	µg/g	0.8	21	6.7	4.7	8	7.7	4.1	7.5	2.7	9.7	12.3	18.5	7.5	6.5
Copper	µg/g	1	92	19.2	16.2	21.5	22.1	16.1	24.6	5.9	36.2	17.4	30	18.8	18.9
Lead	µg/g	1	120	54	36	49	42	25	44	7	130	22	5	42	43
Molybdenum	µg/g	0.5	2	0.6	<0.5	0.6	0.6	0.6	0.5	<0.5	1.3	1	<0.5	0.5	0.7
Nickel	µg/g	1	82	14	9	17	15	7	15	5	19	27	37	14	13
Selenium	µg/g	0.8	1.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	0.5	2.5	0.64	0.53	0.64	0.54	<0.50	0.59	<0.50	0.63	0.56	0.6	0.5	0.56
Vanadium	µg/g	2	86	26.9	19.2	27.3	24.8	16.3	24.4	18.4	28.4	33	37.5	26	25.1
Zinc	µg/g	5	290	239	202	226	192	235	252	25	349	109	81	245	276
Chromium, Hexavalent	µg/g	0.2	0.66	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-20	2025-01-20
				DUP 25-52	25-53 @ 7.5-10	25-54 @ 5-7.5	25-55 @ 5-7.5	25-56 @ 5-7.5	25-57 @ 2.5-5	25-58 @ 2.5-5	25-59 @ 0-2.5	25-60 @ 0-2.5	25-61 @ 2.5-5	25-62 @ 7.5-10	DUP 25-62
Cyanide, WAD	µg/g	0.04	0.051	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.1	0.27	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.18	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.005	0.57	0.22	0.132	0.294	0.369	0.179	0.377	0.232	0.225	0.386	0.222	0.126	0.2
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	N/A	2.4	0.181	0.134	0.506	0.598	0.431	0.495	0.631	0.588	0.423	1.09	0.149	0.152
pH, 2:1 CaCl2 Extraction	pH Units	NA		7.34	7.63	7.56	7.78	7.87	7.7	8.58	9.27	11.7	8.24	7.99	7.43
Naphthalene	µg/g	0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.05	0.093	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.05	0.072	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.05	0.12	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.05	0.69	<0.05	<0.05	<0.05	0.29	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.05	0.16	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.05	0.56	<0.05	<0.05	<0.05	0.24	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	0.05	1	<0.05	<0.05	<0.05	0.17	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.05	0.36	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	0.05	2.8	<0.05	<0.05	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.05	0.47	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-20	2025-01-20
				DUP 25-52	25-53 @ 7.5-10	25-54 @ 5-7.5	25-55 @ 5-7.5	25-56 @ 5-7.5	25-57 @ 2.5-5	25-58 @ 2.5-5	25-59 @ 0-2.5	25-60 @ 0-2.5	25-61 @ 2.5-5	25-62 @ 7.5-10	DUP 25-62
Benzo(k)fluoranthene	µg/g	0.05	0.48	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.05	0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.05	0.23	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.05	0.68	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.05	0.59	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene-d8		1													
Naphthalene-d8	%	1		70	70	70	70	70	75	65	70	75	70	65	65
Acridine-d9	%	1		90	110	85	90	115	85	75	85	85	85	90	75
Terphenyl-d14	%	1		120	125	120	95	130	130	130	125	125	120	130	105
Moisture Content	%	0.1		13.9	15.8	15	15.5	7.5	16.8	12.6	12.6	14.2	8.1	15.5	16.6
F1 (C6 to C10)	µg/g	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	5	25	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene-d8	%	1		108	102	99	105	103	110	105	102	100	102	105	97
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g	10		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	50	240	<50	<50	<50	103	<50	<50	59	<50	<50	<50	<50	<50

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-20	2025-01-20
				DUP 25-52	25-53 @ 7.5-10	25-54 @ 5-7.5	25-55 @ 5-7.5	25-56 @ 5-7.5	25-57 @ 2.5-5	25-58 @ 2.5-5	25-59 @ 0-2.5	25-60 @ 0-2.5	25-61 @ 2.5-5	25-62 @ 7.5-10	DUP 25-62
F3 (C16 to C34) minus PAHs	µg/g	50	240	<50	<50	<50	102	<50	<50	59	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	50	120	<50	<50	<50	113	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	50		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%	0.1		13.9	15.8	15	15.5	7.5	16.8	12.6	12.6	14.2	8.1	15.5	16.6
Terphenyl	%	1		76	84	77	76	70	77	83	81	83	76	76	73
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.05	0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-20	2025-01-20
				DUP 25-52	25-53 @ 7.5-10	25-54 @ 5-7.5	25-55 @ 5-7.5	25-56 @ 5-7.5	25-57 @ 2.5-5	25-58 @ 2.5-5	25-59 @ 0-2.5	25-60 @ 0-2.5	25-61 @ 2.5-5	25-62 @ 7.5-10	DUP 25-62
Methyl Ethyl Ketone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.05	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-20	2025-01-20
				DUP 25-52	25-53 @ 7.5-10	25-54 @ 5-7.5	25-55 @ 5-7.5	25-56 @ 5-7.5	25-57 @ 2.5-5	25-58 @ 2.5-5	25-59 @ 0-2.5	25-60 @ 0-2.5	25-61 @ 2.5-5	25-62 @ 7.5-10	DUP 25-62
Ethylene Dibromide	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-20	2025-01-20
				DUP 25-52	25-53 @ 7.5-10	25-54 @ 5-7.5	25-55 @ 5-7.5	25-56 @ 5-7.5	25-57 @ 2.5-5	25-58 @ 2.5-5	25-59 @ 0-2.5	25-60 @ 0-2.5	25-61 @ 2.5-5	25-62 @ 7.5-10	DUP 25-62
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene-d8	% Recovery	1		108	102	99	105	103	110	105	102	100	102	105	97
4-Bromofluorobenzene	% Recovery	1		92	93	92	94	93	93	93	83	91	88	88	91
Moisture Content	%	0.1		13.9	15.8	15	15.5	7.5	16.8	12.6	12.6	14.2	8.1	15.5	16.6

Exceeds Guideline	Within Guideline													
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20
				25-63 @ 7.5-10	25-64 @ 2.5-5	25-65 @ 5-7.5	25-66 @ 7.5-10	25-67 @ 7.5-10	25-68 @ 5-7.5	25-69 @ 7.5-10	25-70 @ 5-7.5	25-71 @ 2.5-5	25-72 @ 7.5-10	25-73 @ 5-7.5	25-74 @ 5-7.5
Parameter Name	**Unit**	**RDL**	**G / S**	**6472724**	**6472725**	**6472726**	**6472727**	**6472728**	**6472729**	**6472780**	**6472781**	**6472782**	**6472783**	**6472784**	**6472785**
Antimony	µg/g	0.8	1.3	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	1	18	5	6	7	6	5	6	7	5	6	6	6	7
Barium	µg/g	2	220	42	55.4	58	51.8	62.3	51.6	60.4	64.4	79.2	17.2	54	71.2
Beryllium	µg/g	0.5	2.5	0.5	0.6	0.6	0.6	0.7	0.6	0.6	0.9	0.7	<0.5	0.6	<0.5
Boron	µg/g	5	36	9	8	8	7	7	8	9	17	17	17	18	7
Boron (Hot Water Soluble)	µg/g	0.1	NA	0.26	0.35	0.49	0.75	0.49	0.46	0.48	0.63	0.29	0.12	0.44	0.5
Cadmium	µg/g	0.5	1.2	<0.5	0.6	0.8	0.7	0.6	0.6	1	<0.5	<0.5	<0.5	0.7	1
Chromium	µg/g	5	70	14	16	15	15	17	15	16	22	19	6	15	16
Cobalt	µg/g	0.8	21	6.3	7.1	6.9	6.4	6.8	7	6.7	12.4	8	2.9	7.1	6.2
Copper	µg/g	1	92	18.6	21.8	21.7	18.1	20.7	19.2	19.9	42.2	32.5	13.5	22	23.3
Lead	µg/g	1	120	34	43	61	55	42	47	70	24	44	39	55	94
Molybdenum	µg/g	0.5	2	0.6	0.6	0.7	0.6	<0.5	0.6	0.8	0.6	0.8	<0.5	0.6	0.8
Nickel	µg/g	1	82	12	14	14	13	15	14	14	25	15	3	14	13
Selenium	µg/g	0.8	1.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	0.5	2.5	<0.50	0.53	0.5	0.57	0.56	0.57	0.62	0.67	0.54	<0.50	0.58	0.71
Vanadium	µg/g	2	86	24.1	26.9	25	25.4	26.1	24.7	26.2	29.8	23.8	8.8	23.9	26.6
Zinc	µg/g	5	290	223	241	336	266	229	258	341	109	92	279	292	350
Chromium, Hexavalent	µg/g	0.2	0.66	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20
				25-63 @ 7.5-10	25-64 @ 2.5-5	25-65 @ 5-7.5	25-66 @ 7.5-10	25-67 @ 7.5-10	25-68 @ 5-7.5	25-69 @ 7.5-10	25-70 @ 5-7.5	25-71 @ 2.5-5	25-72 @ 7.5-10	25-73 @ 5-7.5	25-74 @ 5-7.5
Cyanide, WAD	µg/g	0.04	0.051	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.1	0.27	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.005	0.57	0.145	0.234	0.216	0.244	0.429	0.27	0.128	0.722	0.398	0.243	0.154	0.226
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	N/A	2.4	0.231	0.159	0.374	0.161	0.14	0.249	0.102	3.07	1.18	0.379	0.19	0.114
pH, 2:1 CaCl2 Extraction	pH Units	NA		6.41	7.46	6.99	7.34	7.15	7.33	7.27	7.79	9.67	8.06	7.87	7.53
Naphthalene	µg/g	0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.05	0.093	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.05	0.072	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.05	0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.05	0.69	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.05	0.16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.05	0.56	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	0.05	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.05	0.36	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	0.05	2.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.05	0.47	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.05	0.48	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20
				25-63 @ 7.5-10	25-64 @ 2.5-5	25-65 @ 5-7.5	25-66 @ 7.5-10	25-67 @ 7.5-10	25-68 @ 5-7.5	25-69 @ 7.5-10	25-70 @ 5-7.5	25-71 @ 2.5-5	25-72 @ 7.5-10	25-73 @ 5-7.5	25-74 @ 5-7.5
Benzo(a)pyrene	µg/g	0.05	0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.05	0.23	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.05	0.68	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.05	0.59	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene-d8		1													
Naphthalene-d8	%	1		65	97	97	97	71	97	71	97	71	97	71	97
Acridine-d9	%	1		70	71	85	85	74	85	74	85	74	85	85	85
Terphenyl-d14	%	1		105	74	77	71	85	99	88	77	88	77	77	99
Moisture Content	%	0.1		9.4	16.8	19.3	16	22.3	14.8	14.6	13.1	11.8	4.4	19.9	15.8
F1 (C6 to C10)	µg/g	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	5	25	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene-d8	%	1		100	102	108	102	103	103	103	98	107	106	104	105
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g	10		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	50	240	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	50	240	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50

Exceeds Guideline	Within Guideline													
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20
				25-63 @ 7.5-10	25-64 @ 2.5-5	25-65 @ 5-7.5	25-66 @ 7.5-10	25-67 @ 7.5-10	25-68 @ 5-7.5	25-69 @ 7.5-10	25-70 @ 5-7.5	25-71 @ 2.5-5	25-72 @ 7.5-10	25-73 @ 5-7.5	25-74 @ 5-7.5
F4 (C34 to C50)	µg/g	50	120	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	50		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%	0.1		9.4	16.8	19.3	16	22.3	14.8	14.6	13.1	11.8	4.4	19.9	15.8
Terphenyl	%	1		78	69	72	68	89	96	79	91	71	67	96	95
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.05	0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20
				25-63 @ 7.5-10	25-64 @ 2.5-5	25-65 @ 5-7.5	25-66 @ 7.5-10	25-67 @ 7.5-10	25-68 @ 5-7.5	25-69 @ 7.5-10	25-70 @ 5-7.5	25-71 @ 2.5-5	25-72 @ 7.5-10	25-73 @ 5-7.5	25-74 @ 5-7.5
Chloroform	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.05	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04

Exceeds Guideline	Within Guideline														
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20
				25-63 @ 7.5-10	25-64 @ 2.5-5	25-65 @ 5-7.5	25-66 @ 7.5-10	25-67 @ 7.5-10	25-68 @ 5-7.5	25-69 @ 7.5-10	25-70 @ 5-7.5	25-71 @ 2.5-5	25-72 @ 7.5-10	25-73 @ 5-7.5	25-74 @ 5-7.5
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene-d8	% Recovery	1		100	102	108	102	103	103	103	98	107	106	104	105
4-Bromofluorobenzene	% Recovery	1		90	93	94	93	95	89	89	94	93	88	86	89
Moisture Content	%	0.1		9.4	16.8	19.3	16	22.3	14.8	14.6	13.1	11.8	4.4	19.9	15.8

Exceeds Guideline	Within Guideline															
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21
				25-75 @ 5-7.5	25-76 @ 5-7.5	25-77 @ 7.5-10	25-78 @ 5-7.5	25-79 @ 7.5-10	25-80 @ 7.5-10	25-81 @ 7.5-10	25-82 @ 5-10	25-83 @ 5-7.5	25-84 @ 5-7.5	25-85 @ 5-7.5	25-86 @ 7.5-10	25-87 @ 7.5-10	25-88 @ 5-7.5
Parameter Name	**Unit**	**RDL**	**G / S**	**6472786**	**6472787**	**6472788**	**6472789**	**6472790**	**6472791**	**6472792**	**6472824**	**6472829**	**6472835**	**6472840**	**6472845**	**6472848**	**6472849**
Antimony	µg/g	0.8	1.3	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	1	18	7	6	6	6	6	6	7	7	4	5	4	6	8	5
Barium	µg/g	2	220	71.8	58.1	52.8	74.2	75	61.2	58.5	62.4	44.7	44.5	38.3	57.4	68.2	72.2
Beryllium	µg/g	0.5	2.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	µg/g	5	36	7	7	6	5	5	6	6	6	6	6	<5	6	6	8
Boron (Hot Water Soluble)	µg/g	0.1	NA	0.45	0.51	0.8	0.6	0.65	0.5	0.49	0.43	0.47	0.42	0.48	0.43	0.56	0.67
Cadmium	µg/g	0.5	1.2	0.8	0.7	0.8	0.6	0.7	0.7	0.9	0.9	<0.5	0.5	<0.5	0.8	0.9	<0.5
Chromium	µg/g	5	70	17	13	12	14	15	15	14	15	13	12	10	13	15	15
Cobalt	µg/g	0.8	21	7.3	5.8	5.4	6.5	6.7	6	6.2	6.6	5.4	5.5	4.5	5.5	6.4	5
Copper	µg/g	1	92	25.6	20.3	18.4	22.1	20.8	19.1	20.3	21.1	17.3	22.9	14.7	16.8	17.4	15.6
Lead	µg/g	1	120	77	64	66	58	57	61	74	68	38	39	34	78	100	50
Molybdenum	µg/g	0.5	2	0.8	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.8	0.7	0.8	1.2
Nickel	µg/g	1	82	15	12	11	13	13	13	12	13	11	11	9	12	12	11
Selenium	µg/g	0.8	1.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	0.5	2.5	0.71	0.64	0.54	0.57	0.61	0.6	0.61	0.62	0.5	<0.50	<0.50	0.63	0.66	0.62
Vanadium	µg/g	2	86	28.2	22.8	21	25.6	26.5	23.9	25.5	26.6	21.4	20.1	18.2	22.7	26.4	24.2
Zinc	µg/g	5	290	340	289	280	259	258	260	342	329	184	211	132	315	335	264

Exceeds Guideline	Within Guideline																
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21
				25-75 @ 5-7.5	25-76 @ 5-7.5	25-77 @ 7.5-10	25-78 @ 5-7.5	25-79 @ 7.5-10	25-80 @ 7.5-10	25-81 @ 7.5-10	25-82 @ 5-10	25-83 @ 5-7.5	25-84 @ 5-7.5	25-85 @ 5-7.5	25-86 @ 7.5-10	25-87 @ 7.5-10	25-88 @ 5-7.5
Chromium, Hexavalent	µg/g	0.2	0.66	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.04	0.051	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.1	0.27	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.005	0.57	0.311	0.176	0.44	0.916	0.173	0.159	0.199	0.138	0.211	0.399	0.26	0.138	0.192	0.232
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	N/A	2.4	0.72	0.16	0.511	0.629	0.244	0.145	0.102	0.093	0.226	0.643	0.352	0.132	0.14	0.388
pH, 2:1 CaCl2 Extraction	pH Units	NA		7.49	7.41	7.33	7.53	7.18	7.26	7.28	6.13	7.54	7.38	7.54	7.22	7.37	7.8
Naphthalene	µg/g	0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.05	0.093	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.05	0.072	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.05	0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.05	0.69	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.05	0.16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.05	0.56	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	0.05	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline															
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21
				25-75 @ 5-7.5	25-76 @ 5-7.5	25-77 @ 7.5-10	25-78 @ 5-7.5	25-79 @ 7.5-10	25-80 @ 7.5-10	25-81 @ 7.5-10	25-82 @ 5-10	25-83 @ 5-7.5	25-84 @ 5-7.5	25-85 @ 5-7.5	25-86 @ 7.5-10	25-87 @ 7.5-10	25-88 @ 5-7.5
Benzo(a)anthracene	µg/g	0.05	0.36	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	0.05	2.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.05	0.47	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.05	0.48	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.05	0.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.05	0.23	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.05	0.68	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.05	0.59	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene-d8		1															
Naphthalene-d8	%	1		75	75	75	75	70	65	65	70	70	70	70	70	88	70
Acridine-d9	%	1		70	95	90	115	115	80	110	65	60	85	85	85	74	90
Terphenyl-d14	%	1		90	105	85	100	70	75	90	85	80	70	65	85	88	70
Moisture Content	%	0.1		19.3	17.6	17.4	19.8	22.5	17.6	16.4	20.7	16.3	16.8	16.1	17.3	17.1	11.3
F1 (C6 to C10)	µg/g	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

Exceeds Guideline	Within Guideline															
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T24063	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21
				25-75 @ 5-7.5	25-76 @ 5-7.5	25-77 @ 7.5-10	25-78 @ 5-7.5	25-79 @ 7.5-10	25-80 @ 7.5-10	25-81 @ 7.5-10	25-82 @ 5-10	25-83 @ 5-7.5	25-84 @ 5-7.5	25-85 @ 5-7.5	25-86 @ 7.5-10	25-87 @ 7.5-10	25-88 @ 5-7.5
F1 (C6 to C10) minus BTEX	µg/g	5	25	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Toluene-d8	%	1		104	100	102	102	104	104	104	105	103	103	101	105	103	105
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g	10		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	50	240	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	91	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	50	240	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	91	<50	<50	<50
F4 (C34 to C50)	µg/g	50	120	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	50		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%	0.1		19.3	17.6	17.4	19.8	22.5	17.6	16.4	20.7	16.3	16.8	16.1	17.3	17.1	11.3
Terphenyl	%	1		73	84	81	67	82	81	90	65	70	66	92	73	70	74
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.05	0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Exceeds Guideline	Within Guideline																
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21
				25-75 @ 5-7.5	25-76 @ 5-7.5	25-77 @ 7.5-10	25-78 @ 5-7.5	25-79 @ 7.5-10	25-80 @ 7.5-10	25-81 @ 7.5-10	25-82 @ 5-10	25-83 @ 5-7.5	25-84 @ 5-7.5	25-85 @ 5-7.5	25-86 @ 7.5-10	25-87 @ 7.5-10	25-88 @ 5-7.5
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Exceeds Guideline	Within Guideline															
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T24063	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21
				25-75 @ 5-7.5	25-76 @ 5-7.5	25-77 @ 7.5-10	25-78 @ 5-7.5	25-79 @ 7.5-10	25-80 @ 7.5-10	25-81 @ 7.5-10	25-82 @ 5-10	25-83 @ 5-7.5	25-84 @ 5-7.5	25-85 @ 5-7.5	25-86 @ 7.5-10	25-87 @ 7.5-10	25-88 @ 5-7.5
1,2-Dichloropropane	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.05	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Exceeds Guideline	Within Guideline															
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T24063	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21
				25-75 @ 5-7.5	25-76 @ 5-7.5	25-77 @ 7.5-10	25-78 @ 5-7.5	25-79 @ 7.5-10	25-80 @ 7.5-10	25-81 @ 7.5-10	25-82 @ 5-10	25-83 @ 5-7.5	25-84 @ 5-7.5	25-85 @ 5-7.5	25-86 @ 7.5-10	25-87 @ 7.5-10	25-88 @ 5-7.5
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene-d8	% Recovery	1		104	100	102	102	104	104	104	105	103	103	101	105	103	105
4-Bromofluorobenzene	% Recovery	1		89	86	91	90	90	90	93	94	91	93	94	95	92	90

Exceeds Guideline	Within Guideline																
				25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863	25T24063	25T240863	25T240863	25T240863	25T240863	25T240863	25T240863
				2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21
				25-75 @ 5-7.5	25-76 @ 5-7.5	25-77 @ 7.5-10	25-78 @ 5-7.5	25-79 @ 7.5-10	25-80 @ 7.5-10	25-81 @ 7.5-10	25-82 @ 5-10	25-83 @ 5-7.5	25-84 @ 5-7.5	25-85 @ 5-7.5	25-86 @ 7.5-10	25-87 @ 7.5-10	25-88 @ 5-7.5
Moisture Content	%	0.1		19.3	17.6	17.4	19.8	22.5	17.6	16.4	20.7	16.3	16.8	16.1	17.3	17.1	11.3

Table 6 – Summary of Analysis for SPLP Samples

Sample Description					BH25-4	BH25-10	BH25-18	BH25-27	BH25-33	BH25-39	BH25-46	BH25-55	BH25-62	BH25-70	BH25-79	BH25-86
Parameter Name	Unit	RDL	Guideline	G / S	6509219	6509220	6509221	6509222	6509223	6509224	6509225	6509226	6509227	6509228	6509229	6509230
O. Reg. 406/19 - SPLP BNA																
Bis(2-chloroethyl)ether Leachate	µg/L	0.5	406 T1 RPIC	5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bis(2-chloroisopropyl)ether Leachate	µg/L	0.5	406 T1 RPIC	4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
p-Chloroaniline Leachate	µg/L	1	406 T1 RPIC	10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
3,3'-Dichlorobenzidine Leachate	µg/L	0.5	406 T1 RPIC	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diethyl phthalate Leachate	µg/L	0.5	406 T1 RPIC	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethylphthalate Leachate	µg/L	0.5	406 T1 RPIC	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dinitrophenol Leachate	µg/L	10	406 T1 RPIC	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4-Dinitrotoluene Leachate	µg/L	0.5	406 T1 RPIC		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,6-Dinitrotoluene Leachate	µg/L	0.5	406 T1 RPIC		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dinitrotoluene (2,4 & 2,6) Leachate	µg/L	0.5	406 T1 RPIC	5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,6-Trichlorophenol Leachate	µg/L	0.2	406 T1 RPIC	0.75	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2-Fluorophenol	%	1	406 T1 RPIC		62	65	69	67	70	61	63	61	70	71	76	80
phenol-d6 surrogate	%	1	406 T1 RPIC		81	90	80	81	90	79	71	64	80	74	79	104
2,4,6-Tribromophenol	%	1	406 T1 RPIC		72	62	76	62	60	65	68	64	103	61	92	62
Chrysene-d12	%	1	406 T1 RPIC		110	94	94	67	110	91	100	77	64	107	78	78
O. Reg. 406/19 SPLP Metals																
Antimony Leachate	µg/L	0.6	406 T1 RPIC	-	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6

Sample Description					BH25-4	BH25-10	BH25-18	BH25-27	BH25-33	BH25-39	BH25-46	BH25-55	BH25-62	BH25-70	BH25-79	BH25-86
Parameter Name	**Unit**	**RDL**	**Guideline**	**G / S**	**650921 9**	**650922 0**	**650922 1**	**650922 2**	**650922 3**	**650922 4**	**650922 5**	**650922 6**	**650922 7**	**650922 8**	**650922 9**	**650923 0**
Arsenic Leachate	µg/L	5	406 T1 RPIC	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Barium Leachate	µg/L	100	406 T1 RPIC	-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Beryllium Leachate	µg/L	0.8	406 T1 RPIC	-	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Boron Leachate	µg/L	500	406 T1 RPIC	-	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500
Cadmium Leachate	µg/L	0.2	406 T1 RPIC	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chromium Leachate	µg/L	10	406 T1 RPIC	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cobalt Leachate	µg/L	0.3	406 T1 RPIC	-	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Copper Leachate	µg/L	6.9	406 T1 RPIC	-	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9
Lead Leachate	µg/L	1	406 T1 RPIC	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Molybdenum Leachate	µg/L	1.5	406 T1 RPIC	**23**	<1.5	<1.5	2.6	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	2.8	<1.5	3.5
Nickel Leachate	µg/L	10	406 T1 RPIC	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Selenium Leachate	µg/L	5	406 T1 RPIC	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Silver Leachate	µg/L	0.1	406 T1 RPIC	**0.3**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Thallium Leachate	µg/L	0.5	406 T1 RPIC	**2**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium Leachate	µg/L	2	406 T1 RPIC	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Vanadium Leachate	µg/L	0.6	406 T1 RPIC	-	<0.6	8.9	9.6	2.6	0.8	6.4	2.2	0.6	1.3	10.2	0.9	3.4
Zinc Leachate	µg/L	20	406 T1 RPIC	-	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
O. Reg. 406/19 - SPLP VOCs																
Bromomethane Leachate	µg/L	0.2	406 T1 RPIC	**0.5**	<0.20	<0.20	<0.20									

Sample Description					BH25-4	BH25-10	BH25-18	BH25-27	BH25-33	BH25-39	BH25-46	BH25-55	BH25-62	BH25-70	BH25-79	BH25-86
Parameter Name	**Unit**	**RDL**	**Guideline**	**G / S**	**6509219**	**6509220**	**6509221**	**6509222**	**6509223**	**6509224**	**6509225**	**6509226**	**6509227**	**6509228**	**6509229**	**6509230**
1,1-Dichloroethylene Leachate	µg/L	0.3	406 T1 RPIC	**0.5**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trans 1,2-Dichloroethylene Leachate	µg/L	0.2	406 T1 RPIC	**0.5**	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
1,1-Dichloroethane Leachate	µg/L	0.3	406 T1 RPIC	**0.5**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Cis 1,2-Dichloroethylene Leachate	µg/L	0.2	406 T1 RPIC	**0.5**	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Chloroform Leachate	µg/L	0.2	406 T1 RPIC	**1**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloroethane Leachate	µg/L	0.2	406 T1 RPIC	**0.5**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Carbon Tetrachloride Leachate	µg/L	0.2	406 T1 RPIC	**0.2**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloropropane Leachate	µg/L	0.2	406 T1 RPIC	**0.5**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trichloroethylene Leachate	µg/L	0.2	406 T1 RPIC	**0.5**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,2-Trichloroethane Leachate	µg/L	0.2	406 T1 RPIC	**0.5**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylene Dibromide Leachate	µg/L	0.1	406 T1 RPIC	**0.2**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Tetrachloroethylene Leachate	µg/L	0.2	406 T1 RPIC	**0.5**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,1,1,2-Tetrachloroethane Leachate	µg/L	0.1	406 T1 RPIC	**0.5**	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,2,2-Tetrachloroethane Leachate	µg/L	0.1	406 T1 RPIC	**0.5**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene Leachate	µg/L	0.1	406 T1 RPIC	**0.5**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene Leachate	µg/L	0.1	406 T1 RPIC	**0.55**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichloropropene Total Leachate	µg/L	0.3	406 T1 RPIC	**0.5**	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Toluene-d8	% Recovery	1	406 T1 RPIC		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

Sample Description					BH25-4	BH25-10	BH25-18	BH25-27	BH25-33	BH25-39	BH25-46	BH25-55	BH25-62	BH25-70	BH25-79	BH25-86
Parameter Name	**Unit**	**RDL**	**Guideline**	**G / S**	**6509219**	**6509220**	**6509221**	**6509222**	**6509223**	**6509224**	**6509225**	**6509226**	**6509227**	**6509228**	**6509229**	**6509230**
Guideline Legend:	Exceeds Guideline			Within Guideline		Below RDL										

APPENDIX B – Figures

Figure 1 – Site Location Map

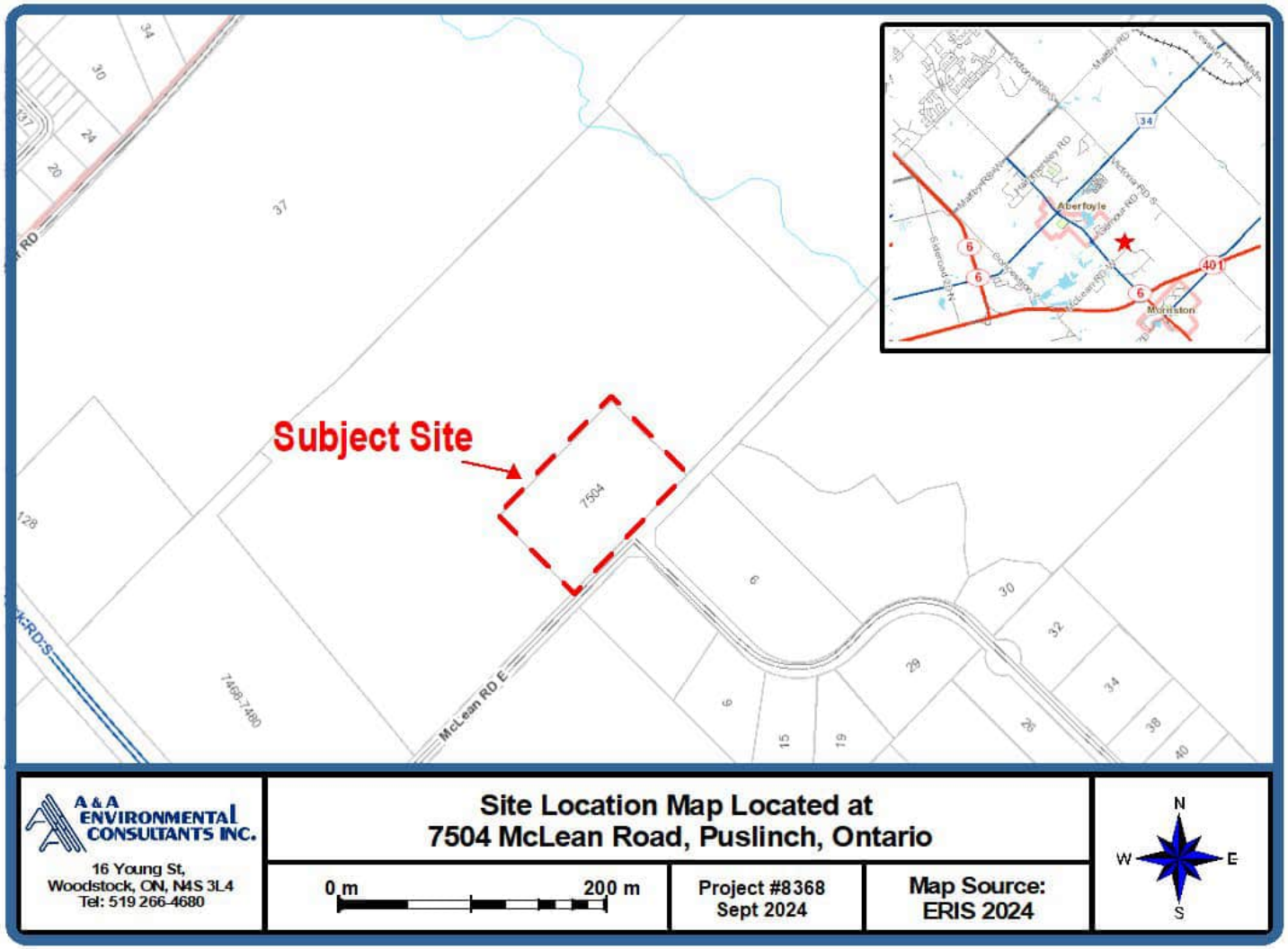


Figure 2 – Satellite Image Indicating the Project area

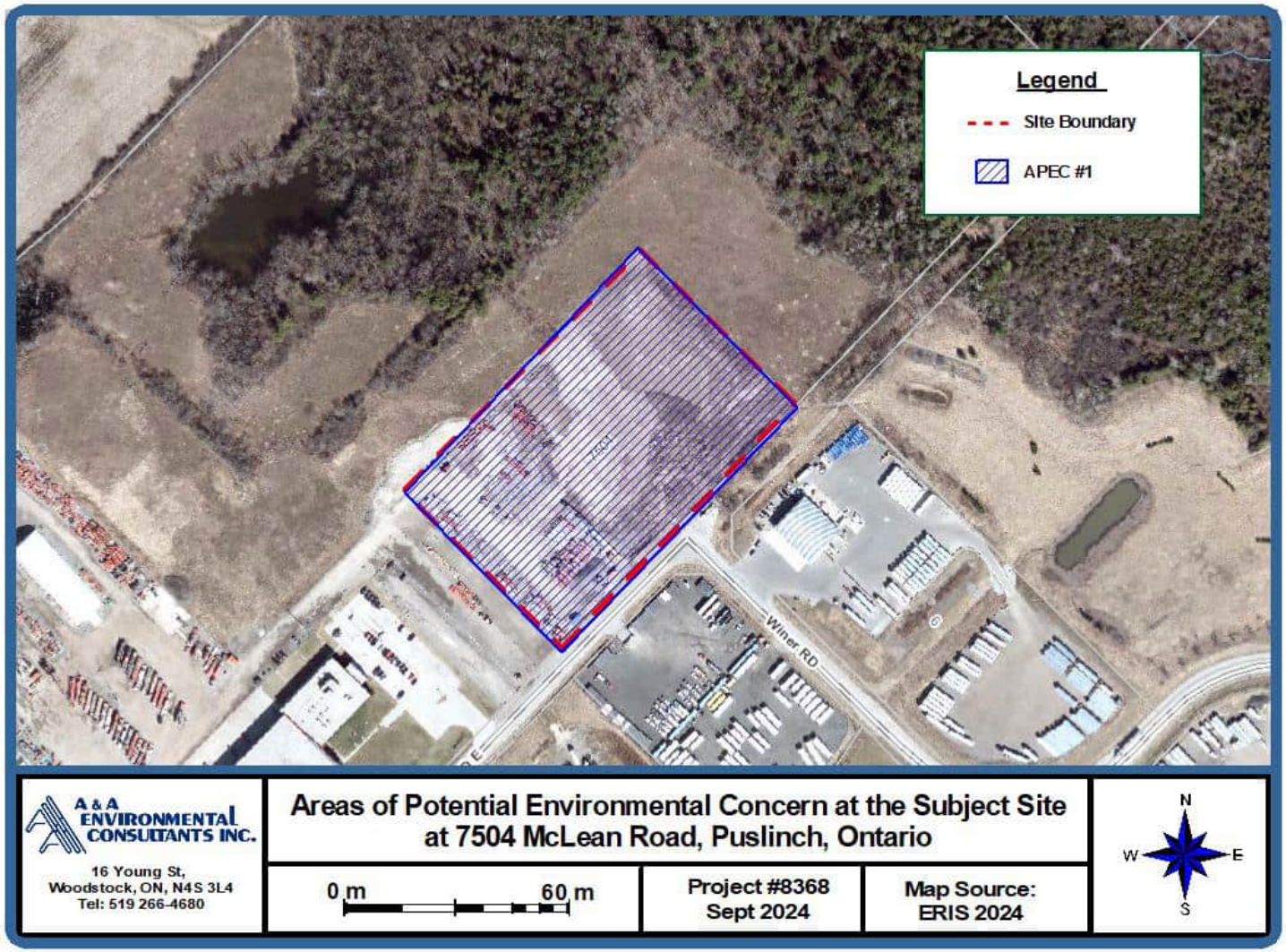


Figure 3 – Topographic Map

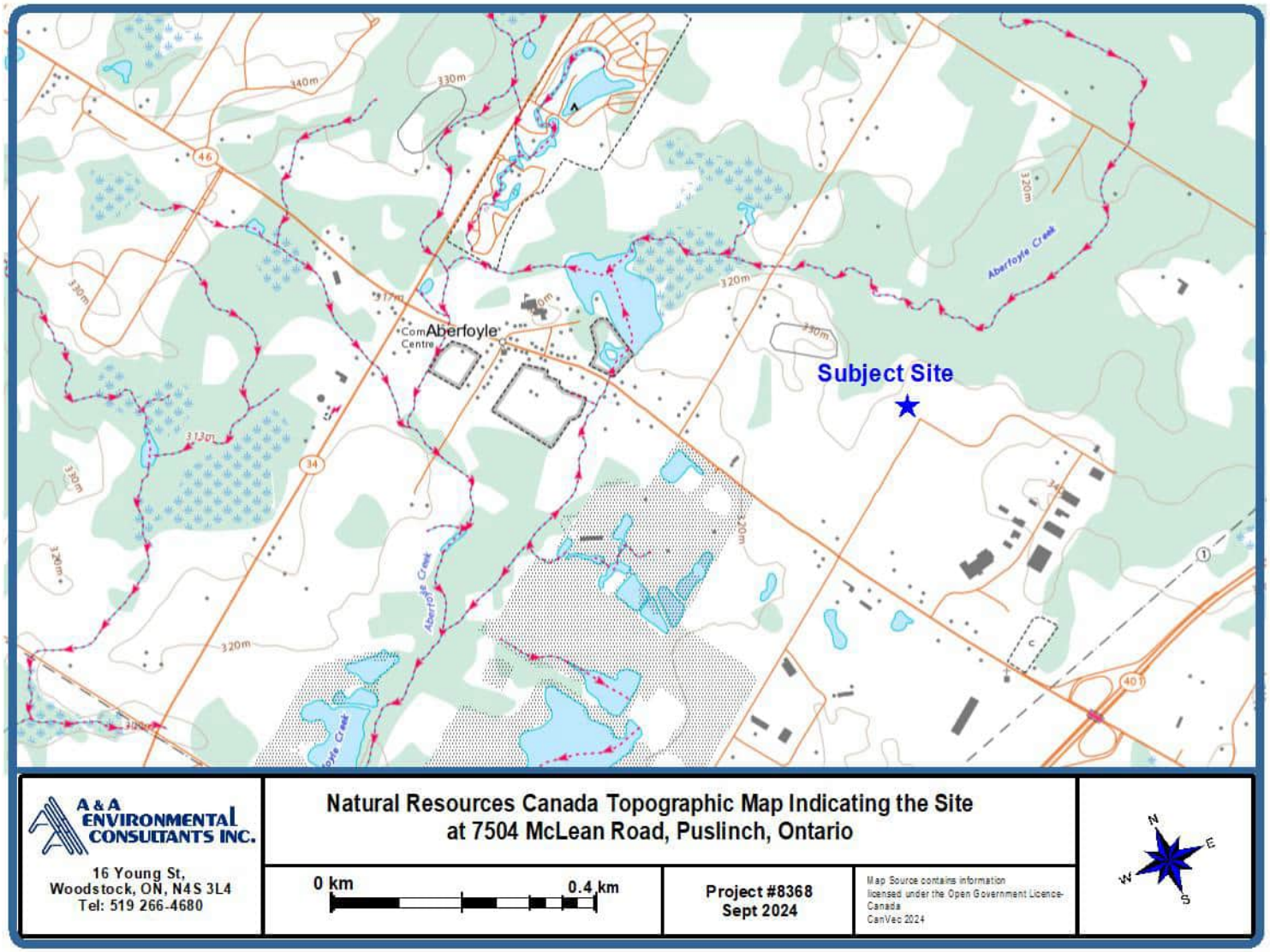


Figure 4 – Plan View Showing Borehole Locations within APEC

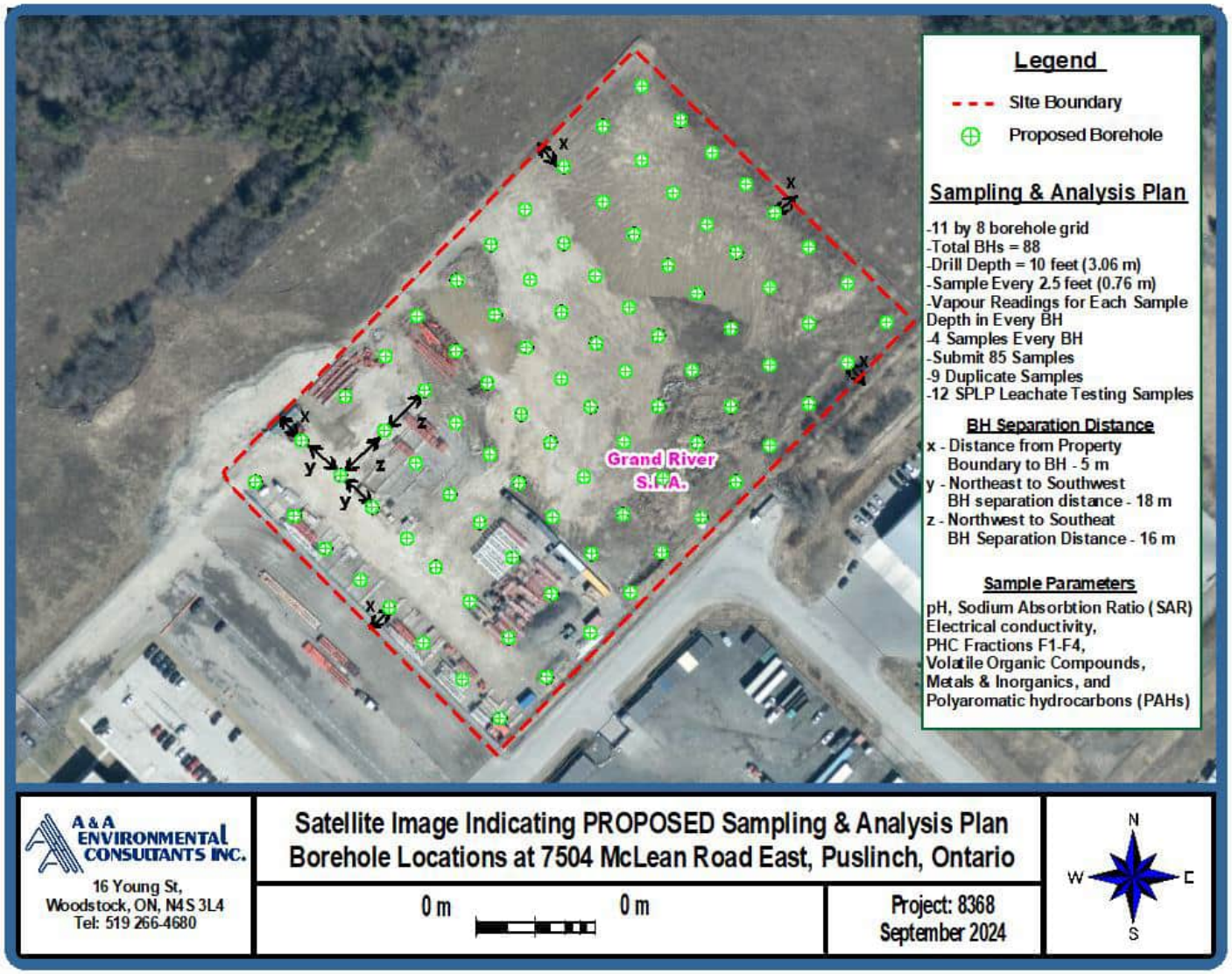


Figure 5 – Borehole Grid with BH Labels

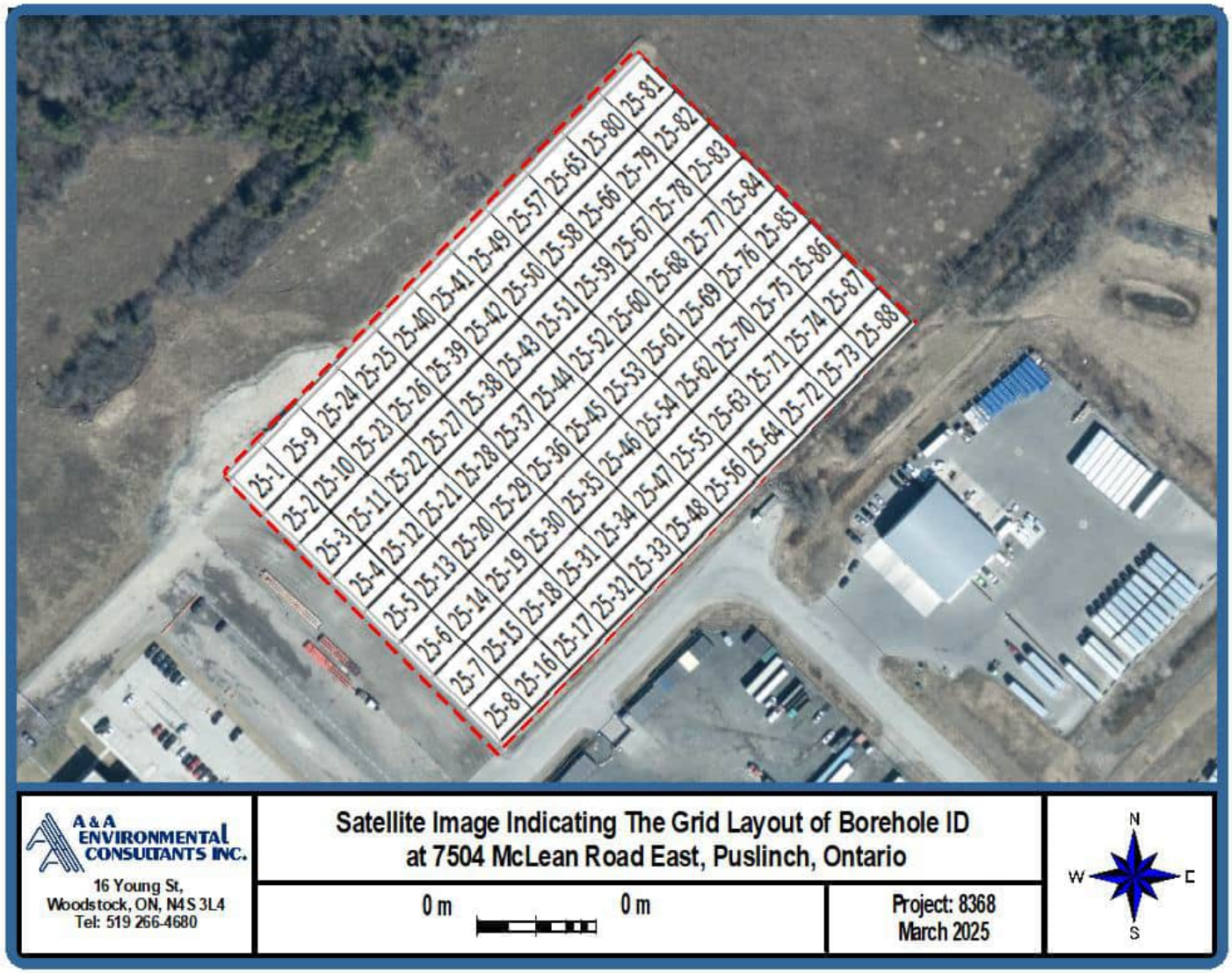


Figure 6 – Boreholes with Exceedances

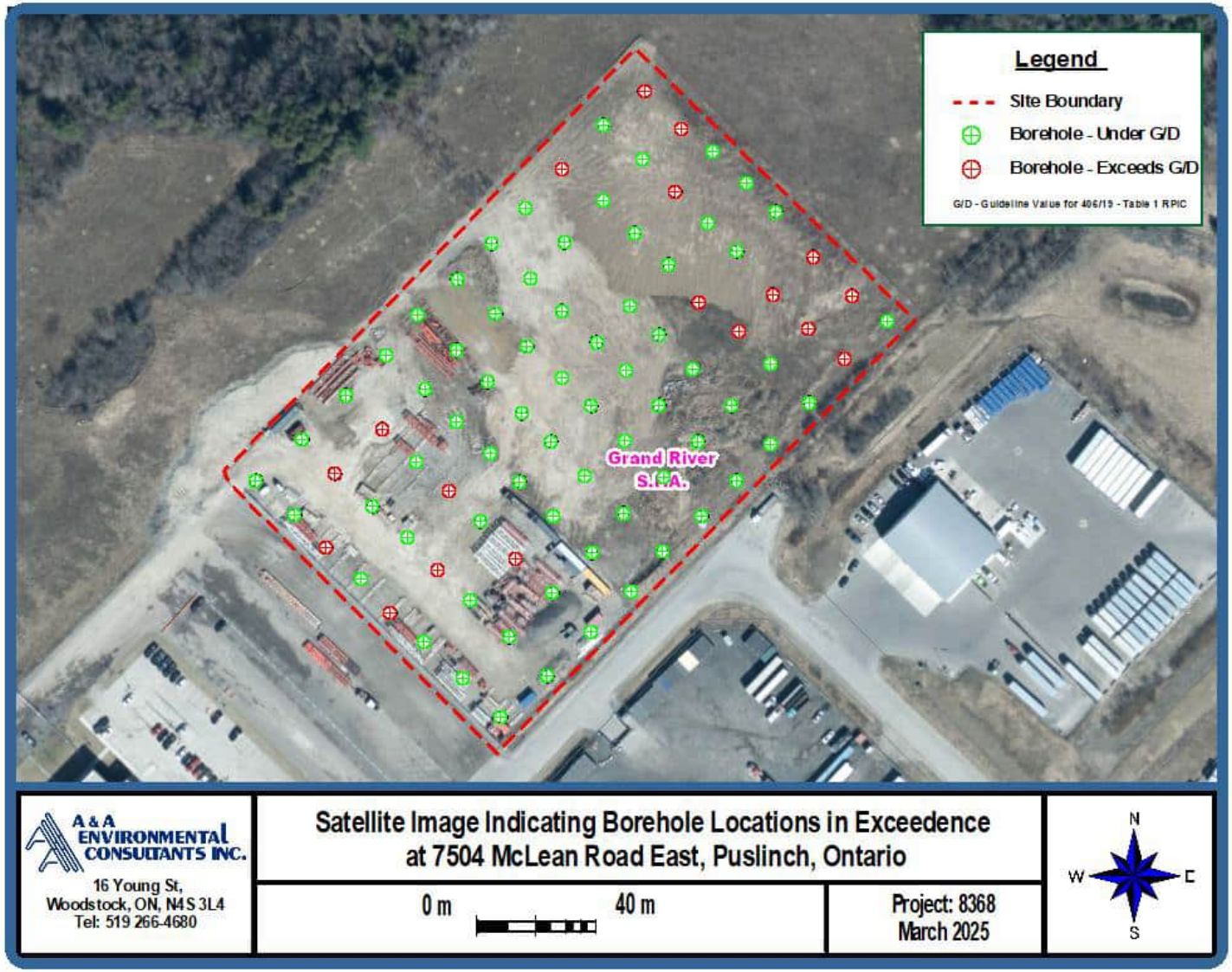


Figure 7 – Geotechnical Investigation Borehole Map

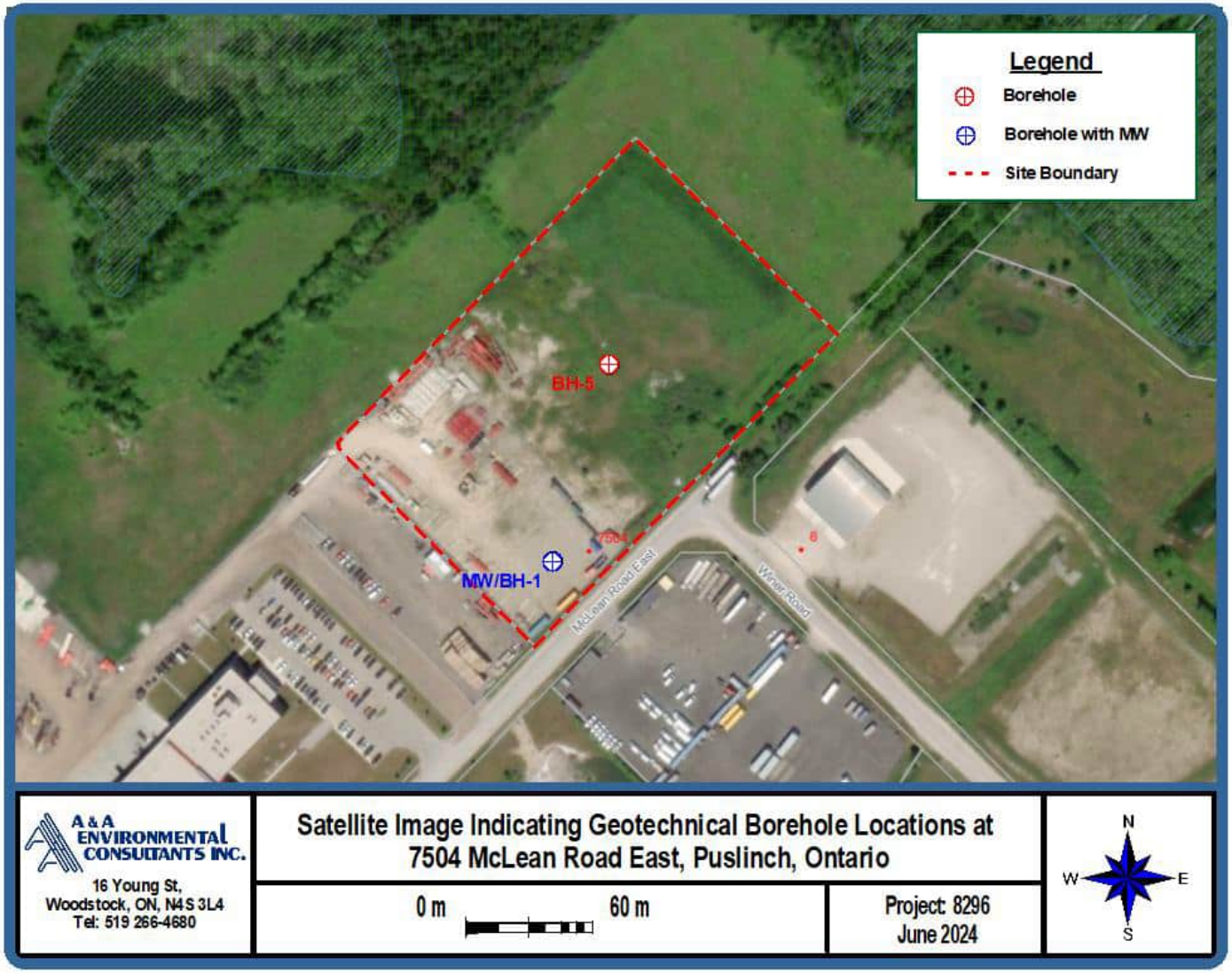
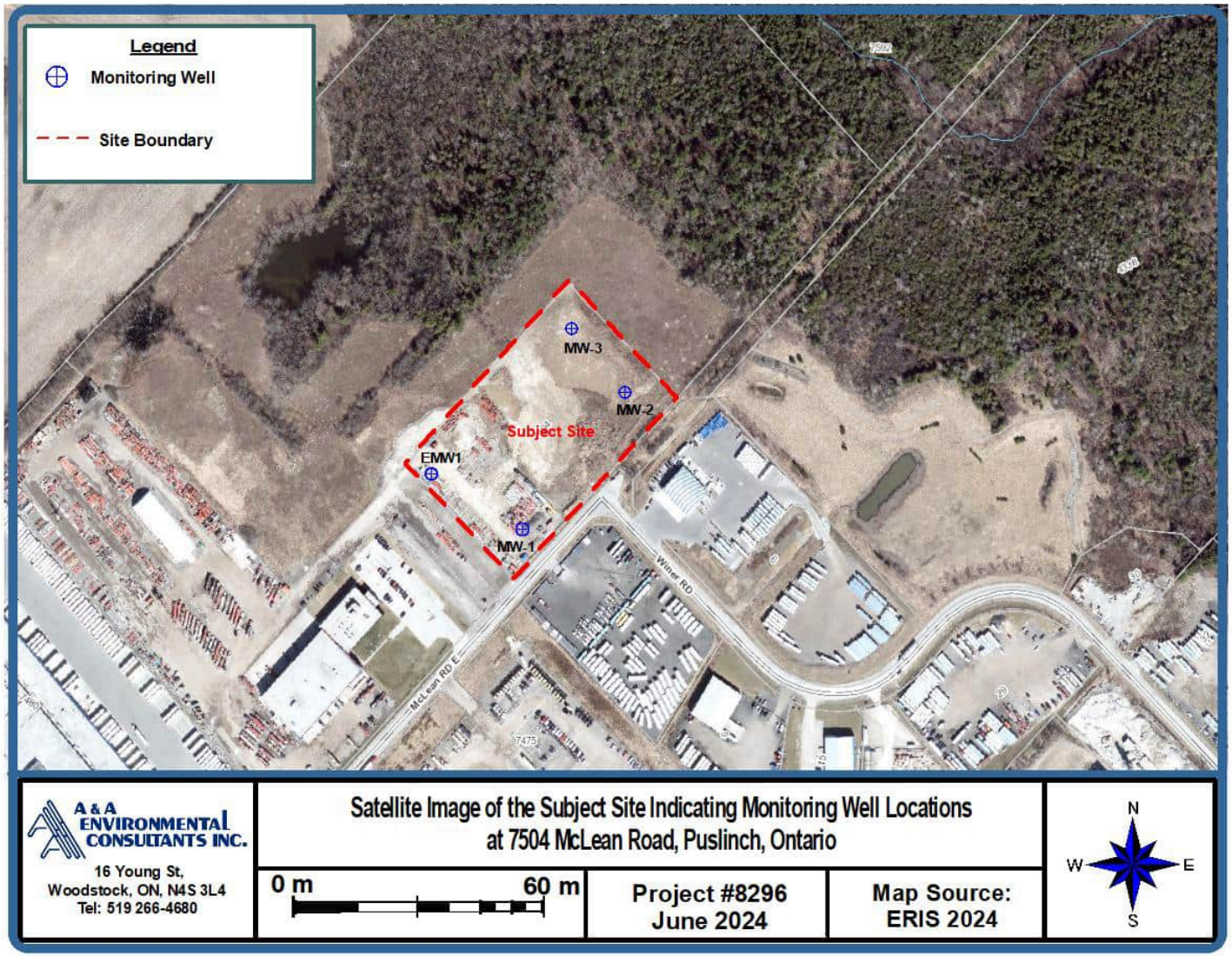
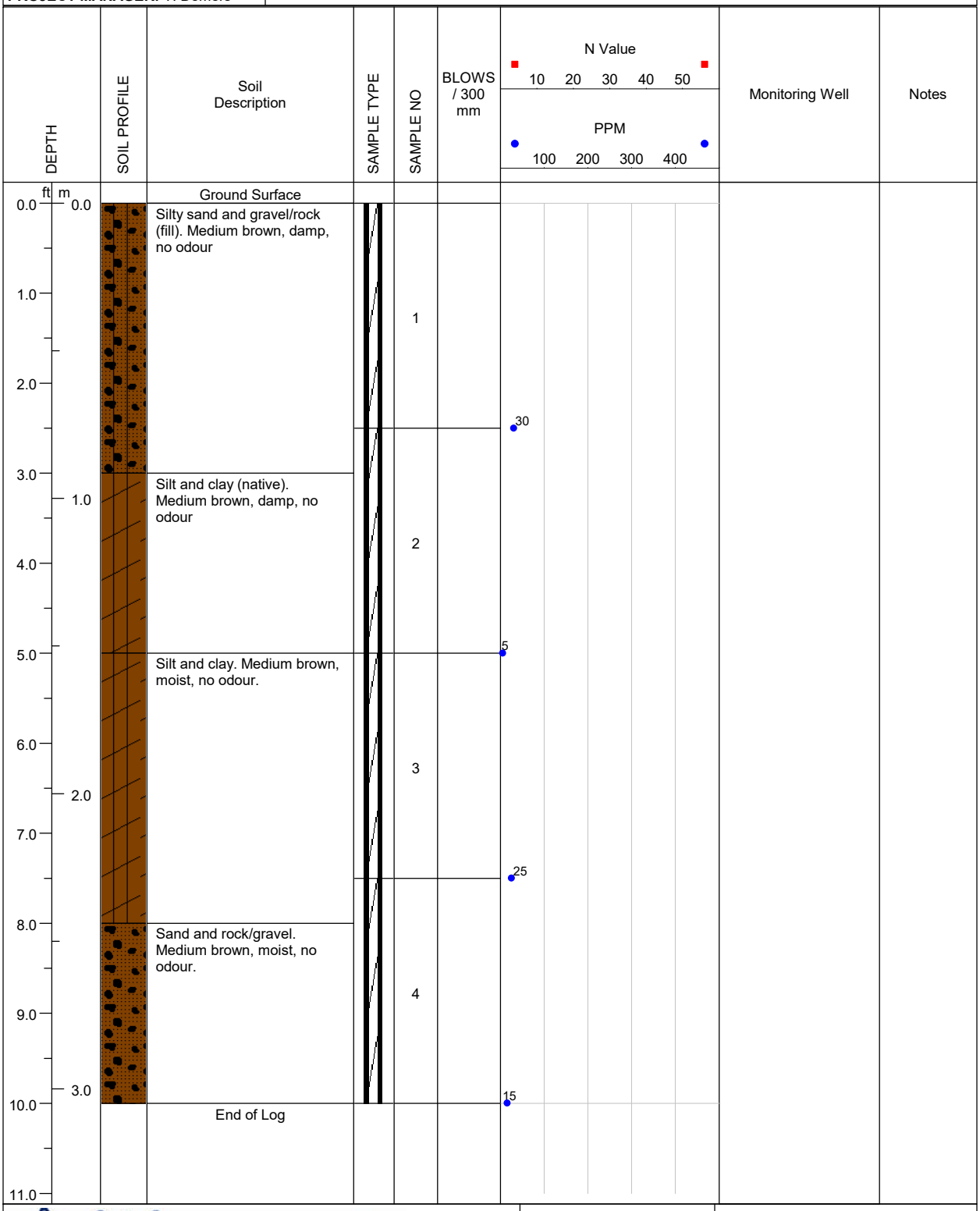


Figure 8 – Hydrogeological Investigation Monitoring Well Map



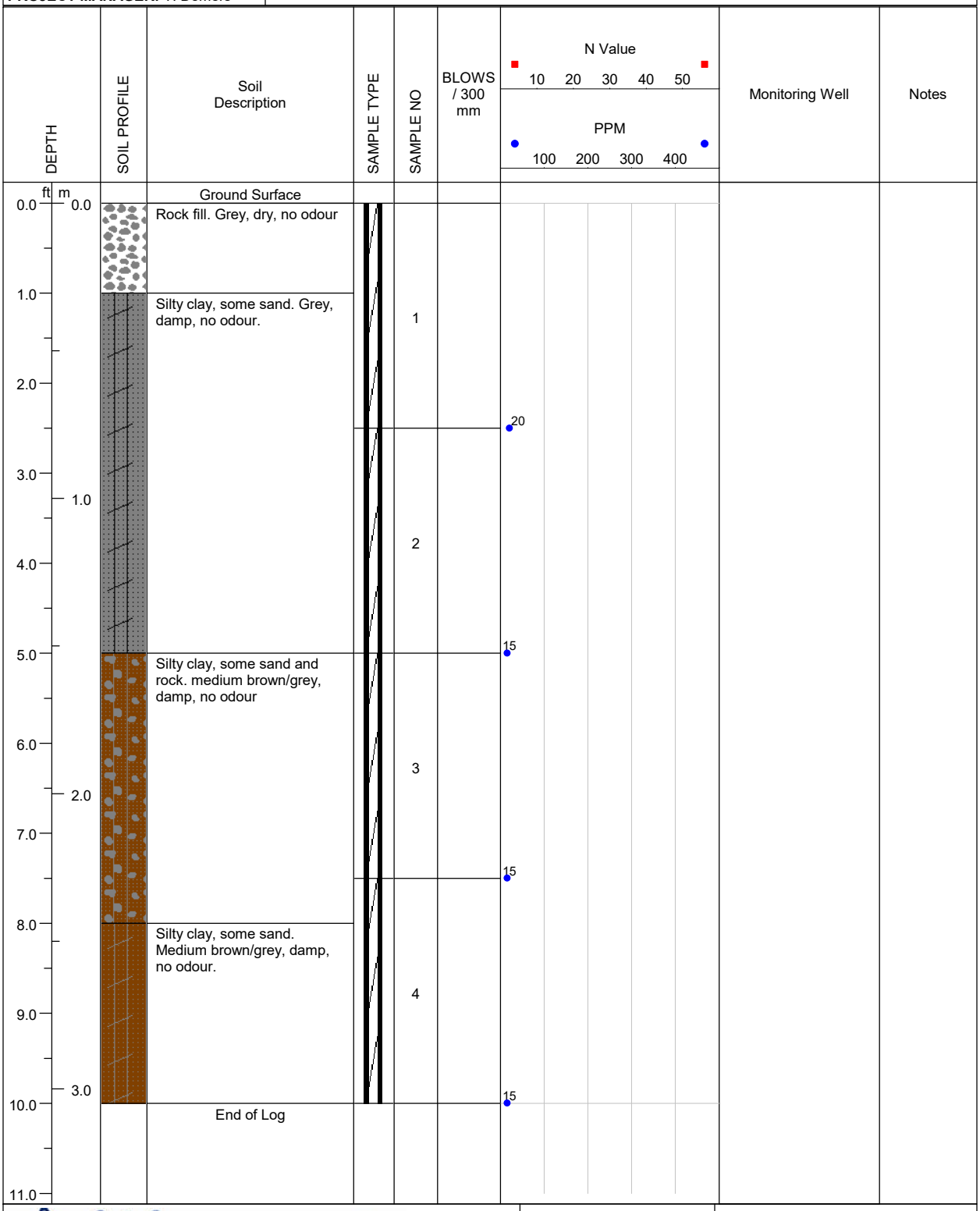
APPENDIX C – Borehole Logs

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m SE of NW site corner	**BOREHOLE NO: 25-1**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/14/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-1	**BOREHOLE NO: 25-2**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/14/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-2	**BOREHOLE NO: 25-3**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	

DEPTH (ft)	DEPTH (m)	Soil Description	SAMPLE NO	BLOWS / 300 mm	N Value / PPM	Monitoring Well	Notes
0.0	0.0	Ground Surface					
0.0	0.0	Rock fill. Dark grey, dry, no odour					
1.0		Silty sand (fill). Medium brown/grey, moist, no odour.	1				
2.0					10		
3.0	1.0	Clayey silty sand and some rock. Light brown/light grey, damp, no odour.	2				
5.0					15		
6.0	2.0	Sandy silty clay. grey, damp, no odour.	3				
7.0					20		
8.0		Sandy silty clay. Medium brown, damp, no odour.	4				
9.0		Concrete					
	3.0	Silty clay. Meidum brown, damp, no odour.					
10.0					15		
		End of Log					
11.0							

N Value: 10 20 30 40 50

PPM: 100 200 300 400

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/14/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-3	**BOREHOLE NO: 25-4**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	

DEPTH (ft)	DEPTH (m)	Soil Description	SAMPLE NO	BLOWS / 300 mm	N Value / PPM	Monitoring Well	Notes
0.0	0.0	Ground Surface					
		Rock fill. Dark grey, dry, no odour					
		Silty sand (fill). Medium brown, moist, no odour.	1		10		
		Clayey silty sand. Medium brown, damp, no odour.	2		15		
			3		10		
			4		10		
10.0	3.0	End of Log					

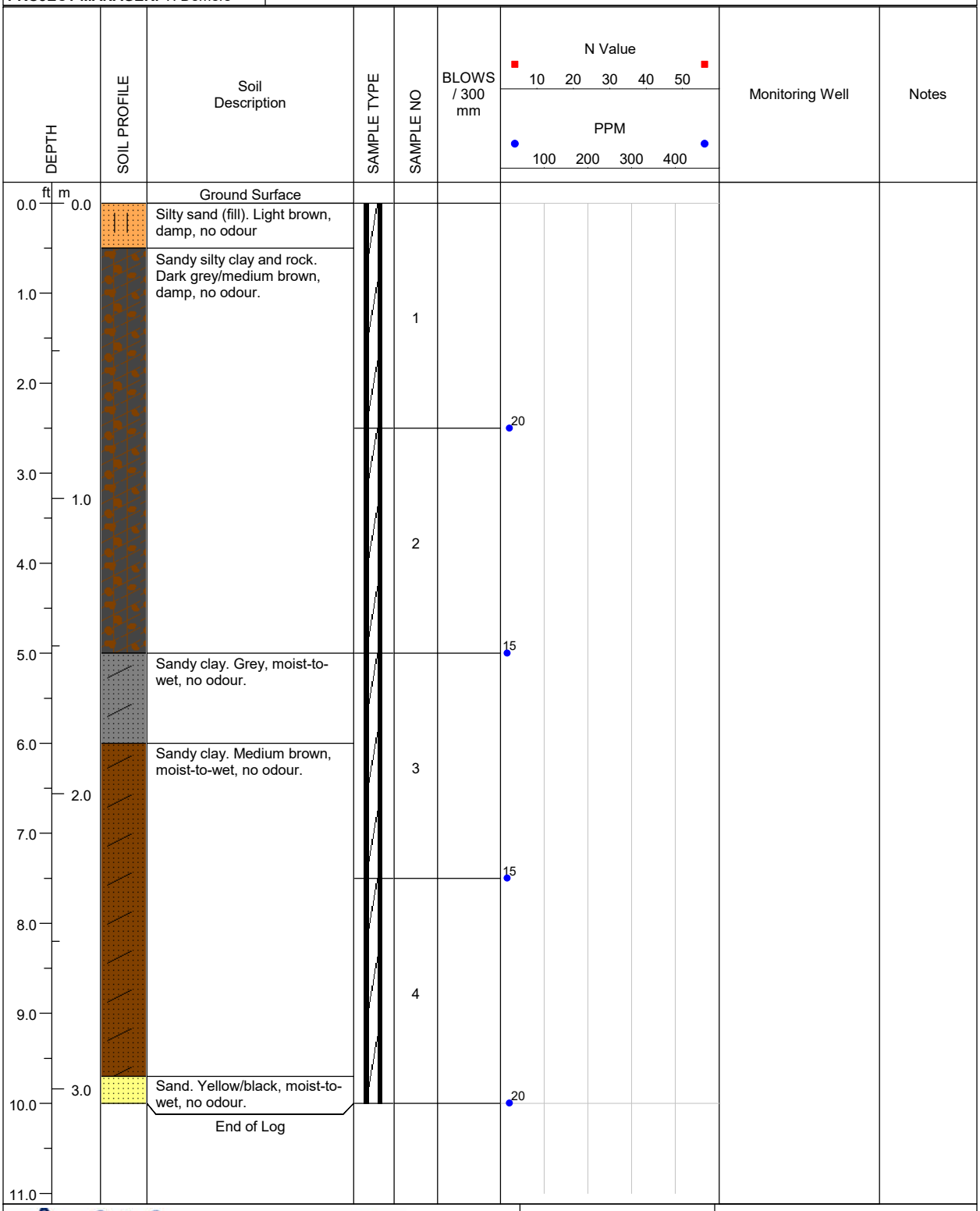
N Value: 10 20 30 40 50

PPM: 100 200 300 400

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/14/2025	**PAGE:** 1 of 1

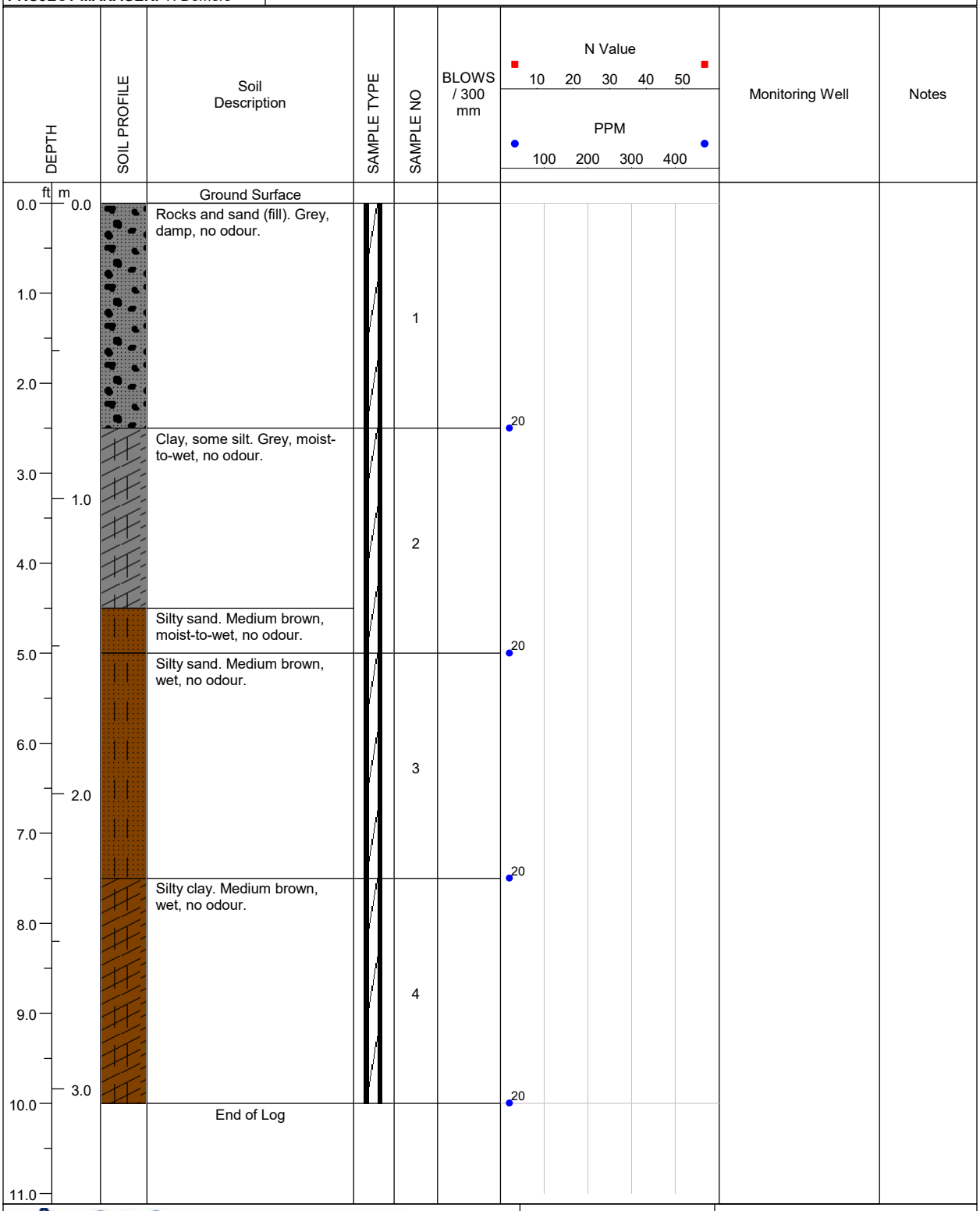
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-4	**BOREHOLE NO: 25-5**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/14/2025	**PAGE:** 1 of 1

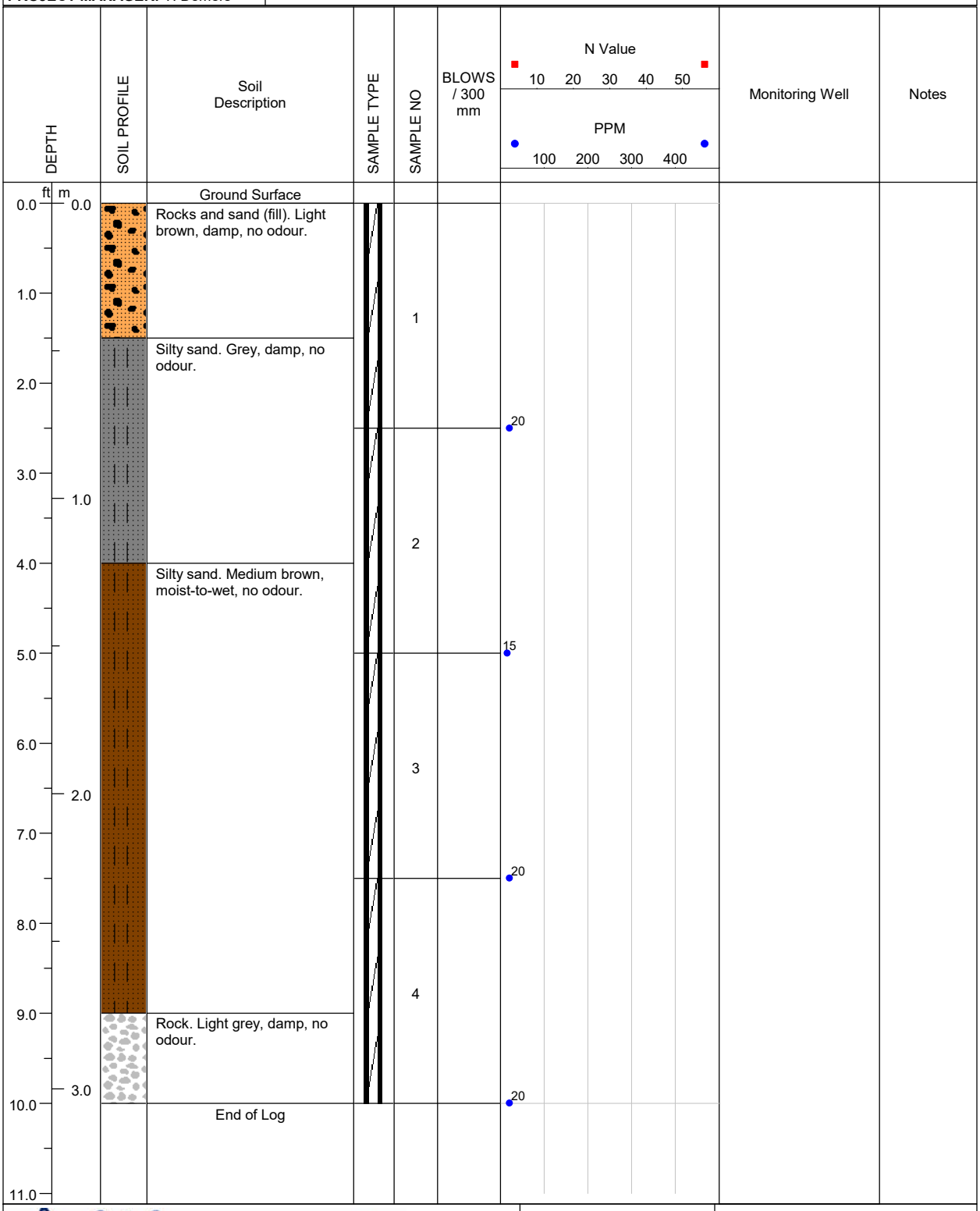
A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-5	**BOREHOLE NO: 25-6**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



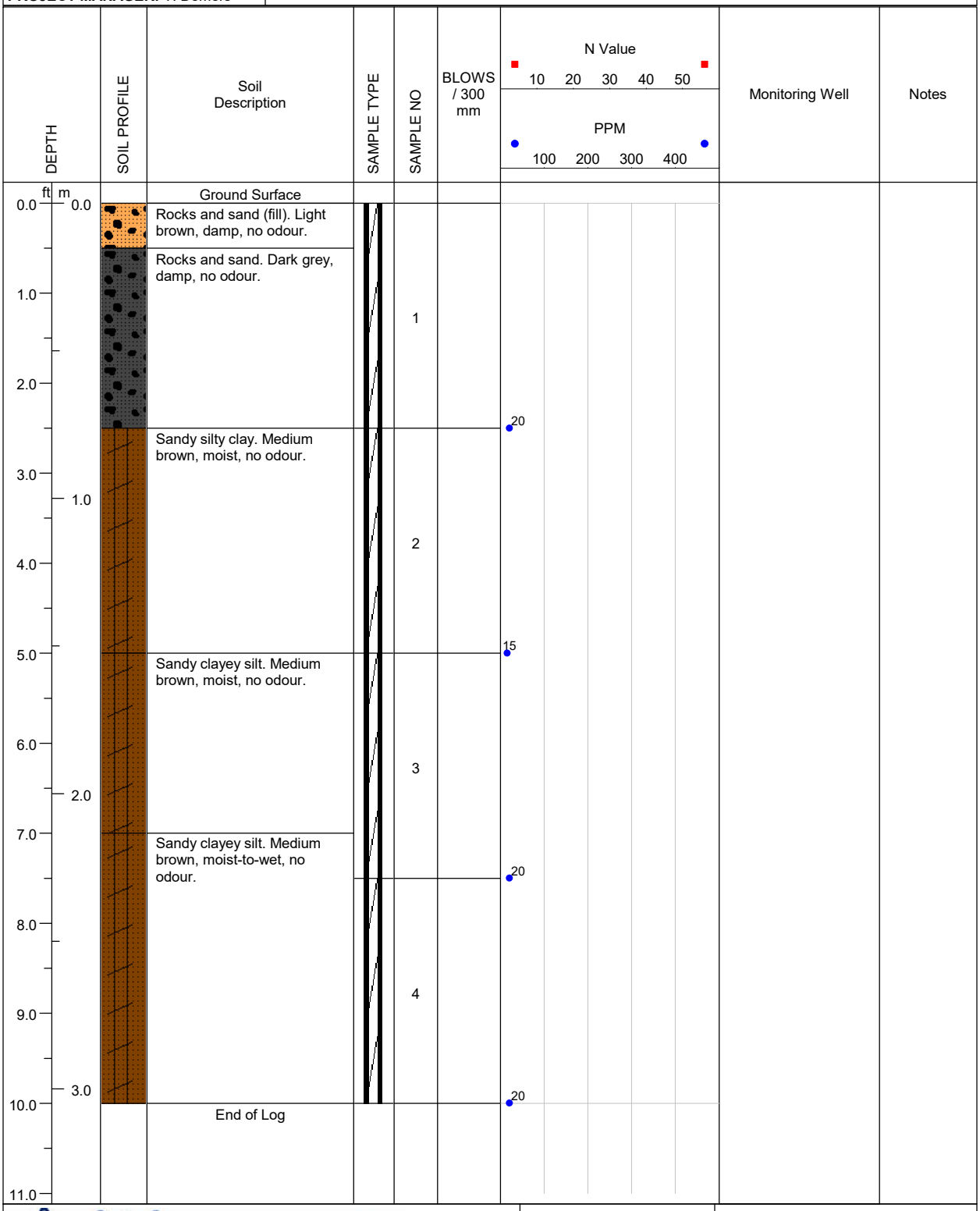
A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/14/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 18m NW of S fenceline	**BOREHOLE NO: 25-7**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/14/2025	**PAGE:** 1 of 1

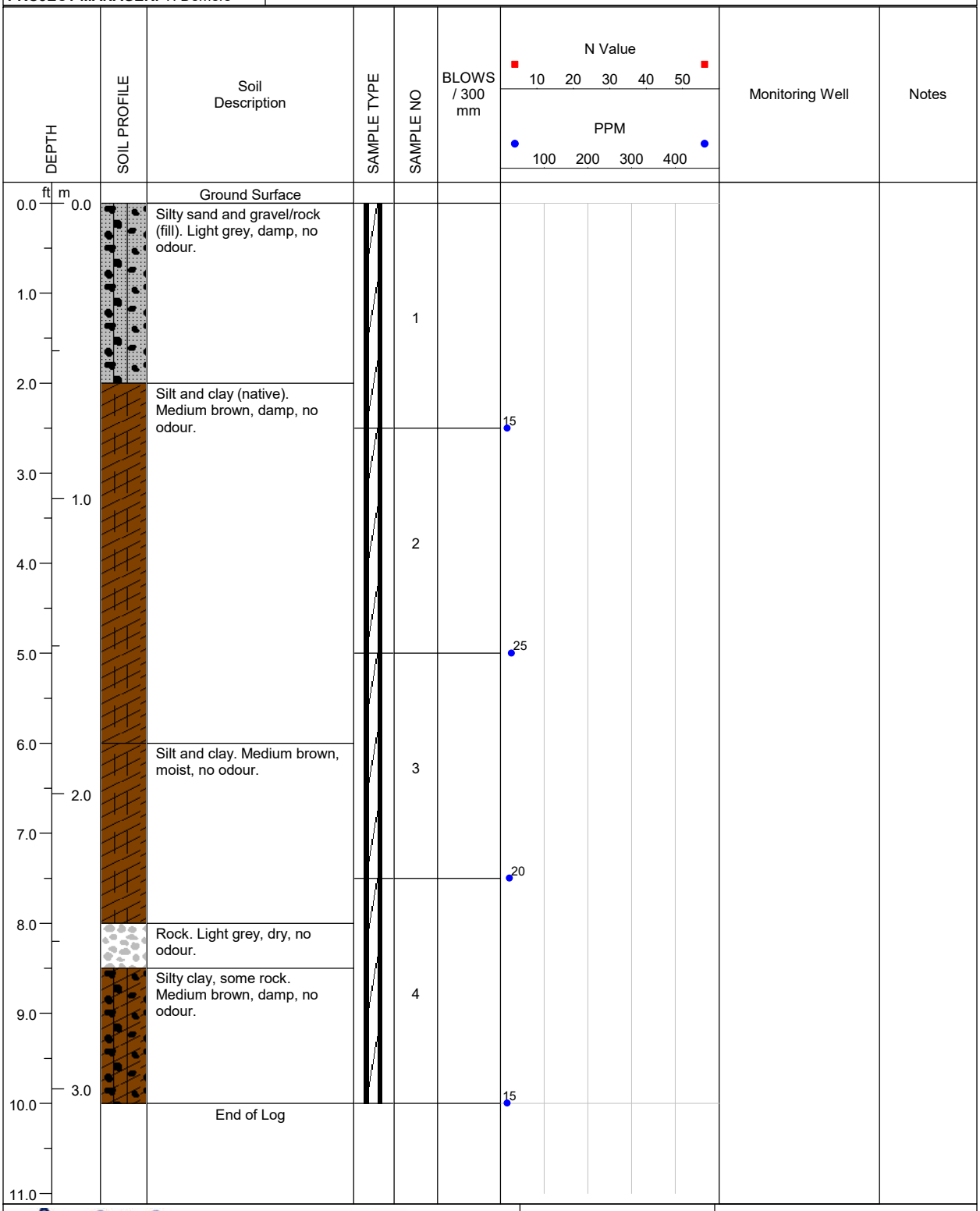
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m NW of S fenceline	**BOREHOLE NO: 25-8**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/14/2025	**PAGE:** 1 of 1

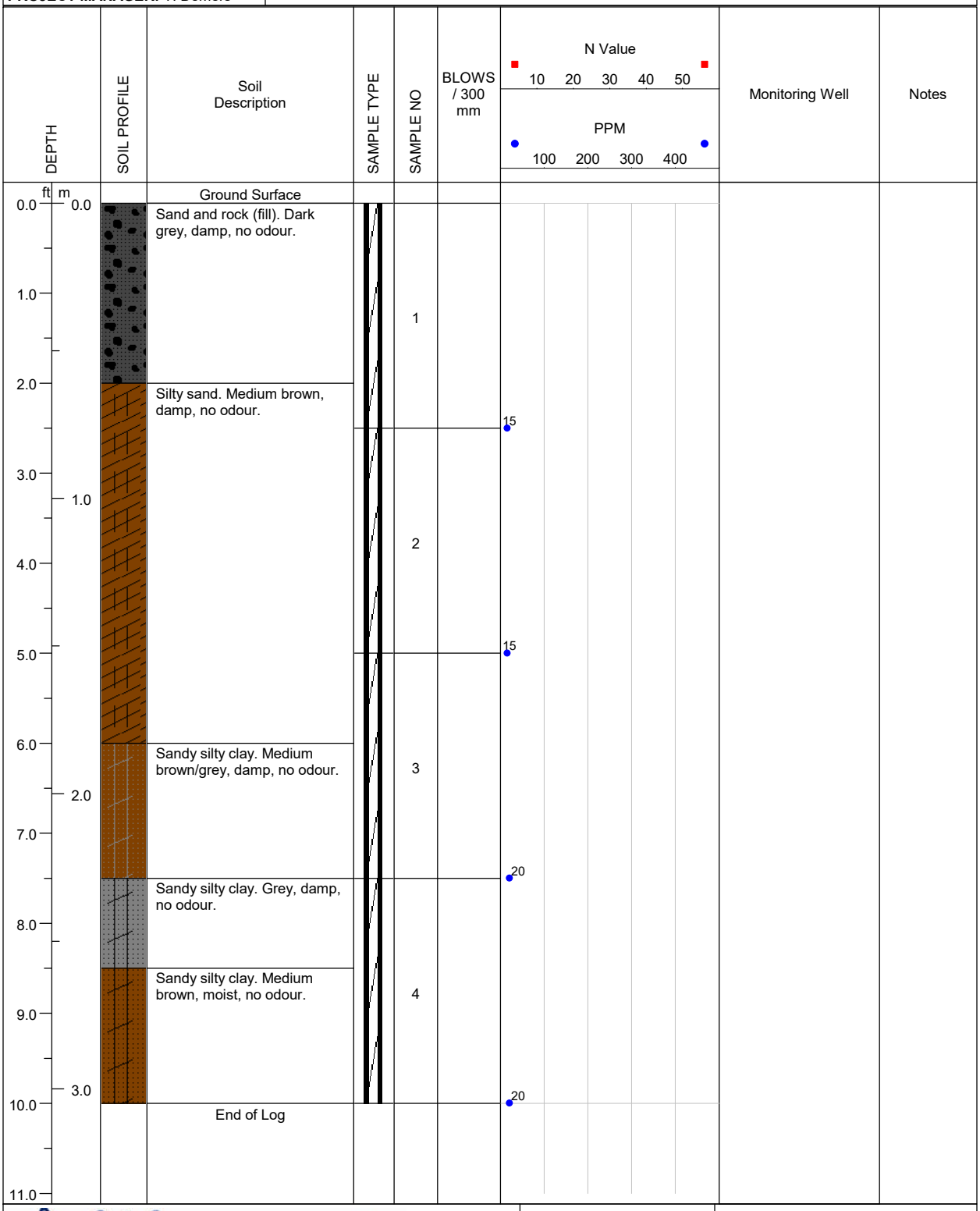
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m SE of N boundary, 13m E of 25-1	**BOREHOLE NO: 25-9**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/04/2025	**PAGE:** 1 of 1

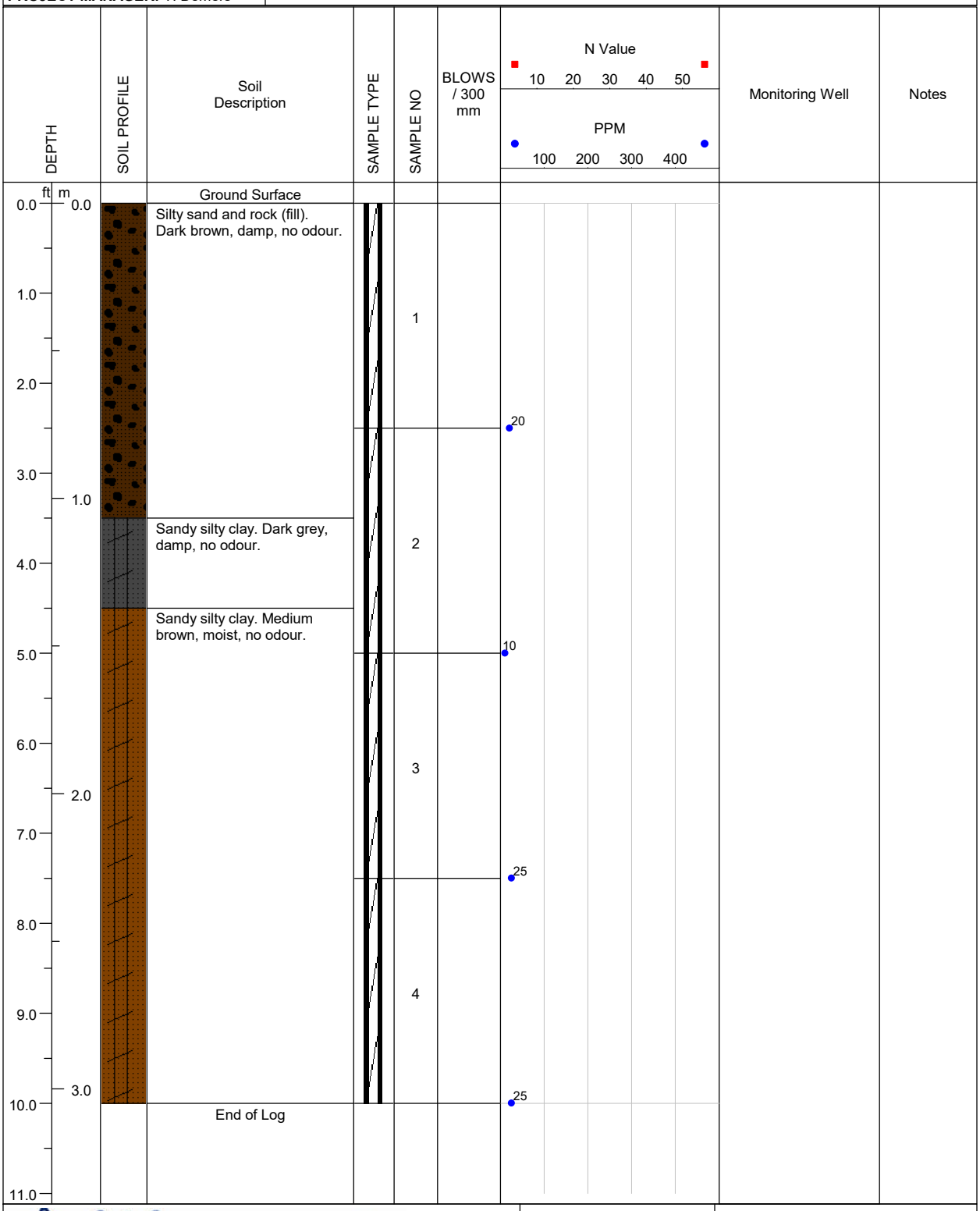
A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-9, 13m E of 25-2	**BOREHOLE NO: 25-10**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/04/2025	**PAGE:** 1 of 1

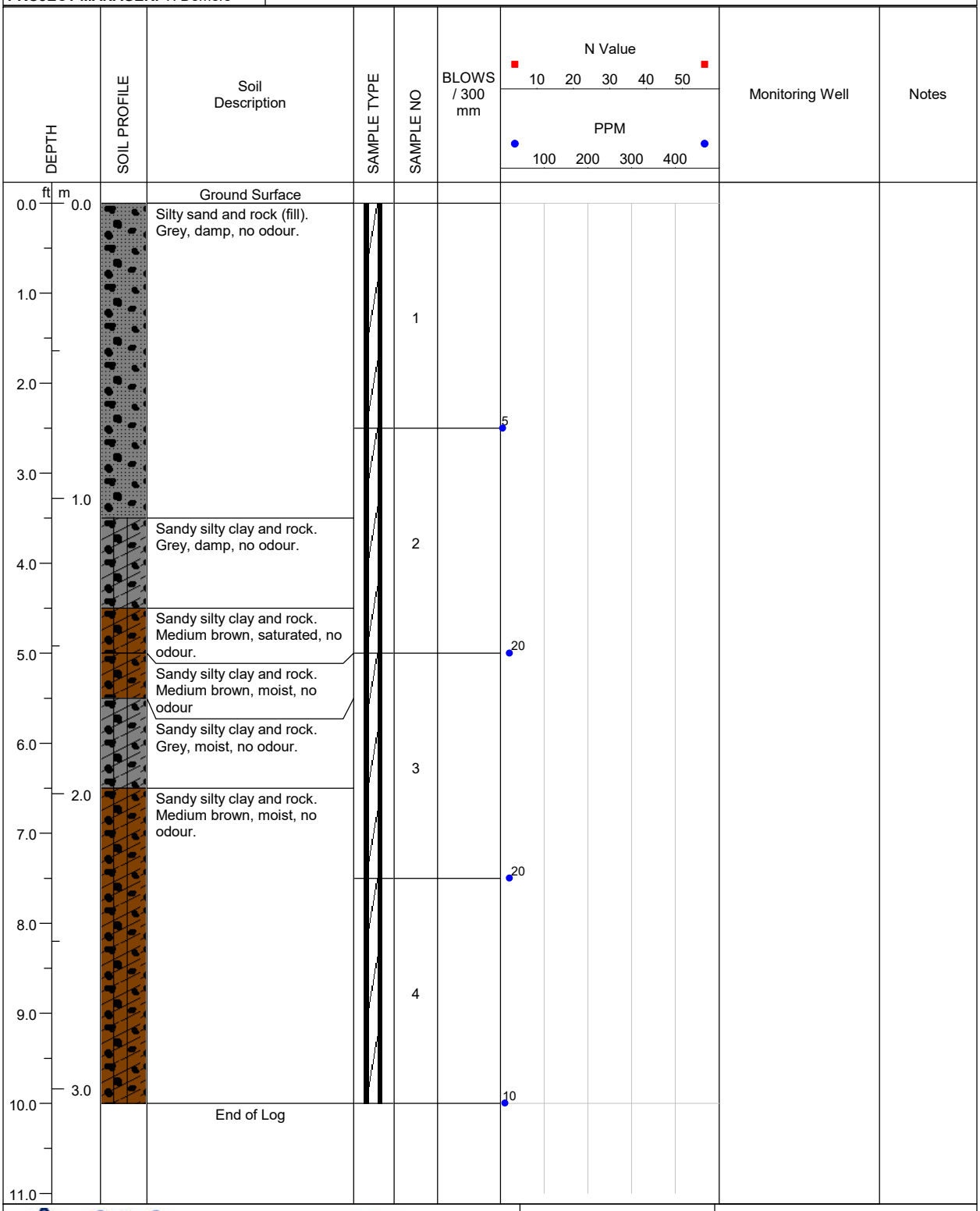
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-10, 13m E of 25-3	**BOREHOLE NO: 25-11**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/04/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-11, 13m E of 25-4	**BOREHOLE NO: 25-12**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/14/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-12, 13m E of 25-5	**BOREHOLE NO: 25-13**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	

DEPTH (ft)	DEPTH (m)	Soil Description	SAMPLE NO	BLOWS / 300 mm	N Value / PPM	Monitoring Well	Notes
		Ground Surface					
0.0	0.0	Sand and rock (fill). Light grey, damp, no odour.					
1.0		Sandy silty clay and rock. Grey, damp, no odour.	1				
2.0		Sandy silty clay and rock. Dark grey, damp, no odour.			25		
3.0	1.0		2				
4.0							
5.0		Sandy silty clay and rock. Medium brown, damp, no odour			20		
6.0			3				
7.0	2.0	Brick. Refusal @ 7.5ft.			25		
		End of Log					
8.0							

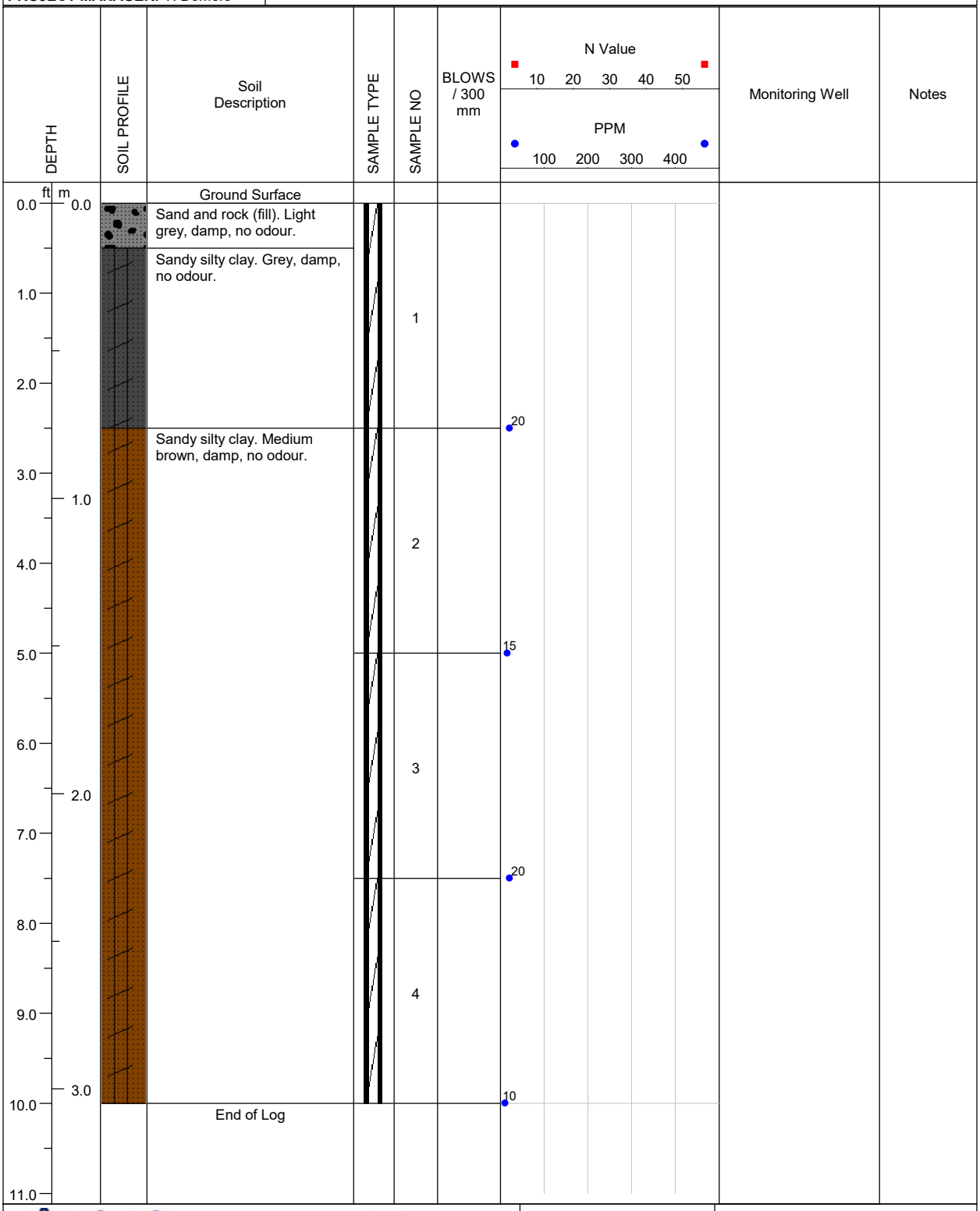
N Value: 10 20 30 40 50

PPM: 100 200 300 400

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 7.5ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/14/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-13, 13m E of 25-6	**BOREHOLE NO: 25-14**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/14/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-14, 13m E of 25-7	**BOREHOLE NO: 25-15**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	

DEPTH (ft)	DEPTH (m)	Soil Description	SAMPLE NO	BLOWS / 300 mm	N Value / PPM
0.0	0.0	Ground Surface			
		Sand and rock (fill). Light brown, damp, no odour.			
		Rock. Light grey, dry, no odour.			
1.0		Sandy silty clay and gravel. Red, damp, no odour.	1		
2.0					10
3.0	1.0		2		
4.0					
5.0					20
6.0			3		
7.0	2.0				20
8.0			4		
9.0					
10.0	3.0	End of Log			15
11.0					

N Value: 10 20 30 40 50

PPM: 100 200 300 400

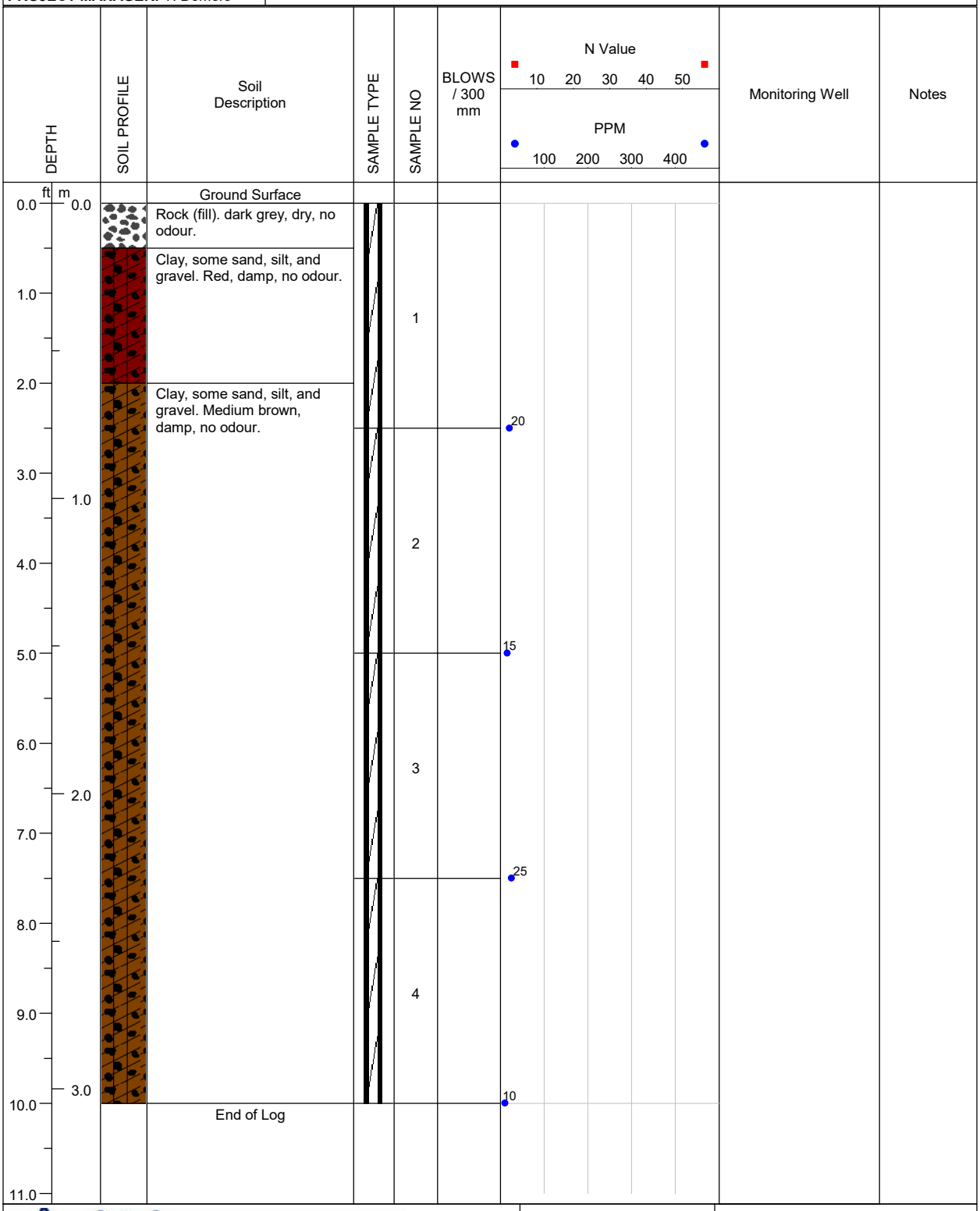
Monitoring Well

Notes

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

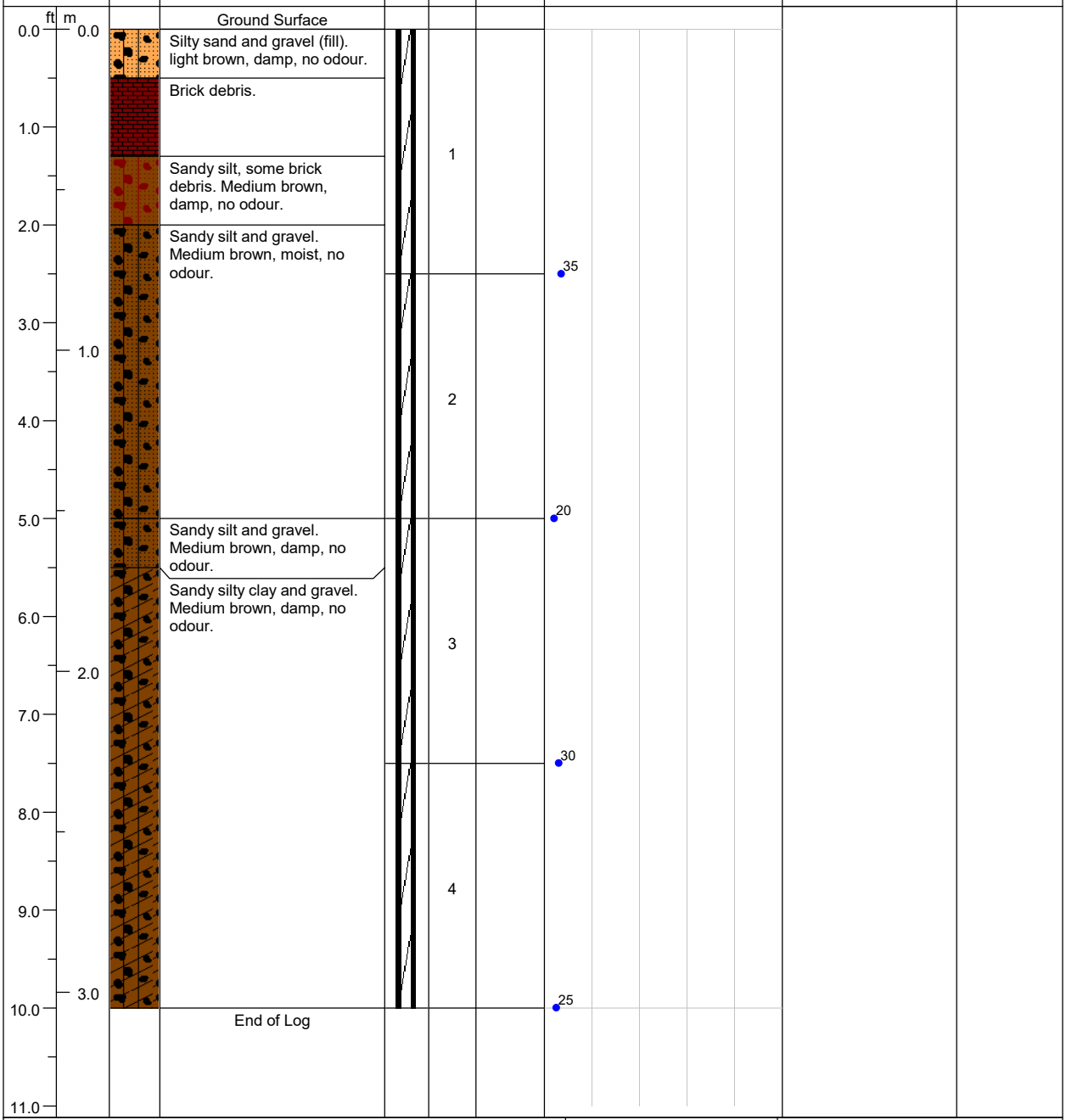
LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/14/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m NE of S fence line, 13m E of 25-8	**BOREHOLE NO: 25-16**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



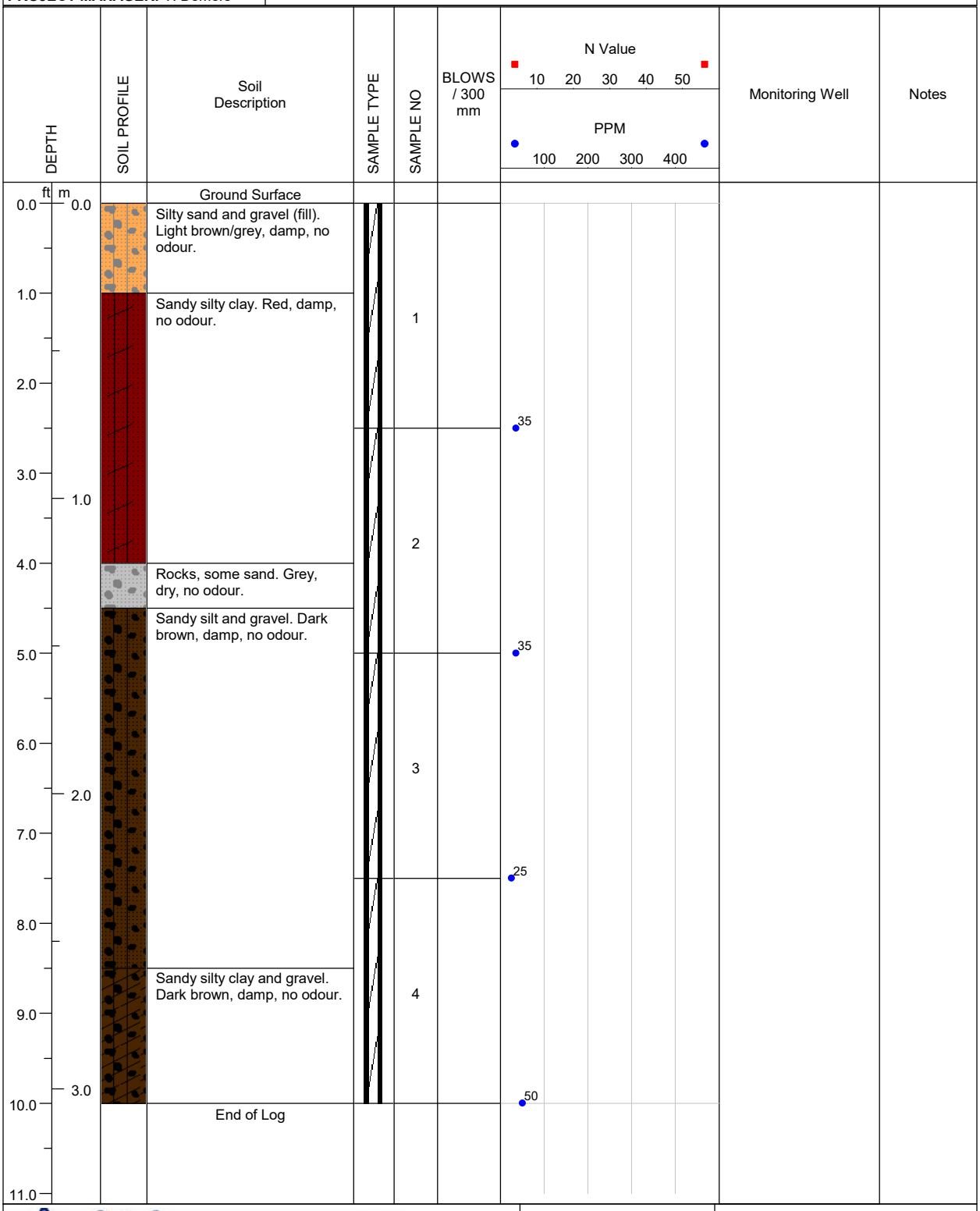
A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/14/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m NW of S boundary, 13m E of 25-16	**BOREHOLE NO: 25-17**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

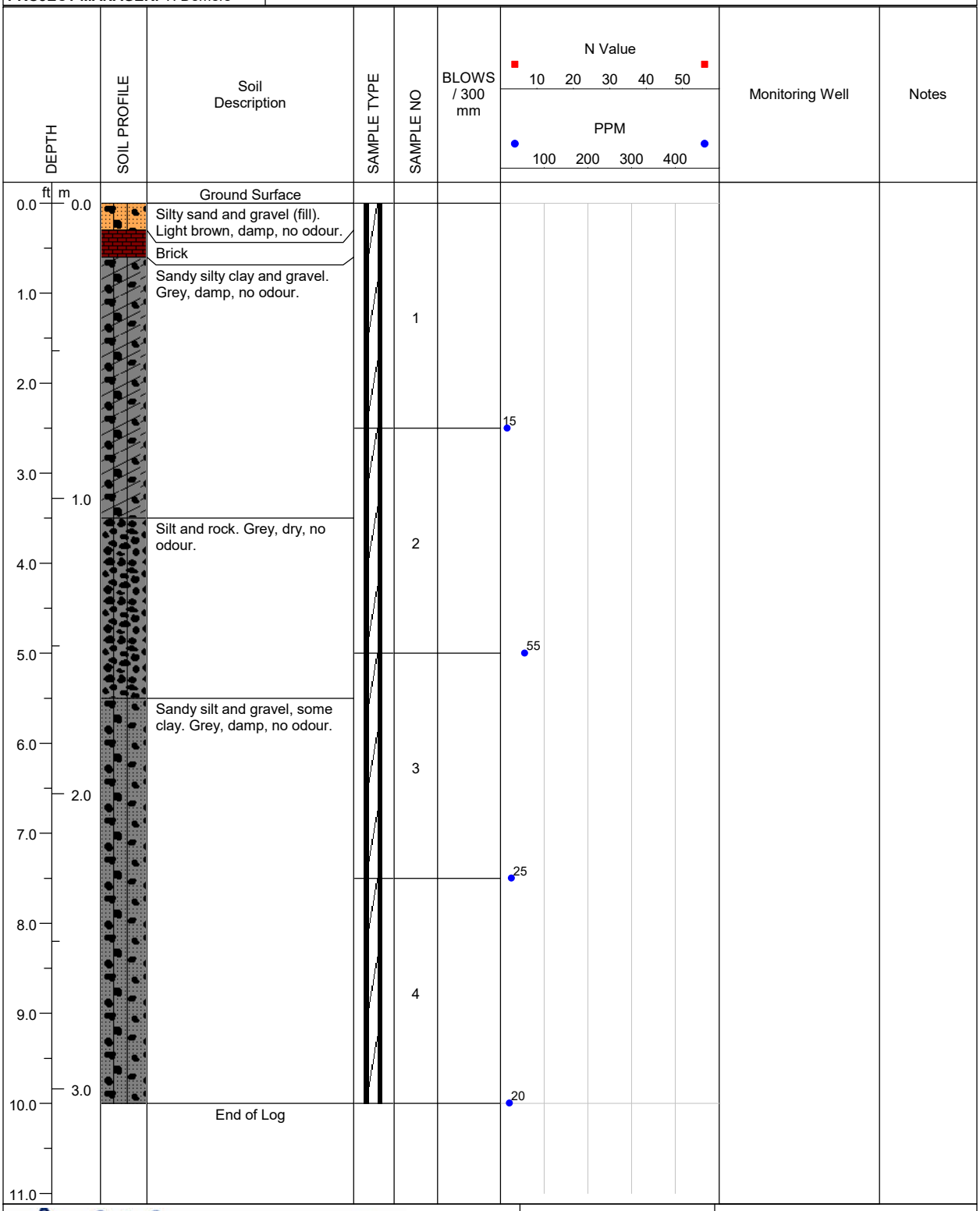
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m NW of 25-17	**BOREHOLE NO: 25-18**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

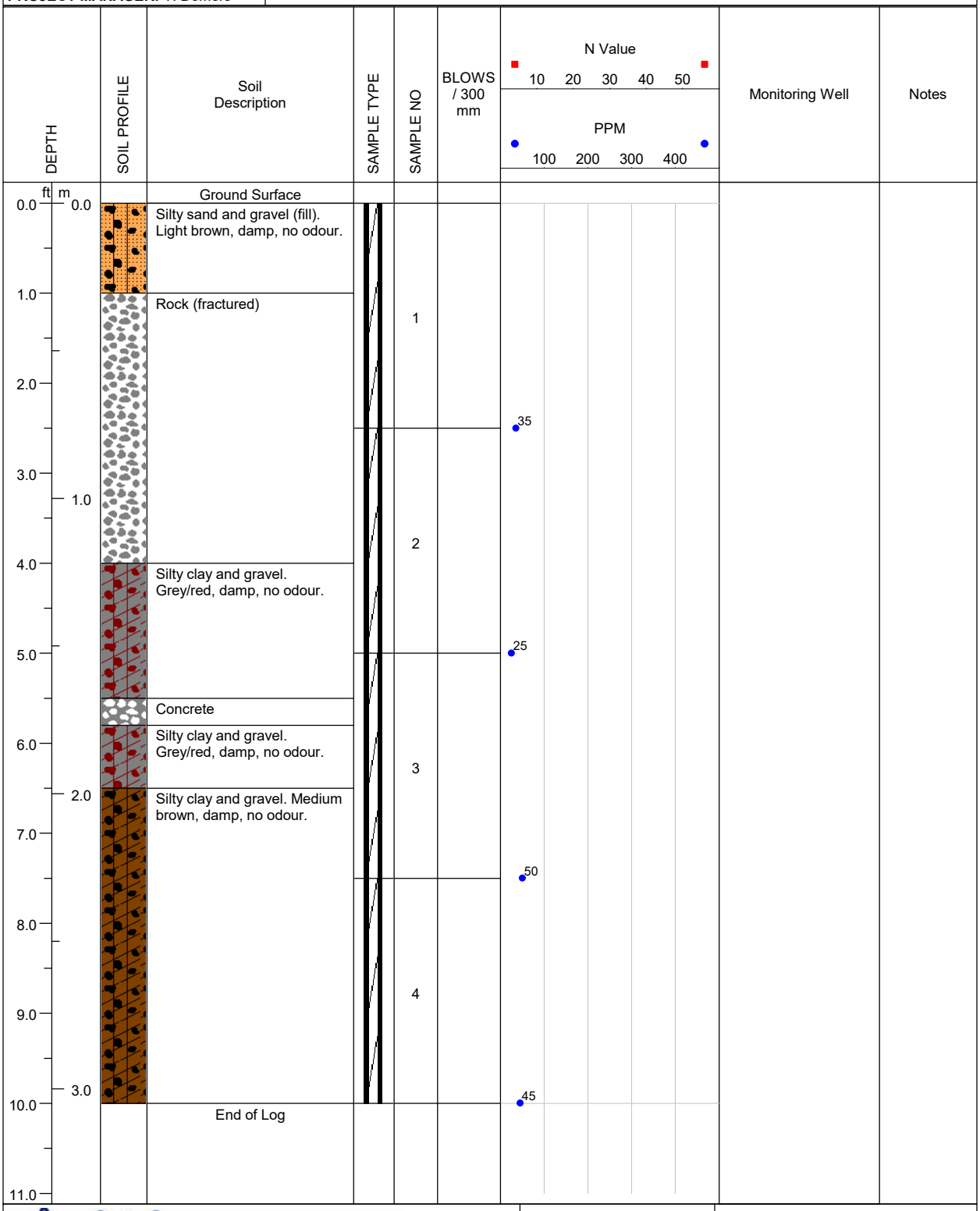
A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m NW of 25-18	**BOREHOLE NO: 25-19**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

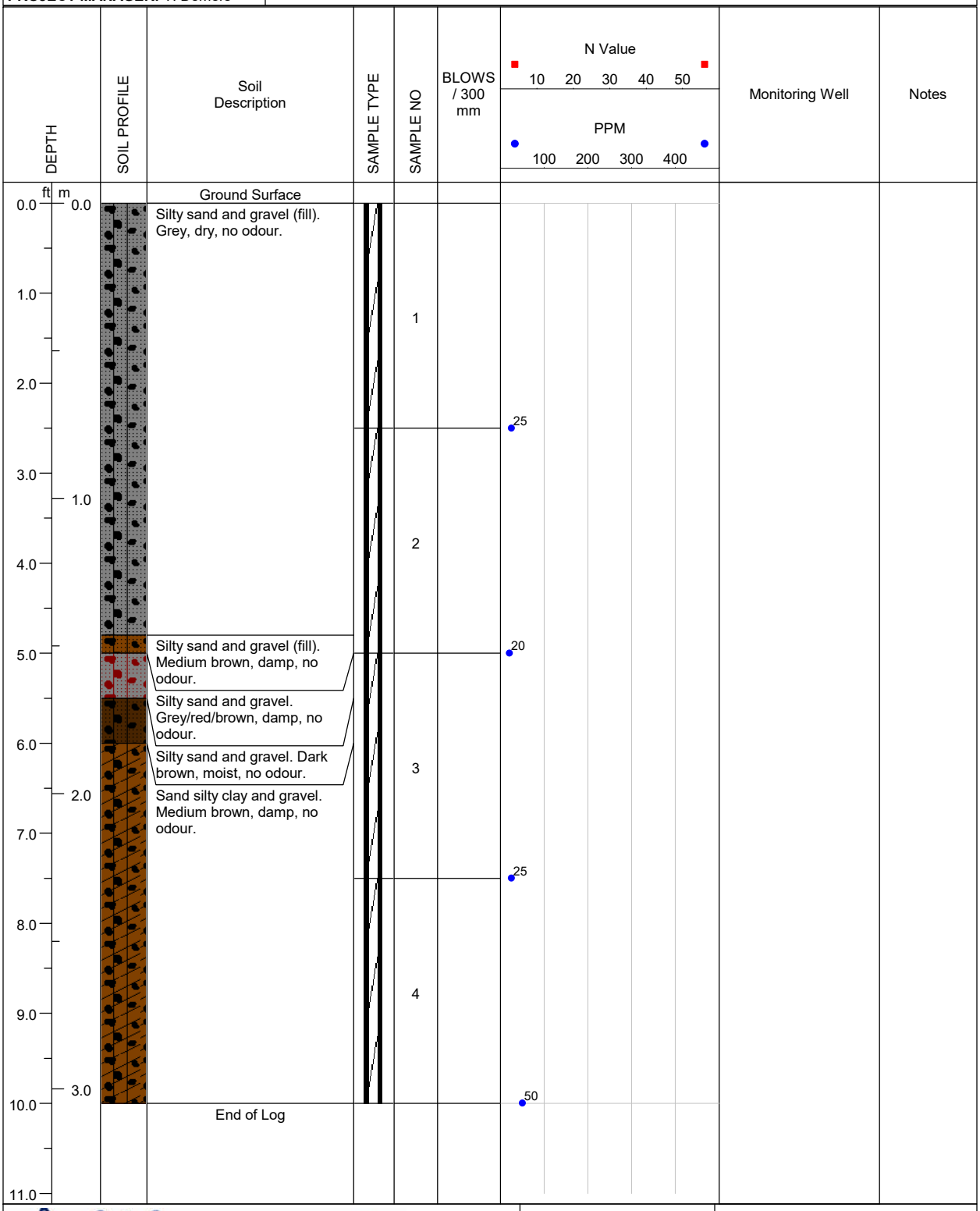
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m NW of 25-19	**BOREHOLE NO: 25-20**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m NW of 25-20	**BOREHOLE NO: 25-21**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m NW of 25-21	**BOREHOLE NO: 25-22**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	

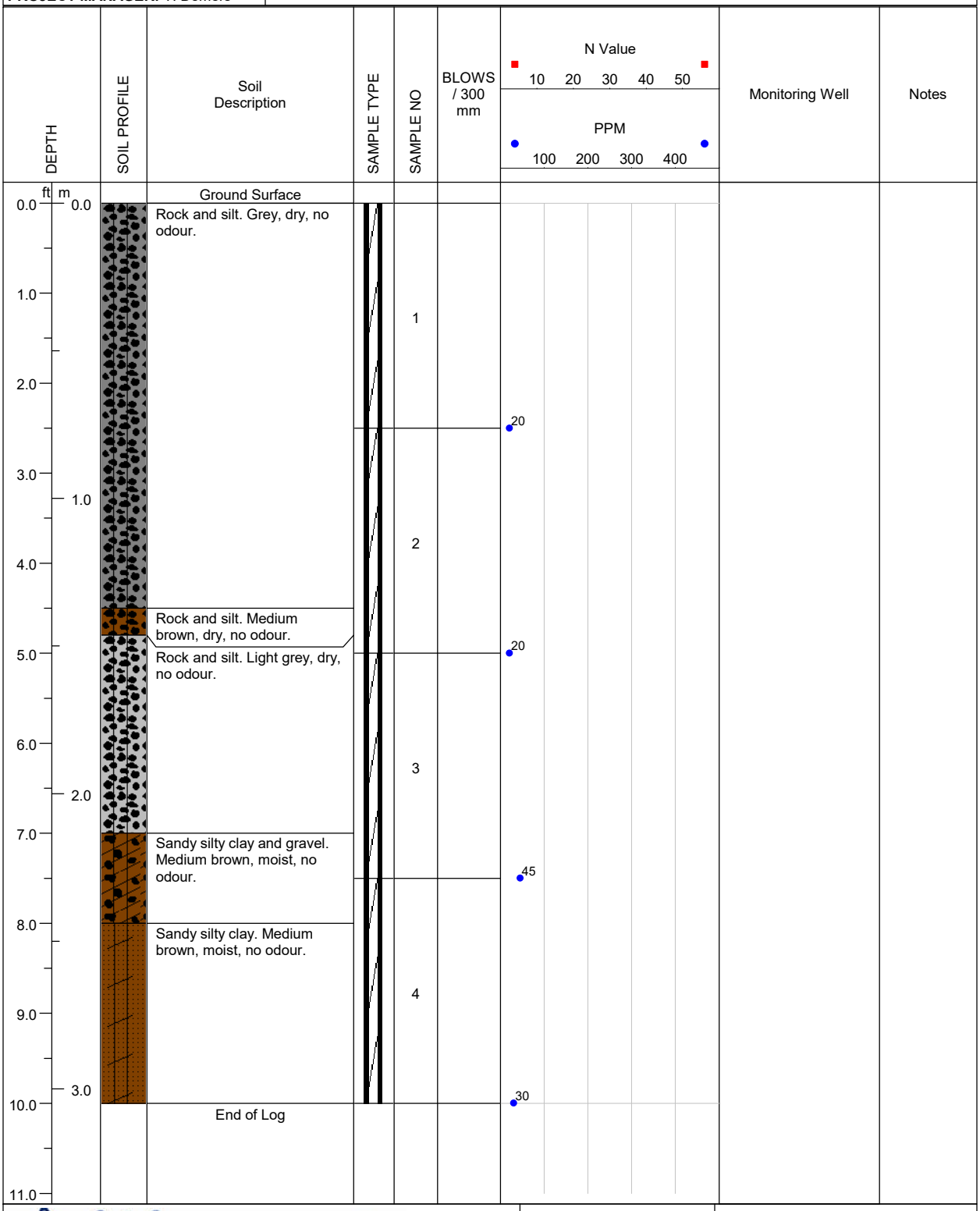
DEPTH (ft)	DEPTH (m)	Soil Description	SAMPLE NO	BLOWS / 300 mm	N Value / PPM	Monitoring Well	Notes
0.0	0.0	Ground Surface					
		Rock and silt. Grey, dry, no odour.	1		35		
		Silt, rock, and brick. Grey/red, dry, no odour.					
	1.0	Silt, rock and brick. Medium brown/red, dry, no odour.	2				
		Silt and rock. Grey, moist, no odour.			35		
		Sandy silty clay and gravel. Medium brown, damp, no odour.	3				
	2.0				30		
		Sandy silty clay. Medium brown, moist, no odour.	4				
	3.0				50		
10.0		End of Log					
11.0							

N Value: 10 20 30 40 50
PPM: 100 200 300 400

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

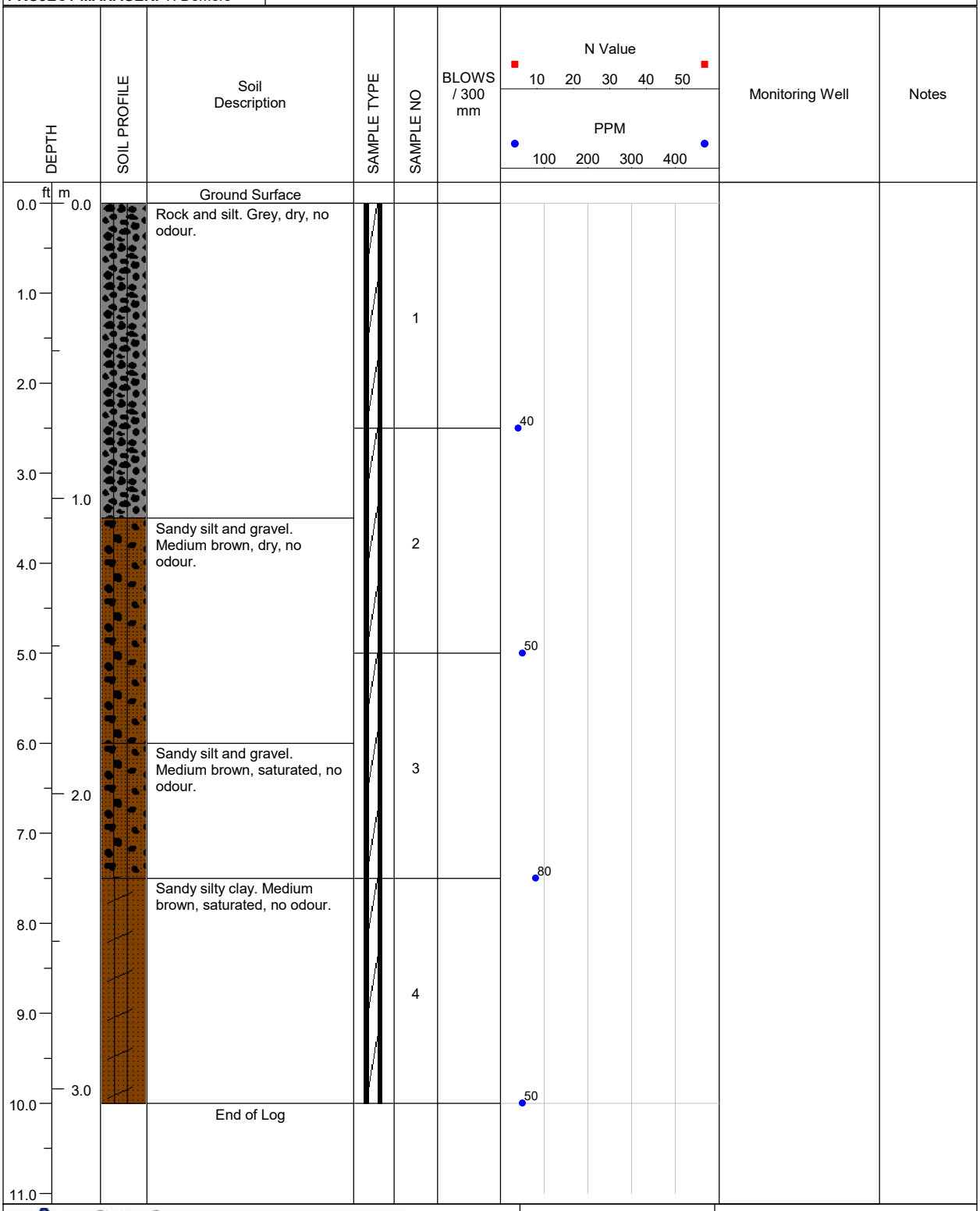
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m NW of 25-22	**BOREHOLE NO: 25-23**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

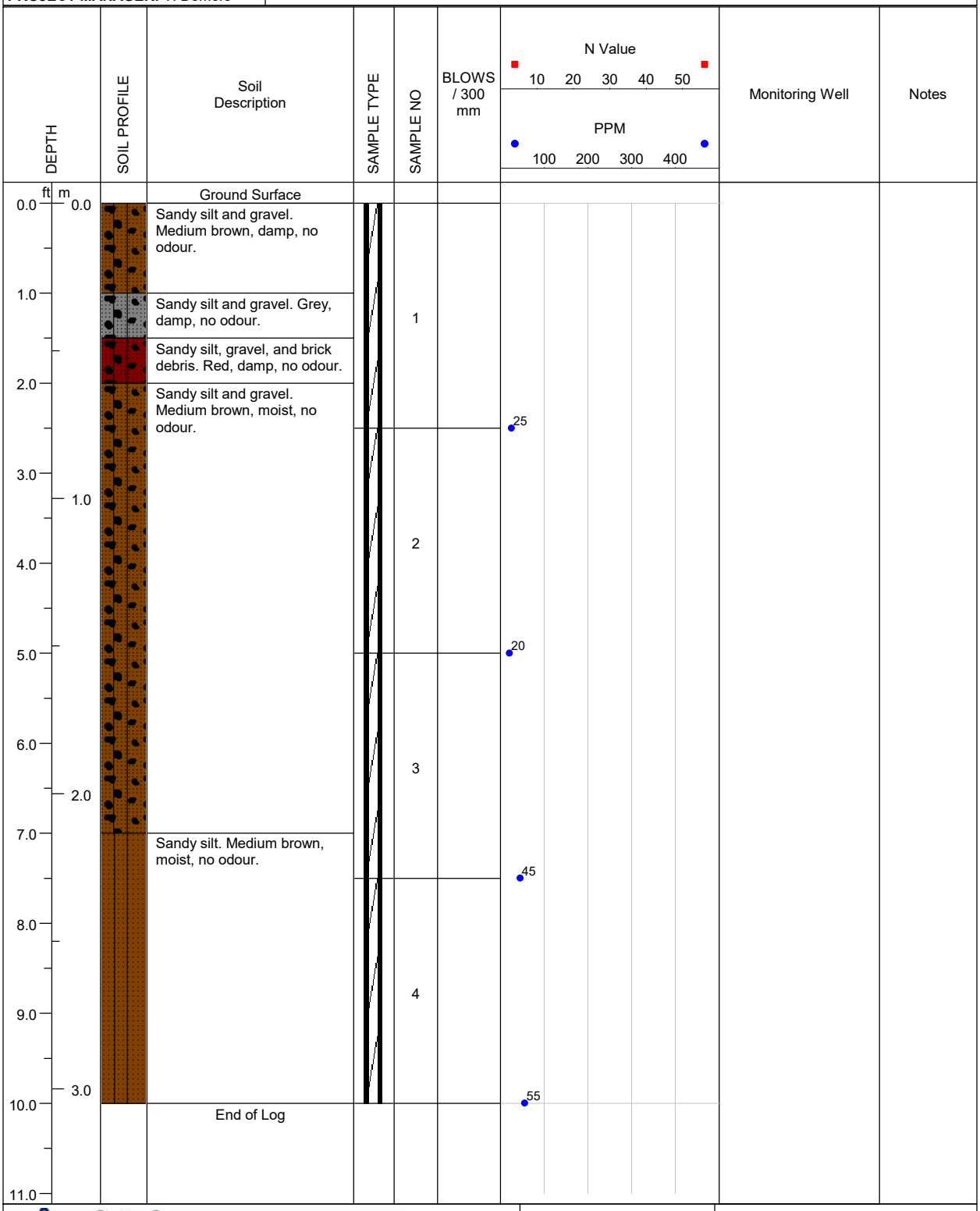
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m SE of N boundary, 13m E of 25-9	**BOREHOLE NO: 25-24**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

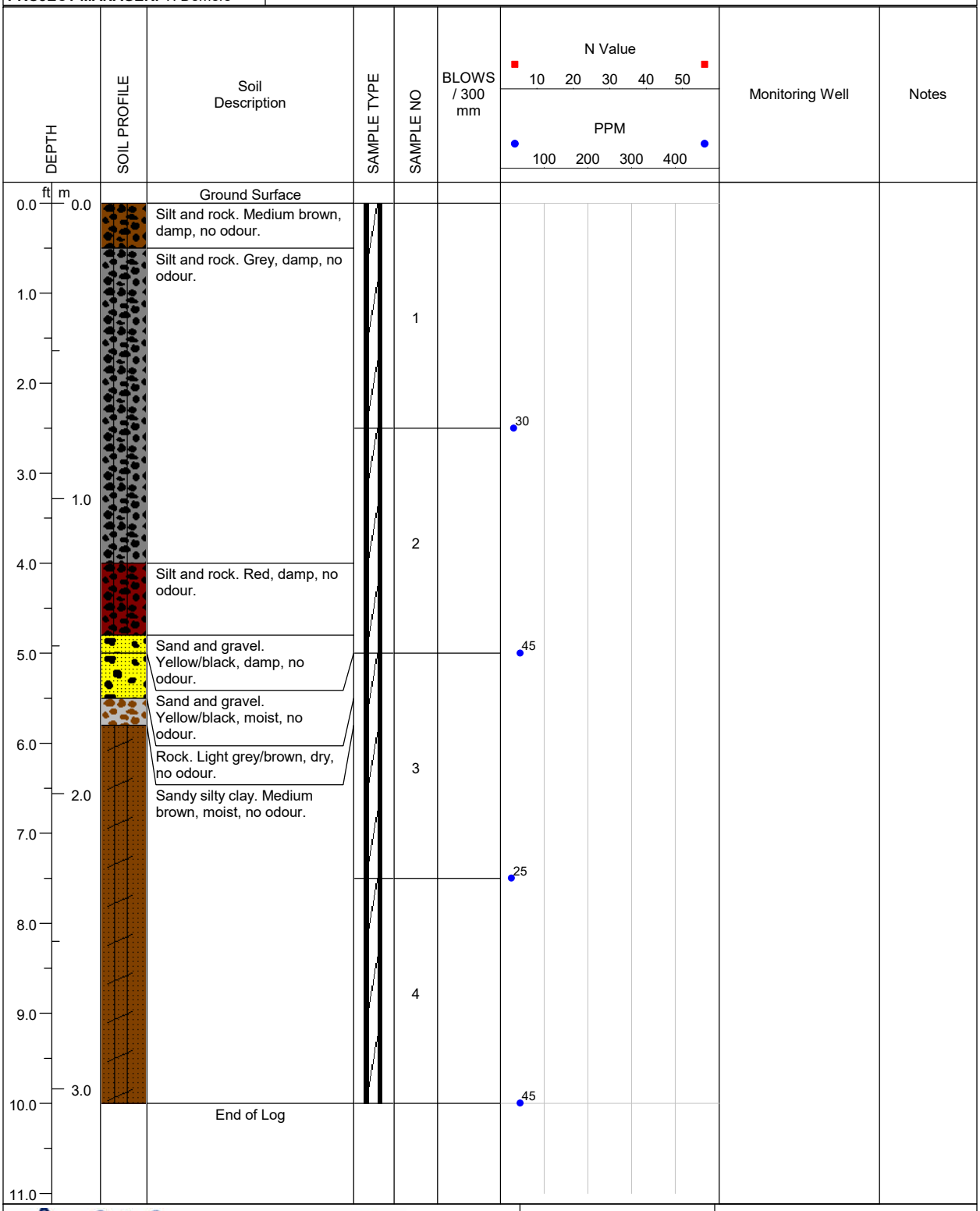
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-24	**BOREHOLE NO: 25-25**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

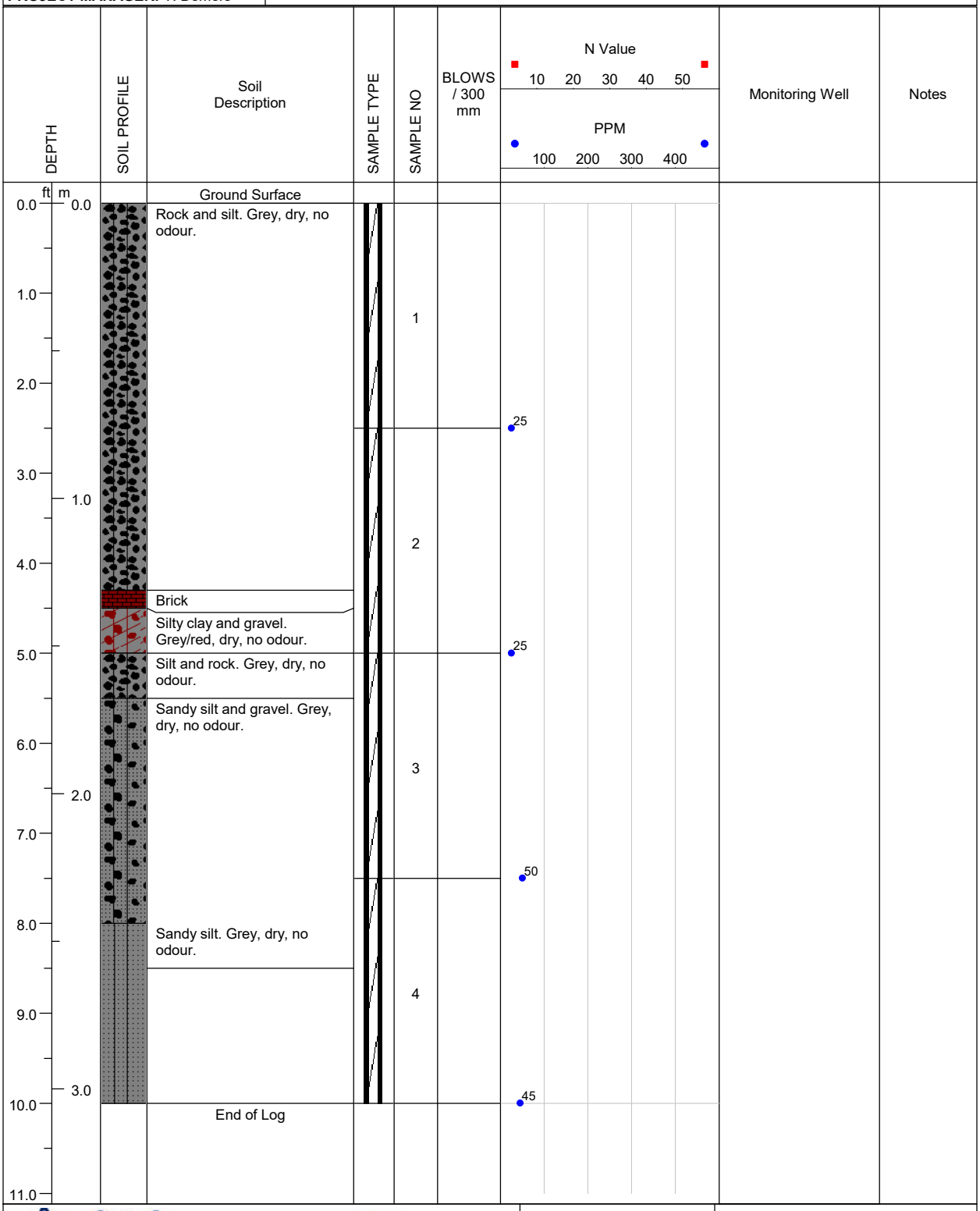
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-25	**BOREHOLE NO: 25-26**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

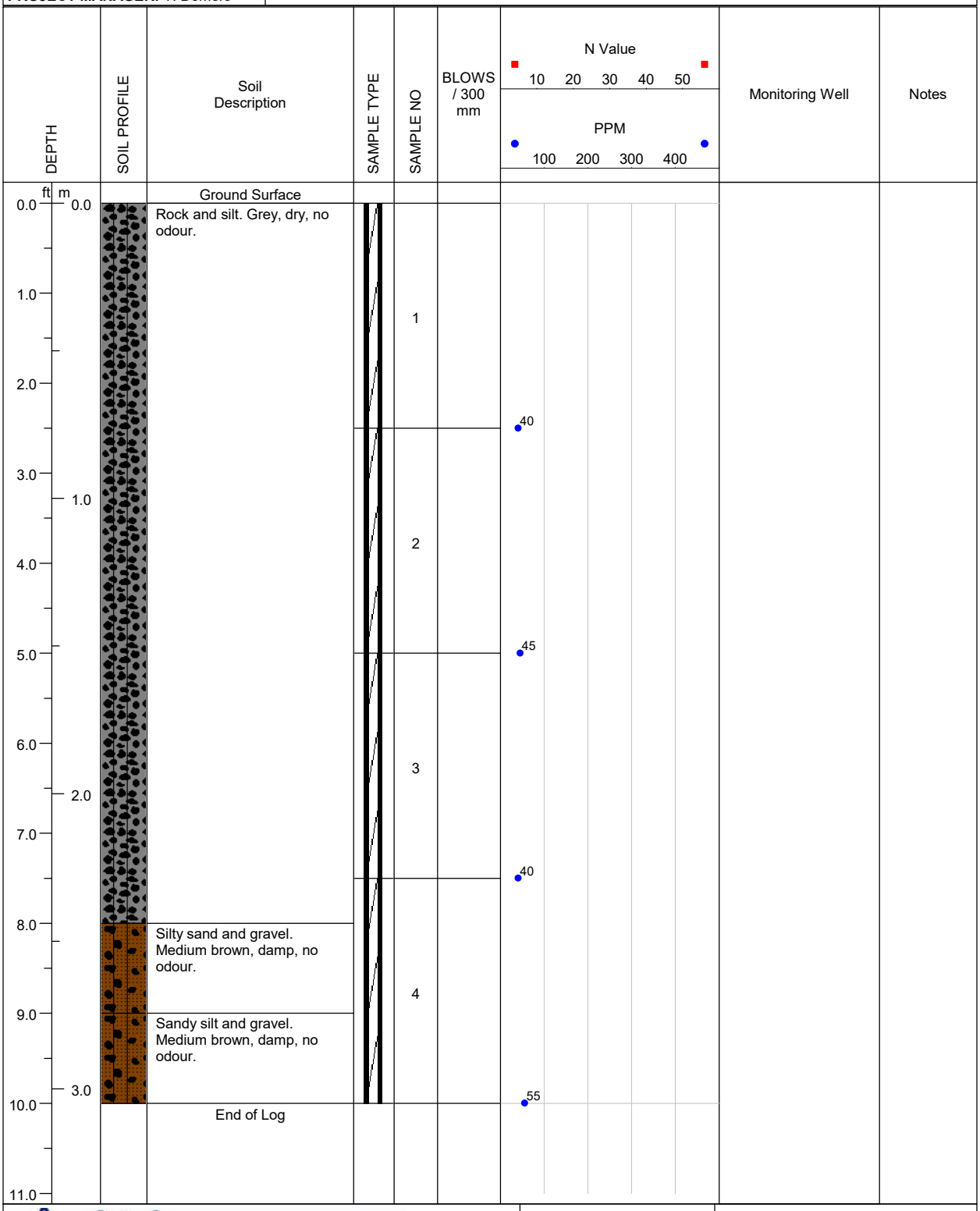
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-26	**BOREHOLE NO: 25-27**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

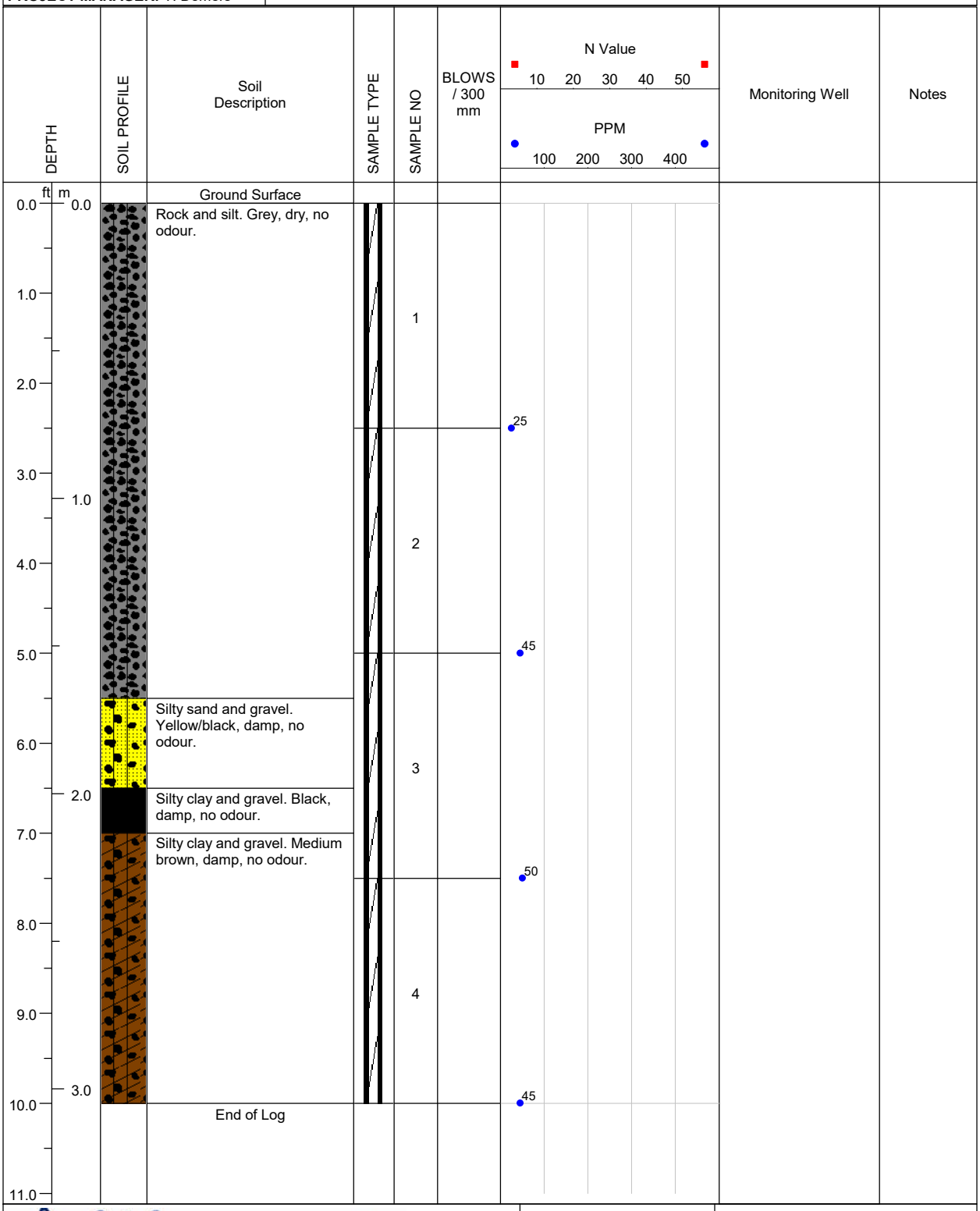
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-27	**BOREHOLE NO: 25-28**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

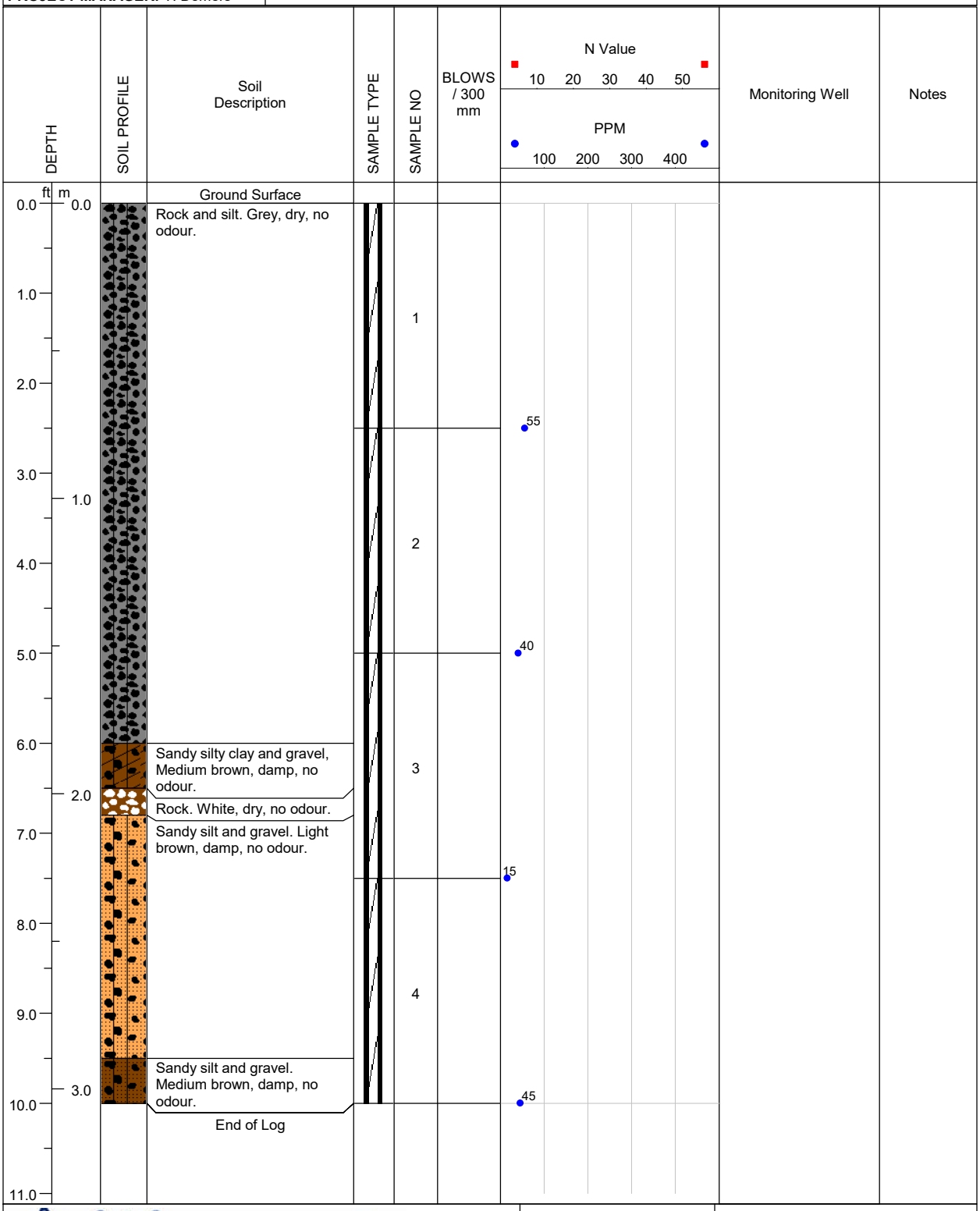
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-28	**BOREHOLE NO: 25-29**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-29	**BOREHOLE NO: 25-30**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

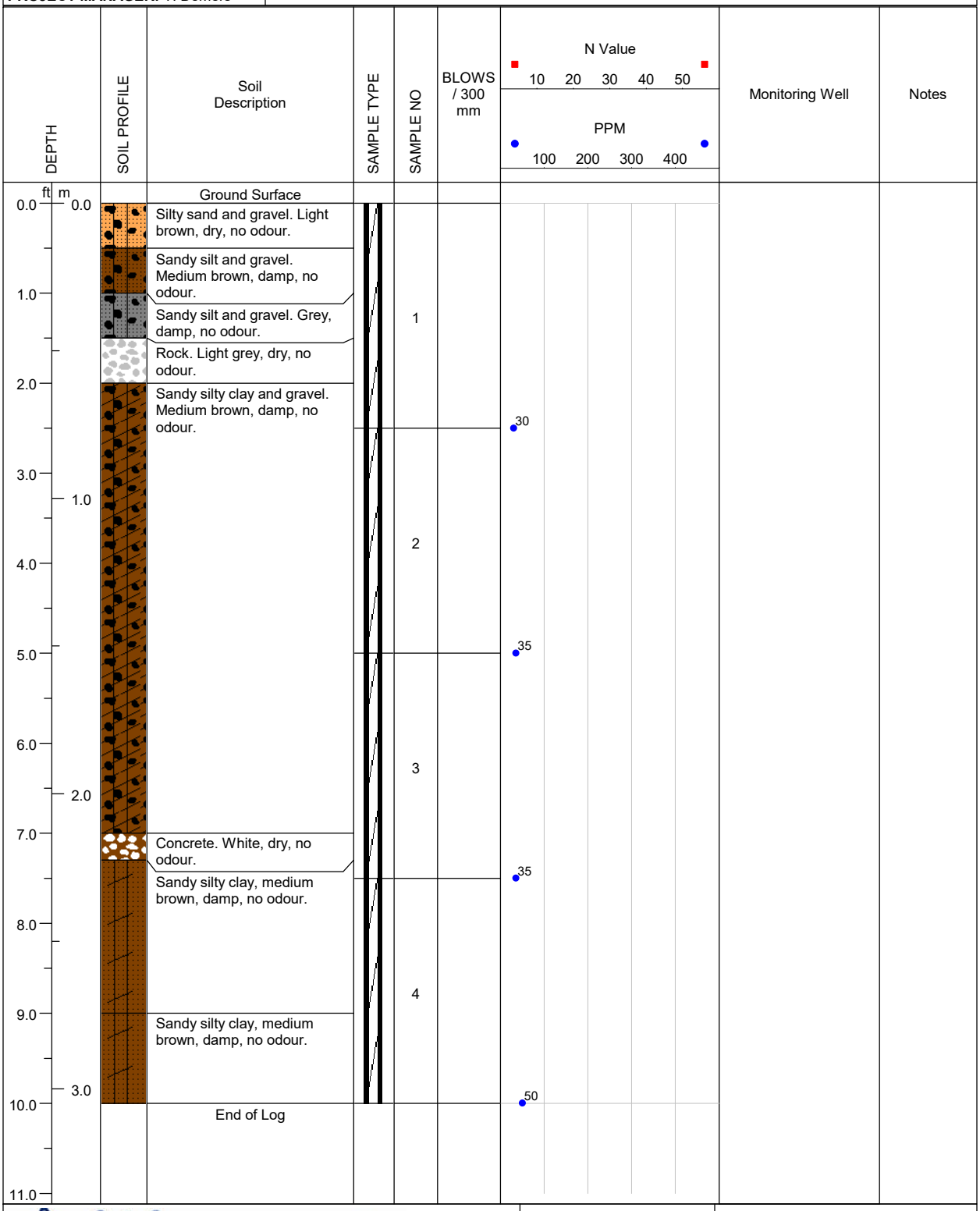
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m SE of 25-30	**BOREHOLE NO: 25-31**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	

DEPTH (ft)	DEPTH (m)	Soil Description	SAMPLE NO	BLOWS / 300 mm	N Value (10 20 30 40 50) / PPM (100 200 300 400)	Monitoring Well	Notes
0.0	0.0	Ground Surface					
0.0	0.0	Silty sand and rock. Light brown, dry, no odour.					
1.0		Sandy silt and gravel, Medium brown/red, damp, no odour.	1				
2.0		Sandy silt and gravel. Grey, damp, no odour.			30		
3.0	1.0		2				
4.0							
5.0		Sandy silt and gravel. Medium brown, damp, no odour.			35		
6.0			3				
7.0	2.0	Sandy silt and gravel. Medium brown, moist, no odour.			35		
8.0							
9.0			4				
10.0	3.0	Concrete. White, dry, no odour.			50		
		End of Log					
11.0							

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

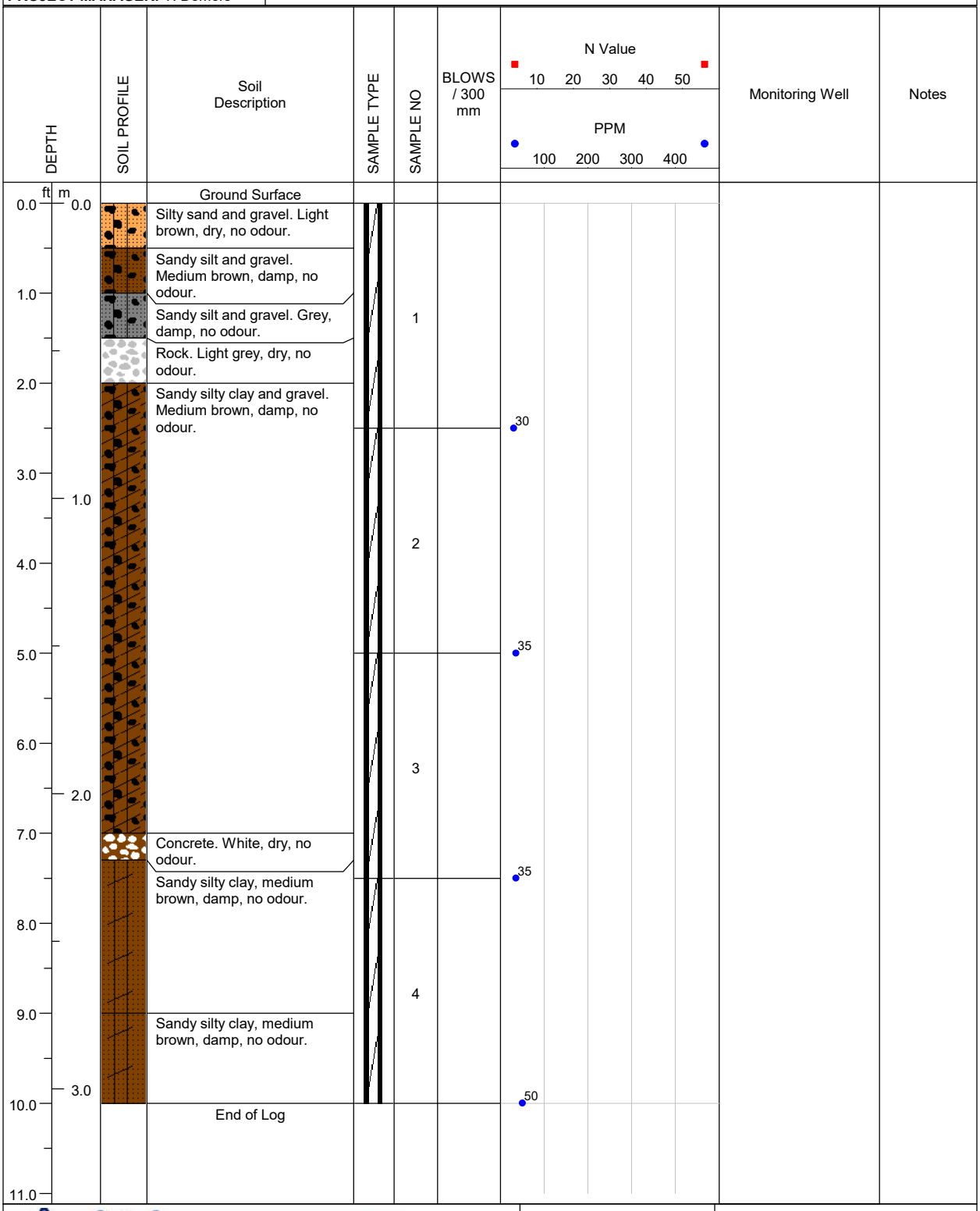
LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m NW of S fenceline, 13m E of 25-17	**BOREHOLE NO: 25-32**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



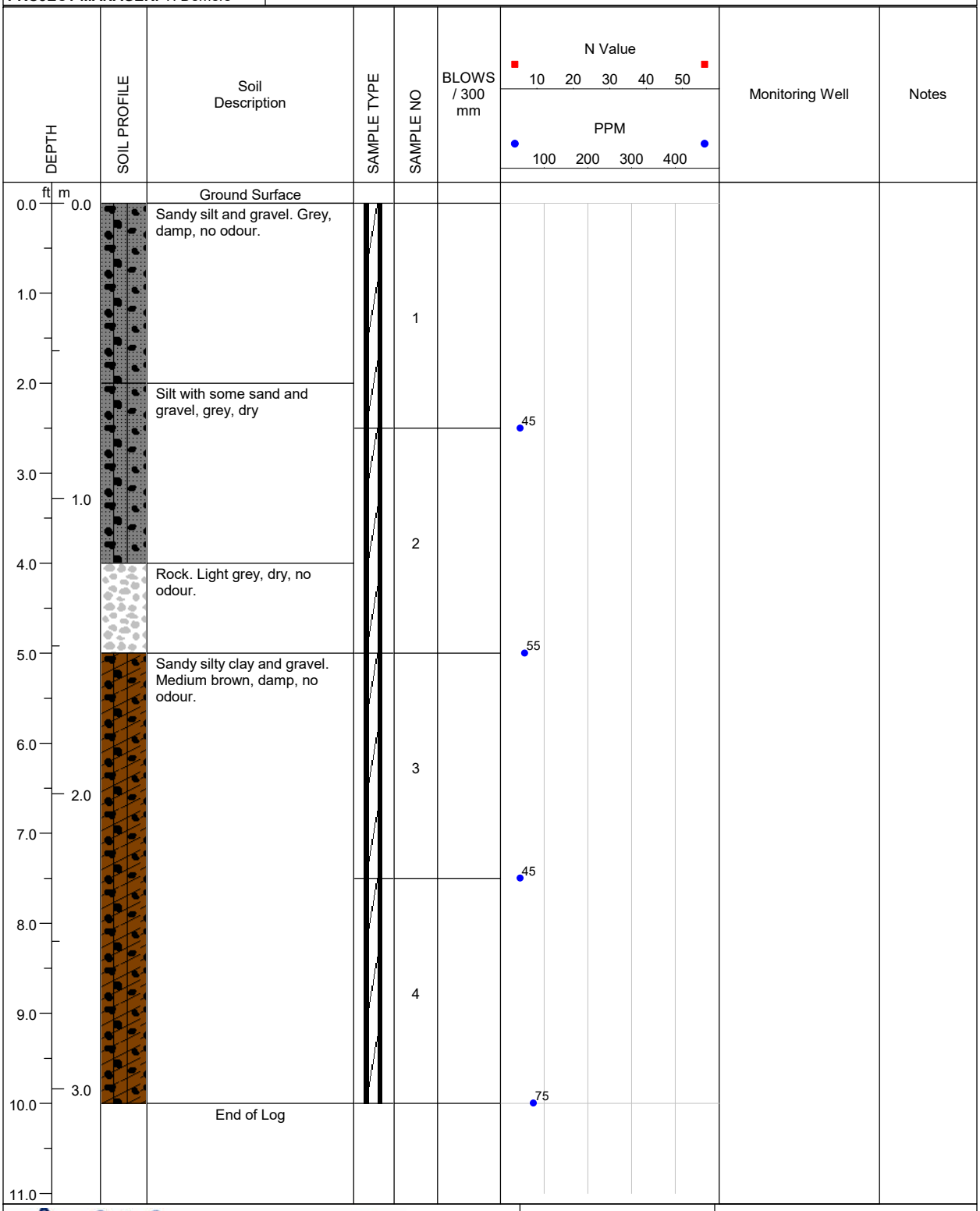
A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	
LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m NW of S fenceline, 13m E of 25-32	**BOREHOLE NO: 25-33**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



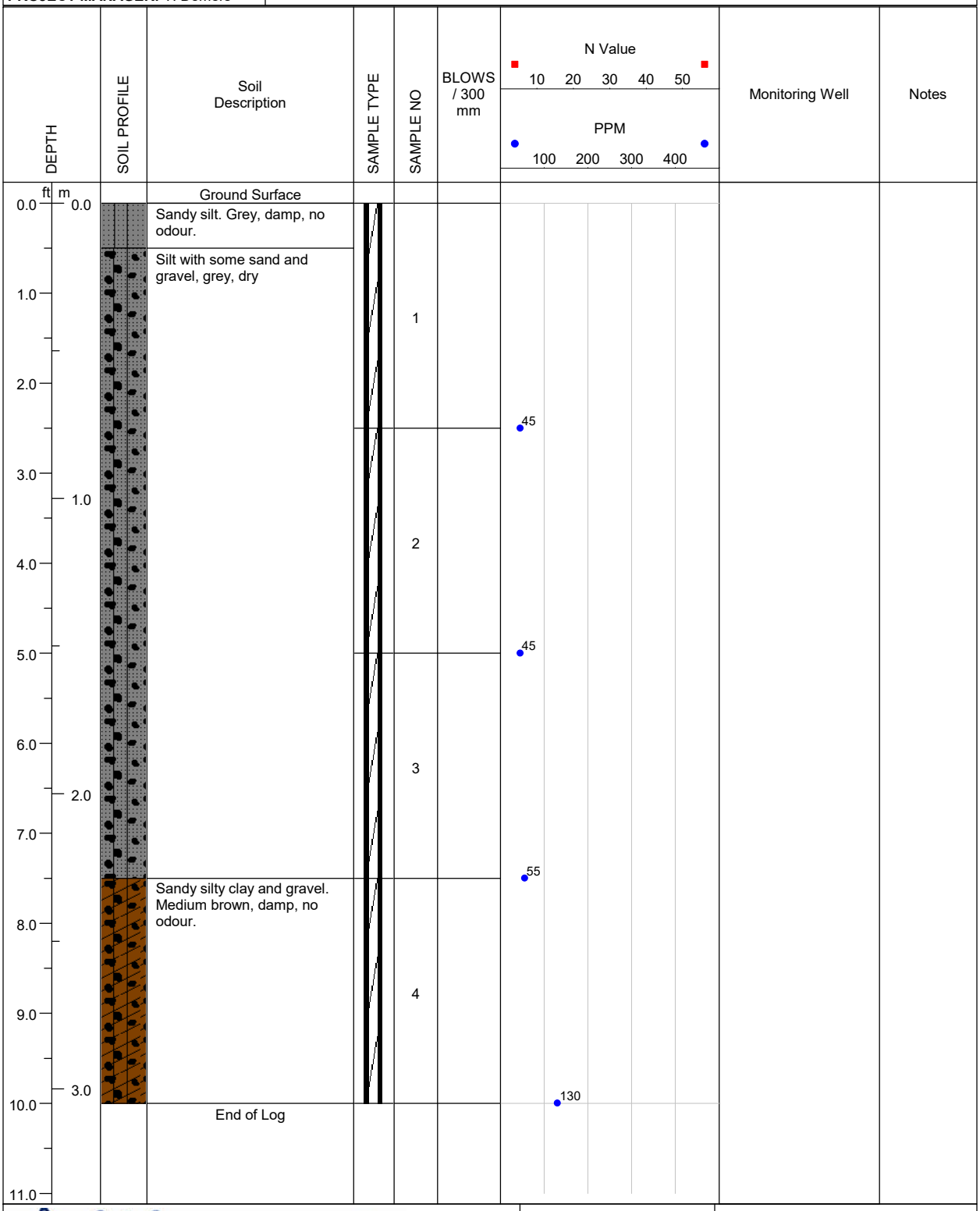
A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	
LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 18m NW of S fenceline, 13m E of 25-31	**BOREHOLE NO: 25-34**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

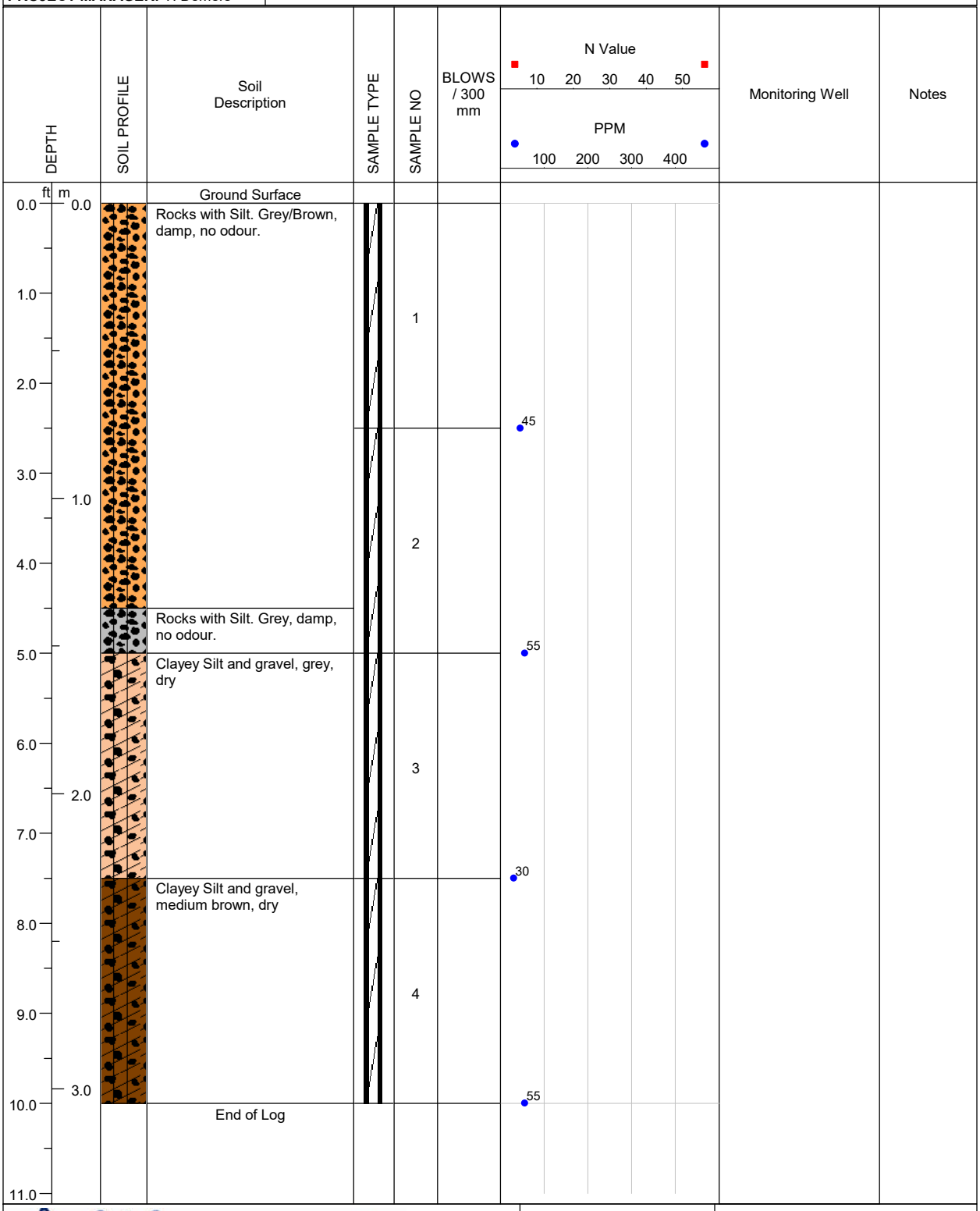
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 31m NW of S fenceline, 13m E of 25-30	**BOREHOLE NO: 25-35**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

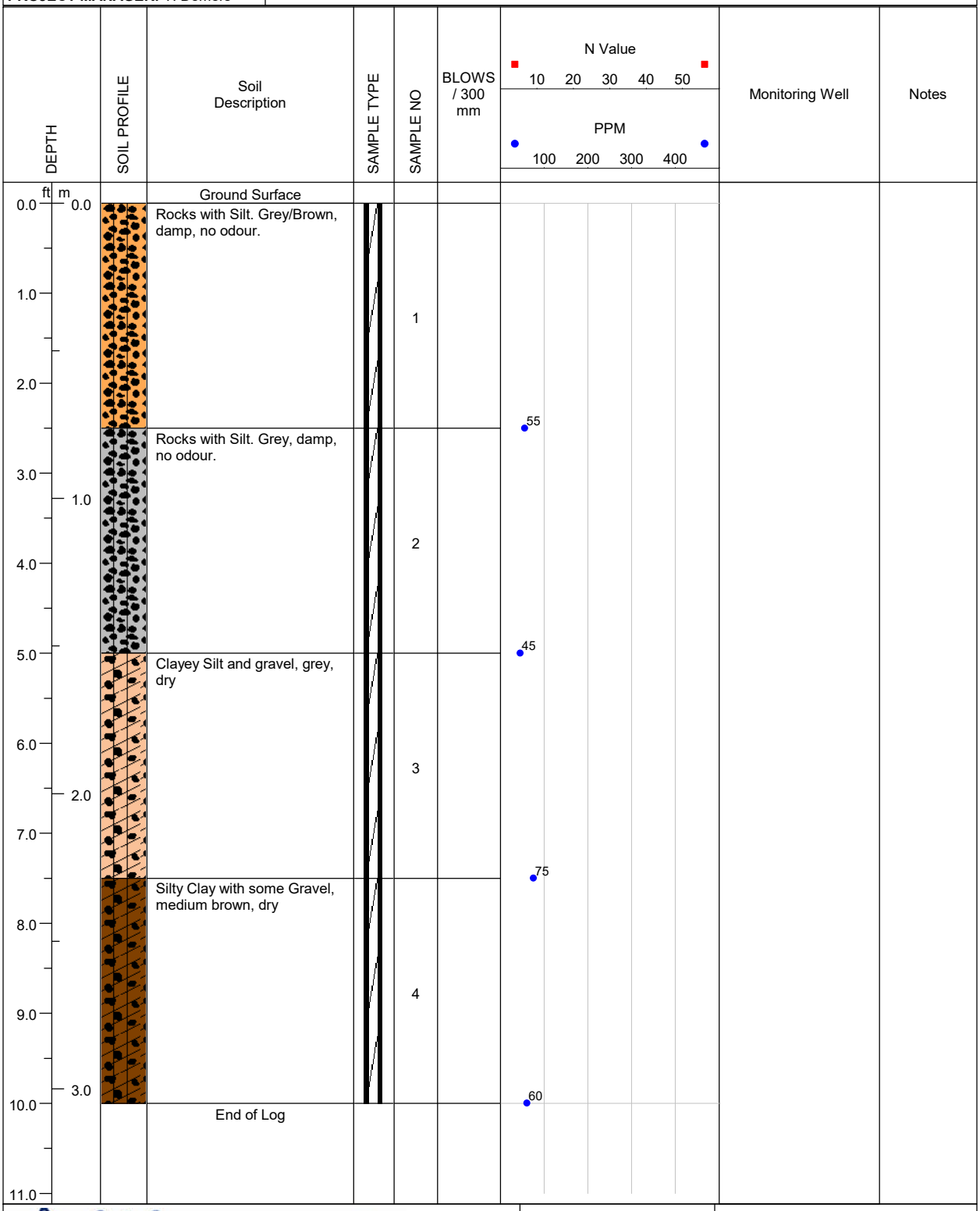
A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 44m NW of S fenceline, 13m E of 25-29	**BOREHOLE NO: 25-36**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A&A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

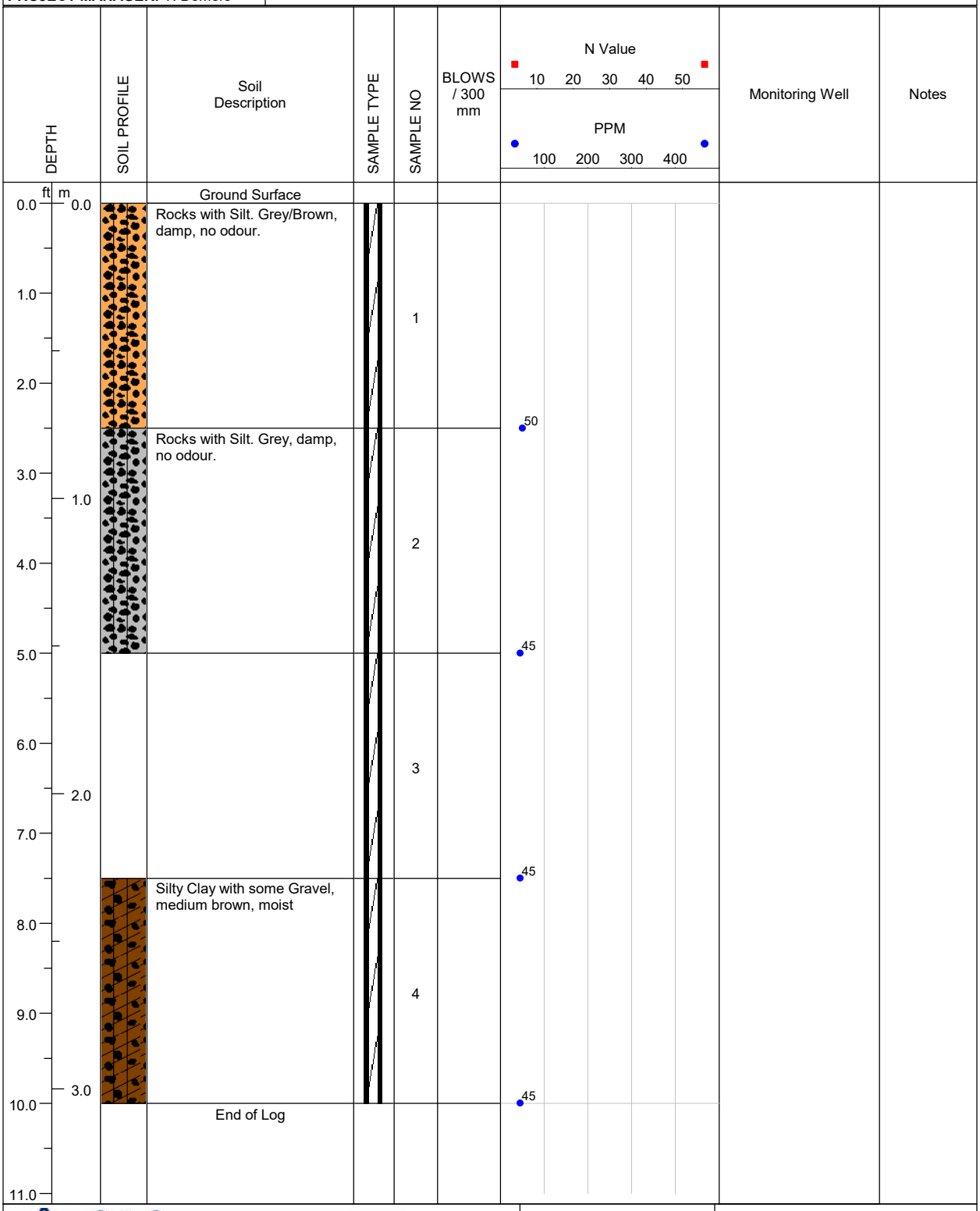
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 57m NW of S fenceline, 13m E of 25-28	**BOREHOLE NO: 25-37**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

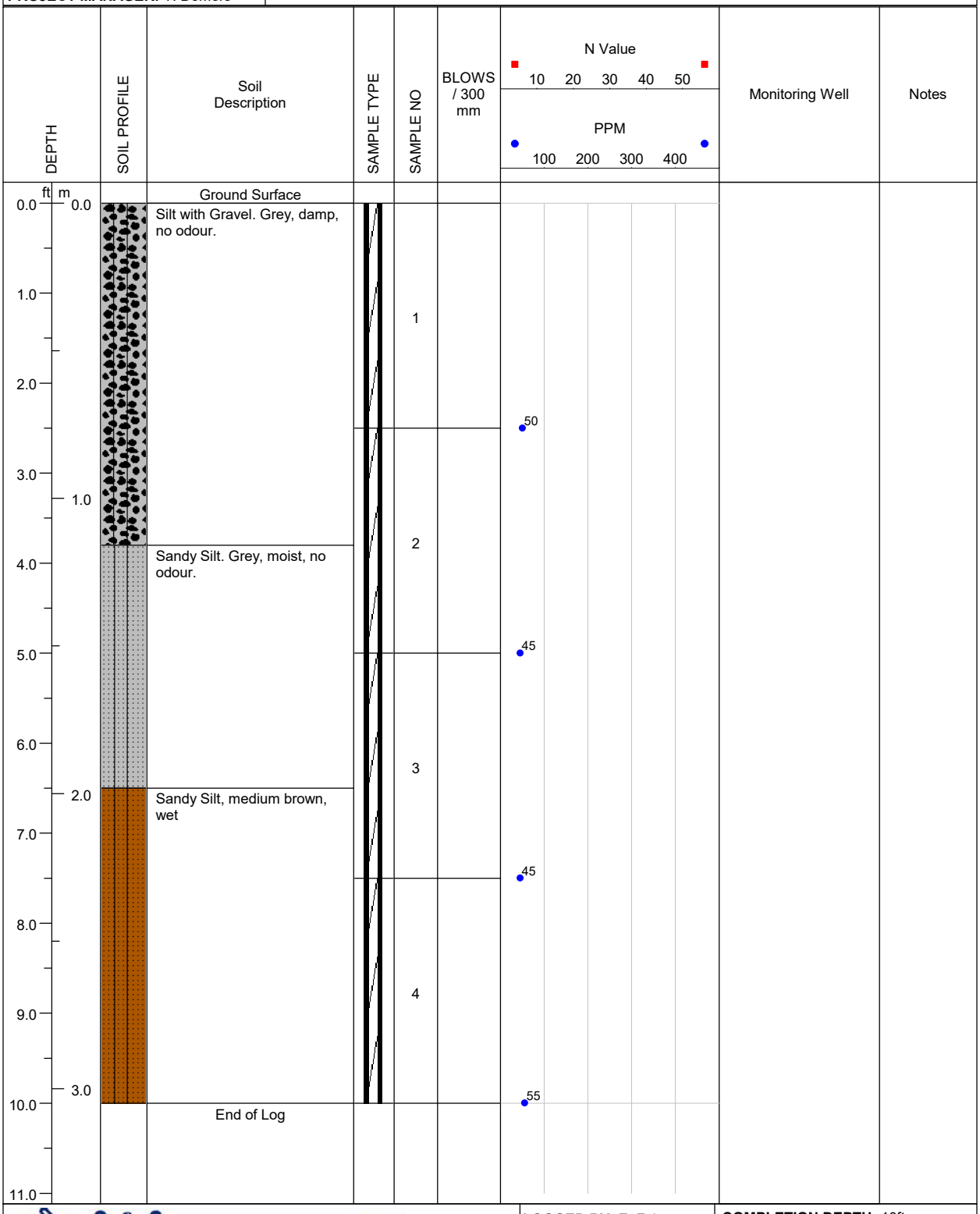
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 70m NW of S fenceline, 13m E of 25-27	**BOREHOLE NO: 25-38**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

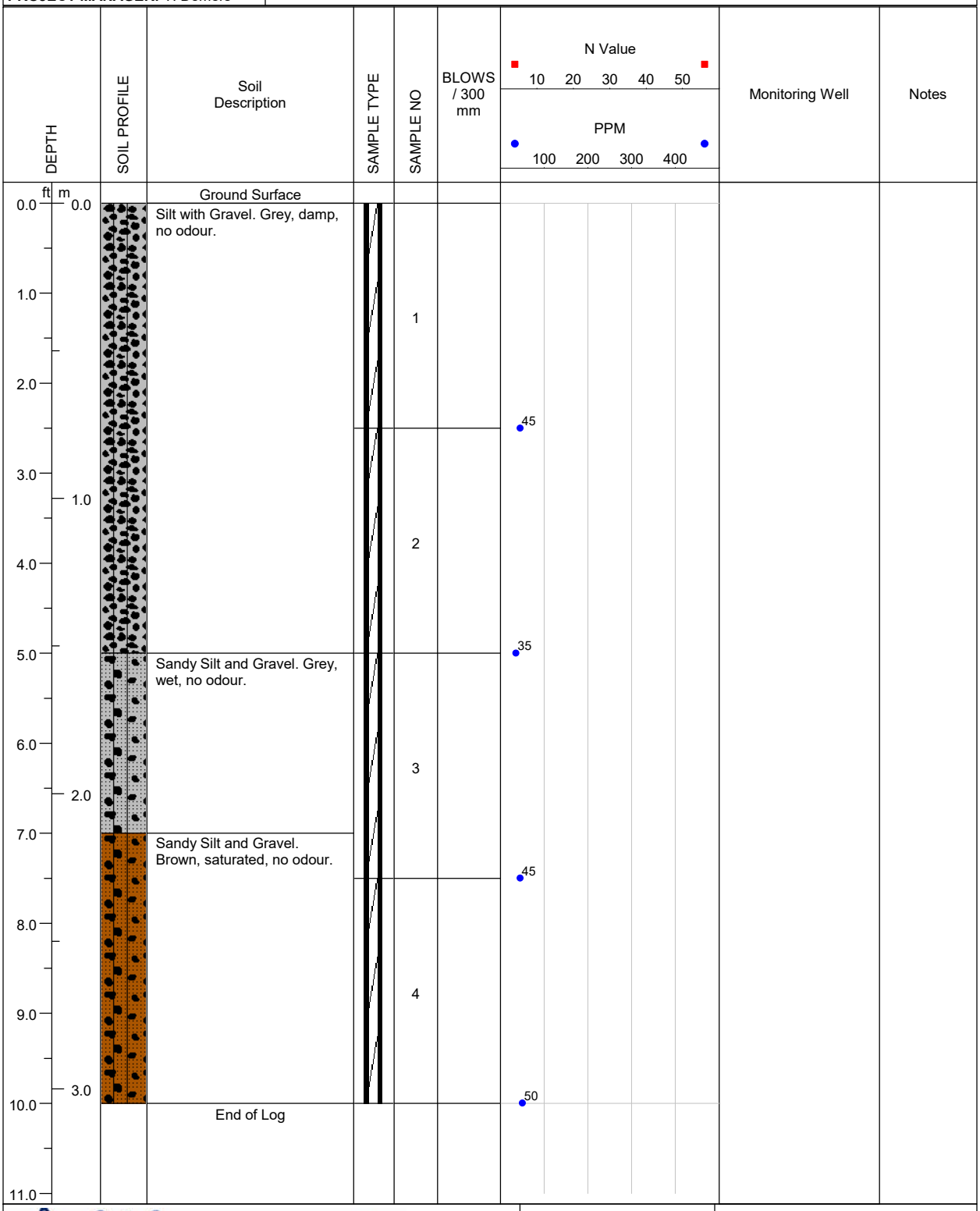
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 18m SE of N fenceline, 13m E of 25-26	**BOREHOLE NO: 25-39**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/15/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

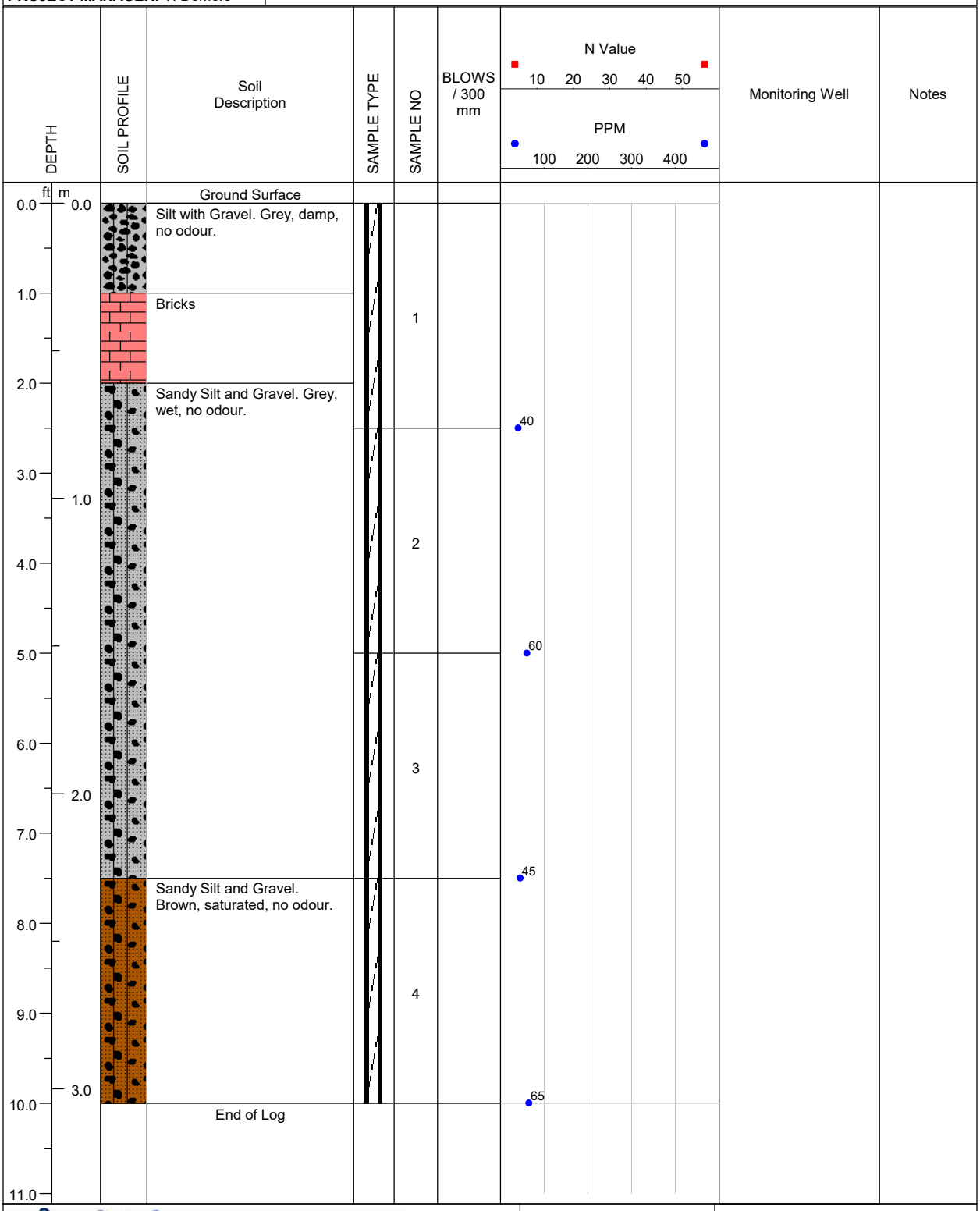
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m SE of N fenceline, 13m E of 25-25	**BOREHOLE NO: 25-40**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

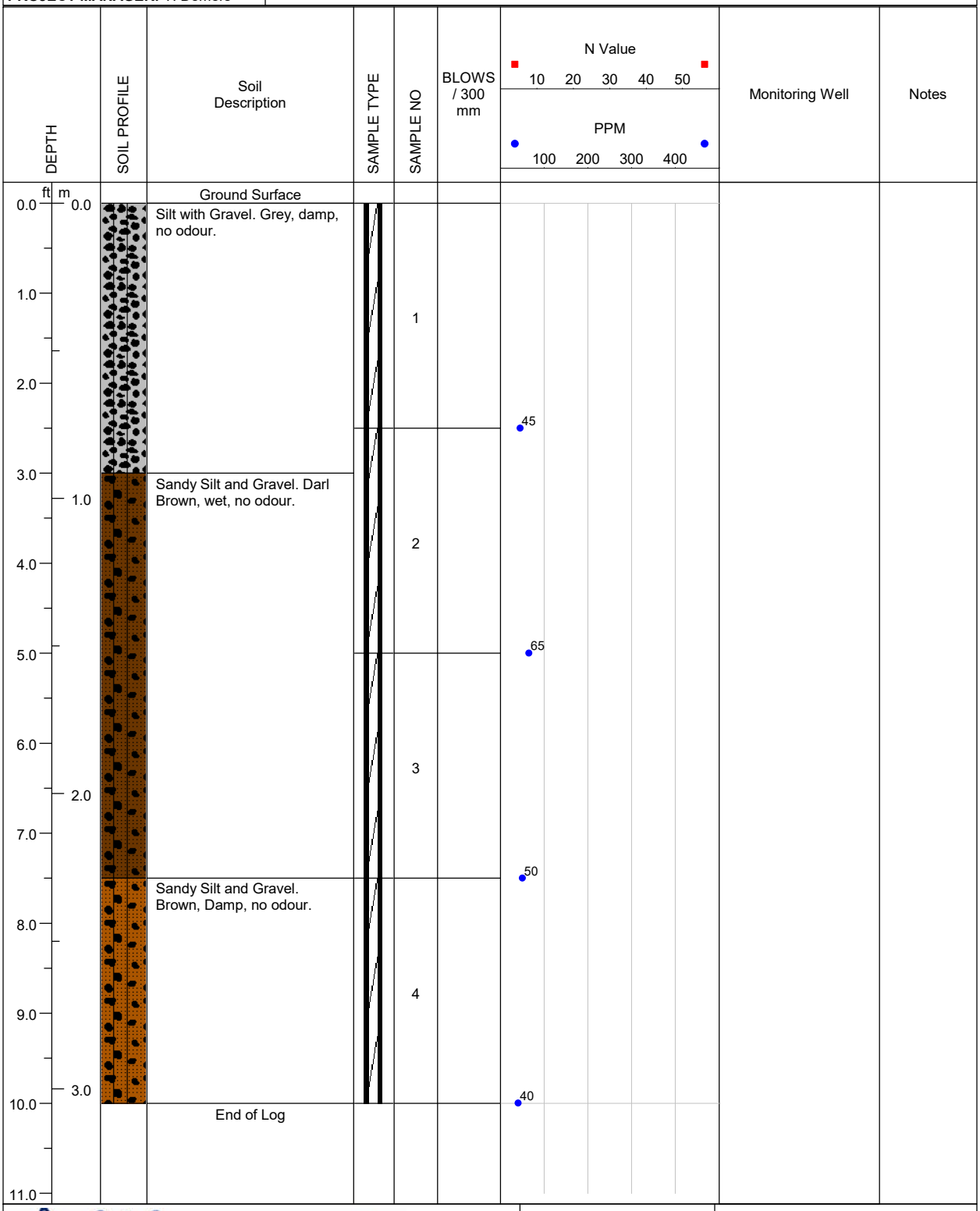
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m SE of N fenceline, 13m E of 25-40	**BOREHOLE NO: 25-41**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

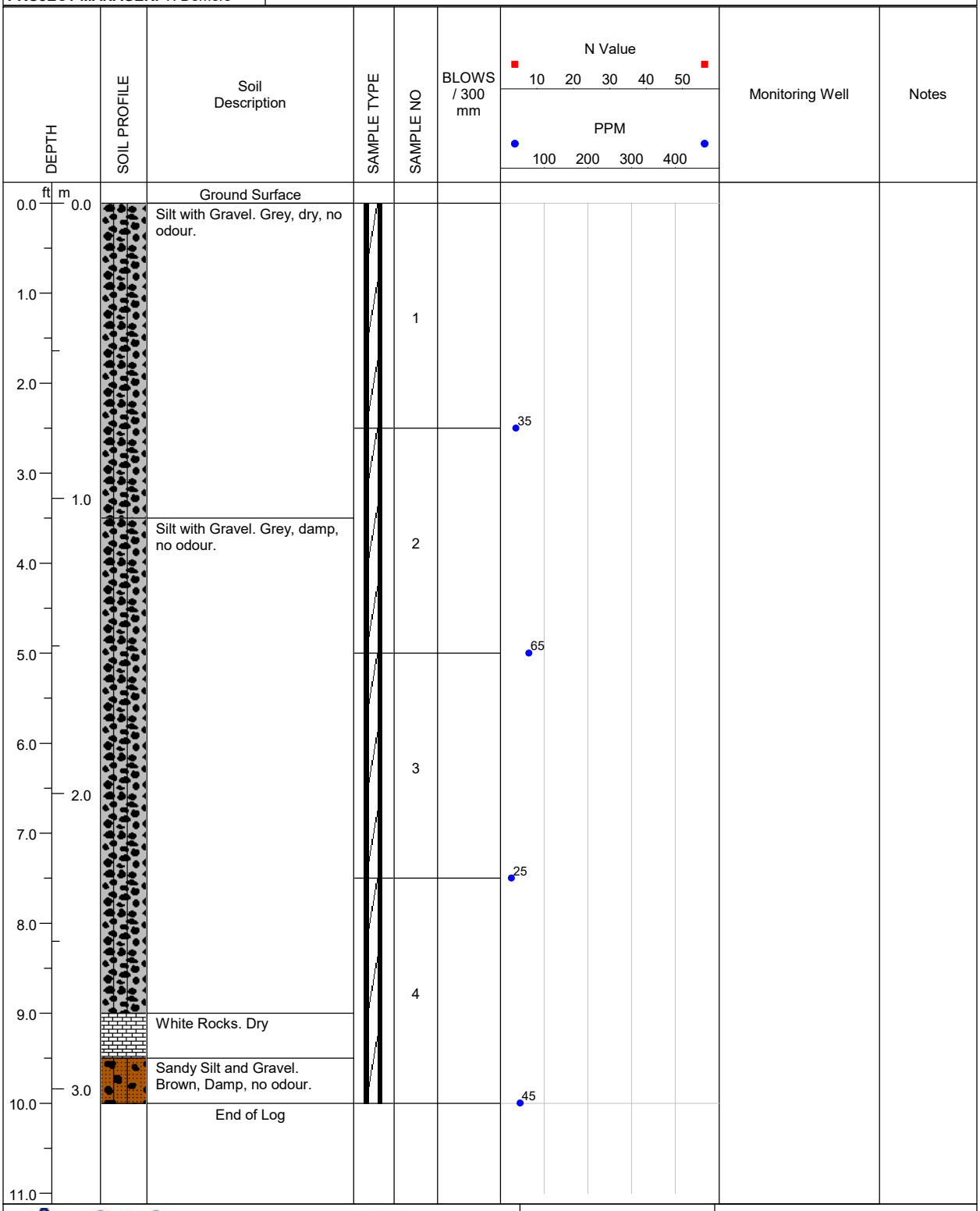
LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 18m SE of N fenceline, 13m E of 25-39	**BOREHOLE NO: 25-42**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 31m SE of N fenceline, 13m E of 25-38	**BOREHOLE NO: 25-43**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 44m SE of N fenceline, 13m E of 25-37	**BOREHOLE NO: 25-44**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	

DEPTH (ft)	DEPTH (m)	Soil Description	SAMPLE NO	BLOWS / 300 mm	N Value / PPM	Monitoring Well	Notes
0.0	0.0	Ground Surface					
0.0 – 1.0	0.0 – 0.3	Silt with Gravel. Grey, dry, no odour.	1				
1.0 – 3.0	0.3 – 1.0	Silt with Sand and Gravel. red, damp, no odour.	1		40		
3.0 – 6.0	1.0 – 2.0	Silt with Sand and Gravel. Grey, damp, no odour.	2		45		
6.0 – 10.0	2.0 – 3.0	Sandy Silt and Gravel. Brown, Damp, no odour.	3		35		
10.0	3.0	End of Log	4		50		
11.0							

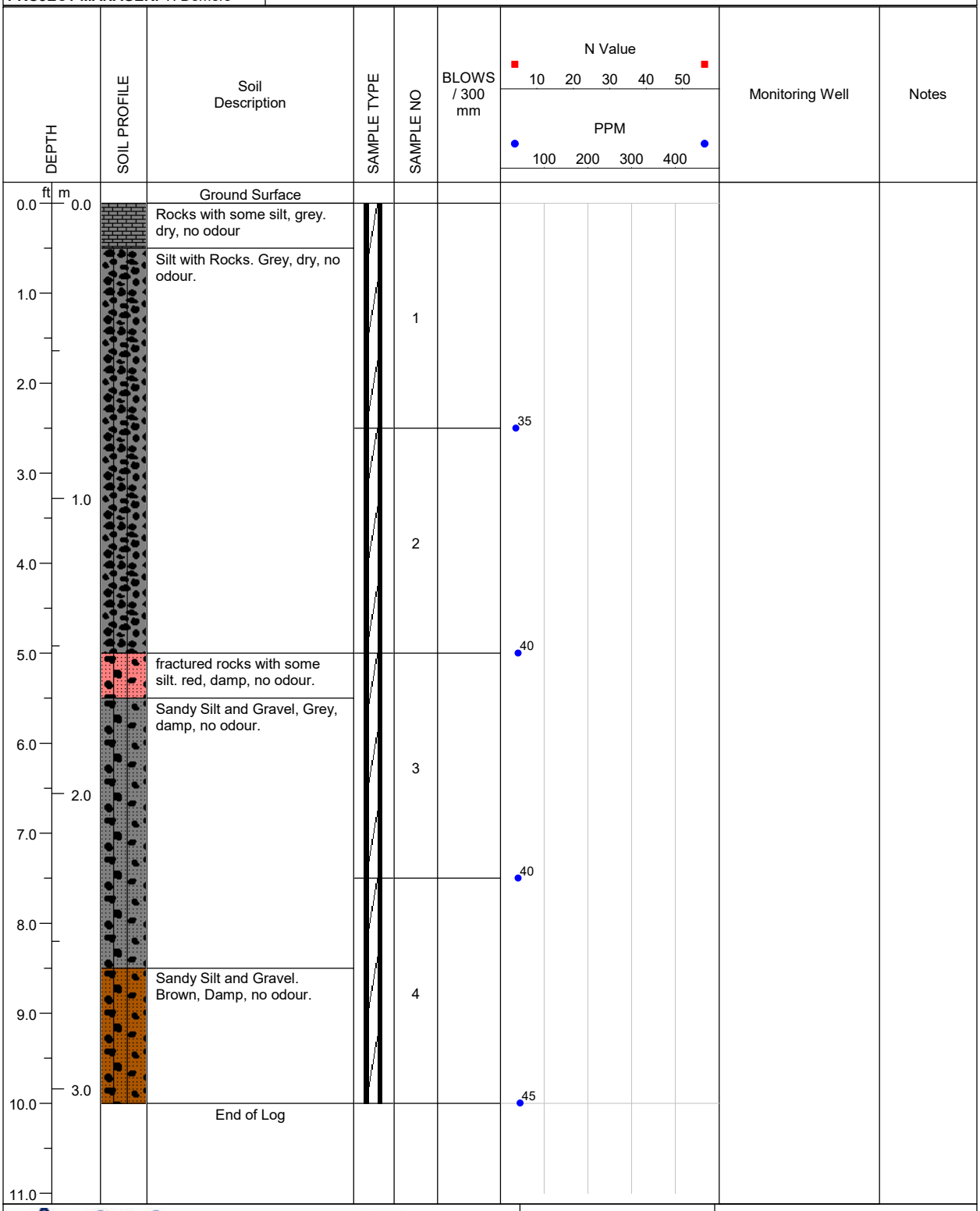
N Value: 10 20 30 40 50

PPM: 100 200 300 400

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

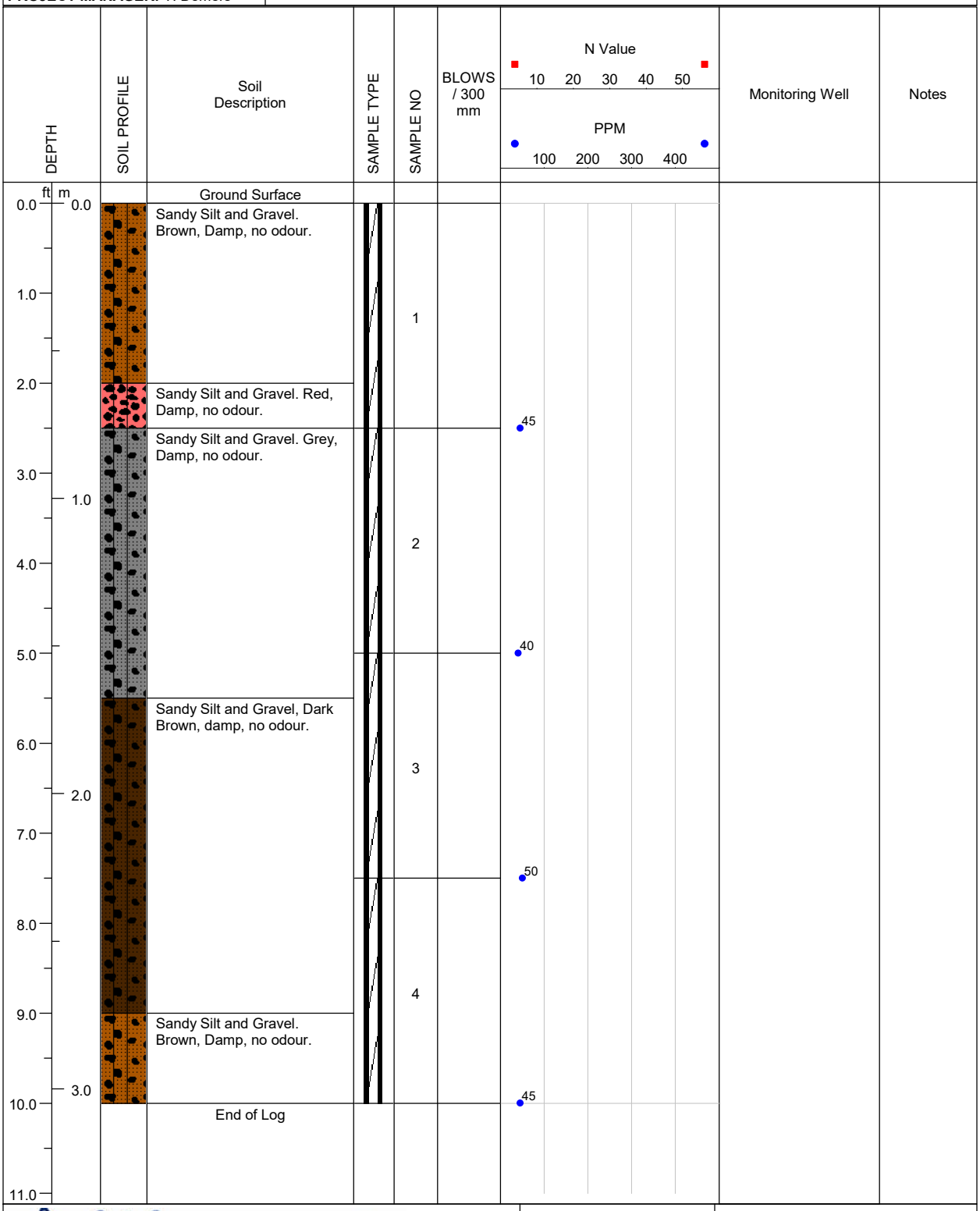
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 44m NW of S fenceline, 13m E of 25-36	**BOREHOLE NO: 25-45**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

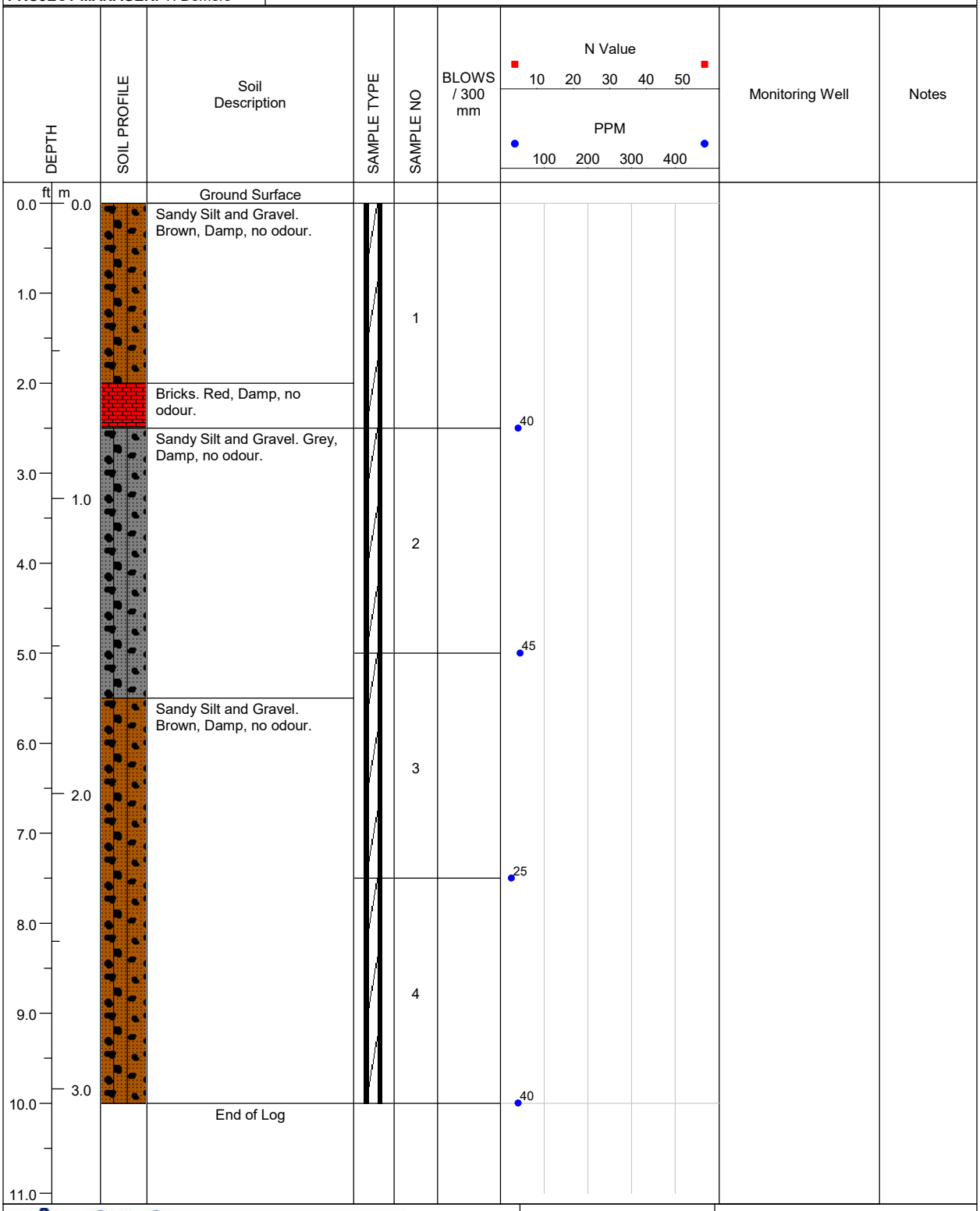
LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 31m NW of S fenceline, 13m E of 25-35	**BOREHOLE NO: 25-46**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



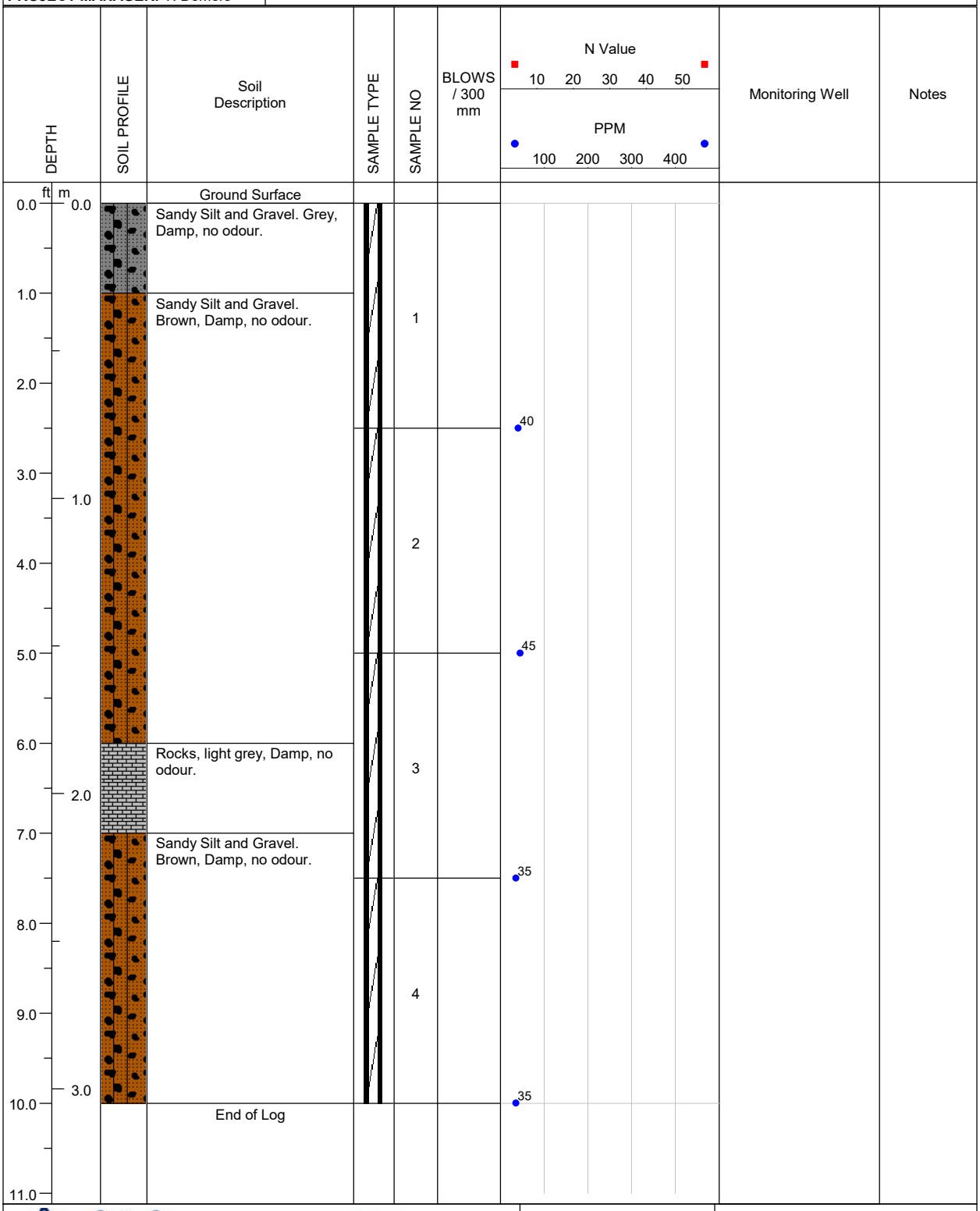
A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 18m NW of S fenceline, 13m E of 25-34	**BOREHOLE NO: 25-47**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

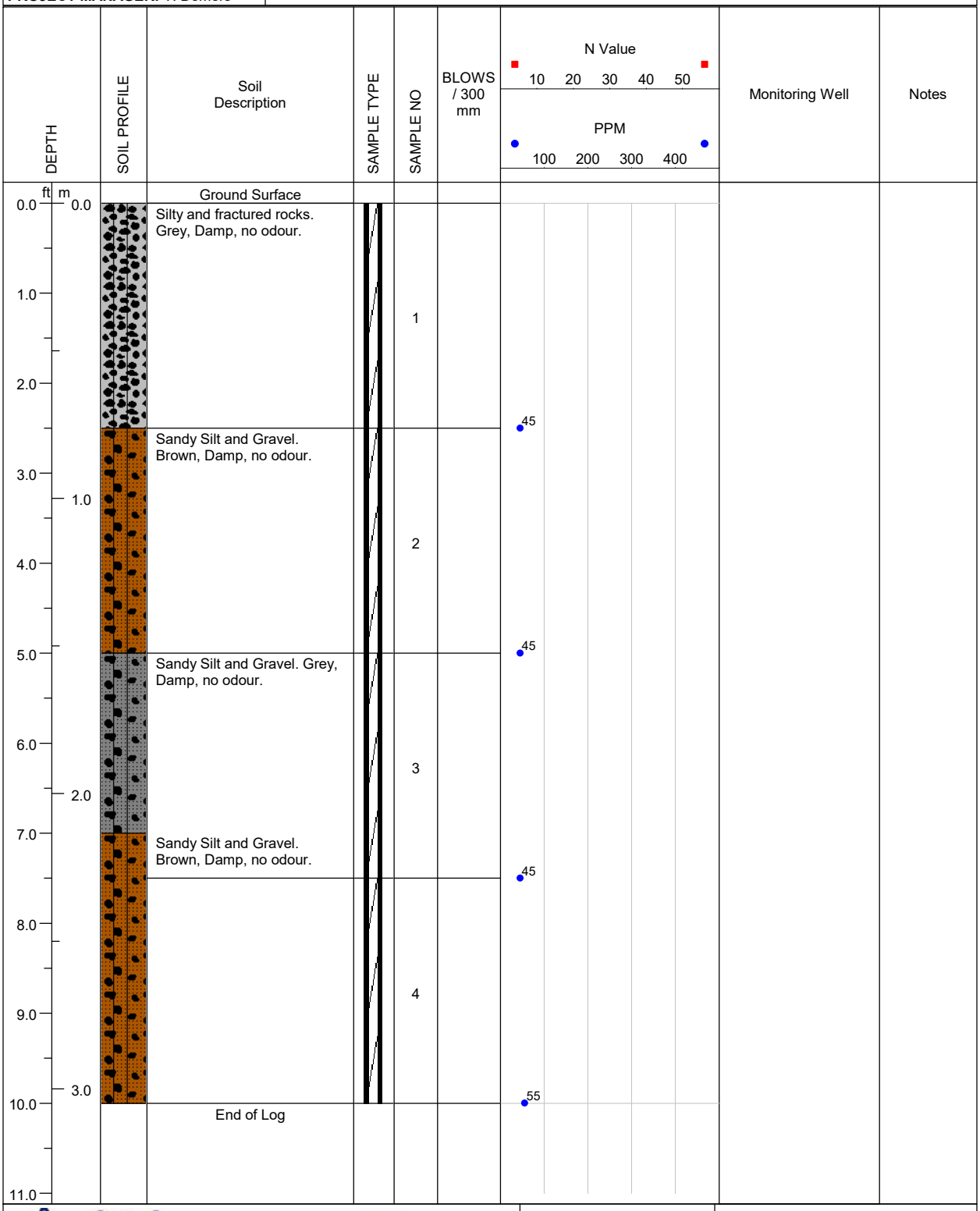
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m NW of S fenceline, 13m E of 25-33	**BOREHOLE NO: 25-48**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

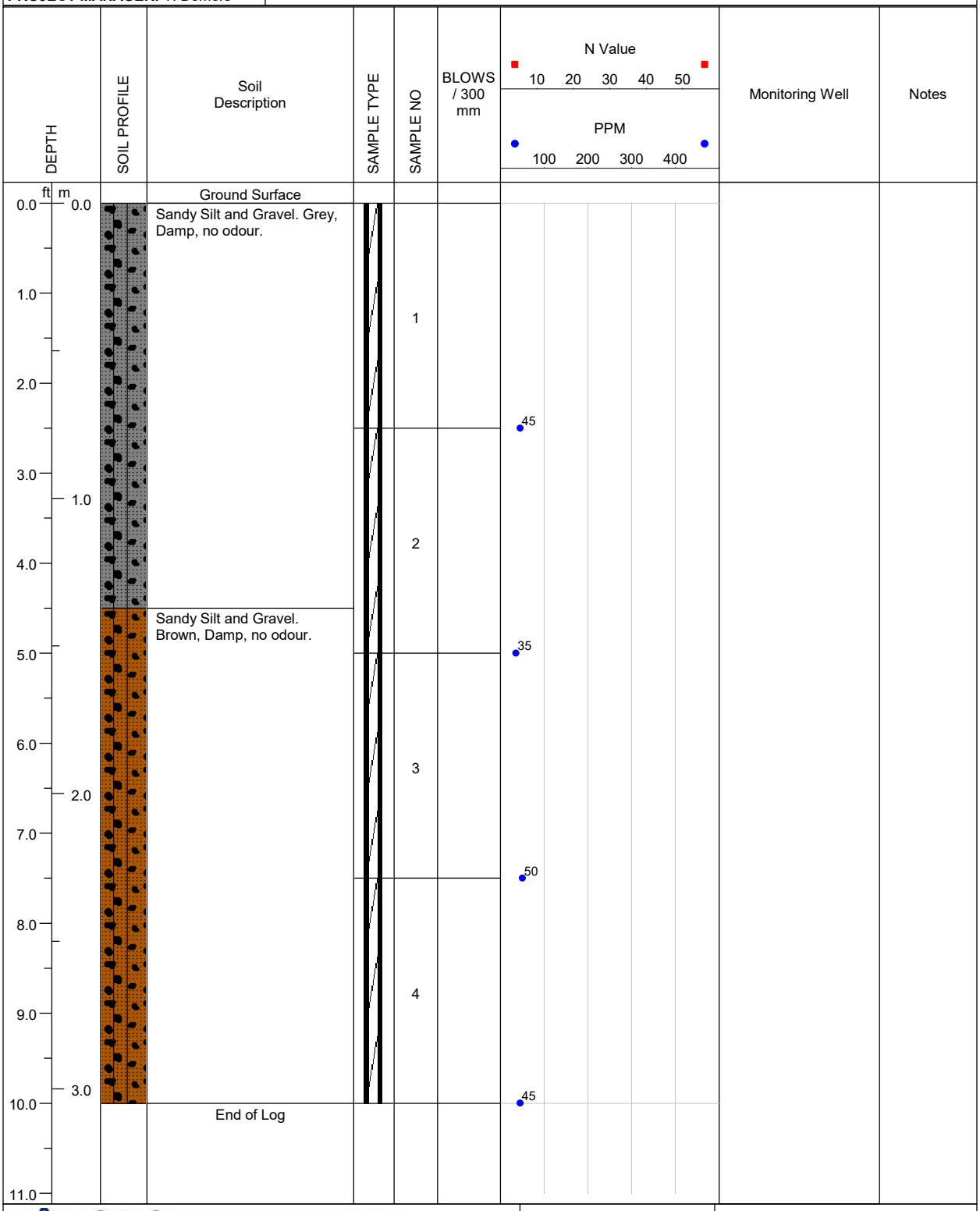
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m SE of N fenceline, 13m E of 25-41	**BOREHOLE NO: 25-49**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

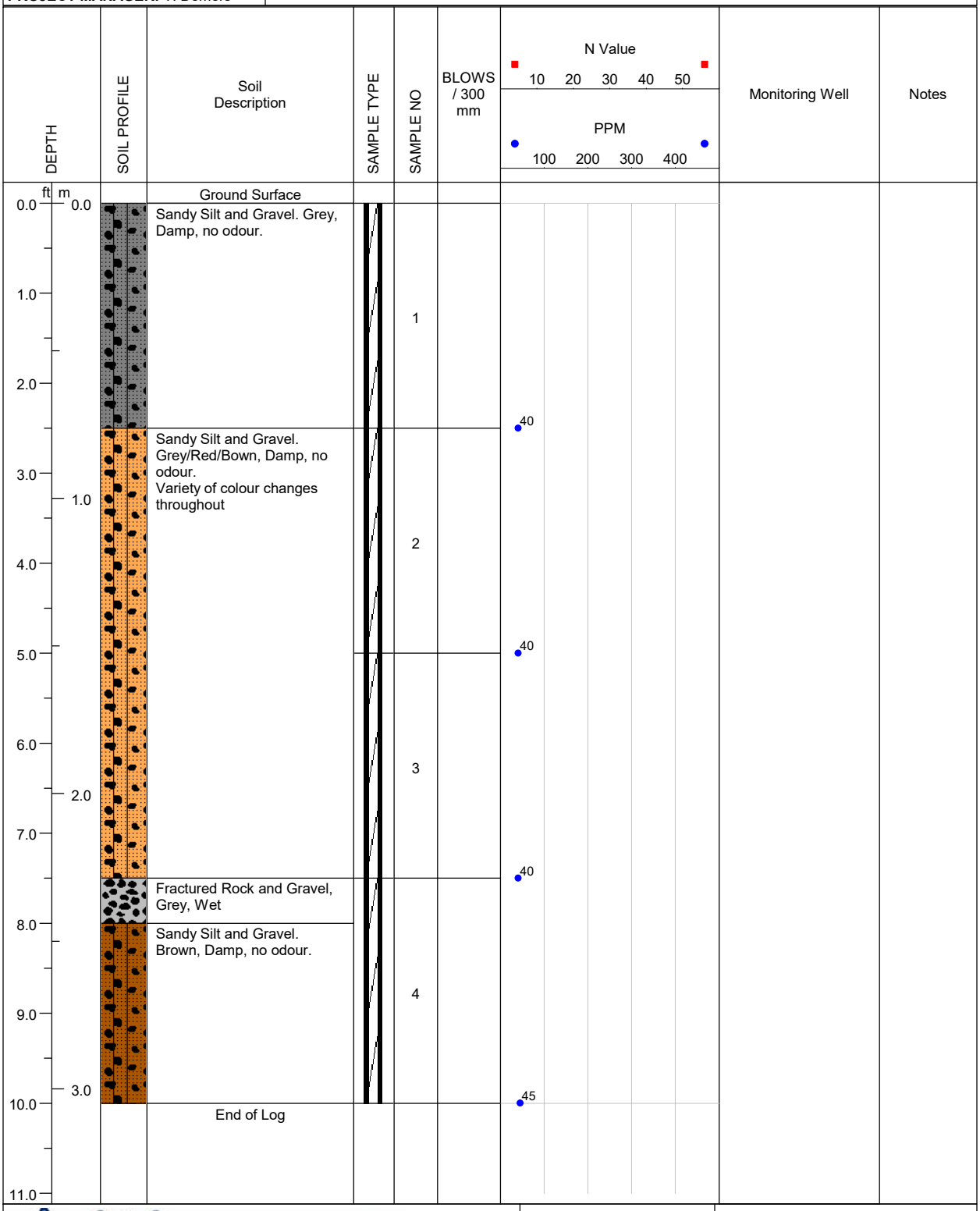
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 18m SE of N fenceline, 13m E of 25-42	**BOREHOLE NO: 25-50**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

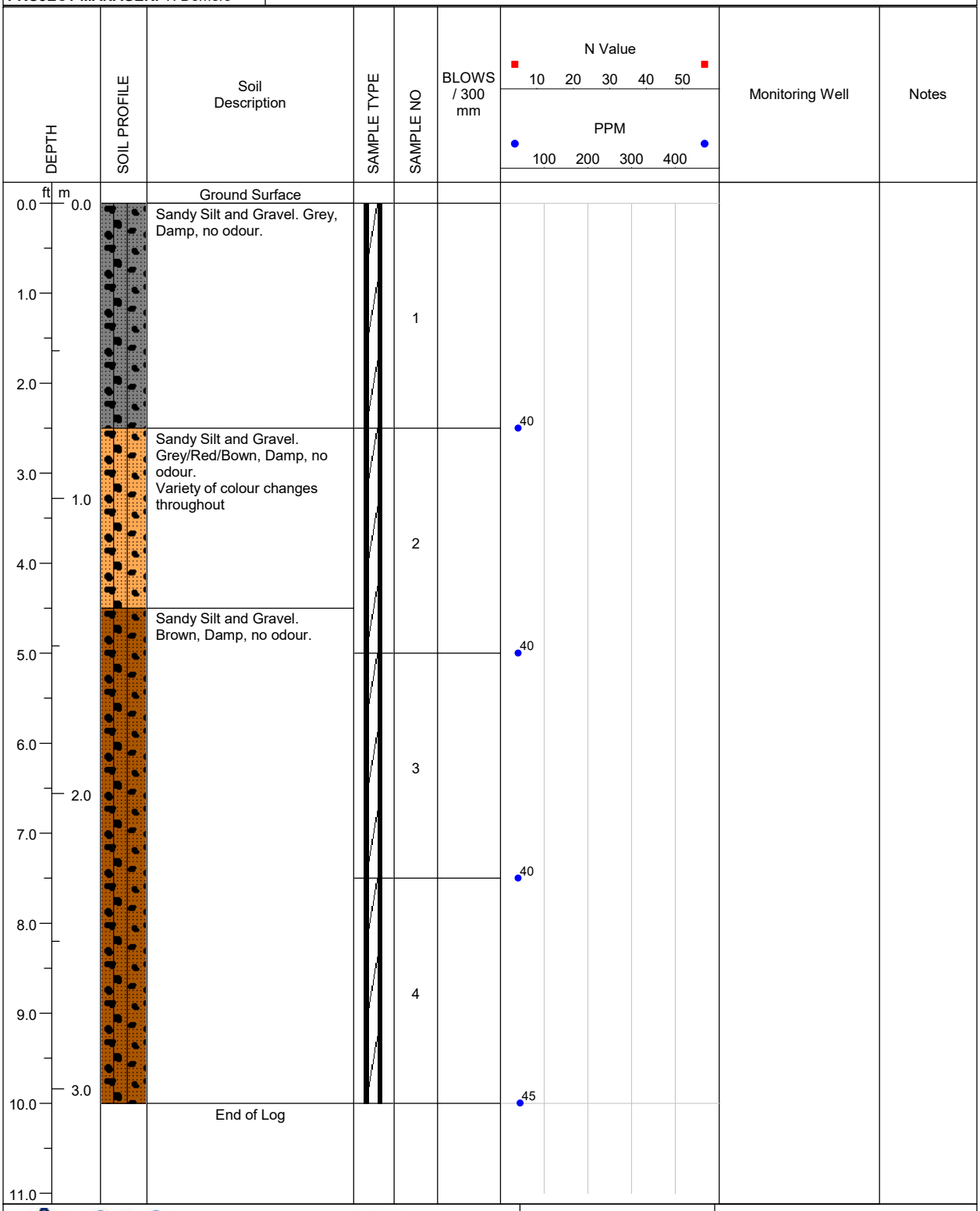
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 31m SE of N fenceline, 13m E of 25-43	**BOREHOLE NO: 25-51**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

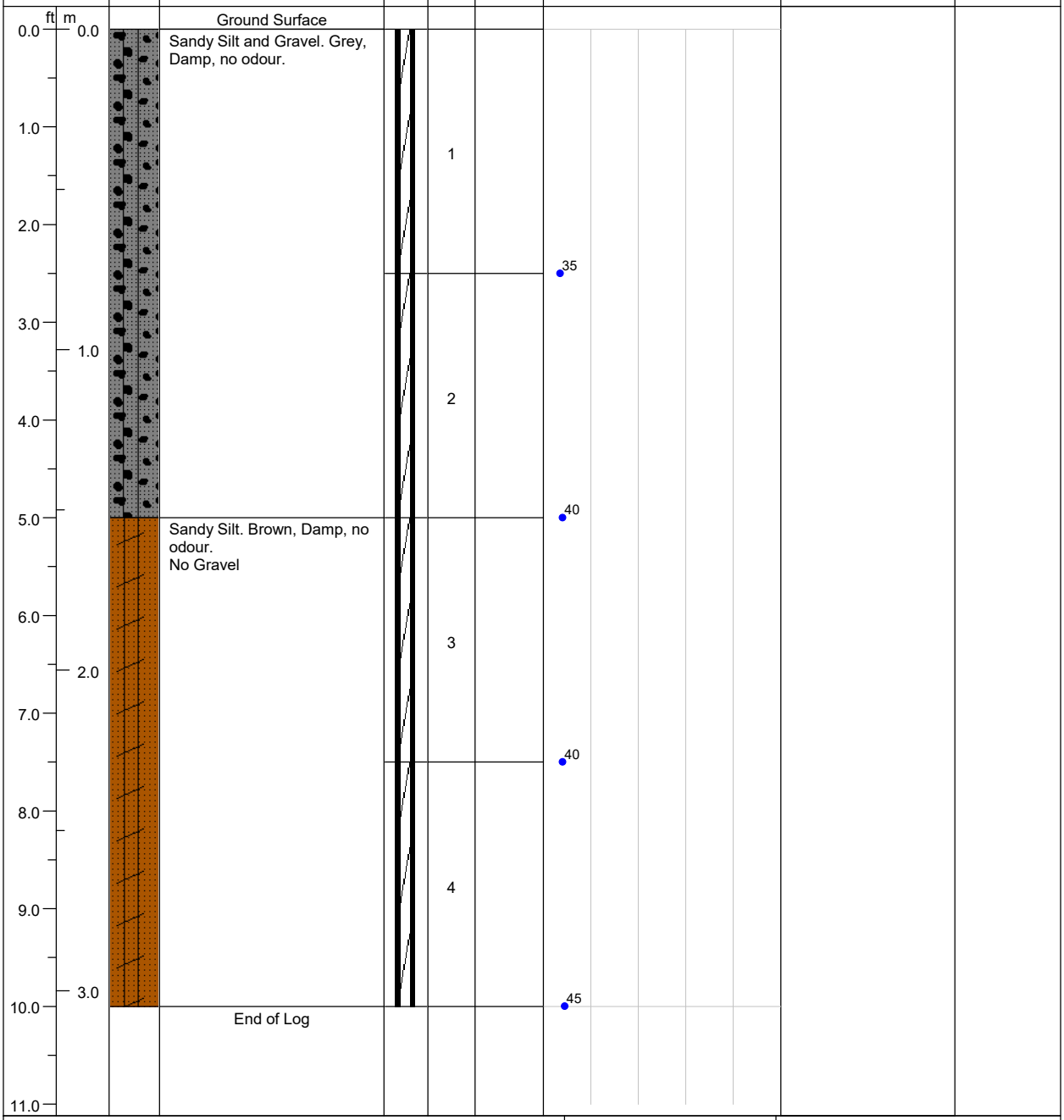
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 44m SE of N fenceline, 13m E of 25-44	**BOREHOLE NO: 25-52**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

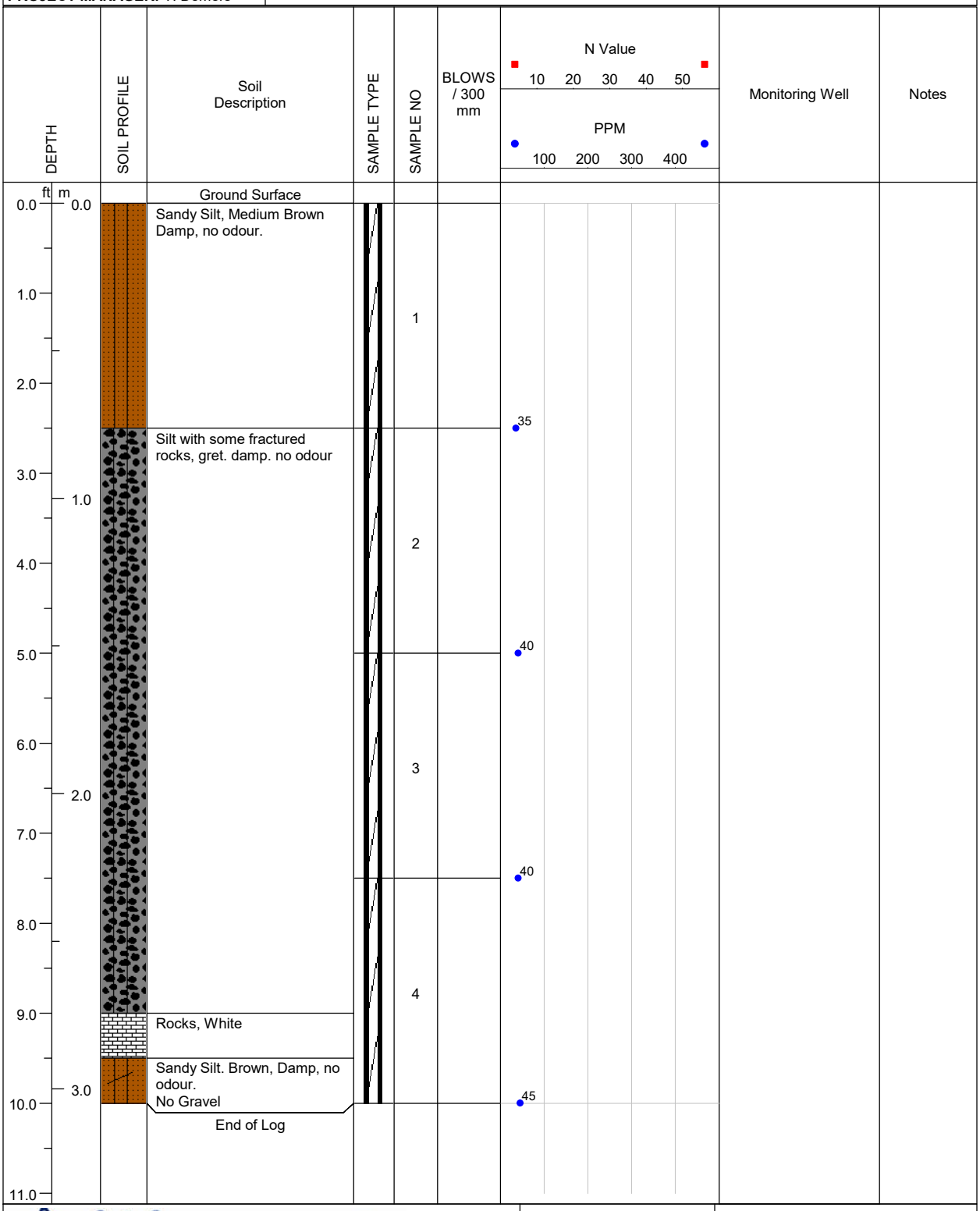
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 44m NW of S fenceline, 13m E of 25-45	**BOREHOLE NO: 25-53**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

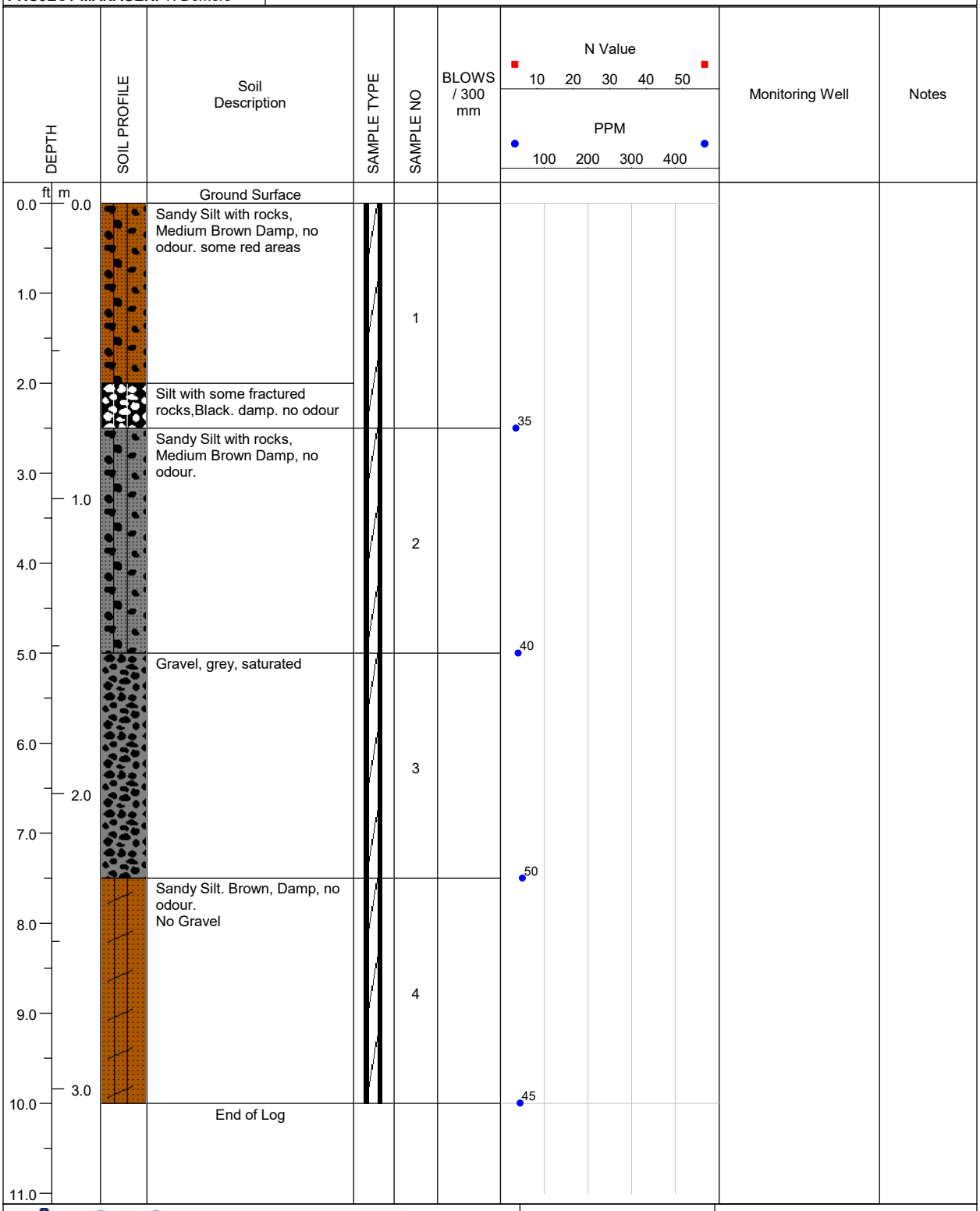
LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 31m NW of S fenceline, 13m E of 25-46	**BOREHOLE NO: 25-54**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

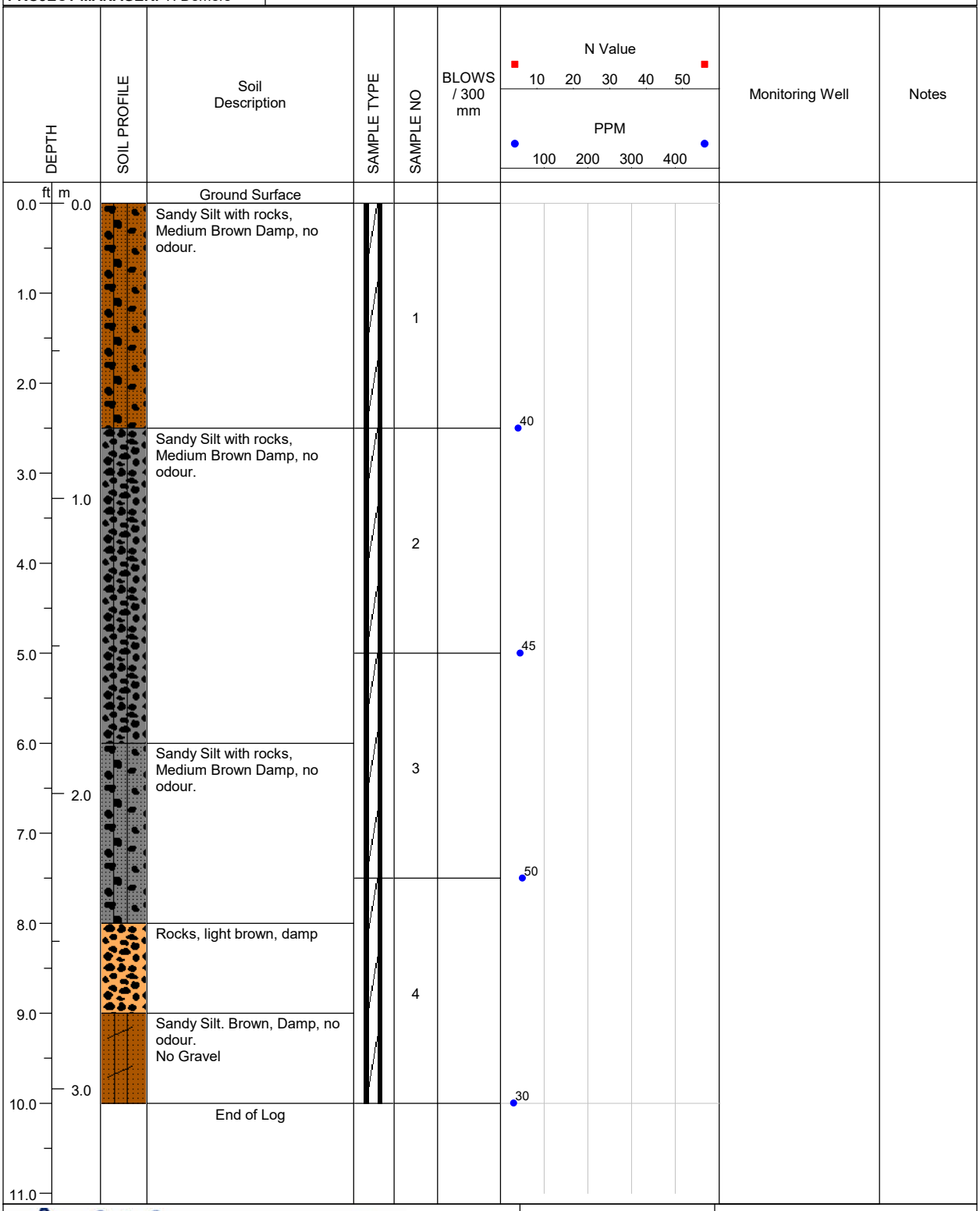
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 18m NW of S fenceline, 13m E of 25-47	**BOREHOLE NO: 25-55**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

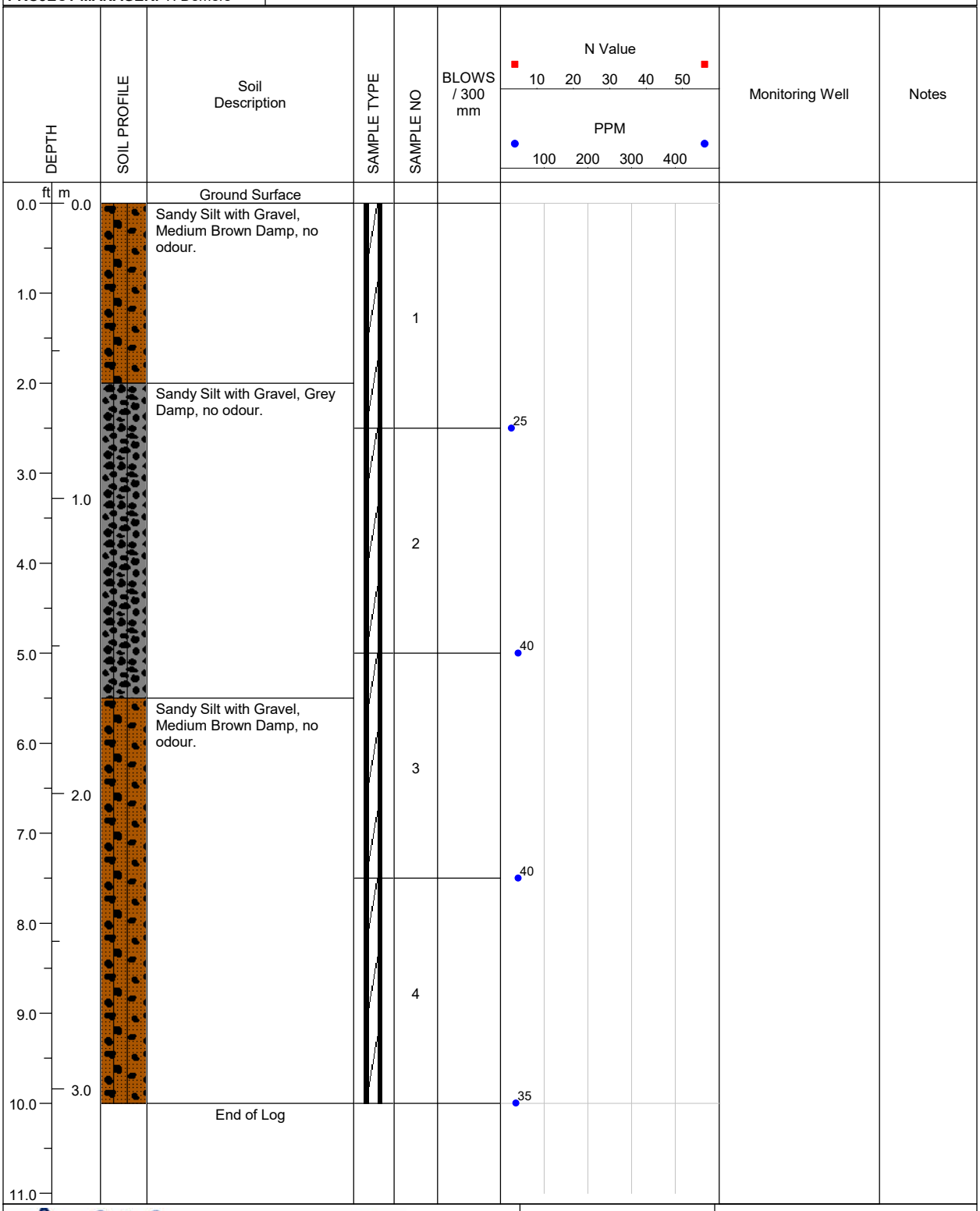
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m NW of S fenceline, 13m E of 25-48	**BOREHOLE NO: 25-56**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

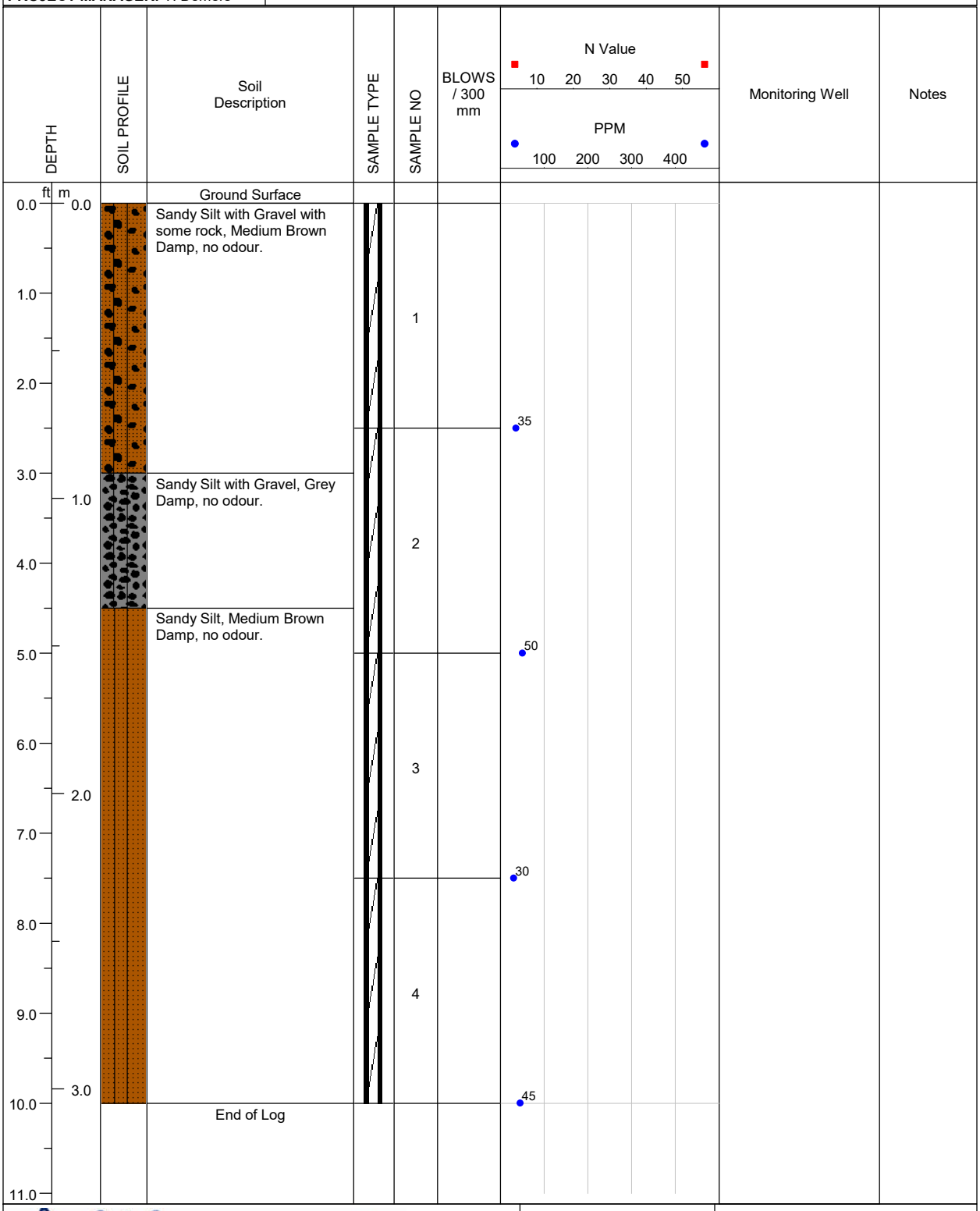
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m NW of S fenceline, 13m E of 25-56	**BOREHOLE NO: 25-57**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

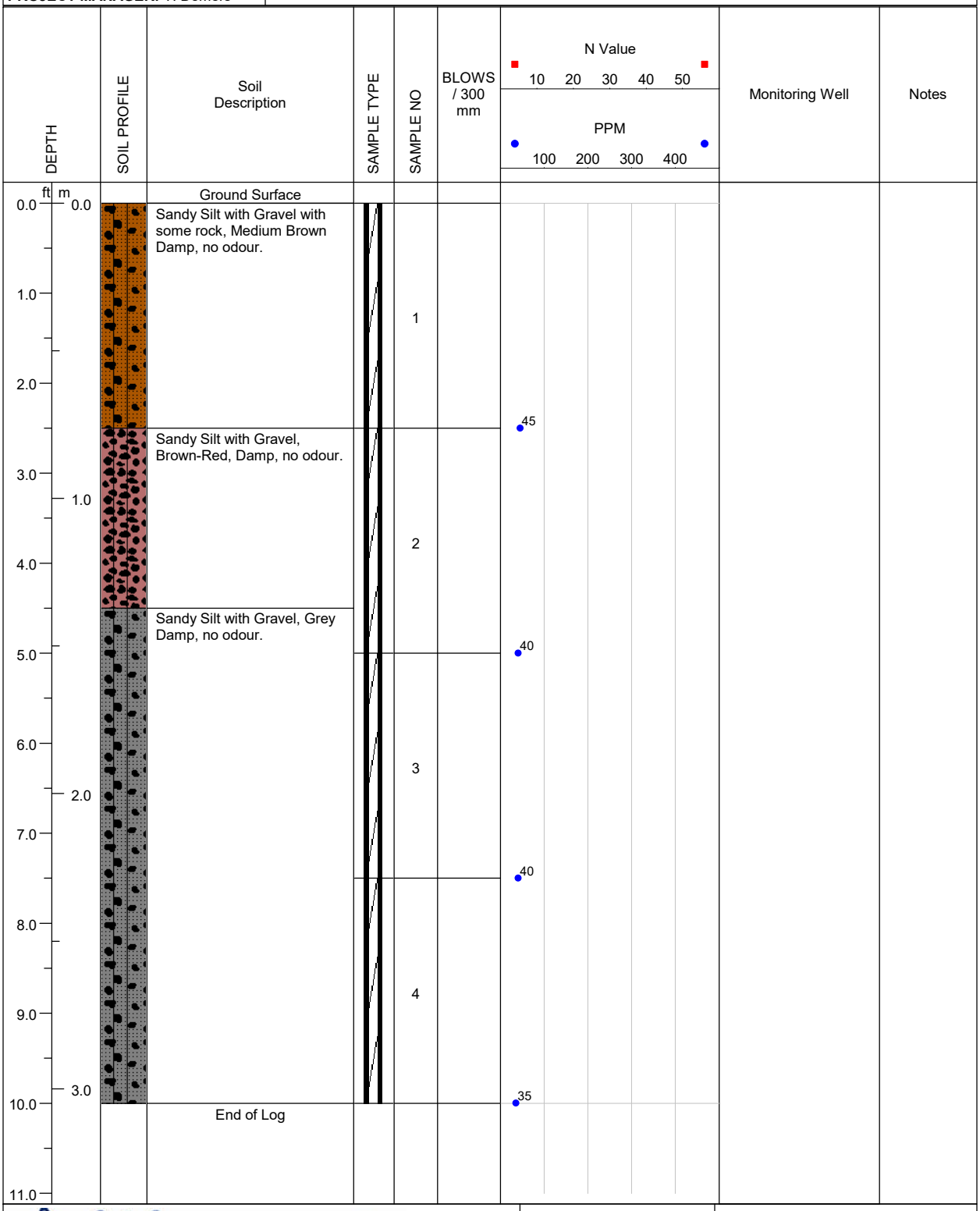
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 18m NW of S fenceline, 13m E of 25-55	**BOREHOLE NO: 25-58**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

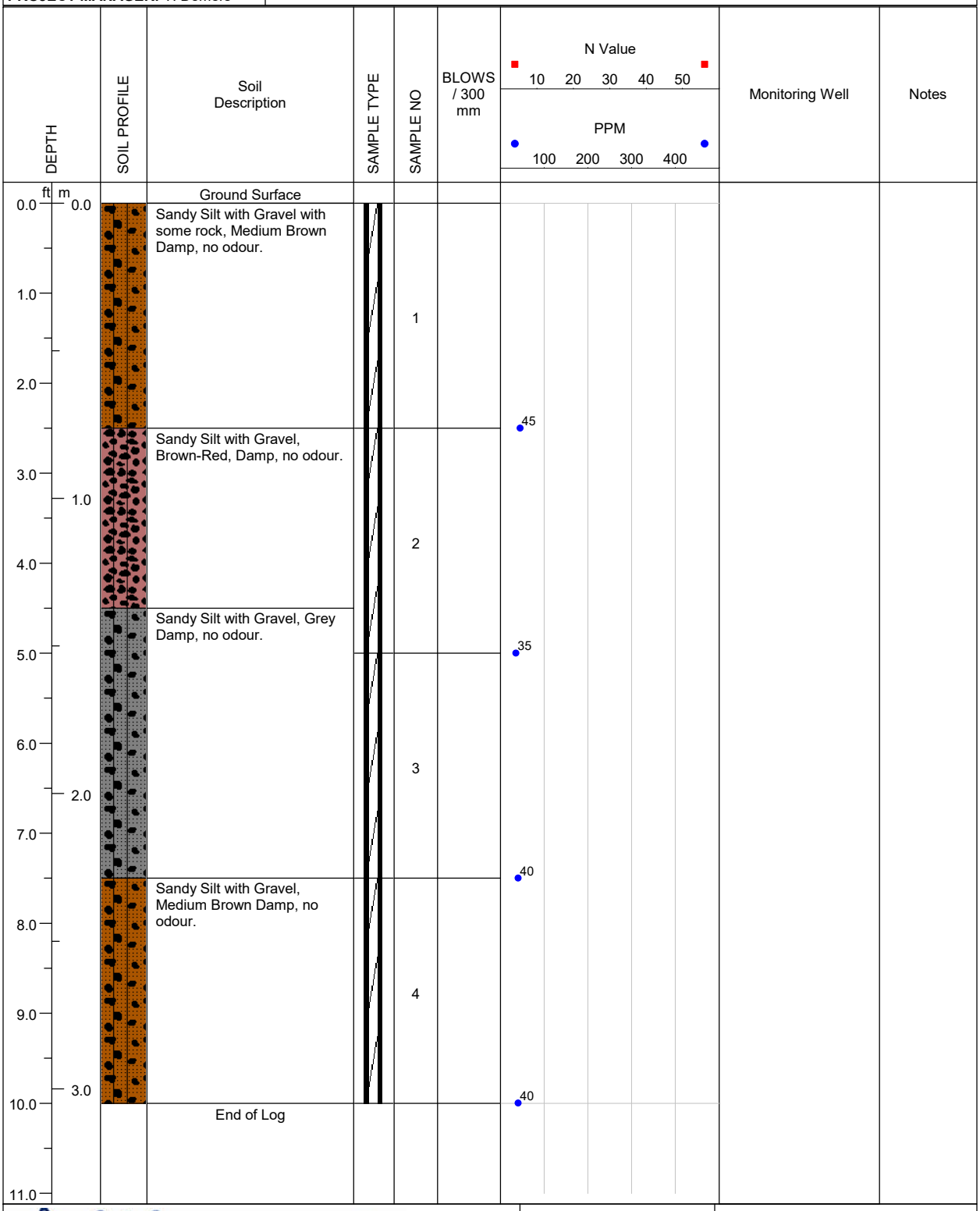
LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 31m NW of S fenceline, 13m E of 25-54	**BOREHOLE NO: 25-59**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

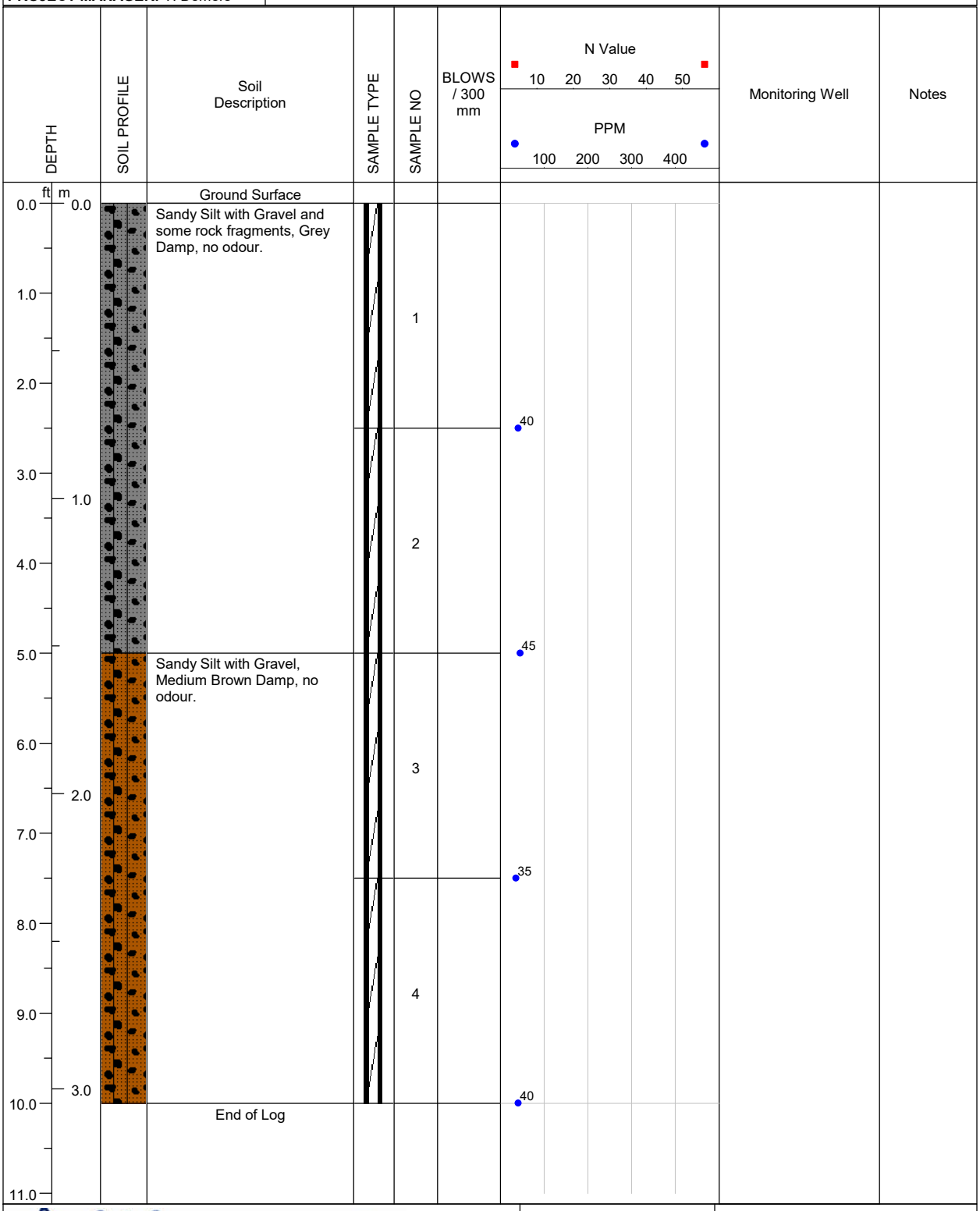
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 44m NW of S fenceline, 13m E of 25-53	**BOREHOLE NO: 25-60**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

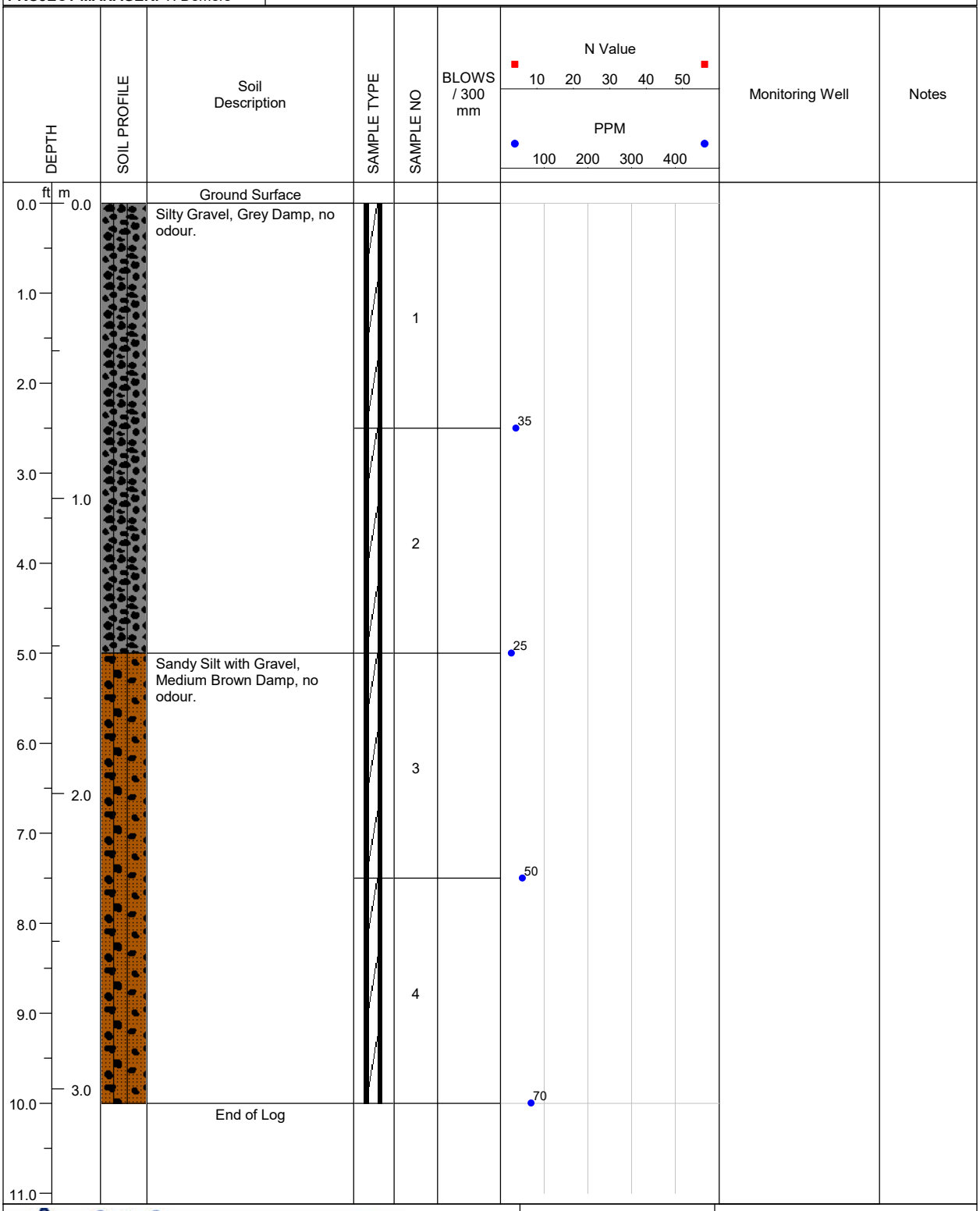
A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 44m SE of N fenceline, 13m E of 25-52	**BOREHOLE NO: 25-61**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



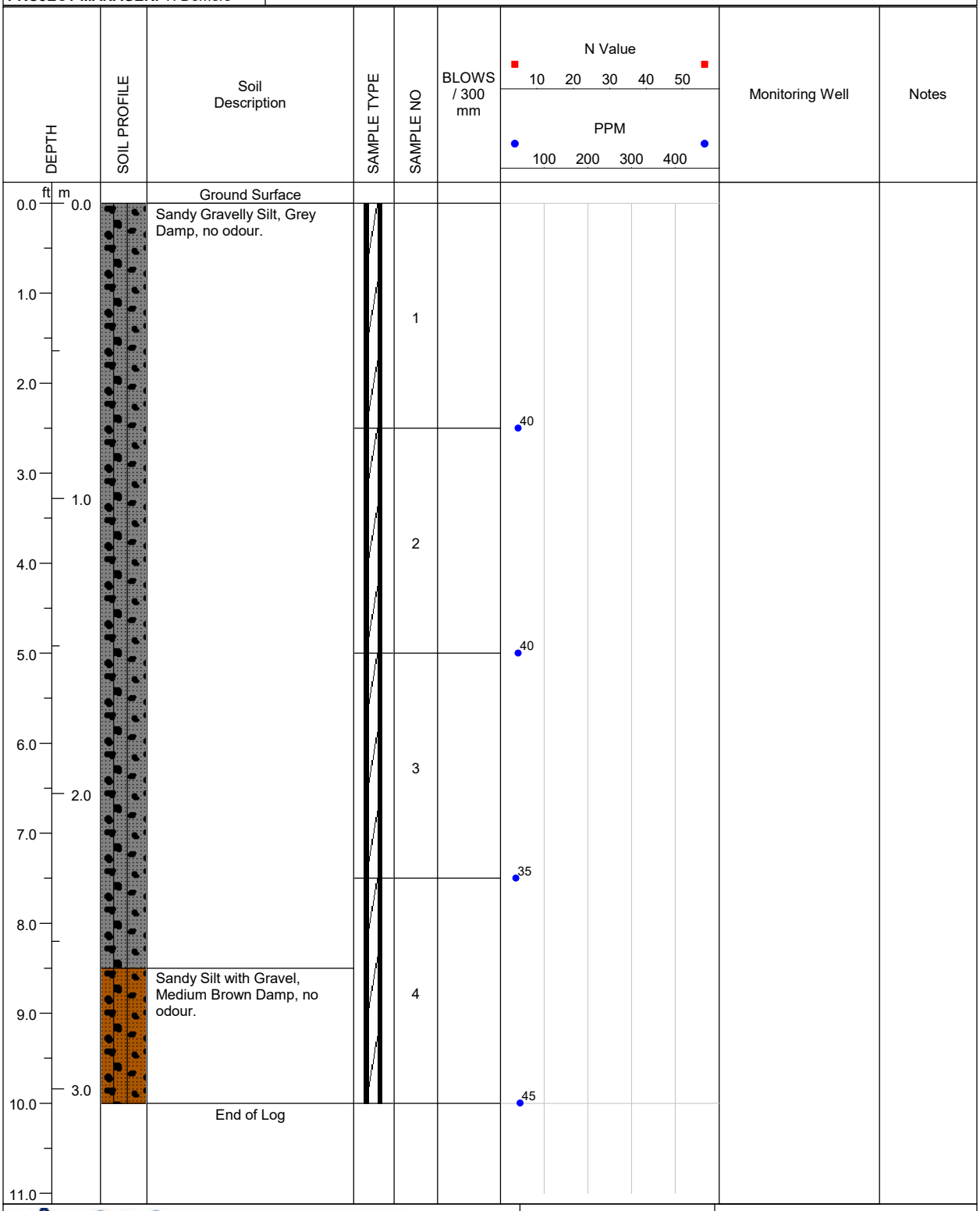
A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/17/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 31m SE of N fenceline, 13m E of 25-51	**BOREHOLE NO: 25-62**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

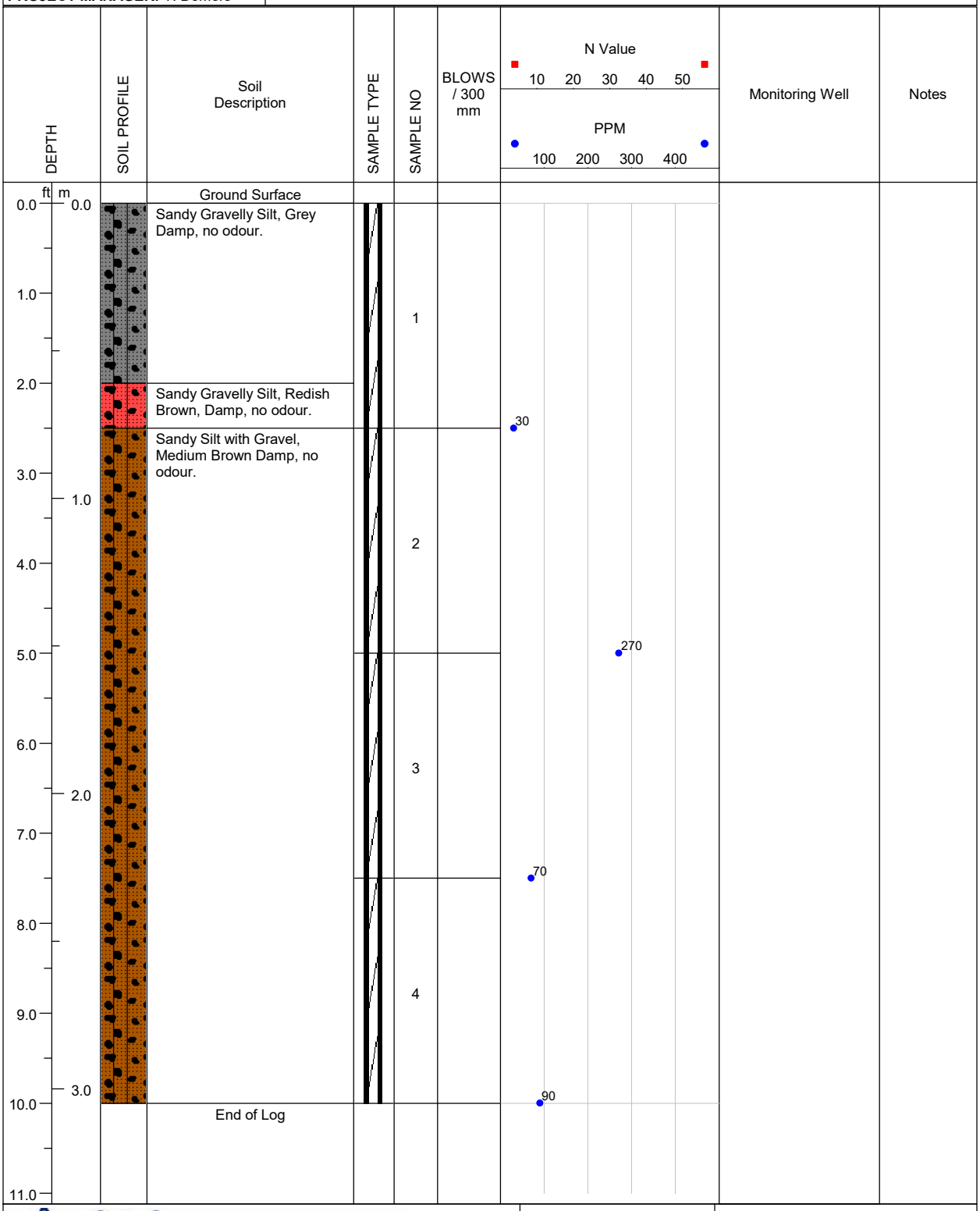
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 18m SE of N fenceline, 13m E of 25-50	**BOREHOLE NO: 25-63**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m SE of N fenceline, 13m E of 25-49	**BOREHOLE NO: 25-64**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

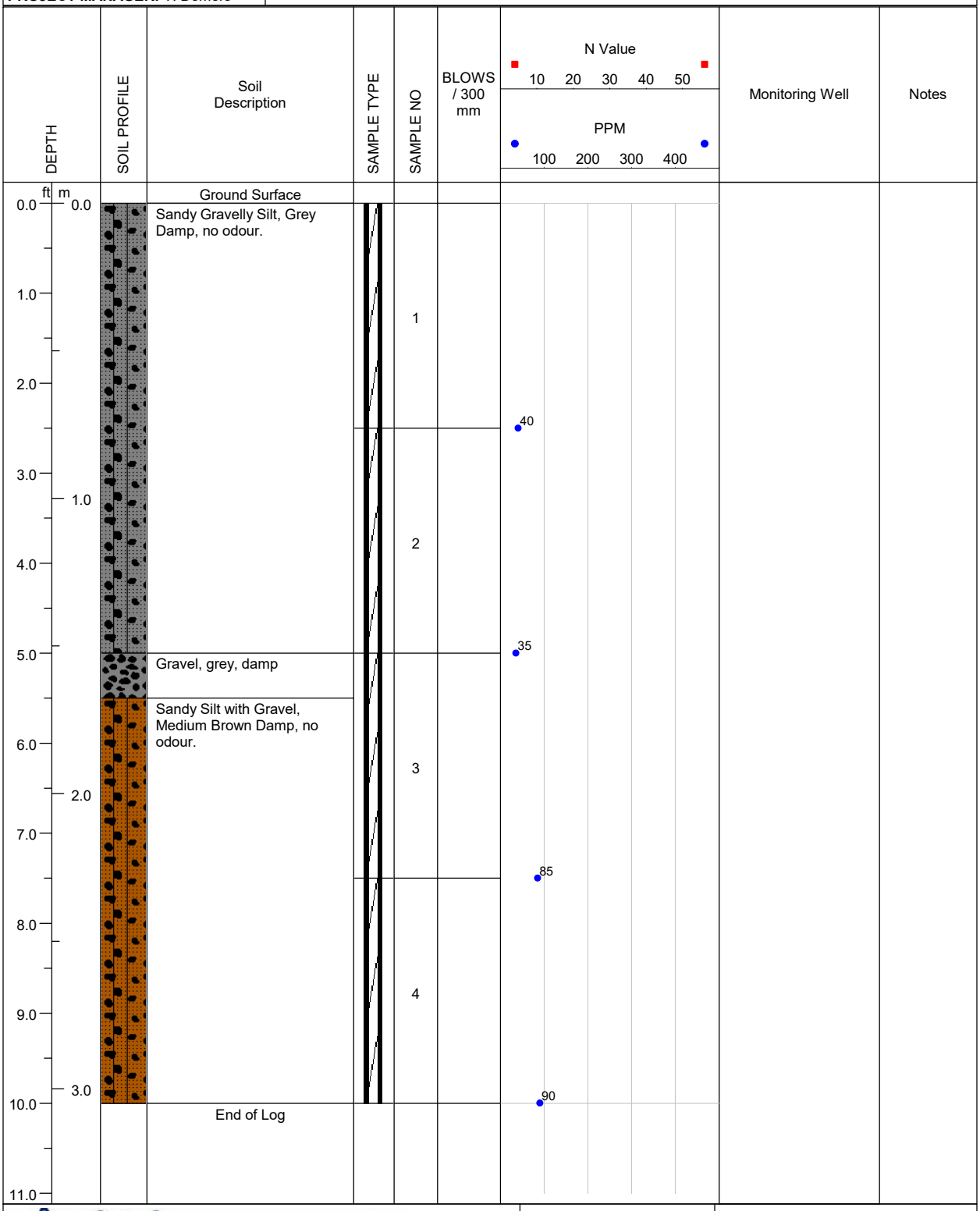
A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m SE of N fenceline, 13m E of 25-64	**BOREHOLE NO: 25-65**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	

DEPTH (ft)	DEPTH (m)	Soil Description	SAMPLE NO	BLOWS / 300 mm	N Value (10 20 30 40 50) / PPM (100 200 300 400)	Monitoring Well	Notes
0.0	0.0	Ground Surface					
0.0	0.0	Sandy Gravelly Silt, Grey Damp, no odour.	1		40		
4.5	1.4	Red Bricks, Damp, no odour.	2		40		
5.0	1.5	Sandy Silt with Bricks, Medium Brown with red, Damp, no odour.					
6.0	1.8	Sandy Silt with Gravel, Medium Brown Damp, no odour.	3		55		
			4				
10.0	3.0	End of Log			45		
11.0							

A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

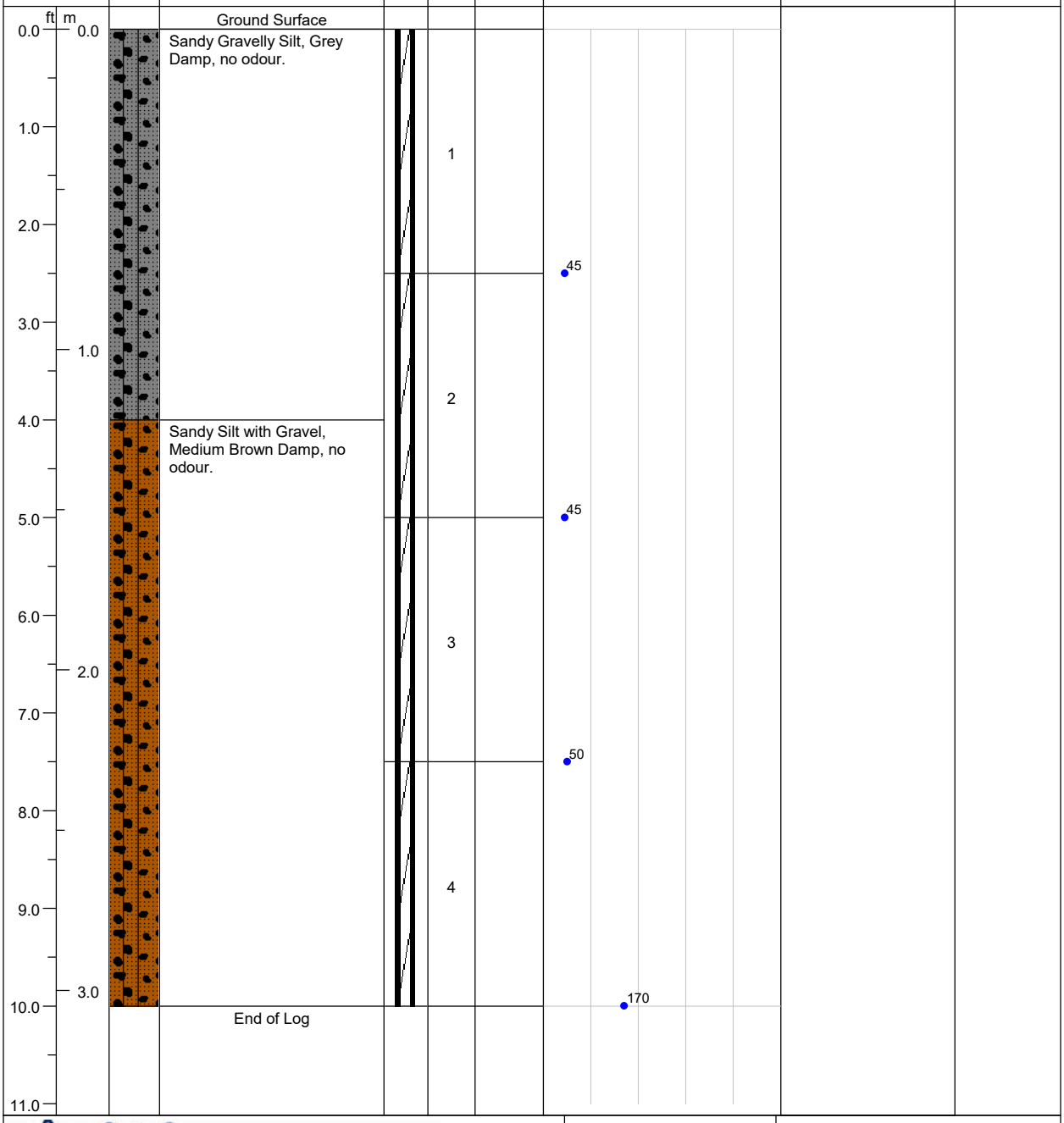
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 18m SE of N fenceline, 13m E of 25-63	**BOREHOLE NO: 25-66**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

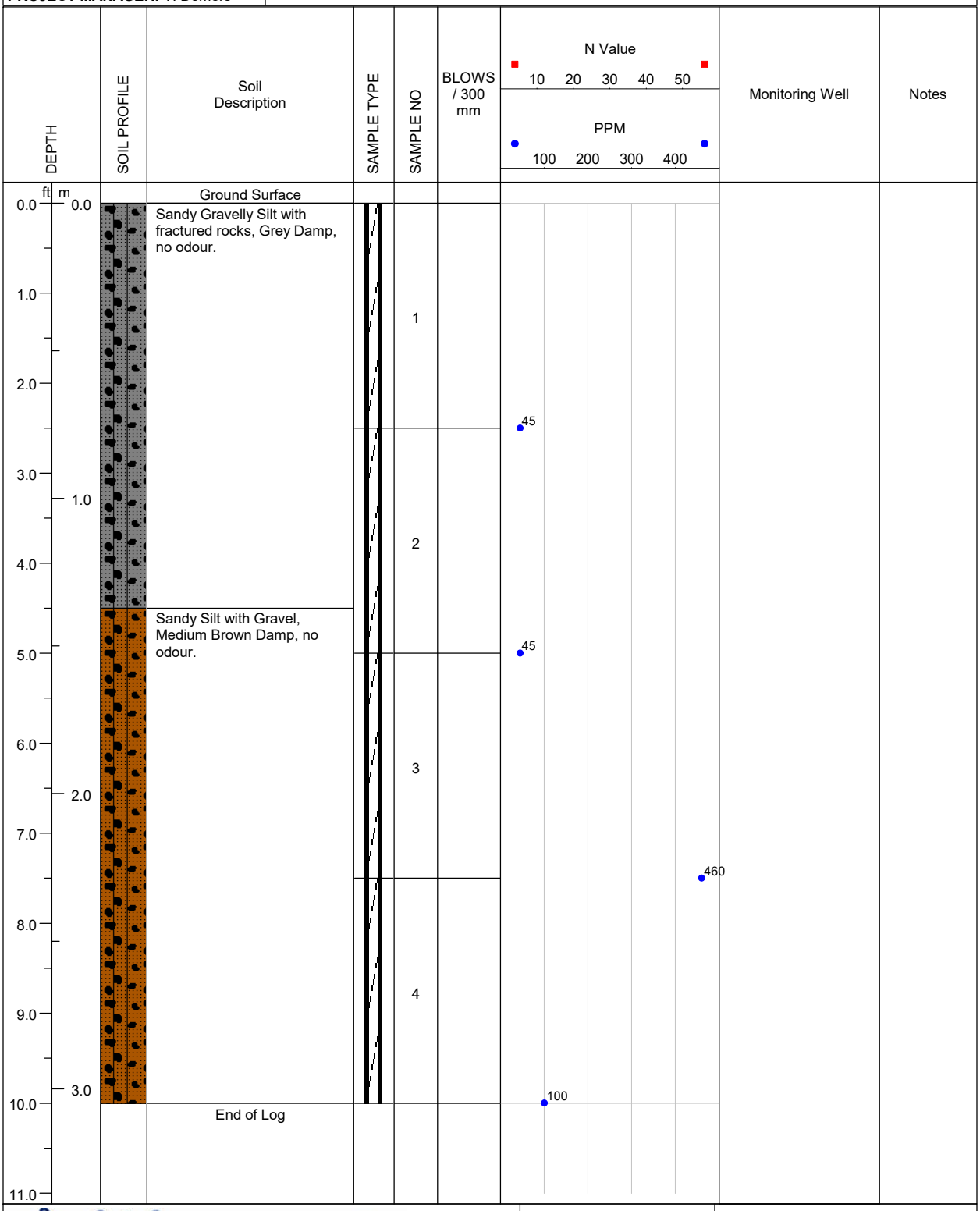
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 31m SE of N fenceline, 13m E of 25-62	**BOREHOLE NO: 25-67**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

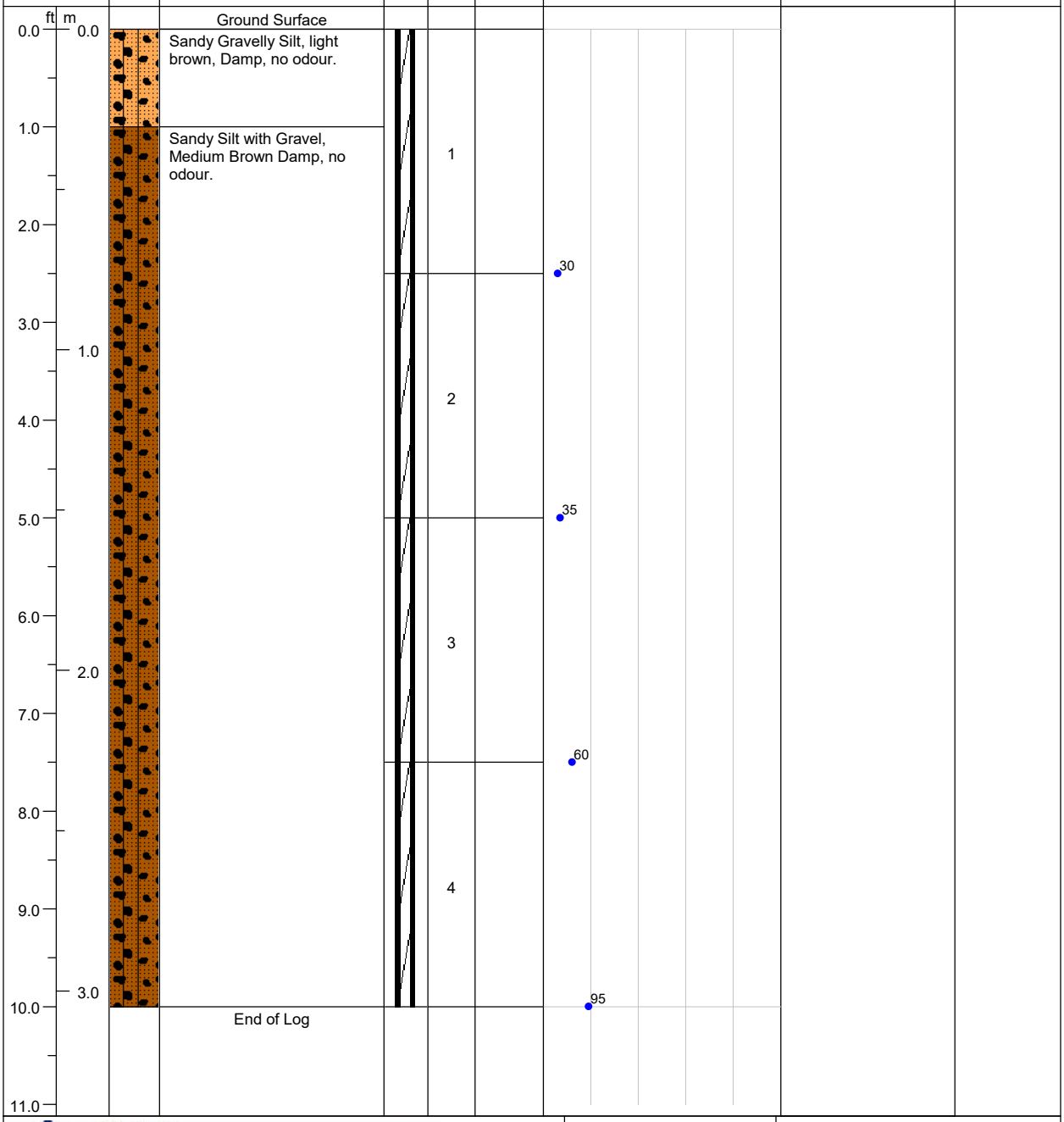
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 44m SE of N fenceline, 13m E of 25-61	**BOREHOLE NO: 25-68**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

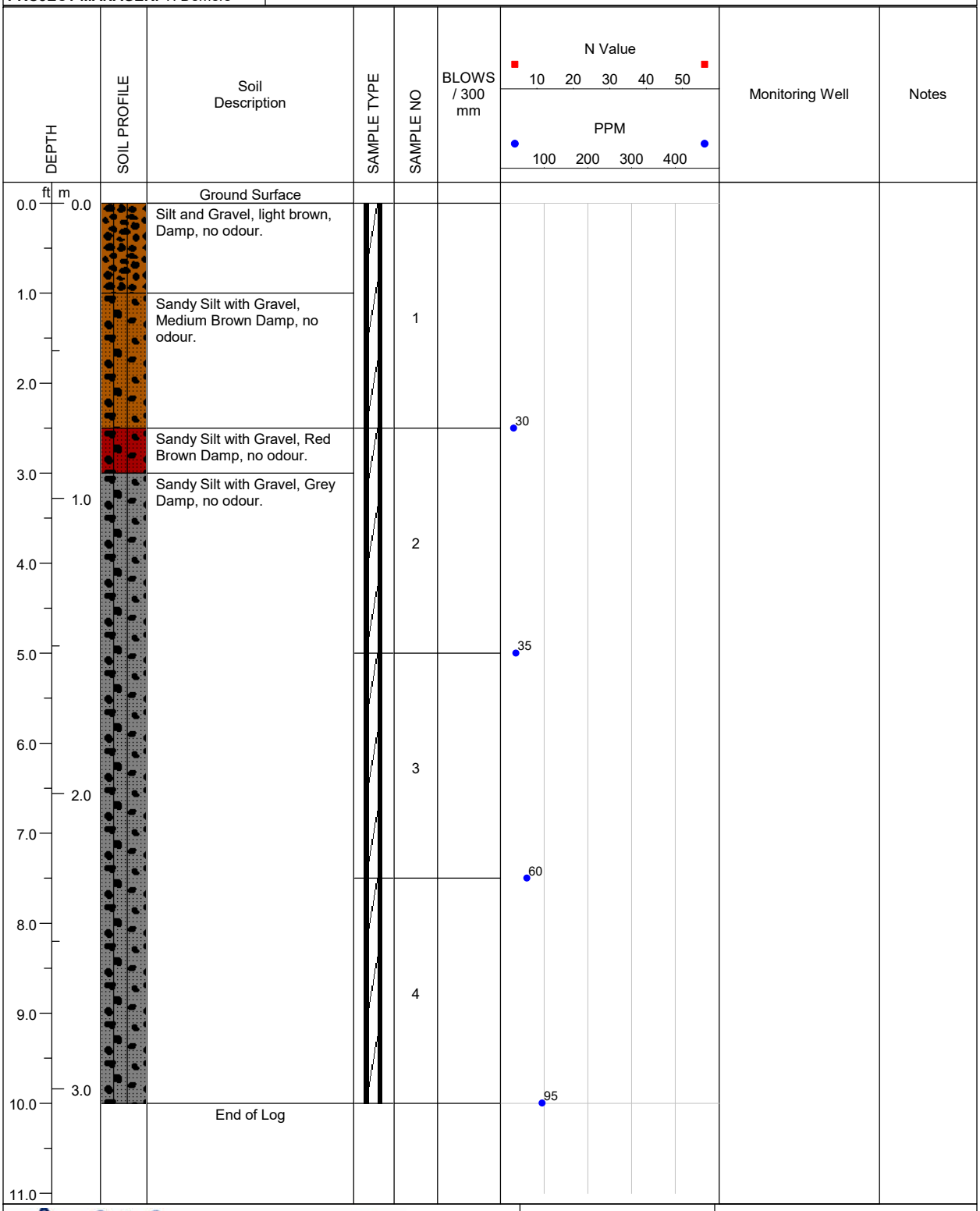
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 44m NW of S fenceline, 13m E of 25-60	**BOREHOLE NO: 25-69**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 31m NW of S fenceline, 13m E of 25-59	**BOREHOLE NO: 25-70**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 18m NW of S fenceline, 13m E of 25-58	**BOREHOLE NO: 25-71**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	

DEPTH (ft)	DEPTH (m)	Soil Description	SAMPLE NO	BLOWS / 300 mm	N Value / PPM	Monitoring Well	Notes
0.0	0.0	Ground Surface					
0.0 – 1.0	0.0 – 0.3	Silt and Gravel, light brown, Damp, no odour.					
1.0 – 2.0	0.3 – 0.6	Sandy Silt with Gravel, Red Brown Damp, no odour. Bricks	1				
2.0 – 7.5	0.6 – 2.3	Sandy Silt with Gravel, Grey Damp, no odour.	2		30		
5.0	1.5		3		40		
7.5 – 10.0	2.3 – 3.0	Sandy Silt with Gravel, Medium Brown Damp, no odour.	4		35		
10.0	3.0	End of Log			35		
11.0							

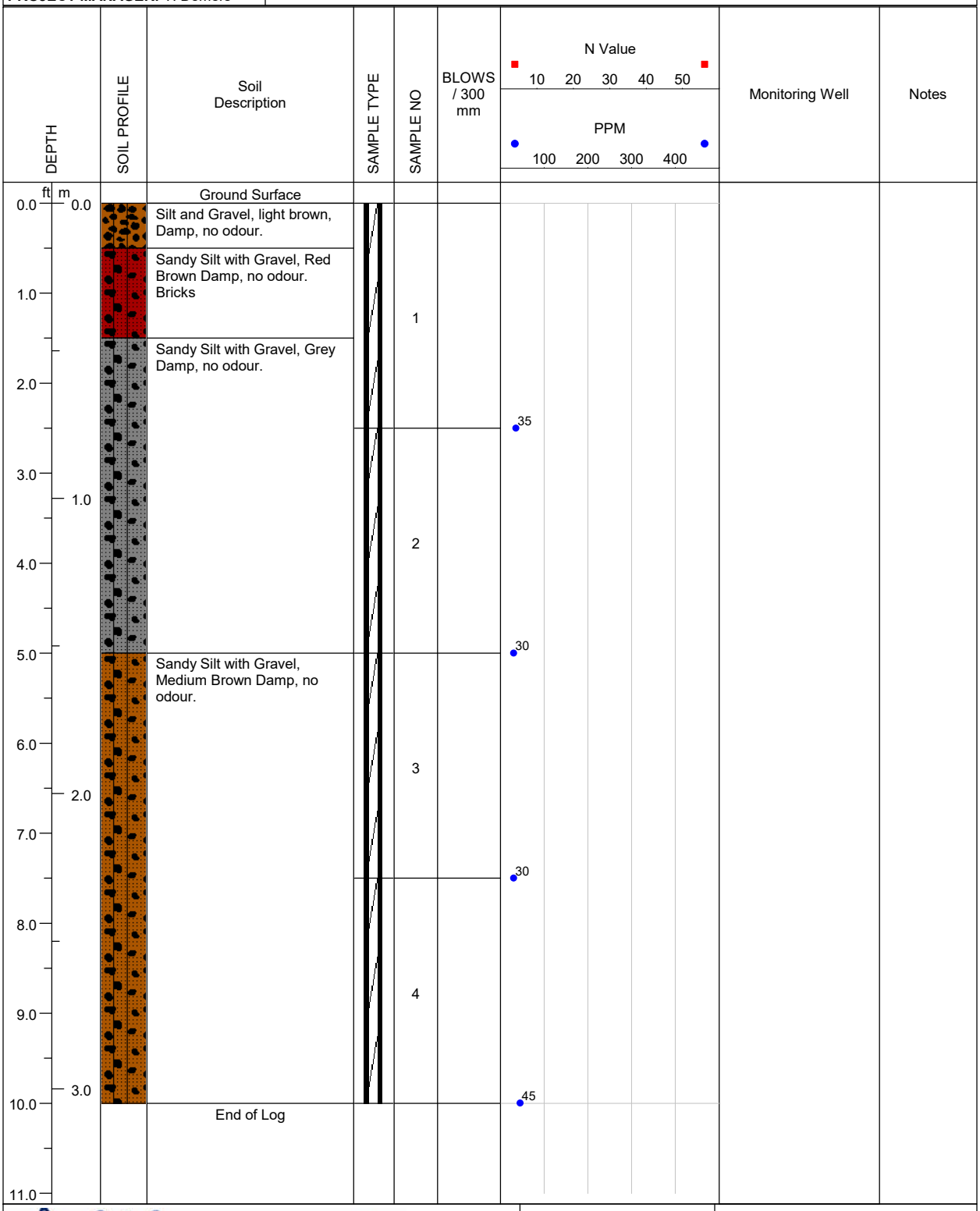
N Value: 10 20 30 40 50

PPM: 100 200 300 400

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

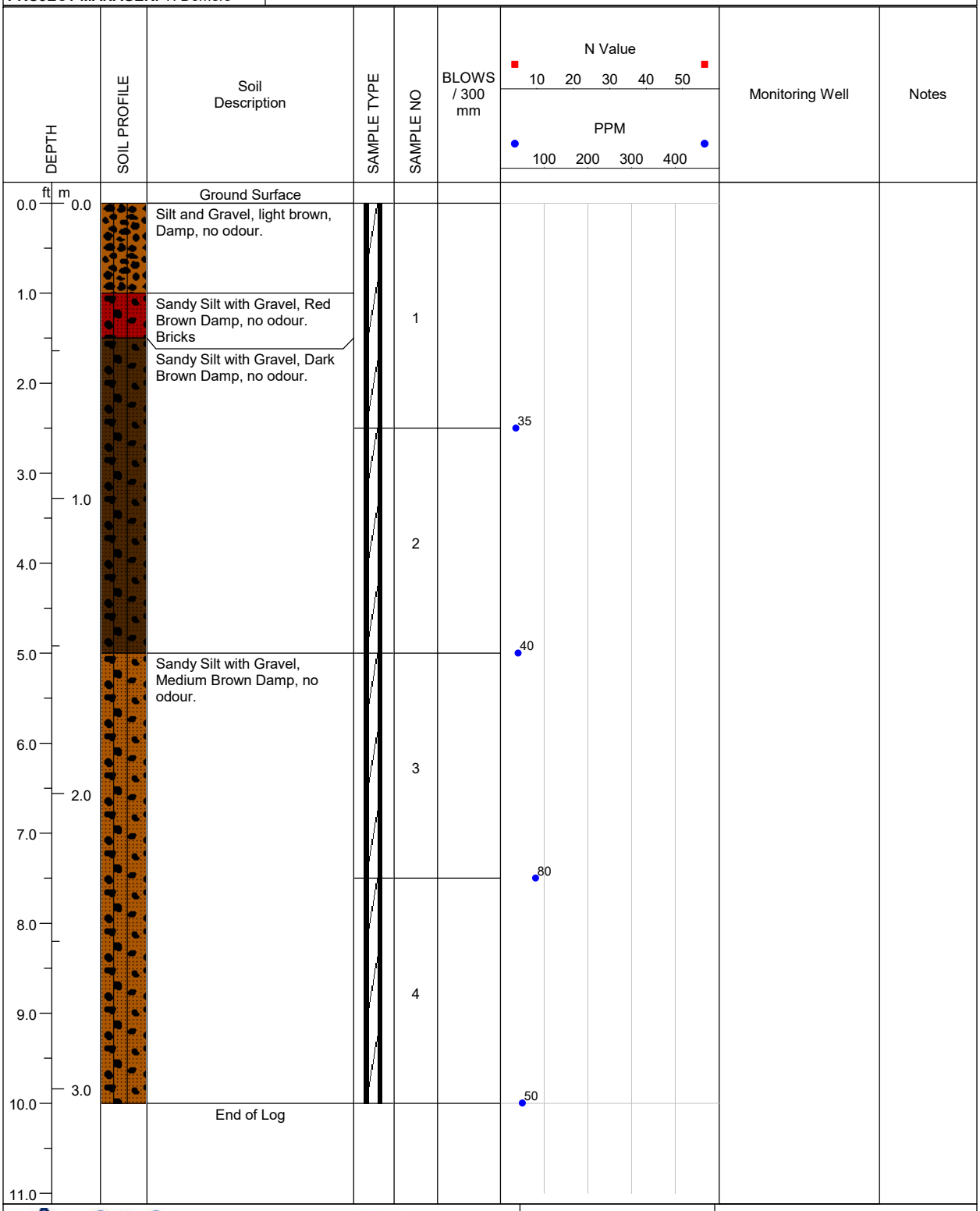
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m NW of S fenceline, 13m E of 25-57	**BOREHOLE NO: 25-72**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

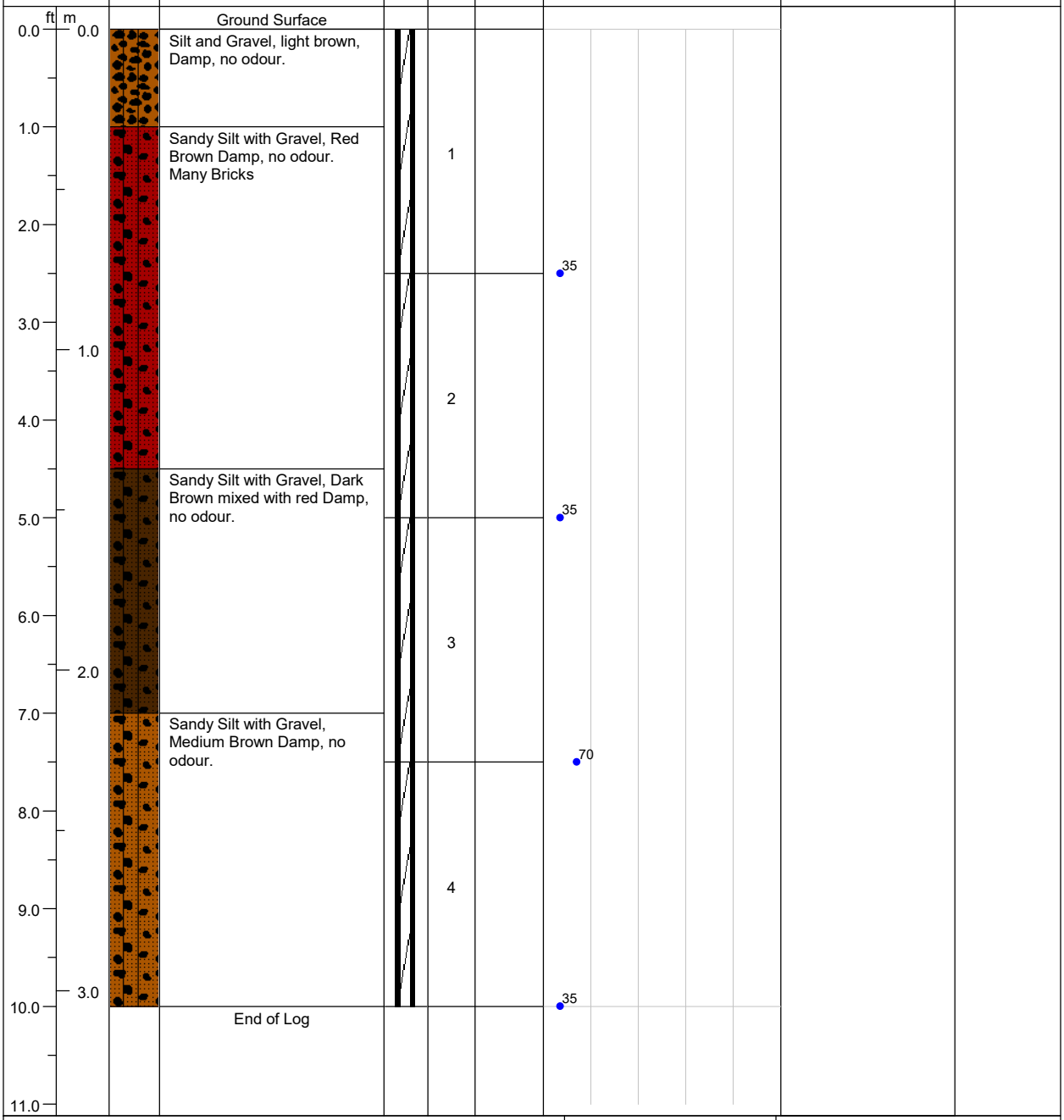
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m NW of S fenceline, 13m E of 25-72	**BOREHOLE NO: 25-73**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 13m NW of S fenceline, 13m E of 25-71	**BOREHOLE NO: 25-74**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 31m NW of S fenceline, 13m E of 25-70	**BOREHOLE NO: 25-75**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	

DEPTH (ft)	DEPTH (m)	SOIL PROFILE	Soil Description	SAMPLE TYPE	SAMPLE NO	BLOWS / 300 mm	N Value / PPM	Monitoring Well	Notes
0.0	0.0		Ground Surface						
0.0 – 1.0	0.0 – 0.3		Silt and Gravel, light brown, Damp, no odour.						
1.0 – 2.5	0.3 – 0.8		Silt and Gravel, medium brown, Damp, no odour.		1				
2.5 – 4.5	0.8 – 1.4		Sandy Silt with Gravel, medium brown Damp, no odour.		2		50		
4.5 – 7.5	1.4 – 2.3		Sandy Silt with Gravel, Medium Brown Moist to saturated, no odour.		3		45		
7.5 – 10.0	2.3 – 3.0				4		70		
10.0	3.0		End of Log				45		
11.0									

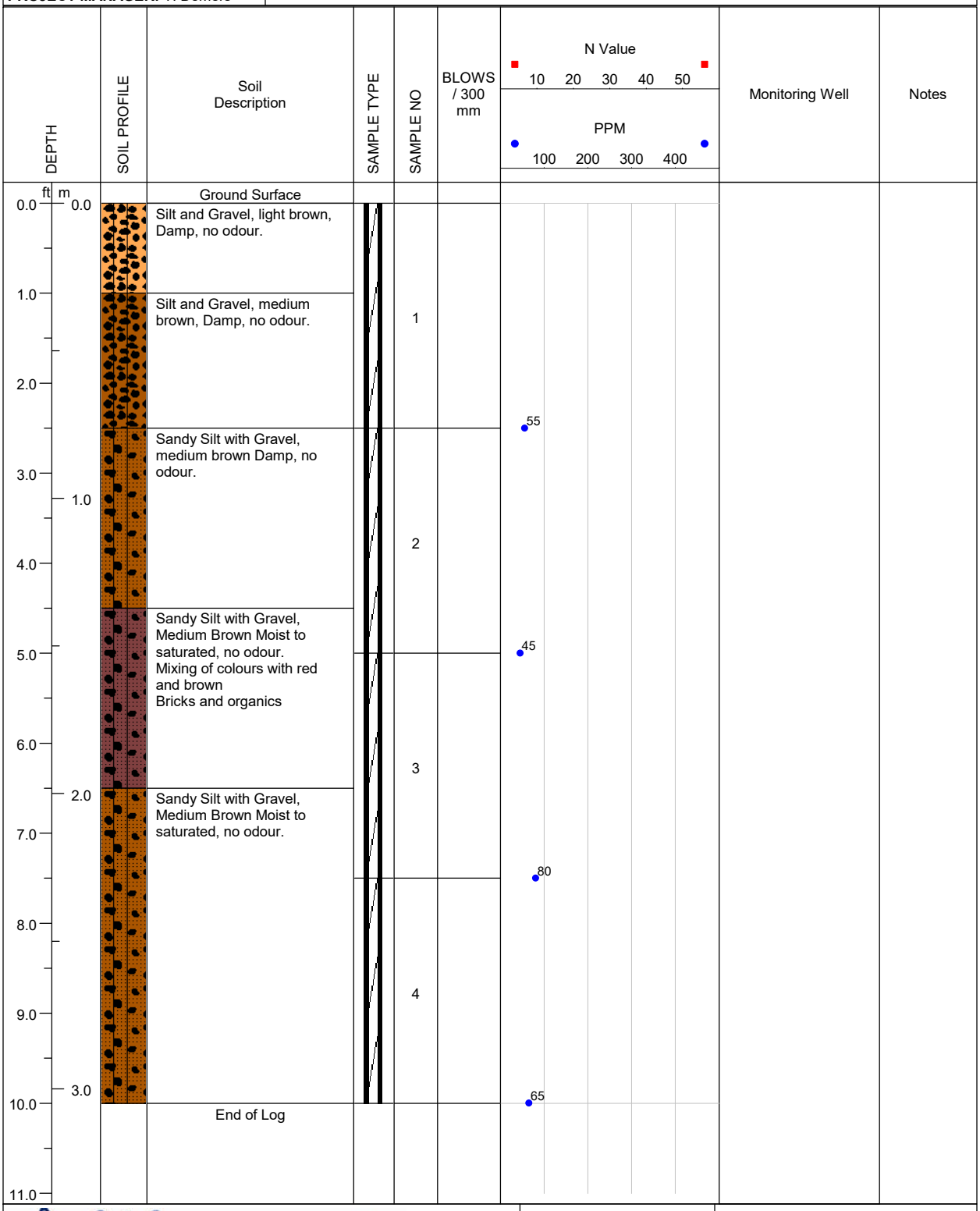
N Value: 10 20 30 40 50

PPM: 100 200 300 400

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

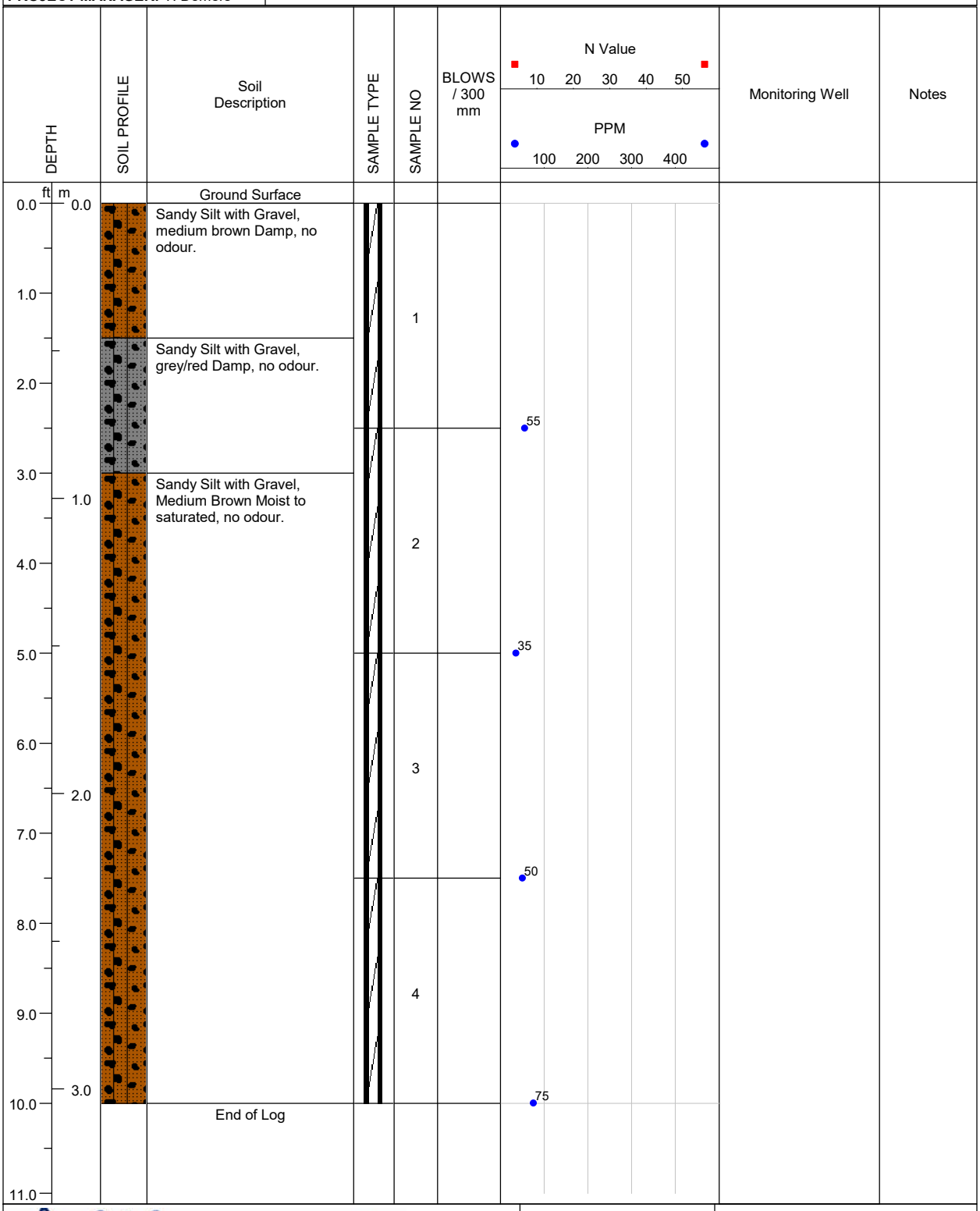
LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 44m NW of S fenceline, 13m E of 25-69	**BOREHOLE NO: 25-76**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



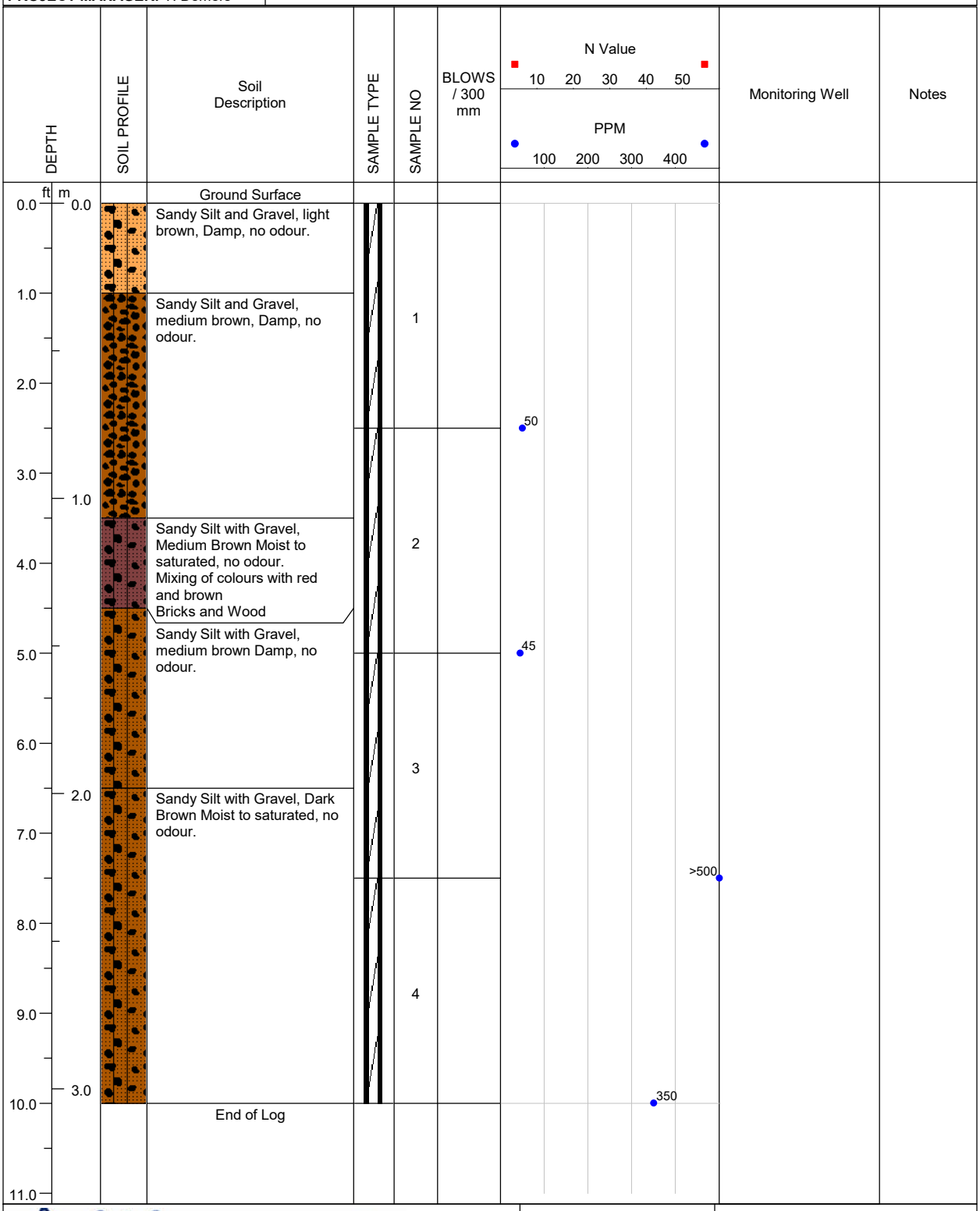
A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 44m SE of N fenceline, 13m E of 25-68	**BOREHOLE NO: 25-77**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



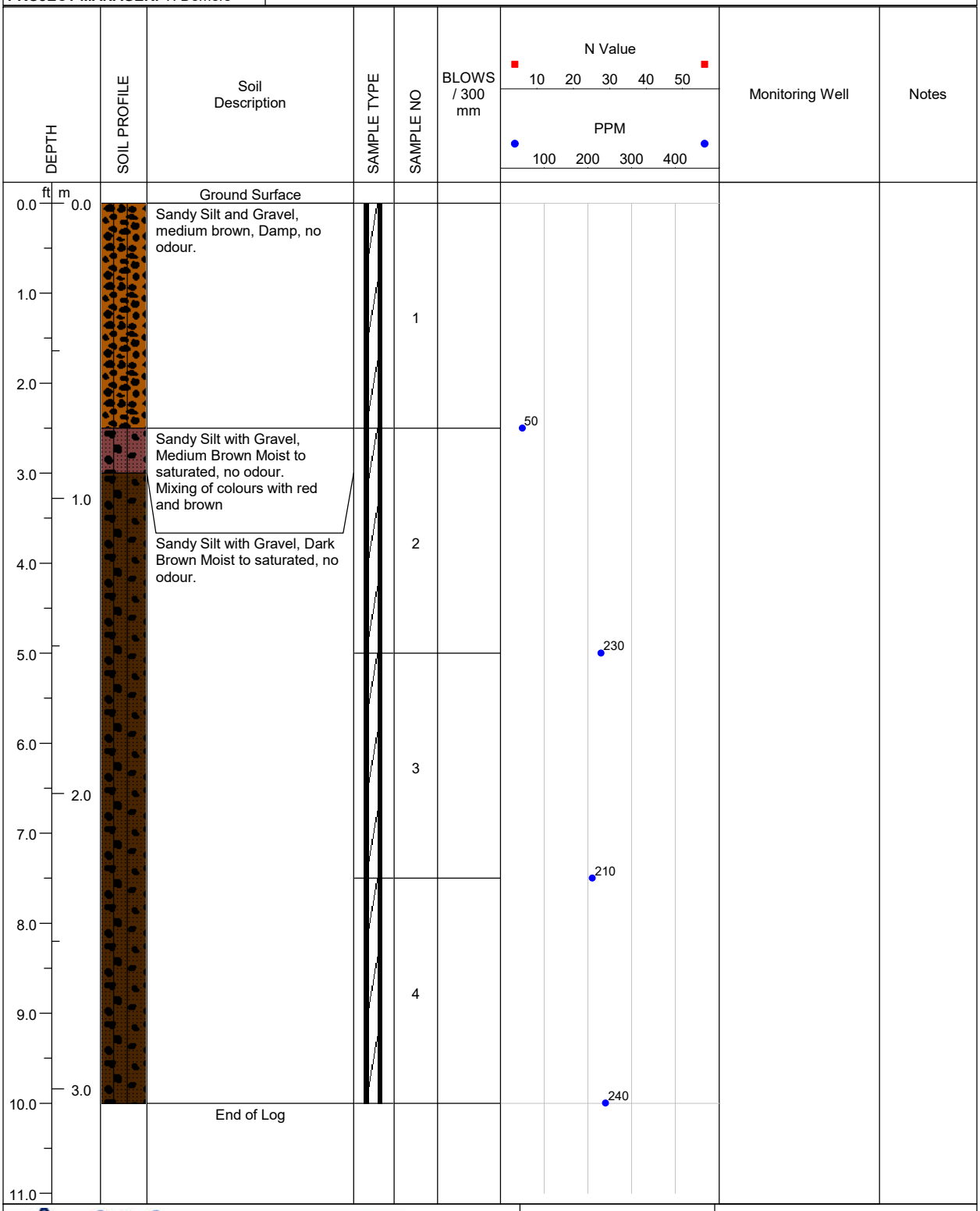
A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 31m SE of N fenceline, 13m E of 25-67	**BOREHOLE NO: 25-78**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

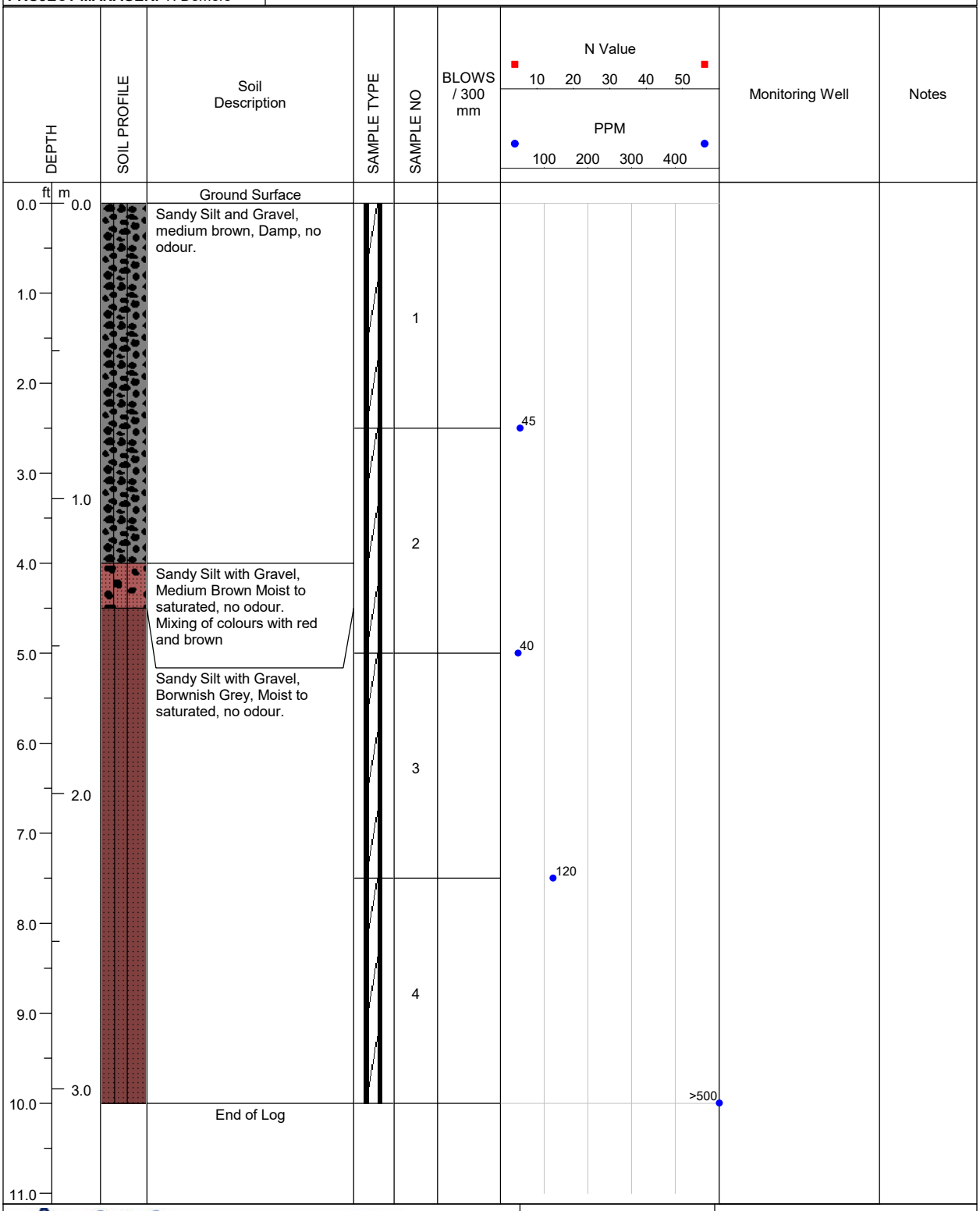
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 18m SE of N fenceline, 13m E of 25-66	**BOREHOLE NO: 25-79**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

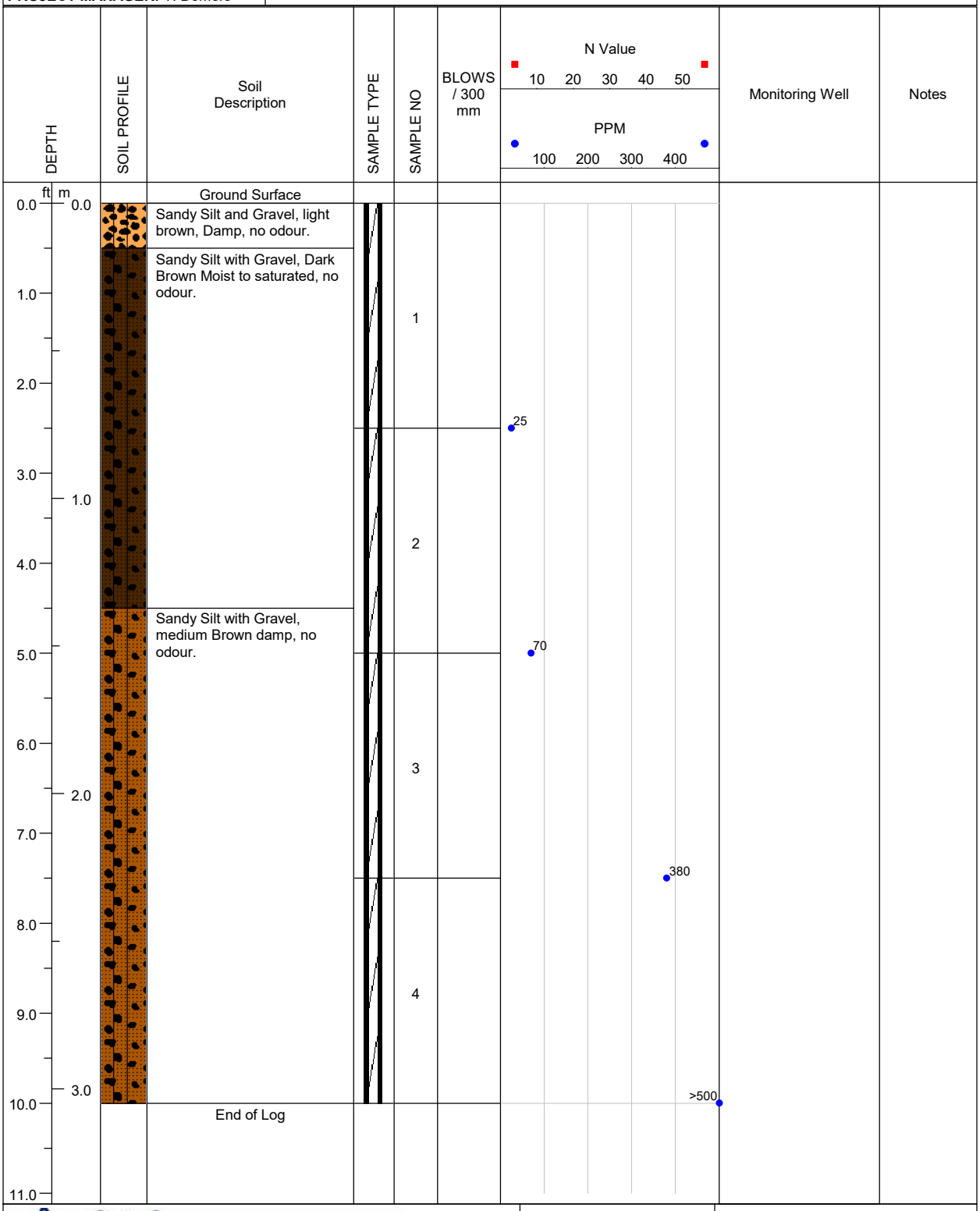
PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m SE of N fenceline, 13m E of 25-65	**BOREHOLE NO: 25-80**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/20/2025	**PAGE:** 1 of 1

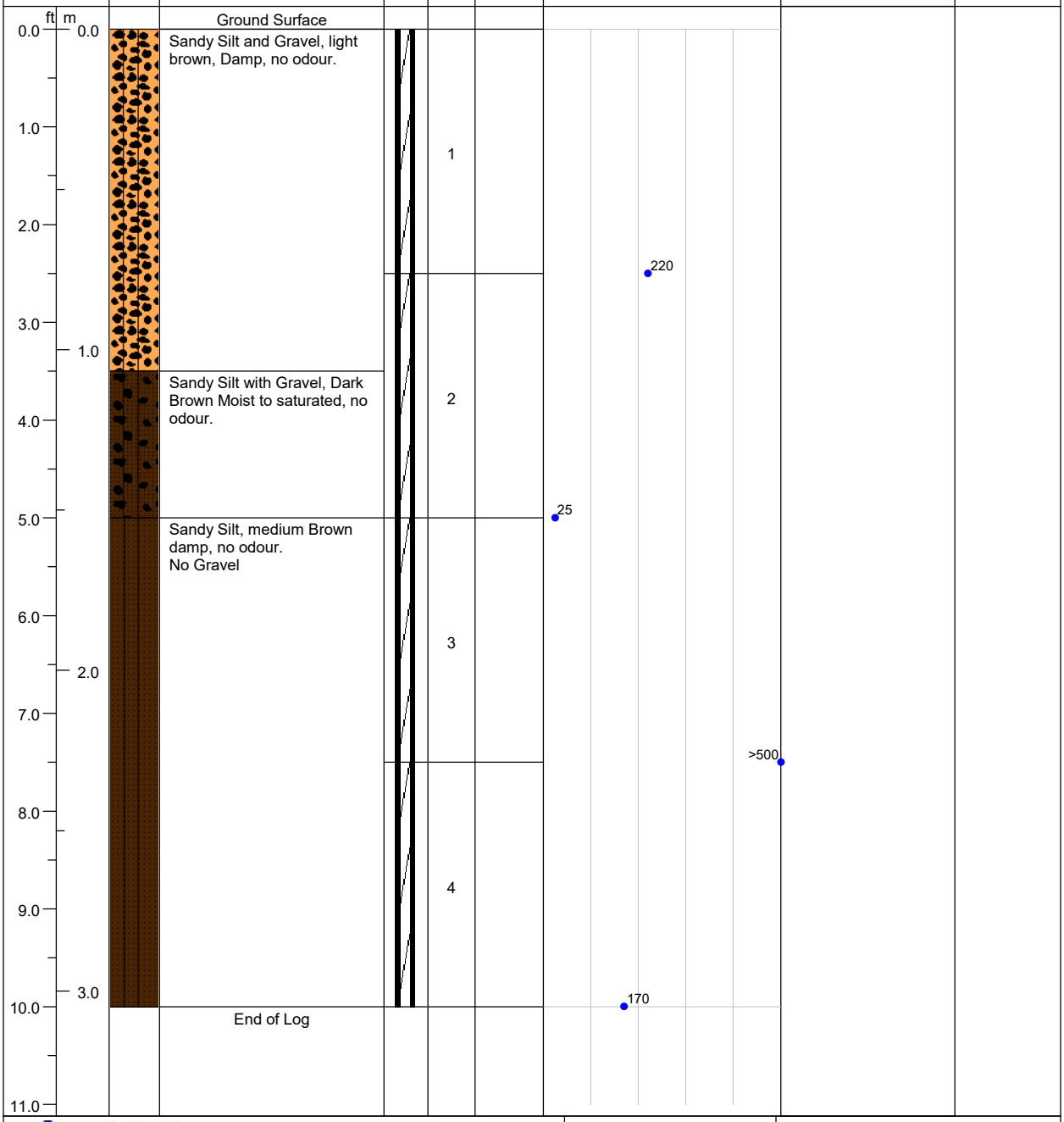
A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m SE of N fenceline, 13m E of 25-80	**BOREHOLE NO: 25-81**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/21/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 18m SE of N fenceline, 13m E of 25-79	**BOREHOLE NO: 25-82**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/21/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 31m SE of N fenceline, 13m E of 25-78	**BOREHOLE NO: 25-83**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	

DEPTH (ft)	DEPTH (m)	Soil Description	SAMPLE NO	BLOWS / 300 mm	N Value / PPM	Monitoring Well	Notes
0.0	0.0	Ground Surface					
0.0	0.0	Sandy Silt and Gravel, light brown, Damp, no odour.					
1.0		Sandy Silt and Gravel, brownish red, Damp, no odour.	1				
2.0		Sandy Silt with Gravel, Medium Brown damp, no odour.			35		
3.0	1.0		2				
4.0					50		
5.0		Sandy Silt and Gravel, dark brown damp, no odour.					
6.0			3				
7.0	2.0				>500		
8.0			4				
9.0							
10.0	3.0	End of Log			220		
11.0							

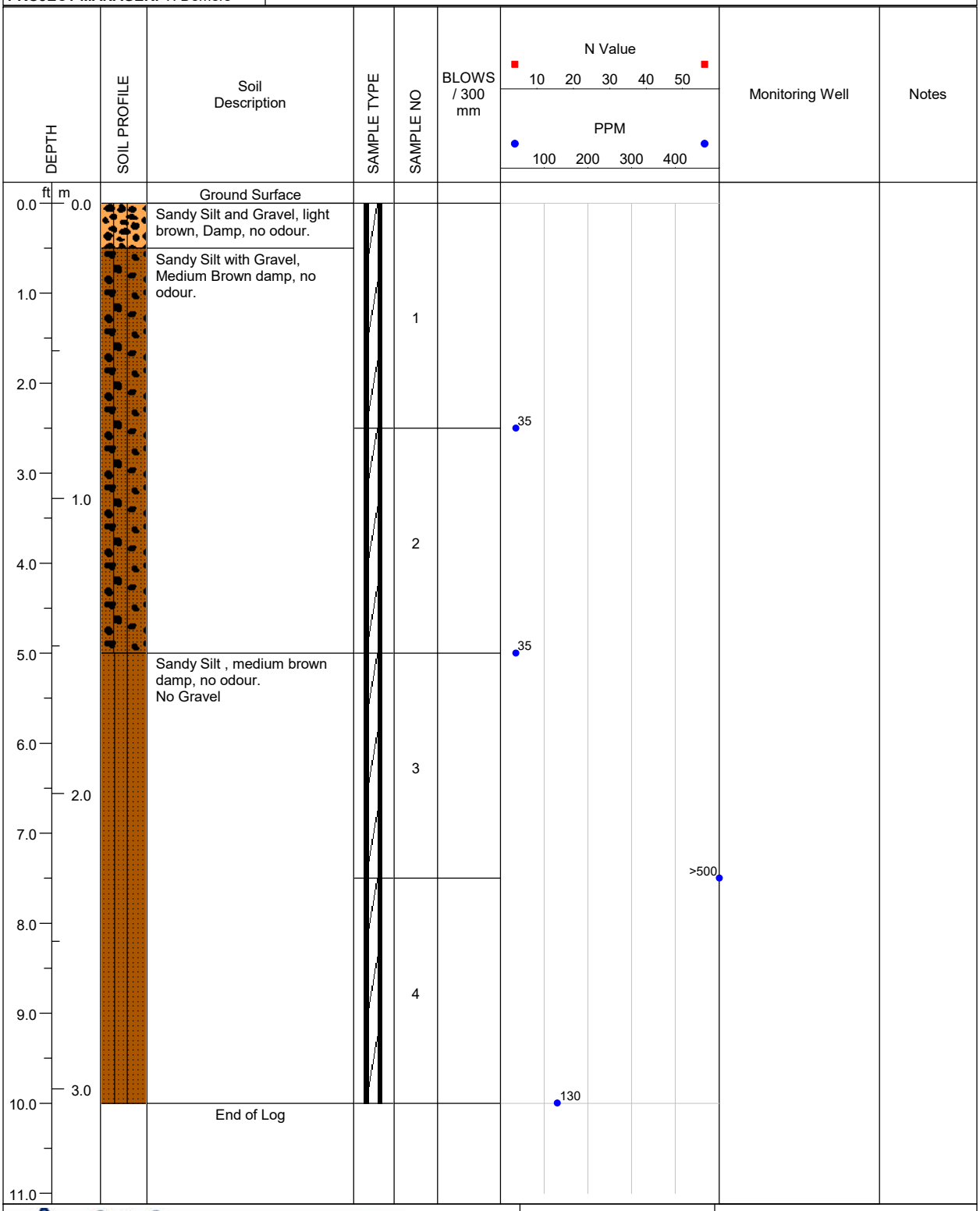
N Value: 10 20 30 40 50

PPM: 100 200 300 400

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

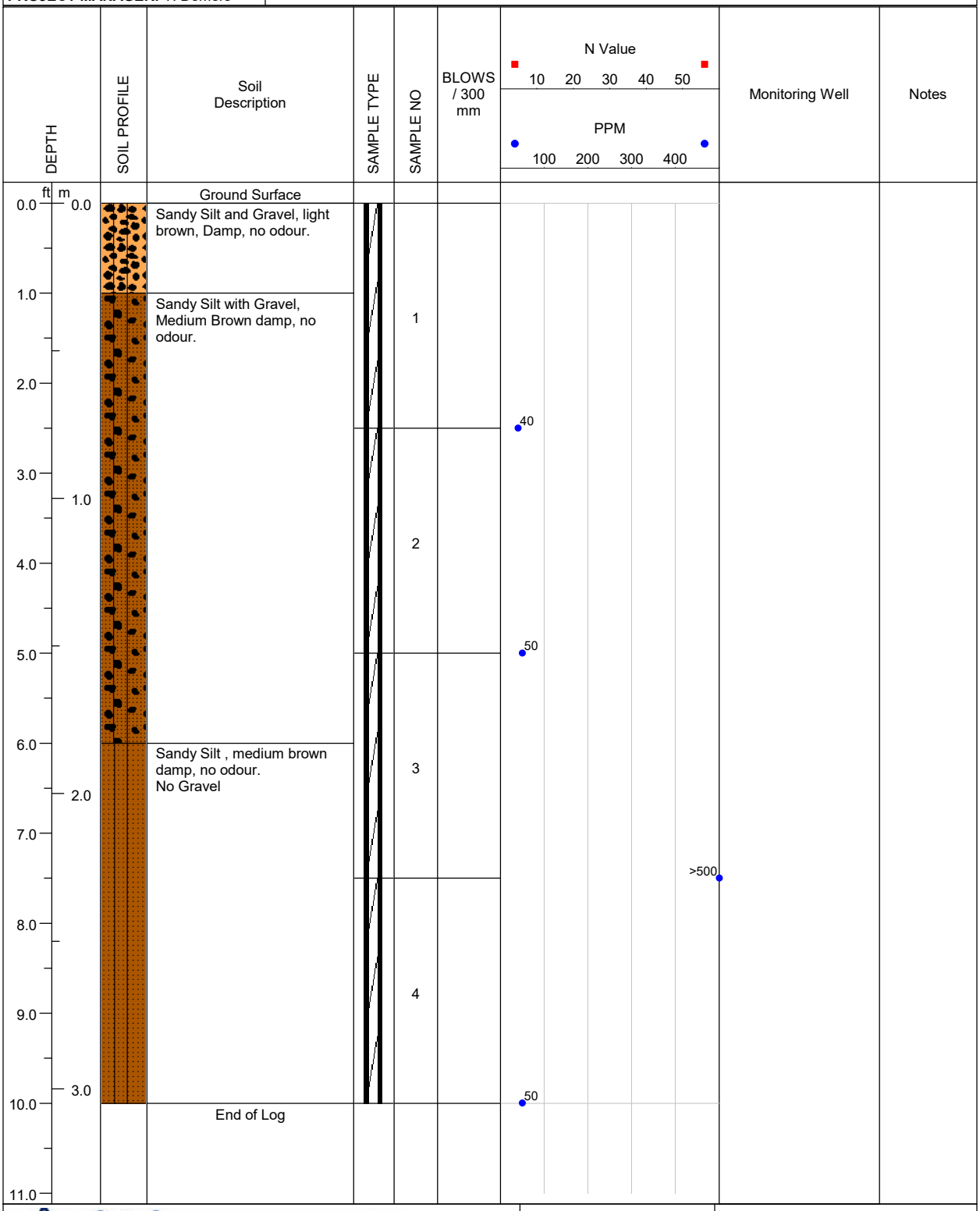
LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/21/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 44m SE of N fenceline, 13m E of 25-77	**BOREHOLE NO: 25-84**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



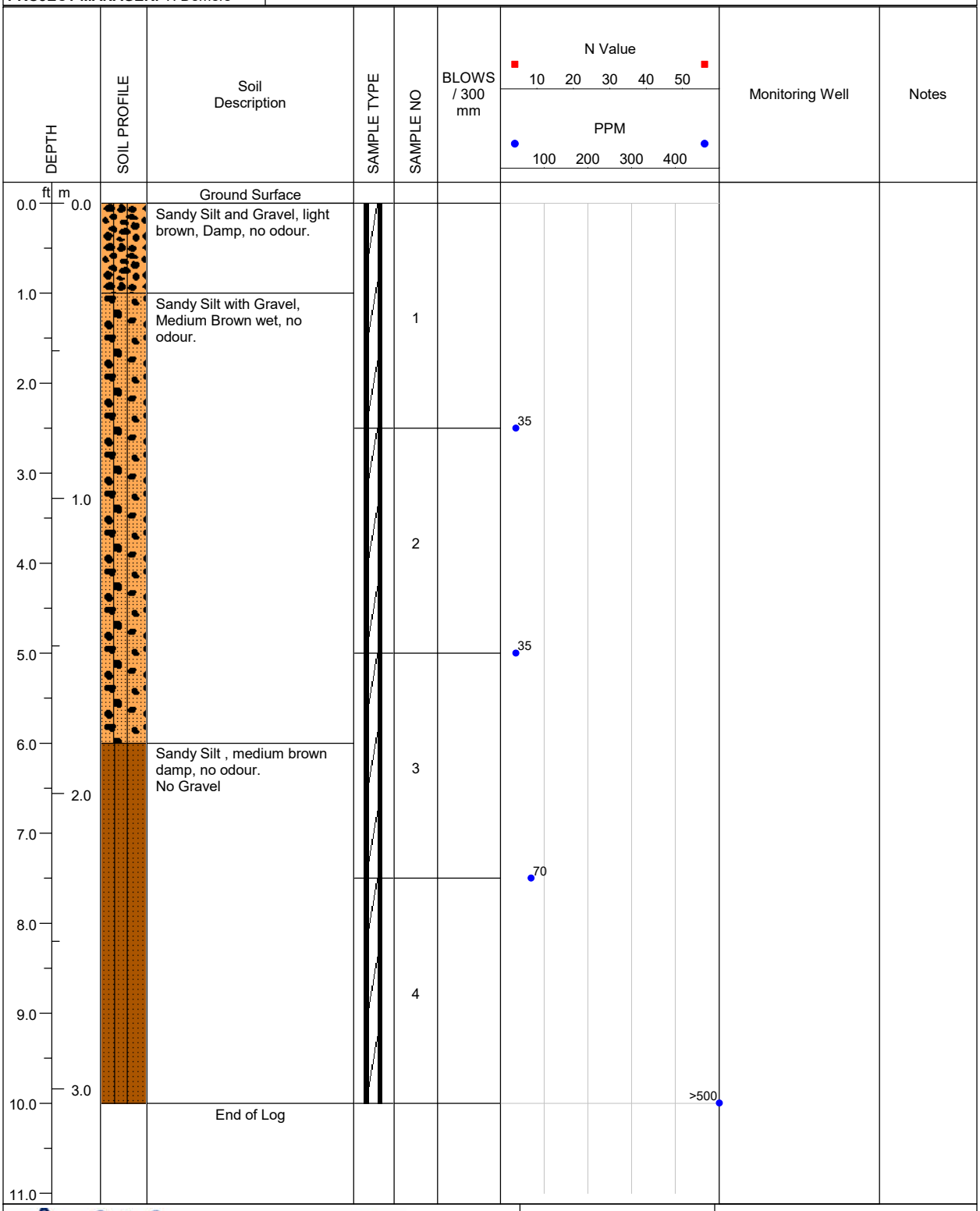
A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/21/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 44m NW of S fenceline, 13m E of 25-76	**BOREHOLE NO: 25-85**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC. 16 Young Street Woodstock, ON	**LOGGED BY:** E. Fulsom	**COMPLETION DEPTH:** 10ft.
	REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
	DRILL DATE: 01/21/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 31m NW of S fenceline, 13m E of 25-75	**BOREHOLE NO: 25-86**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/21/2025	**PAGE:** 1 of 1

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 18m NW of S fenceline, 13m E of 25-74	**BOREHOLE NO: 25-87**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	

DEPTH (ft)	DEPTH (m)	Soil Description	SAMPLE NO	BLOWS / 300 mm	N Value / PPM	Monitoring Well	Notes
0.0	0.0	Ground Surface					
0.0 – 3.0	0.0 – 1.0	Sandy Silt and Gravel, light brown with some grey, Damp, no odour.	1		40		
3.0 – 4.0	1.0	Red Bricks, some silt and sand with gravel, damp rock fractures	2		40		
4.0 – 10.0	1.0 – 3.0	Sandy Silt and Gravel, brown with some red, Damp, no odour.	3		45		
8.0 – 10.0	2.0 – 3.0	Sandy Silt , medium brown damp, no odour. No Gravel	4		70		
10.0	3.0	End of Log					

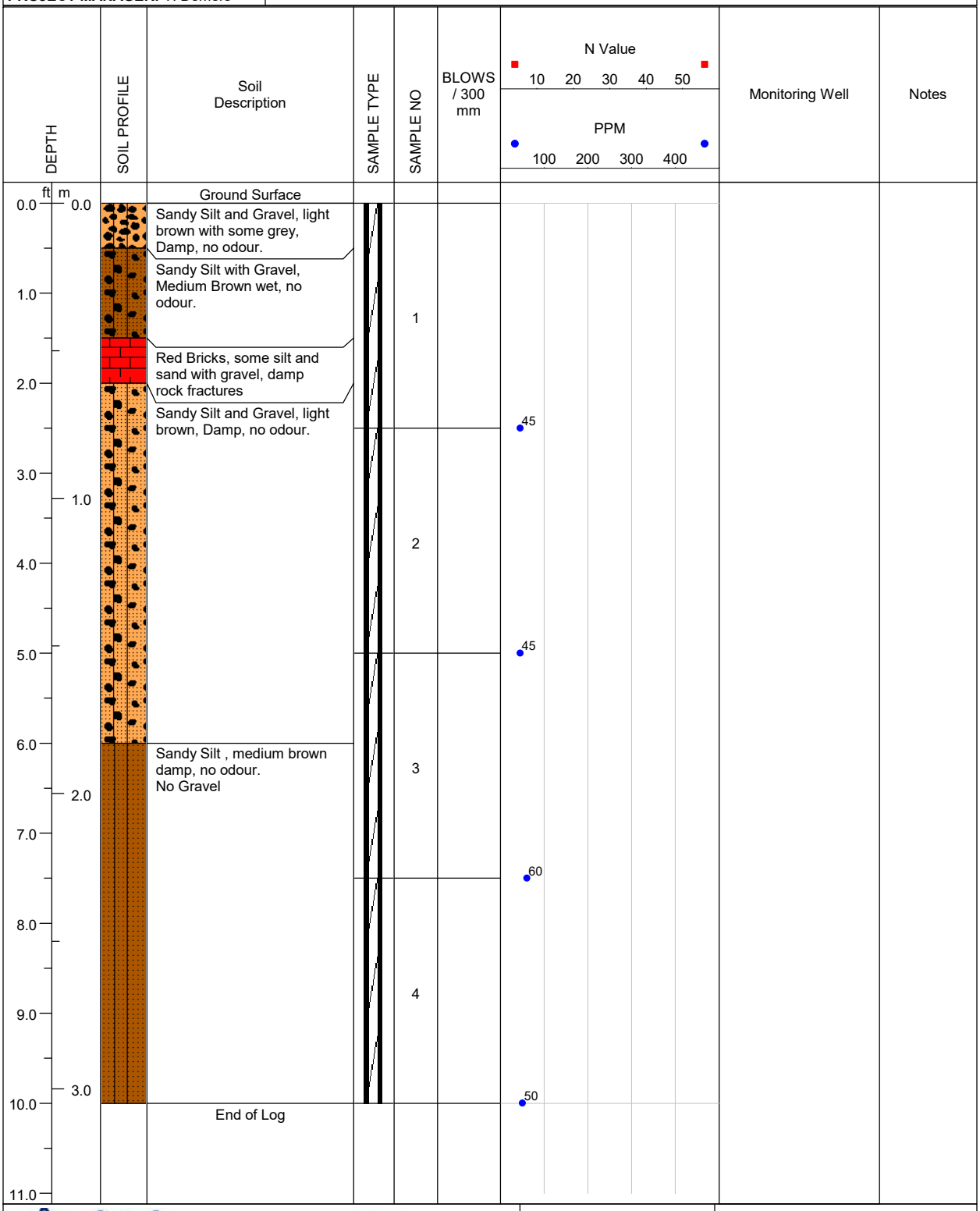
N Value: 10 20 30 40 50

PPM: 100 200 300 400

A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/21/2025	**PAGE:** 1 of 1

PROJECT: BVD Puslinch Delineation	**BH LOCATION:** 5m NW of S fenceline, 13m E of 25-73	**BOREHOLE NO: 25-88**
PROJECT NO: 8368	**LOCATION:** 7504 McLean Road, Puslinch	
PROJECT MANAGER: T. Demers	**COMPANY NAME: A&A Environmental Consultants Inc.**	



A & A ENVIRONMENTAL CONSULTANTS INC.
16 Young Street Woodstock, ON

LOGGED BY: E. Fulsom	**COMPLETION DEPTH:** 10ft.
REVIEWED BY: A.Rasoul	**DRILL METHOD:** Direct Push
DRILL DATE: 01/21/2025	**PAGE:** 1 of 1

APPENDIX D – Certificates of Analysis

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
16 Young Street
WOODSTOCK, ON N4S3L4
(519) 266-4680

ATTENTION TO: Ali Rasoul

PROJECT: 8368 BVD Puslinch

AGAT WORK ORDER: 24T166367

SOIL ANALYSIS REVIEWED BY: Sukhwinder Randhawa, Inorganic Team Lead

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Jul 03, 2024

PAGES (INCLUDING COVER): 13

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 24T166367

PROJECT: 8368 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 Mclean Rd.,Puslinch

SAMPLED BY:E.F.

O. Reg. 153(511) - Metals (Including Hydrides) (Soil)

DATE RECEIVED: 2024-06-25 **DATE REPORTED: 2024-07-03**

		SAMPLE DESCRIPTION:		BH1@0-2.5	BH2@0-2.5	BH3@2.5-5	BH3@5-7.5	BH4@2.5-5	BH5@0-2.5	DUP BH
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2024-06-24	2024-06-24	2024-06-24	2024-06-24	2024-06-24	2024-06-24	2024-06-24
Parameter	Unit	G / S	RDL	5960149	5960154	5960155	5960157	5960158	5960159	5960160
Antimony	µg/g	40	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	7	6	5	6	5	<1	7
Barium	µg/g	670	2.0	186	104	64.3	64.7	32.0	<2.0	171
Beryllium	µg/g	8	0.5	0.9	0.6	0.5	0.6	<0.5	<0.5	0.8
Boron	µg/g	120	5	24	10	7	6	8	<5	21
Cadmium	µg/g	1.9	0.5	<0.5	<0.5	<0.5	0.6	0.6	<0.5	<0.5
Chromium	µg/g	160	5	29	23	15	16	12	<5	27
Cobalt	µg/g	80	0.8	12.9	5.8	6.2	6.6	4.6	<0.8	13.0
Copper	µg/g	230	1.0	23.4	32.8	19.5	21.2	18.8	<1.0	23.9
Lead	µg/g	120	1	15	45	44	54	36	<1	15
Molybdenum	µg/g	40	0.5	1.4	1.3	<0.5	<0.5	0.5	<0.5	1.4
Nickel	µg/g	270	1	29	15	13	14	10	<1	29
Selenium	µg/g	5.5	0.8	1.9	1.3	2.1	2.0	1.4	<0.8	1.7
Silver	µg/g	40	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	3.3	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	33	0.50	0.79	0.65	0.54	0.55	<0.50	<0.50	0.77
Vanadium	µg/g	86	2.0	34.6	26.9	27.1	26.1	19.3	<2.0	33.7
Zinc	µg/g	340	5	69	203	174	268	237	<5	67

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Soil - Industrial/Commercial/Community Property Use - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 24T166367

PROJECT: 8368 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 Mclean Rd.,Puslinch

SAMPLED BY:E.F.

O. Reg. 153(511) - ORPs (Soil)

DATE RECEIVED: 2024-06-25 **DATE REPORTED: 2024-07-03**

		SAMPLE DESCRIPTION:		BH1@0-2.5	BH2@0-2.5	BH3@2.5-5	BH3@5-7.5	BH4@2.5-5	BH5@0-2.5	DUP BH
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2024-06-24	2024-06-24	2024-06-24	2024-06-24	2024-06-24	2024-06-24	2024-06-24
Parameter	Unit	G / S	RDL	5960149	5960154	5960155	5960157	5960158	5960159	5960160
Electrical Conductivity (2:1)	mS/cm	1.4	0.005	0.248	0.601	0.826	0.259	0.199	0.276	0.220
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	12	N/A	0.712	0.524	0.377	0.226	0.485	0.680	0.544

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Soil - Industrial/Commercial/Community Property Use - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5960149-5960160 EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract obtained from 2:1 leaching procedure (2 parts extraction fluid:1 part wet soil). SAR is a calculated parameter.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

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AGAT WORK ORDER: 24T166367

PROJECT: 8368 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 Mclean Rd.,Puslinch

SAMPLED BY:E.F.

O. Reg. 153(511) - PHCs F1 - F4 (with VOC) (Soil)

DATE RECEIVED: 2024-06-25

DATE REPORTED: 2024-07-03

		SAMPLE DESCRIPTION:		BH1@0-2.5	BH2@0-2.5	BH3@2.5-5	BH3@5-7.5	BH4@2.5-5	BH5@0-2.5	DUP BH
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2024-06-24	2024-06-24	2024-06-24	2024-06-24	2024-06-24	2024-06-24	2024-06-24
Parameter	Unit	G / S	RDL	5960149	5960154	5960155	5960157	5960158	5960159	5960160
F1 (C6 to C10)	µg/g	55	5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	55	5	<5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	230	10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	1700	50	<50	311	<50	<50	<50	77	<50
F4 (C34 to C50)	µg/g	3300	50	<50	247	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g	3300	50	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	10.7	17.4	21.8	20.7	9.3	21.6	6.4
Surrogate	Unit	Acceptable Limits								
Toluene-d8	%	50-140		88	80	80	83	80	81	80
Terphenyl	%	60-140		79	130	87	104	90	110	99

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Soil - Industrial/Commercial/Community Property Use - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5960149-5960160 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contribution.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified without the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

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AGAT WORK ORDER: 24T166367

PROJECT: 8368 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 Mclean Rd.,Puslinch

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2024-06-25

DATE REPORTED: 2024-07-03

		SAMPLE DESCRIPTION:		BH1@0-2.5	BH2@0-2.5	BH3@2.5-5	BH3@5-7.5	BH4@2.5-5	BH5@0-2.5	DUP BHI
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2024-06-24	2024-06-24	2024-06-24	2024-06-24	2024-06-24	2024-06-24	2024-06-24
Parameter	Unit	G / S	RDL	5960149	5960154	5960155	5960157	5960158	5960159	5960160
Dichlorodifluoromethane	µg/g	16	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.032	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	4	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	16	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.064	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	1.6	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	1.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	11	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	17	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	70	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	55	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.47	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	6.1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.21	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.32	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.16	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.91	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	18	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	31	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	68	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	13	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	4.5	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.087	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	2.4	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	9.5	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24T166367

PROJECT: 8368 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 Mclean Rd.,Puslinch

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2024-06-25 **DATE REPORTED: 2024-07-03**

		SAMPLE DESCRIPTION:		BH1@0-2.5	BH2@0-2.5	BH3@2.5-5	BH3@5-7.5	BH4@2.5-5	BH5@0-2.5	DUP BH
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2024-06-24	2024-06-24	2024-06-24	2024-06-24	2024-06-24	2024-06-24	2024-06-24
Parameter	Unit	G / S	RDL	5960149	5960154	5960155	5960157	5960158	5960159	5960160
Bromoform	ug/g	0.61	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	34	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	9.6	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	6.8	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	26	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.18	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	46	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	10.7	17.4	21.8	20.7	9.3	21.6	6.4
Surrogate	Unit	Acceptable Limits								
Toluene-d8	% Recovery	50-140		88	80	80	83	80	81	80
4-Bromofluorobenzene	% Recovery	50-140		84	81	80	84	80	78	80

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Soil - Industrial/Commercial/Community Property Use - Coarse Textured Soils
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5960149-5960160 The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
AGAT WORK ORDER: 24T166367
PROJECT: 8368 BVD Puslinch
ATTENTION TO: Ali Rasoul
SAMPLING SITE:7504 Mclean Rd.,Puslinch
SAMPLED BY:E.F.

Soil Analysis

RPT Date: Jul 03, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals (Including Hydrides) (Soil)															
Antimony	5958882		<0.8	<0.8	NA	< 0.8	77%	70%	130%	108%	80%	120%	107%	70%	130%
Arsenic	5958882		3	3	NA	< 1	108%	70%	130%	119%	80%	120%	122%	70%	130%
Barium	5958882		31.3	32.5	3.8%	< 2.0	120%	70%	130%	102%	80%	120%	102%	70%	130%
Beryllium	5958882		<0.5	<0.5	NA	< 0.5	105%	70%	130%	100%	80%	120%	114%	70%	130%
Boron	5958882		<5	<5	NA	< 5	94%	70%	130%	81%	80%	120%	89%	70%	130%
Cadmium	5958882		<0.5	<0.5	NA	< 0.5	110%	70%	130%	104%	80%	120%	111%	70%	130%
Chromium	5958882		14	14	NA	< 5	100%	70%	130%	88%	80%	120%	100%	70%	130%
Cobalt	5958882		4.6	4.8	4.3%	< 0.8	97%	70%	130%	101%	80%	120%	101%	70%	130%
Copper	5958882		12.1	12.8	5.6%	< 1.0	94%	70%	130%	104%	80%	120%	102%	70%	130%
Lead	5958882		5	6	18.2%	< 1	108%	70%	130%	91%	80%	120%	104%	70%	130%
Molybdenum	5958882		<0.5	<0.5	NA	< 0.5	96%	70%	130%	106%	80%	120%	108%	70%	130%
Nickel	5958882		11	11	0.0%	2	100%	70%	130%	103%	80%	120%	101%	70%	130%
Selenium	5958882		1.8	1.8	NA	< 0.8	99%	70%	130%	104%	80%	120%	105%	70%	130%
Silver	5958882		<0.5	<0.5	NA	< 0.5	108%	70%	130%	104%	80%	120%	109%	70%	130%
Thallium	5958882		<0.5	<0.5	NA	< 0.5	102%	70%	130%	89%	80%	120%	100%	70%	130%
Uranium	5958882		<0.50	<0.50	NA	< 0.50	103%	70%	130%	87%	80%	120%	103%	70%	130%
Vanadium	5958882		26.3	27.0	2.6%	< 2.0	105%	70%	130%	103%	80%	120%	104%	70%	130%
Zinc	5958882		24	25	NA	< 5	103%	70%	130%	102%	80%	120%	103%	70%	130%

Comments: NA Signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

O. Reg. 153(511) - ORPs (Soil)									
Electrical Conductivity (2:1)	5955306	0.133	0.137	3.0%	< 0.005	104%	80%	120%	
Sodium Adsorption Ratio (2:1) (Calc.)	5955337	0.190	0.192	1.0%	NA				

Comments: NA signifies Not Applicable.

O. Reg. 153(511) - ORPs (Soil)									
Electrical Conductivity (2:1)	5955337	0.111	0.106	4.6%	< 0.005	103%	80%	120%	

Certified By:

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

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TEL (905)712-5100
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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 24T166367

PROJECT: 8368 BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 Mclean Rd.,Puslinch

SAMPLED BY:E.F.

Trace Organics Analysis

RPT Date: Jul 03, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (with VOC) (Soil)															
F1 (C6 to C10)	5960160	5960160	<5	<5	NA	< 5	96%	60%	140%	103%	60%	140%	98%	60%	140%
F2 (C10 to C16)	5962936		< 10	< 10	NA	< 10	109%	60%	140%	98%	60%	140%	100%	60%	140%
F3 (C16 to C34)	5962936		53	53	NA	< 50	106%	60%	140%	125%	60%	140%	124%	60%	140%
F4 (C34 to C50)	5962936		< 50	< 50	NA	< 50	62%	60%	140%	78%	60%	140%	89%	60%	140%
O. Reg. 153(511) - VOCs (with PHC) (Soil)															
Dichlorodifluoromethane	5960160	5960160	<0.05	<0.05	NA	< 0.05	104%	50%	140%	82%	50%	140%	80%	50%	140%
Vinyl Chloride	5960160	5960160	<0.02	<0.02	NA	< 0.02	112%	50%	140%	92%	50%	140%	122%	50%	140%
Bromomethane	5960160	5960160	<0.05	<0.05	NA	< 0.05	113%	50%	140%	77%	50%	140%	123%	50%	140%
Trichlorofluoromethane	5960160	5960160	<0.05	<0.05	NA	< 0.05	100%	50%	140%	104%	50%	140%	123%	50%	140%
Acetone	5960160	5960160	<0.50	<0.50	NA	< 0.50	103%	50%	140%	93%	50%	140%	91%	50%	140%
1,1-Dichloroethylene	5960160	5960160	<0.05	<0.05	NA	< 0.05	106%	50%	140%	79%	60%	130%	105%	50%	140%
Methylene Chloride	5960160	5960160	<0.05	<0.05	NA	< 0.05	96%	50%	140%	100%	60%	130%	96%	50%	140%
Trans- 1,2-Dichloroethylene	5960160	5960160	<0.05	<0.05	NA	< 0.05	95%	50%	140%	66%	60%	130%	79%	50%	140%
Methyl tert-butyl Ether	5960160	5960160	<0.05	<0.05	NA	< 0.05	98%	50%	140%	109%	60%	130%	104%	50%	140%
1,1-Dichloroethane	5960160	5960160	<0.02	<0.02	NA	< 0.02	80%	50%	140%	85%	60%	130%	105%	50%	140%
Methyl Ethyl Ketone	5960160	5960160	<0.50	<0.50	NA	< 0.50	93%	50%	140%	132%	50%	140%	117%	50%	140%
Cis- 1,2-Dichloroethylene	5960160	5960160	<0.02	<0.02	NA	< 0.02	92%	50%	140%	68%	60%	130%	80%	50%	140%
Chloroform	5960160	5960160	<0.04	<0.04	NA	< 0.04	83%	50%	140%	66%	60%	130%	99%	50%	140%
1,2-Dichloroethane	5960160	5960160	<0.03	<0.03	NA	< 0.03	104%	50%	140%	99%	60%	130%	100%	50%	140%
1,1,1-Trichloroethane	5960160	5960160	<0.05	<0.05	NA	< 0.05	99%	50%	140%	95%	60%	130%	101%	50%	140%
Carbon Tetrachloride	5960160	5960160	<0.05	<0.05	NA	< 0.05	89%	50%	140%	76%	60%	130%	81%	50%	140%
Benzene	5960160	5960160	<0.02	<0.02	NA	< 0.02	90%	50%	140%	91%	60%	130%	98%	50%	140%
1,2-Dichloropropane	5960160	5960160	<0.03	<0.03	NA	< 0.03	91%	50%	140%	91%	60%	130%	101%	50%	140%
Trichloroethylene	5960160	5960160	<0.03	<0.03	NA	< 0.03	89%	50%	140%	97%	60%	130%	91%	50%	140%
Bromodichloromethane	5960160	5960160	<0.05	<0.05	NA	< 0.05	88%	50%	140%	79%	60%	130%	77%	50%	140%
Methyl Isobutyl Ketone	5960160	5960160	<0.50	<0.50	NA	< 0.50	86%	50%	140%	113%	50%	140%	109%	50%	140%
1,1,2-Trichloroethane	5960160	5960160	<0.04	<0.04	NA	< 0.04	106%	50%	140%	107%	60%	130%	103%	50%	140%
Toluene	5960160	5960160	<0.05	<0.05	NA	< 0.05	96%	50%	140%	88%	60%	130%	97%	50%	140%
Dibromochloromethane	5960160	5960160	<0.05	<0.05	NA	< 0.05	61%	50%	140%	71%	60%	130%	77%	50%	140%
Ethylene Dibromide	5960160	5960160	<0.04	<0.04	NA	< 0.04	81%	50%	140%	76%	60%	130%	78%	50%	140%
Tetrachloroethylene	5960160	5960160	<0.05	<0.05	NA	< 0.05	80%	50%	140%	90%	60%	130%	99%	50%	140%
1,1,1,2-Tetrachloroethane	5960160	5960160	<0.04	<0.04	NA	< 0.04	62%	50%	140%	73%	60%	130%	69%	50%	140%
Chlorobenzene	5960160	5960160	<0.05	<0.05	NA	< 0.05	103%	50%	140%	97%	60%	130%	98%	50%	140%
Ethylbenzene	5960160	5960160	<0.05	<0.05	NA	< 0.05	108%	50%	140%	102%	60%	130%	102%	50%	140%
m & p-Xylene	5960160	5960160	<0.05	<0.05	NA	< 0.05	116%	50%	140%	108%	60%	130%	107%	50%	140%
Bromoform	5960160	5960160	<0.05	<0.05	NA	< 0.05	88%	50%	140%	91%	60%	130%	62%	50%	140%
Styrene	5960160	5960160	<0.05	<0.05	NA	< 0.05	86%	50%	140%	80%	60%	130%	77%	50%	140%
1,1,2,2-Tetrachloroethane	5960160	5960160	<0.05	<0.05	NA	< 0.05	105%	50%	140%	89%	60%	130%	89%	50%	140%
o-Xylene	5960160	5960160	<0.05	<0.05	NA	< 0.05	95%	50%	140%	103%	60%	130%	105%	50%	140%

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 24T166367

PROJECT: 8368 BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 Mclean Rd.,Puslinch

SAMPLED BY:E.F.

Trace Organics Analysis (Continued)

RPT Date: Jul 03, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
1,3-Dichlorobenzene	5960160	5960160	<0.05	<0.05	NA	< 0.05	86%	50%	140%	87%	60%	130%	85%	50%	140%
1,4-Dichlorobenzene	5960160	5960160	<0.05	<0.05	NA	< 0.05	94%	50%	140%	85%	60%	130%	80%	50%	140%
1,2-Dichlorobenzene	5960160	5960160	<0.05	<0.05	NA	< 0.05	80%	50%	140%	78%	60%	130%	85%	50%	140%
n-Hexane	5960160	5960160	<0.05	<0.05	NA	< 0.05	74%	50%	140%	92%	60%	130%	89%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 24T166367

PROJECT: 8368 BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 Mclean Rd.,Puslinch

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Electrical Conductivity (2:1)	INOR-93-6075	modified from MSA PART 3, CH 14 and SM 2510 B	PC TITRATE
Sodium Adsorption Ratio (2:1) (Calc.)	INOR-93-6007	modified from EPA 6010D & Analytical Protocol	ICP/OES

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Method Summary

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AGAT WORK ORDER: 24T166367

PROJECT: 8368 BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 Mclean Rd.,Puslinch

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
F1 (C6 to C10)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Dichlorodifluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 24T166367

PROJECT: 8368 BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 Mclean Rd.,Puslinch

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Toluene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS

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AGAT Laboratories

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Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 24T166367

Cooler Quantity: 1 med

Arrival Temperatures: 6.5 | 6.9 | 5.7

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes: F/I

Report Information:

Company: A & A Environmental Consultants Inc.
Contact: Dr. Ali Rasoul
Address: 16 Young St
Woodstock, ON
Phone: 519-266-4680 Fax: 519-266-3666
Reports to be sent to:
1. Email: arasoul@aaenvironmental.ca, vsowden@"
2. Email: sscott@"; tdemers@" ; ckennedy@"

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☑ Regulation 153/04
Table 3 *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☑ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region _____ *Indicate One*
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply): _____

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: 8368 BVD Puslinch
Site Location: 7504 McLean Rd., Puslinch
Sampled By: E.F.
AGAT Quote #: 16288129079 PO: 8368
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y / N	Field Filtered - Metals, Hg, CrVI	O. Reg 153: Metals and Inorganics	All Metals ☐ 153 Metals (excl. Hydrides)	Hydride Metals ☐ 153 Metals (incl. Hydrides)	ORPs: ☐ B-HWS ☐ Cl ☐ CN	Cr⁶⁺ ☑ EC ☐ FOC ☐ Hg	pH ☑ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN	NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☑ M&I ☑ VOCs ☑ ABNs ☑ B(a)P ☑ PCBs	Sewer Use	Metals Soil 93-101	Metals Water 93-196	CCME F1-F4/VOCs Soil 91-248	CCME F1-F4/VOCs Water 91-249	CCME F1-F4/ BTEX Water 91-315	Sieve & texture (75 Micron)
BH1 @ 0-2.5		6/24/24	3	S							☑															☑		☑			
BH2 @ 0-2.5		6/24/24	3	S							☑															☑		☑			
BH3 @ 2.5-5		6/24/24	3	S							☑															☑		☑			
BH3 @ 5-7.5		6/24/24	3	S							☑															☑		☑			
BH4 @ 2.5-5		6/24/24	3	S							☑															☑		☑			
~~BH5 @ 0-2.5~~		~~6/24/24~~	~~3~~	~~S~~							☑															☑		☑			
DUP BH1		6/24/24	3	S							☑															☑		☑			
					**please adjust soil texture																										
					to results of sieve analysis																										

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
E. Fulsom [redacted]	6/25/24	10am	[redacted]	25.6.24	3:40pm
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page 1 of 1

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Document ID: DIV-78-1511.015

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Date Issued: March 16, 2018

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CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
16 Young Street
WOODSTOCK, ON N4S3L4
(519) 266-4680

ATTENTION TO: Ali Rasoul

PROJECT: 8368 BVD Puslinch

AGAT WORK ORDER: 24T166836

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

WATER ANALYSIS REVIEWED BY: Nivine Basily, Inorganic Team Lead

DATE REPORTED: Jul 04, 2024

PAGES (INCLUDING COVER): 17

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

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AGAT WORK ORDER: 24T166836

PROJECT: 8368 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E.F.

O. Reg. 153(511) - PAHs (Water)

DATE RECEIVED: 2024-06-26

DATE REPORTED: 2024-07-04

		SAMPLE DESCRIPTION:		EMW1	MW2	MW3	DUP MW2
		SAMPLE TYPE:		Water	Water	Water	Water
		DATE SAMPLED:		2024-06-25	2024-06-25	2024-06-25	2024-06-25
Parameter	Unit	G / S	RDL	5962156	5962161	5962170	5962171
Naphthalene	µg/L	7	0.20	<0.20	<0.20	<0.20	<0.20
Acenaphthylene	µg/L	1	0.20	<0.20	<0.20	<0.20	<0.20
Acenaphthene	µg/L	4.1	0.20	<0.20	<0.20	<0.20	<0.20
Fluorene	µg/L	120	0.20	<0.20	<0.20	<0.20	<0.20
Phenanthrene	µg/L	0.1	0.10	<0.10	<0.10	<0.10	<0.10
Anthracene	µg/L	0.1	0.10	<0.10	<0.10	<0.10	<0.10
Fluoranthene	µg/L	0.4	0.20	<0.20	<0.20	<0.20	<0.20
Pyrene	µg/L	0.2	0.20	<0.20	<0.20	<0.20	<0.20
Benzo(a)anthracene	µg/L	0.2	0.20	<0.20	<0.20	<0.20	<0.20
Chrysene	µg/L	0.1	0.10	<0.10	<0.10	<0.10	<0.10
Benzo(b)fluoranthene	µg/L	0.1	0.10	<0.10	<0.10	<0.10	<0.10
Benzo(k)fluoranthene	µg/L	0.1	0.10	<0.10	<0.10	<0.10	<0.10
Benzo(a)pyrene	µg/L	0.01	0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	µg/L	0.2	0.20	<0.20	<0.20	<0.20	<0.20
Dibenz(a,h)anthracene	µg/L	0.2	0.20	<0.20	<0.20	<0.20	<0.20
Benzo(g,h,i)perylene	µg/L	0.2	0.20	<0.20	<0.20	<0.20	<0.20
2-and 1-methyl Napthalene	µg/L	2	0.20	<0.20	<0.20	<0.20	<0.20
Sediment				2	2	2	2
Surrogate	Unit	Acceptable Limits					
Naphthalene-d8	%	50-140		89	95	85	93
Acridine-d9	%	50-140		81	115	92	62
Terphenyl-d14	%	50-140		70	74	80	83

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON T1 GW
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5962156-5962171 Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.
Legend: 1 = no sediment present; 2 = sediment present; 3 = sediment present in trace amount
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&(j)Fluoranthene isomers because the isomers co-elute on the GC column.
2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 24T166836

PROJECT: 8368 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E.F.

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Water)

DATE RECEIVED: 2024-06-26

DATE REPORTED: 2024-07-04

		SAMPLE DESCRIPTION:		EMW1	MW2	MW3	DUP MW2
		SAMPLE TYPE:		Water	Water	Water	Water
		DATE SAMPLED:		2024-06-25	2024-06-25	2024-06-25	2024-06-25
Parameter	Unit	G / S	RDL	5962156	5962161	5962170	5962171
F1 (C6 to C10)	µg/L	420	25	<25	<25	<25	<25
F1 (C6 to C10) minus BTEX	µg/L	420	25	<25	<25	<25	<25
F2 (C10 to C16)	µg/L	150	100	<100	<100	<100	<100
F2 (C10 to C16) minus Naphthalene	µg/L		100	<100	<100	<100	<100
F3 (C16 to C34)	µg/L	500	100	<100	<100	<100	<100
F3 (C16 to C34) minus PAHs	µg/L		100	<100	<100	<100	<100
F4 (C34 to C50)	µg/L	500	100	<100	<100	<100	<100
Gravimetric Heavy Hydrocarbons	µg/L		500	NA	NA	NA	NA
Sediment				2	2	2	2
Surrogate	Unit	Acceptable Limits					
Toluene-d8	%	50-140		93	98	97	99
Terphenyl	% Recovery	60-140		69	61	76	73

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON T1 GW
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5962156-5962171 The C6-C10 fraction is calculated using toluene response factor.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX and PAH contributions.
C>10 – C16 (F2- Naphthalene) is a calculated parameter. The calculated value is F2 - Naphthalene.
C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (PAH: sum of Phenanthrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene and Pyrene).
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.
Legend: 1 = no sediment present; 2 = sediment present; 3 = sediment present in trace amounts

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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AGAT WORK ORDER: 24T166836

PROJECT: 8368 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Water)

DATE RECEIVED: 2024-06-26

DATE REPORTED: 2024-07-04

		SAMPLE DESCRIPTION:		EMW1	MW2	MW3	DUP MW2
		SAMPLE TYPE:		Water	Water	Water	Water
		DATE SAMPLED:		2024-06-25	2024-06-25	2024-06-25	2024-06-25
Parameter	Unit	G / S	RDL	5962156	5962161	5962170	5962171
Dichlorodifluoromethane	µg/L	590	0.40	<0.40	<0.40	<0.40	<0.40
Vinyl Chloride	µg/L	0.5	0.17	<0.17	<0.17	<0.17	<0.17
Bromomethane	µg/L	0.89	0.20	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L	150	0.40	<0.40	<0.40	<0.40	<0.40
Acetone	µg/L	2700	1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethylene	µg/L	0.5	0.30	<0.30	<0.30	<0.30	<0.30
Methylene Chloride	µg/L	5	0.30	<0.30	<0.30	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L	1.6	0.20	<0.20	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L	15	0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L	0.5	0.30	<0.30	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L	400	1.0	<1.0	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	1.6	0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	µg/L	2	0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloroethane	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L	0.5	0.30	<0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L	0.2	0.20	<0.20	<0.20	<0.20	<0.20
Benzene	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloropropane	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20
Trichloroethylene	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L	2	0.20	<0.20	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L	640	1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L	0.8	0.20	0.49	0.64	0.59	0.77
Dibromochloromethane	µg/L	2	0.10	<0.10	<0.10	<0.10	<0.10
Ethylene Dibromide	µg/L	0.2	0.10	<0.10	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	1.1	0.10	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	µg/L	0.5	0.10	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	µg/L	0.5	0.10	<0.10	<0.10	<0.10	<0.10
m & p-Xylene	µg/L		0.20	<0.20	0.33	<0.20	0.34

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 24T166836

PROJECT: 8368 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Water)

DATE RECEIVED: 2024-06-26

DATE REPORTED: 2024-07-04

		SAMPLE DESCRIPTION:		EMW1	MW2	MW3	DUP MW2
		SAMPLE TYPE:		Water	Water	Water	Water
		DATE SAMPLED:		2024-06-25	2024-06-25	2024-06-25	2024-06-25
Parameter	Unit	G / S	RDL	5962156	5962161	5962170	5962171
Bromoform	µg/L	5	0.10	<0.10	<0.10	<0.10	<0.10
Styrene	µg/L	0.5	0.10	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	0.5	0.10	<0.10	<0.10	<0.10	<0.10
o-Xylene	µg/L		0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L	0.5	0.10	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L	0.5	0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L	0.5	0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichloropropene	µg/L	0.5	0.30	<0.30	<0.30	<0.30	<0.30
Xylenes (Total)	µg/L	72	0.20	<0.20	0.33	<0.20	0.34
n-Hexane	µg/L	5	0.20	<0.20	<0.20	<0.20	<0.20
Surrogate	Unit	Acceptable Limits					
Toluene-d8	% Recovery	50-140		93	98	97	99
4-Bromofluorobenzene	% Recovery	50-140		83	82	87	85

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON T1 GW
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5962156-5962171 Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 24T166836

PROJECT: 8368 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E.F.

O. Reg. 153(511) - Metals (Including Hydrides) (Water)

DATE RECEIVED: 2024-06-26

DATE REPORTED: 2024-07-04

		SAMPLE DESCRIPTION:		MW2	MW3	DUP MW2
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2024-06-25	2024-06-25	2024-06-25
Parameter	Unit	G / S	RDL	5962161	5962170	5962171
Dissolved Antimony	µg/L	1.5	1.0	<1.0	1.1	<1.0
Dissolved Arsenic	µg/L	13	1.0	<1.0	4.9	<1.0
Dissolved Barium	µg/L	610	2.0	104	86.3	111
Dissolved Beryllium	µg/L	0.5	0.50	<0.50	<0.50	<0.50
Dissolved Boron	µg/L	1700	10.0	276	114	289
Dissolved Cadmium	µg/L	0.5	0.20	<0.20	<0.20	0.33
Dissolved Chromium	µg/L	11	2.0	<2.0	<2.0	<2.0
Dissolved Cobalt	µg/L	3.8	0.50	2.15	4.97	1.83
Dissolved Copper	µg/L	5	1.0	5.6	1.4	6.6
Dissolved Lead	µg/L	1.9	0.50	<0.50	<0.50	<0.50
Dissolved Molybdenum	µg/L	23	0.50	1.26	11.6	1.70
Dissolved Nickel	µg/L	14	1.0	5.2	4.8	4.4
Dissolved Selenium	µg/L	5	1.0	1.6	2.5	1.8
Dissolved Silver	µg/L	0.3	0.20	<0.20	<0.20	<0.20
Dissolved Thallium	µg/L	0.5	0.30	<0.30	<0.30	<0.30
Dissolved Uranium	µg/L	8.9	0.50	0.58	0.77	0.68
Dissolved Vanadium	µg/L	3.9	0.40	<0.40	<0.40	<0.40
Dissolved Zinc	µg/L	160	5.0	67.9	<5.0	67.2

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON T1 GW
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5962161-5962171 Metals analysis completed on a filtered sample.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 24T166836

PROJECT: 8368 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E.F.

O. Reg. 153(511) - Metals (Including Hydrides) (Water) - Lab Filtered

DATE RECEIVED: 2024-06-26

DATE REPORTED: 2024-07-04

		SAMPLE DESCRIPTION:		EMW1
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2024-06-25
Parameter	Unit	G / S	RDL	5962156
Dissolved Antimony	µg/L	1.5	1.0	<1.0
Dissolved Arsenic	µg/L	13	1.0	3.0
Dissolved Barium	µg/L	610	2.0	129
Dissolved Beryllium	µg/L	0.5	0.50	<0.50
Dissolved Boron	µg/L	1700	10.0	231
Dissolved Cadmium	µg/L	0.5	0.20	<0.20
Dissolved Chromium	µg/L	11	2.0	<2.0
Dissolved Cobalt	µg/L	3.8	0.50	3.52
Dissolved Copper	µg/L	5	1.0	3.7
Dissolved Lead	µg/L	1.9	0.50	<0.50
Dissolved Molybdenum	µg/L	23	0.50	5.34
Dissolved Nickel	µg/L	14	1.0	5.5
Dissolved Selenium	µg/L	5	1.0	2.2
Dissolved Silver	µg/L	0.3	0.20	<0.20
Dissolved Thallium	µg/L	0.5	0.30	<0.30
Dissolved Uranium	µg/L	8.9	0.50	2.22
Dissolved Vanadium	µg/L	3.9	0.40	0.92
Dissolved Zinc	µg/L	160	5.0	10.3
Lab Filtration Metals				1

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON T1 GW
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5962156 Metals analysis completed on a lab filtered sample.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 24T166836

PROJECT: 8368 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E.F.

O. Reg. 153(511) - ORPs (Water)

DATE RECEIVED: 2024-06-26 **DATE REPORTED: 2024-07-04**

				SAMPLE DESCRIPTION:	EMW1	MW2	MW3	DUP MW2
				SAMPLE TYPE:	Water	Water	Water	Water
				DATE SAMPLED:	2024-06-25	2024-06-25	2024-06-25	2024-06-25
Parameter	Unit	G / S	RDL		5962156	5962161	5962170	5962171
Electrical Conductivity	uS/cm	NA	2		1440	1750	769	1770
pH	pH Units		NA		7.62	7.39	7.63	7.39

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON T1 GW
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5962156-5962171 pH is a recommended field analysis taken within 15 minutes of sample collection. Due to the potential for rapid change in sample equilibrium chemistry laboratory results may differ from field measured results.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Exceedance Summary

AGAT WORK ORDER: 24T166836

PROJECT: 8368 BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
5962161	MW2	ON T1 GW	O. Reg. 153(511) - Metals (Including Hydrides) (Water)	Dissolved Copper	µg/L	5	5.6
5962170	MW3	ON T1 GW	O. Reg. 153(511) - Metals (Including Hydrides) (Water)	Dissolved Cobalt	µg/L	3.8	4.97
5962171	DUP MW2	ON T1 GW	O. Reg. 153(511) - Metals (Including Hydrides) (Water)	Dissolved Copper	µg/L	5	6.6

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 24T166836

PROJECT: 8368 BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E.F.

Trace Organics Analysis

RPT Date: Jul 04, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PAHs (Water)															
Naphthalene	5962246		<0.20	<0.20	NA	< 0.20	89%	50%	140%	74%	50%	140%	77%	50%	140%
Acenaphthylene	5962246		<0.20	<0.20	NA	< 0.20	92%	50%	140%	75%	50%	140%	71%	50%	140%
Acenaphthene	5962246		<0.20	<0.20	NA	< 0.20	83%	50%	140%	71%	50%	140%	70%	50%	140%
Fluorene	5962246		<0.20	<0.20	NA	< 0.20	86%	50%	140%	75%	50%	140%	72%	50%	140%
Phenanthrene	5962246		<0.10	<0.10	NA	< 0.10	85%	50%	140%	76%	50%	140%	74%	50%	140%
Anthracene	5962246		<0.10	<0.10	NA	< 0.10	72%	50%	140%	67%	50%	140%	72%	50%	140%
Fluoranthene	5962246		<0.20	<0.20	NA	< 0.20	86%	50%	140%	76%	50%	140%	77%	50%	140%
Pyrene	5962246		<0.20	<0.20	NA	< 0.20	82%	50%	140%	72%	50%	140%	73%	50%	140%
Benzo(a)anthracene	5962246		<0.20	<0.20	NA	< 0.20	75%	50%	140%	69%	50%	140%	78%	50%	140%
Chrysene	5962246		<0.10	<0.10	NA	< 0.10	96%	50%	140%	74%	50%	140%	83%	50%	140%
Benzo(b)fluoranthene	5962246		<0.10	<0.10	NA	< 0.10	72%	50%	140%	77%	50%	140%	103%	50%	140%
Benzo(k)fluoranthene	5962246		<0.10	<0.10	NA	< 0.10	83%	50%	140%	97%	50%	140%	118%	50%	140%
Benzo(a)pyrene	5962246		<0.01	<0.01	NA	< 0.01	75%	50%	140%	72%	50%	140%	103%	50%	140%
Indeno(1,2,3-cd)pyrene	5962246		<0.20	<0.20	NA	< 0.20	71%	50%	140%	81%	50%	140%	98%	50%	140%
Dibenz(a,h)anthracene	5962246		<0.20	<0.20	NA	< 0.20	74%	50%	140%	76%	50%	140%	77%	50%	140%
Benzo(g,h,i)perylene	5962246		<0.20	<0.20	NA	< 0.20	74%	50%	140%	74%	50%	140%	110%	50%	140%
O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Water)															
F1 (C6 to C10)	5961449		<25	<25	NA	< 25	109%	60%	140%	108%	60%	140%	88%	60%	140%
F2 (C10 to C16)	5965454		<100	<100	NA	< 100	85%	60%	140%	62%	60%	140%	62%	60%	140%
F3 (C16 to C34)	5965454		<100	<100	NA	< 100	92%	60%	140%	74%	60%	140%	72%	60%	140%
F4 (C34 to C50)	5965454		<100	<100	NA	< 100	88%	60%	140%	114%	60%	140%	104%	60%	140%
O. Reg. 153(511) - VOCs (with PHC) (Water)															
Dichlorodifluoromethane	5961449		<0.40	<0.40	NA	< 0.40	118%	50%	140%	113%	50%	140%	77%	50%	140%
Vinyl Chloride	5961449		<0.17	<0.17	NA	< 0.17	113%	50%	140%	119%	50%	140%	110%	50%	140%
Bromomethane	5961449		<0.20	<0.20	NA	< 0.20	76%	50%	140%	78%	50%	140%	85%	50%	140%
Trichlorofluoromethane	5961449		<0.40	<0.40	NA	< 0.40	112%	50%	140%	112%	50%	140%	101%	50%	140%
Acetone	5961449		<1.0	<1.0	NA	< 1.0	77%	50%	140%	92%	50%	140%	114%	50%	140%
1,1-Dichloroethylene	5961449		<0.30	<0.30	NA	< 0.30	103%	50%	140%	118%	60%	130%	93%	50%	140%
Methylene Chloride	5961449		<0.30	<0.30	NA	< 0.30	94%	50%	140%	108%	60%	130%	104%	50%	140%
trans- 1,2-Dichloroethylene	5961449		<0.20	<0.20	NA	< 0.20	109%	50%	140%	104%	60%	130%	99%	50%	140%
Methyl tert-butyl ether	5961449		<0.20	<0.20	NA	< 0.20	70%	50%	140%	73%	60%	130%	68%	50%	140%
1,1-Dichloroethane	5961449		<0.30	<0.30	NA	< 0.30	106%	50%	140%	99%	60%	130%	117%	50%	140%
Methyl Ethyl Ketone	5961449		<1.0	<1.0	NA	< 1.0	93%	50%	140%	110%	50%	140%	92%	50%	140%
cis- 1,2-Dichloroethylene	5961449		<0.20	<0.20	NA	< 0.20	107%	50%	140%	103%	60%	130%	95%	50%	140%
Chloroform	5961449		<0.20	<0.20	NA	< 0.20	109%	50%	140%	102%	60%	130%	99%	50%	140%
1,2-Dichloroethane	5961449		<0.20	<0.20	NA	< 0.20	113%	50%	140%	113%	60%	130%	113%	50%	140%
1,1,1-Trichloroethane	5961449		<0.30	<0.30	NA	< 0.30	96%	50%	140%	88%	60%	130%	85%	50%	140%
Carbon Tetrachloride	5961449		<0.20	<0.20	NA	< 0.20	107%	50%	140%	101%	60%	130%	97%	50%	140%

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 24T166836

PROJECT: 8368 BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E.F.

Trace Organics Analysis (Continued)

RPT Date: Jul 04, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Benzene	5961449		<0.20	<0.20	NA	< 0.20	100%	50%	140%	93%	60%	130%	94%	50%	140%
1,2-Dichloropropane	5961449		<0.20	<0.20	NA	< 0.20	91%	50%	140%	85%	60%	130%	87%	50%	140%
Trichloroethylene	5961449		<0.20	<0.20	NA	< 0.20	105%	50%	140%	94%	60%	130%	85%	50%	140%
Bromodichloromethane	5961449		<0.20	<0.20	NA	< 0.20	90%	50%	140%	87%	60%	130%	86%	50%	140%
Methyl Isobutyl Ketone	5961449		<1.0	<1.0	NA	< 1.0	95%	50%	140%	81%	50%	140%	93%	50%	140%
1,1,2-Trichloroethane	5961449		<0.20	<0.20	NA	< 0.20	108%	50%	140%	103%	60%	130%	105%	50%	140%
Toluene	5961449		<0.20	<0.20	NA	< 0.20	110%	50%	140%	99%	60%	130%	95%	50%	140%
Dibromochloromethane	5961449		<0.10	<0.10	NA	< 0.10	82%	50%	140%	74%	60%	130%	79%	50%	140%
Ethylene Dibromide	5961449		<0.10	<0.10	NA	< 0.10	99%	50%	140%	80%	60%	130%	87%	50%	140%
Tetrachloroethylene	5961449		<0.20	<0.20	NA	< 0.20	115%	50%	140%	99%	60%	130%	100%	50%	140%
1,1,1,2-Tetrachloroethane	5961449		<0.10	<0.10	NA	< 0.10	95%	50%	140%	82%	60%	130%	90%	50%	140%
Chlorobenzene	5961449		<0.10	<0.10	NA	< 0.10	111%	50%	140%	94%	60%	130%	100%	50%	140%
Ethylbenzene	5961449		<0.10	<0.10	NA	< 0.10	98%	50%	140%	86%	60%	130%	85%	50%	140%
m & p-Xylene	5961449		<0.20	<0.20	NA	< 0.20	106%	50%	140%	91%	60%	130%	91%	50%	140%
Bromoform	5961449		<0.10	<0.10	NA	< 0.10	100%	50%	140%	86%	60%	130%	118%	50%	140%
Styrene	5961449		<0.10	<0.10	NA	< 0.10	100%	50%	140%	90%	60%	130%	89%	50%	140%
1,1,2,2-Tetrachloroethane	5961449		<0.10	<0.10	NA	< 0.10	107%	50%	140%	91%	60%	130%	79%	50%	140%
o-Xylene	5961449		<0.10	<0.10	NA	< 0.10	106%	50%	140%	94%	60%	130%	94%	50%	140%
1,3-Dichlorobenzene	5961449		<0.10	<0.10	NA	< 0.10	111%	50%	140%	94%	60%	130%	100%	50%	140%
1,4-Dichlorobenzene	5961449		<0.10	<0.10	NA	< 0.10	113%	50%	140%	94%	60%	130%	102%	50%	140%
1,2-Dichlorobenzene	5961449		<0.10	<0.10	NA	< 0.10	105%	50%	140%	93%	60%	130%	103%	50%	140%
n-Hexane	5961449		<0.20	<0.20	NA	< 0.20	87%	50%	140%	102%	60%	130%	103%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
AGAT WORK ORDER: 24T166836
PROJECT: 8368 BVD Puslinch
ATTENTION TO: Ali Rasoul
SAMPLING SITE:7504 McLean Rd., Puslinch
SAMPLED BY:E.F.

Water Analysis

RPT Date: Jul 04, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals (Including Hydrides) (Water)															
Dissolved Antimony	5961434		1.6	1.5	NA	< 1.0	101%	70%	130%	104%	80%	120%	109%	70%	130%
Dissolved Arsenic	5961434		2.3	1.4	NA	< 1.0	97%	70%	130%	95%	80%	120%	112%	70%	130%
Dissolved Barium	5961434		77.8	74.1	5.0%	< 2.0	98%	70%	130%	95%	80%	120%	101%	70%	130%
Dissolved Beryllium	5961434		<0.50	<0.50	NA	< 0.50	96%	70%	130%	102%	80%	120%	103%	70%	130%
Dissolved Boron	5961434		68.1	61.1	10.9%	< 10.0	102%	70%	130%	101%	80%	120%	98%	70%	130%
Dissolved Cadmium	5961434		<0.20	<0.20	NA	< 0.20	100%	70%	130%	102%	80%	120%	105%	70%	130%
Dissolved Chromium	5961434		<2.0	<2.0	NA	< 2.0	101%	70%	130%	99%	80%	120%	106%	70%	130%
Dissolved Cobalt	5961434		0.71	0.98	NA	< 0.50	106%	70%	130%	98%	80%	120%	110%	70%	130%
Dissolved Copper	5961434		1.0	<1.0	NA	< 1.0	100%	70%	130%	100%	80%	120%	112%	70%	130%
Dissolved Lead	5961434		<0.50	<0.50	NA	< 0.50	99%	70%	130%	103%	80%	120%	104%	70%	130%
Dissolved Molybdenum	5961434		5.86	6.84	15.5%	< 0.50	107%	70%	130%	119%	80%	120%	119%	70%	130%
Dissolved Nickel	5961434		6.7	4.2	47.3%	< 1.0	104%	70%	130%	100%	80%	120%	107%	70%	130%
Dissolved Selenium	5961434		1.5	<1.0	NA	< 1.0	97%	70%	130%	99%	80%	120%	101%	70%	130%
Dissolved Silver	5961434		<0.20	<0.20	NA	< 0.20	119%	70%	130%	115%	80%	120%	118%	70%	130%
Dissolved Thallium	5961434		<0.30	<0.30	NA	< 0.30	95%	70%	130%	103%	80%	120%	103%	70%	130%
Dissolved Uranium	5961434		<0.50	<0.50	NA	< 0.50	101%	70%	130%	104%	80%	120%	110%	70%	130%
Dissolved Vanadium	5961434		6.44	6.21	3.7%	< 0.40	102%	70%	130%	103%	80%	120%	109%	70%	130%
Dissolved Zinc	5961434		117	115	1.7%	< 5.0	98%	70%	130%	113%	80%	120%	115%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

O. Reg. 153(511) - ORPs (Water)															
Electrical Conductivity	5962847		1100	925	17.6%	< 2	98%	90%	110%						
pH	5962847		7.68	7.75	0.9%	NA	99%	90%	110%						

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

O. Reg. 153(511) - ORPs (Water)															
Electrical Conductivity	5962171	5962171	1770	1900	7.2%	< 2	107%	90%	110%						
pH	5962171	5962171	7.39	7.41	0.3%	NA	99%	90%	110%						

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By:

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 24T166836

PROJECT: 8368 BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Acenaphthylene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Acenaphthene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Fluorene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Anthracene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Pyrene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(a)anthracene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Chrysene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
2-and 1-methyl Napthalene	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Acridine-d9	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Terphenyl-d14	ORG-91-5105	modified from EPA 3510C and EPA 8270E	GC/MS
Sediment			N/A
F1 (C6 to C10)	VOL-91-5010	modified from MOE PHC-E3421	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5010	modified from MOE PHC-E3421	P&T GC/FID
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5010	modified from MOE PHC-E3421	GC/FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5010	modified from MOE PHC-E3421	GC/FID
F3 (C16 to C34)	VOL-91-5010	modified from MOE PHC-E3421	GC/FID
F3 (C16 to C34) minus PAHs	VOL-91-5010	modified from MOE PHC-E3421	GC/FID
F4 (C34 to C50)	VOL-91-5010	modified from MOE PHC-E3421	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	modified from MOE PHC-E3421	BALANCE
Terphenyl	VOL-91-5010	modified from MOE PHC-E3421	GC/FID
Dichlorodifluoromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 24T166836

PROJECT: 8368 BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Vinyl Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
trans- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

5835 COOPERS AVENUE
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TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 24T166836

PROJECT: 8368 BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
m & p-Xylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 24T166836

PROJECT: 8368 BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Dissolved Antimony	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Arsenic	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Barium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Beryllium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Boron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cadmium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Chromium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cobalt	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Copper	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Lead	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Molybdenum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Nickel	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Selenium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Silver	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Thallium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Uranium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Vanadium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Zinc	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Lab Filtration Metals	SR-78-9001		FILTRATION
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE

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AGAT Laboratories

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Mississauga, Ontario L4Z 1Y2
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webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 24T166836

Cooler Quantity: 1 | 1

Arrival Temperatures: 4.9 | 5.1 | 4.3

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes: F/I

Report Information:

Company: A & A Environmental Consultants Inc.
Contact: Dr. Ali Rasoul
Address: 16 Young St
Woodstock, ON
Phone: 519-266-4680 Fax: 519-266-3666
Reports to be sent to:
1. Email: arasoul@aaenvironmental.ca, vsowden@"
2. Email: sscott@"; tdemers@" ; ckennedy@"

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☑ Regulation 153/04
Table 3 *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☑ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region _____ *Indicate One*
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply): _____

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: 8368 BVD Puslinch
Site Location: 7504 McLean Rd., Puslinch
Sampled By: E.F.
AGAT Quote #: 16288129079 PO: 8368
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y / N (Field Filtered - Metals, Hg, CrVI)	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (incl. Hydrides))	O. Reg 153: ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr⁶⁺ ☑ EC ☐ FOC ☐ Hg ☑ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☑ M&I ☑ VOCs ☑ ABNs ☑ B(a)P ☑ PCBs	Sewer Use	Metals Soil 93-101	Metals Water 93-196	CCME F1-F4/VOCs Soil 91-248	CCME F1-F4/VOCs Water 91-249	CCME F1-F4/ BTEX Water 91-315	Sieve & texture (75 Micron)
EMW1	6/25/24		7	GW	limited volume	N		☑						☑					☑				☑	
MW2	6/25/24		12	GW		Y		☑						☑					☑				☑	
MW3	6/25/24		12	GW		Y		☑						☑					☑				☑	
DUP MW2	6/25/24		12	GW		Y		☑						☑					☑				☑	

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
E. Fulsom [redacted]	6/25/24	3pm	[redacted]	26.6.24	1:40pm

Page 1 of 1

N°:

Document ID: DIV-78-1511.015

Pink Copy - Client I Yellow Copy - AGAT I White Copy- AGAT

Date Issued: March 16, 2016

AGAT Laboratories

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CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
16 Young Street
WOODSTOCK, ON N4S3L4
(519) 266-4680

ATTENTION TO: Ali Rasoul

PROJECT: 8368-BVD Puslinch

AGAT WORK ORDER: 25T238982

SOIL ANALYSIS REVIEWED BY: Nivine Basily, Inorganic Team Lead

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Jan 23, 2025

PAGES (INCLUDING COVER): 29

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Certificate of Analysis

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-15 **DATE REPORTED: 2025-01-23**

SAMPLE DESCRIPTION:				BH25-1@0-2.5	BH25-2@0-5	BH25-3@5-7.5	BH25-4@2.5-5	BH25-5@5-10	BH25-6@5-7.5	BH25-7@5-7.5	BH25-8@7.5-10
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6459609	6459610	6459611	6459612	6459613	6459614	6459615	6459616
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	3	4	5	6	6	4	4	4
Barium	µg/g	220	2.0	17.8	16.2	17.8	21.4	21.5	21.4	23.9	20.3
Beryllium	µg/g	2.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	µg/g	36	5	6	9	9	8	10	9	9	8
Boron (Hot Water Soluble)	µg/g	NA	0.10	<0.10	0.20	0.11	<0.10	0.22	0.25	<0.10	<0.10
Cadmium	µg/g	1.2	0.5	<0.5	<0.5	0.6	<0.5	0.6	<0.5	<0.5	0.5
Chromium	µg/g	70	5	8	11	8	10	9	9	8	7
Cobalt	µg/g	21	0.8	3.4	4.9	4.5	4.8	5.4	4.1	4.1	3.5
Copper	µg/g	92	1.0	10.5	12.4	25.5	24.5	17.6	14.2	13.4	12.9
Lead	µg/g	120	1	13	11	25	20	28	22	26	25
Molybdenum	µg/g	2	0.5	0.8	<0.5	0.6	<0.5	0.6	0.7	0.5	<0.5
Nickel	µg/g	82	1	5	8	7	8	9	6	6	5
Selenium	µg/g	1.5	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	2.5	0.50	<0.50	0.53	0.50	<0.50	0.54	<0.50	0.50	1.47
Vanadium	µg/g	86	2.0	19.0	20.3	16.2	18.8	17.7	16.4	16.3	15.6
Zinc	µg/g	290	5	94	87	678	187	302	215	249	264
Chromium, Hexavalent	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.57	0.005	0.144	0.166	0.147	0.191	0.123	0.345	0.121	0.126
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	2.4	N/A	0.725	0.708	1.59	1.71	1.45	0.554	0.859	0.279
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.70	7.66	7.64	7.63	7.61	10.3	7.53	8.20

Certified By:

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-15 **DATE REPORTED: 2025-01-23**

SAMPLE DESCRIPTION:				DUP 8	BH25-9@5-7.5	BH25-10@7.5-10	DUP 10	BH25-11@5-7.5	DUP 11	BH25-12@5-7.5	BH25-13@2.5-5
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6459617	6459618	6459619	6459620	6459621	6459622	6459623	6459624
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	4	6	4	4	4	4	5	6
Barium	µg/g	220	2.0	22.8	30.3	20.5	19.2	19.4	19.3	28.2	109
Beryllium	µg/g	2.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8
Boron	µg/g	36	5	9	11	8	7	9	9	14	18
Boron (Hot Water Soluble)	µg/g	NA	0.10	<0.10	0.17	<0.10	<0.10	0.15	<0.10	0.78	1.29
Cadmium	µg/g	1.2	0.5	0.6	<0.5	0.7	0.7	<0.5	0.6	<0.5	<0.5
Chromium	µg/g	70	5	8	14	8	8	8	8	16	24
Cobalt	µg/g	21	0.8	3.8	6.4	3.9	4.3	4.3	4.1	7.6	12.3
Copper	µg/g	92	1.0	13.4	18.6	14.1	14.9	15.2	14.9	20.4	24.2
Lead	µg/g	120	1	22	21	26	30	27	27	18	13
Molybdenum	µg/g	2	0.5	<0.5	1.0	<0.5	<0.5	0.5	<0.5	0.8	0.9
Nickel	µg/g	82	1	5	12	6	7	7	6	15	25
Selenium	µg/g	1.5	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	2.5	0.50	<0.50	0.57	0.54	0.52	<0.50	0.50	0.58	0.65
Vanadium	µg/g	86	2.0	16.3	26.5	15.5	15.8	15.9	16.7	28.7	31.3
Zinc	µg/g	290	5	304	166	308	360	202	258	150	74
Chromium, Hexavalent	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.57	0.005	0.085	0.211	0.106	0.145	0.105	0.135	0.158	0.836
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	2.4	N/A	0.206	0.691	1.29	1.23	0.503	0.612	0.747	2.11
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.59	7.86	7.62	7.79	7.31	6.23	7.28	7.44

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-15 **DATE REPORTED: 2025-01-23**

		SAMPLE DESCRIPTION:		BH25-14@5-7.5	BH25-15@2.5-5	BH25-16@5-7.5
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6459625	6459626	6459627
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	3	4	4
Barium	µg/g	220	2.0	25.1	48.0	36.2
Beryllium	µg/g	2.5	0.5	<0.5	<0.5	<0.5
Boron	µg/g	36	5	9	14	11
Boron (Hot Water Soluble)	µg/g	NA	0.10	0.13	0.23	0.26
Cadmium	µg/g	1.2	0.5	<0.5	<0.5	<0.5
Chromium	µg/g	70	5	10	13	11
Cobalt	µg/g	21	0.8	4.5	6.3	4.6
Copper	µg/g	92	1.0	17.7	18.5	15.7
Lead	µg/g	120	1	28	23	29
Molybdenum	µg/g	2	0.5	<0.5	0.7	0.6
Nickel	µg/g	82	1	10	14	10
Selenium	µg/g	1.5	0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5
Thallium	µg/g	1	0.5	<0.5	<0.5	<0.5
Uranium	µg/g	2.5	0.50	<0.50	0.52	0.52
Vanadium	µg/g	86	2.0	17.6	21.8	17.1
Zinc	µg/g	290	5	196	159	217
Chromium, Hexavalent	µg/g	0.66	0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.051	0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.57	0.005	0.157	0.178	0.152
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	2.4	N/A	1.05	0.359	0.487
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.41	7.45	7.48

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-15 **DATE REPORTED: 2025-01-23**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 1: Full Depth Background Site Condition - RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6459609-6459627 EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio. SAR is a calculated parameter.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2025-01-15 **DATE REPORTED: 2025-01-23**

		SAMPLE DESCRIPTION:		BH25-1@0-2.5	BH25-2@0-5	BH25-3@5-7.5	BH25-4@2.5-5	BH25-5@5-10	BH25-6@5-7.5	BH25-7@5-7.5	BH25-8@7.5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6459609	6459610	6459611	6459612	6459613	6459614	6459615	6459616
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.12	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.16	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.56	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	9.4	7.4	9.8	8.0	8.5	9.2	8.6	8.0
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		70	70	65	70	65	70	65	80
Acridine-d9	%	50-140		60	110	85	115	85	85	105	75
Terphenyl-d14	%	50-140		70	75	80	75	65	75	70	80

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2025-01-15 **DATE REPORTED: 2025-01-23**

SAMPLE DESCRIPTION:				DUP 8	BH25-9@5-7.5	BH25-10@7.5-10	DUP 10	BH25-11@5-7.5	DUP 11	BH25-12@5-7.5	BH25-13@2.5-5
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6459617	6459618	6459619	6459620	6459621	6459622	6459623	6459624
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.12	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.16	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.56	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	8.0	9.8	8.0	8.0	9.2	9.2	8.2	9.6
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		70	65	65	70	70	75	80	65
Acridine-d9	%	50-140		100	105	85	95	75	65	115	95
Terphenyl-d14	%	50-140		70	65	70	80	75	85	80	75

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2025-01-15 **DATE REPORTED: 2025-01-23**

		SAMPLE DESCRIPTION:		BH25-14@5-7.5	BH25-15@2.5-5	BH25-16@5-7.5
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6459625	6459626	6459627
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.12	0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.16	0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.56	0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	1	0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	6.6	11.1	7.9
Surrogate	Unit	Acceptable Limits				
Naphthalene-d8	%	50-140		85	65	70
Acridine-d9	%	50-140		105	100	100
Terphenyl-d14	%	50-140		95	85	80

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 1: Full Depth Background Site Condition - RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6459609-6459627 Results are based on the dry weight of the soil.
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&j)Fluoranthene isomers because the isomers co-elute on the GC column.
2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)

DATE RECEIVED: 2025-01-15 **DATE REPORTED: 2025-01-23**

		SAMPLE DESCRIPTION:		BH25-1@0-2.5	BH25-2@0-5	BH25-3@5-7.5	BH25-4@2.5-5	BH25-5@5-10	BH25-6@5-7.5	BH25-7@5-7.5	BH25-8@7.5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6459609	6459610	6459611	6459612	6459613	6459614	6459615	6459616
F1 (C6 to C10)	µg/g		5	<5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50	<50	<50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	240	50	<50	<50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	9.4	7.4	9.8	8.0	8.5	9.2	8.6	8.0
Surrogate	Unit	Acceptable Limits									
Toluene-d8	%	50-140		96	100	91	96	93	92	94	98
Terphenyl	%	60-140		98	100	87	78	98	80	81	95

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)

DATE RECEIVED: 2025-01-15 **DATE REPORTED: 2025-01-23**

		SAMPLE DESCRIPTION:		DUP 8	BH25-9@5-7.5	BH25-10@7.5-10	DUP 10	BH25-11@5-7.5	DUP 11	BH25-12@5-7.5	BH25-13@2.5-5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6459617	6459618	6459619	6459620	6459621	6459622	6459623	6459624
F1 (C6 to C10)	µg/g		5	<5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50	<50	<50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	240	50	<50	<50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	8.0	9.8	8.0	8.0	9.2	9.2	8.2	9.6
Surrogate	Unit	Acceptable Limits									
Toluene-d8	%	50-140		95	94	92	98	93	96	95	98
Terphenyl	%	60-140		74	99	76	86	83	84	83	96

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)

DATE RECEIVED: 2025-01-15 **DATE REPORTED: 2025-01-23**

				SAMPLE DESCRIPTION:	BH25-14@5-7.5	BH25-15@2.5-5	BH25-16@5-7.5
				SAMPLE TYPE:	Soil	Soil	Soil
				DATE SAMPLED:	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL		6459625	6459626	6459627
F1 (C6 to C10)	µg/g		5		<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5		<5	<5	<5
F2 (C10 to C16)	µg/g	10	10		<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10		<10	<10	<10
F3 (C16 to C34)	µg/g	240	50		<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	240	50		<50	<50	<50
F4 (C34 to C50)	µg/g	120	50		<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50		NA	NA	NA
Moisture Content	%		0.1		6.6	11.1	7.9
Surrogate	Unit	Acceptable Limits					
Toluene-d8	%	50-140			95	94	97
Terphenyl	%	60-140			89	75	98

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 1: Full Depth Background Site Condition - RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6459609-6459627 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX and PAH contributions.
C>10 – C16 (F2- Naphthalene) is a calculated parameter. The calculated value is F2 - Naphthalene.
C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (PAH: sum of Phenanthrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene and Pyrene).
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-15

DATE REPORTED: 2025-01-23

		SAMPLE DESCRIPTION:		BH25-1@0-2.5	BH25-2@0-5	BH25-3@5-7.5	BH25-4@2.5-5	BH25-5@5-10	BH25-6@5-7.5	BH25-7@5-7.5	BH25-8@7.5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6459609	6459610	6459611	6459612	6459613	6459614	6459615	6459616
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-15 **DATE REPORTED: 2025-01-23**

		SAMPLE DESCRIPTION:		BH25-1@0-2.5	BH25-2@0-5	BH25-3@5-7.5	BH25-4@2.5-5	BH25-5@5-10	BH25-6@5-7.5	BH25-7@5-7.5	BH25-8@7.5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6459609	6459610	6459611	6459612	6459613	6459614	6459615	6459616
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	9.4	7.4	9.8	8.0	8.5	9.2	8.6	8.0
Surrogate	Unit	Acceptable Limits									
Toluene-d8	% Recovery	50-140		96	100	91	96	93	92	94	98
4-Bromofluorobenzene	% Recovery	50-140		100	98	94	92	90	96	92	92

Certified By: [redacted]

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AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-15 **DATE REPORTED: 2025-01-23**

SAMPLE DESCRIPTION:				DUP 8	BH25-9@5-7.5	BH25-10@7.5-10	DUP 10	BH25-11@5-7.5	DUP 11	BH25-12@5-7.5	BH25-13@2.5-5
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6459617	6459618	6459619	6459620	6459621	6459622	6459623	6459624
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-15 **DATE REPORTED: 2025-01-23**

SAMPLE DESCRIPTION:				DUP 8	BH25-9@5-7.5	BH25-10@7.5-10	DUP 10	BH25-11@5-7.5	DUP 11	BH25-12@5-7.5	BH25-13@2.5-5
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6459617	6459618	6459619	6459620	6459621	6459622	6459623	6459624
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	8.0	9.8	8.0	8.0	9.2	9.2	8.2	9.6
Surrogate	Unit	Acceptable Limits									
Toluene-d8	% Recovery	50-140		95	94	92	98	93	96	95	98
4-Bromofluorobenzene	% Recovery	50-140		96	93	94	92	97	92	94	90

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-15

DATE REPORTED: 2025-01-23

SAMPLE DESCRIPTION:				BH25-14@5-7.5	BH25-15@2.5-5	BH25-16@5-7.5
SAMPLE TYPE:				Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6459625	6459626	6459627
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-15 **DATE REPORTED: 2025-01-23**

				SAMPLE DESCRIPTION:	BH25-14@5-7.5	BH25-15@2.5-5	BH25-16@5-7.5
				SAMPLE TYPE:	Soil	Soil	Soil
				DATE SAMPLED:	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL		6459625	6459626	6459627
Bromoform	ug/g	0.05	0.05		<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05		<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05		<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05		<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05		<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05		<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05		<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05		<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05		<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05		<0.05	<0.05	<0.05
Moisture Content	%		0.1		6.6	11.1	7.9
Surrogate	Unit	Acceptable Limits					
Toluene-d8	% Recovery	50-140			95	94	97
4-Bromofluorobenzene	% Recovery	50-140			92	91	101

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 1: Full Depth Background Site Condition - RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6459609-6459627 The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

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Exceedance Summary

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
6459611	BH25-3@5-7.5	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	678
6459613	BH25-5@5-10	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	302
6459617	DUP 8	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	304
6459619	BH25-10@7.5-10	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	308
6459620	DUP 10	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	360
6459624	BH25-13@2.5-5	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity (2:1)	mS/cm	0.57	0.836

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
AGAT WORK ORDER: 25T238982
PROJECT: 8368-BVD Puslinch
ATTENTION TO: Ali Rasoul
SAMPLING SITE:Puslinch
SAMPLED BY:EF

Soil Analysis

RPT Date: Jan 23, 2025			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	6459609	6459609	<0.8	<0.8	NA	< 0.8	99%	70%	130%	74%	80%	120%	76%	70%	130%
Arsenic	6459609	6459609	3	3	NA	< 1	127%	70%	130%	94%	80%	120%	110%	70%	130%
Barium	6459609	6459609	17.8	17.7	0.6%	< 2.0	104%	70%	130%	94%	80%	120%	103%	70%	130%
Beryllium	6459609	6459609	<0.5	<0.5	NA	< 0.5	108%	70%	130%	104%	80%	120%	124%	70%	130%
Boron	6459609	6459609	6	7	NA	< 5	92%	70%	130%	94%	80%	120%	106%	70%	130%
Boron (Hot Water Soluble)	6459609	6459609	<0.10	<0.10	NA	< 0.10	97%	60%	140%	101%	70%	130%	95%	60%	140%
Cadmium	6459609	6459609	<0.5	<0.5	NA	< 0.5	98%	70%	130%	96%	80%	120%	101%	70%	130%
Chromium	6459609	6459609	8	10	NA	< 5	112%	70%	130%	83%	80%	120%	90%	70%	130%
Cobalt	6459609	6459609	3.4	3.6	NA	< 0.8	100%	70%	130%	86%	80%	120%	95%	70%	130%
Copper	6459609	6459609	10.5	11.4	8.2%	< 1.0	99%	70%	130%	84%	80%	120%	81%	70%	130%
Lead	6459609	6459609	13	13	0.0%	< 1	114%	70%	130%	89%	80%	120%	87%	70%	130%
Molybdenum	6459609	6459609	0.8	1.0	NA	< 0.5	117%	70%	130%	91%	80%	120%	107%	70%	130%
Nickel	6459609	6459609	5	5	0.0%	< 1	111%	70%	130%	93%	80%	120%	100%	70%	130%
Selenium	6459609	6459609	<0.8	<0.8	NA	< 0.8	70%	70%	130%	95%	80%	120%	103%	70%	130%
Silver	6459609	6459609	<0.5	<0.5	NA	< 0.5	94%	70%	130%	90%	80%	120%	92%	70%	130%
Thallium	6459609	6459609	<0.5	<0.5	NA	< 0.5	102%	70%	130%	111%	80%	120%	119%	70%	130%
Uranium	6459609	6459609	<0.50	0.52	NA	< 0.50	110%	70%	130%	93%	80%	120%	104%	70%	130%
Vanadium	6459609	6459609	19.0	20.6	8.1%	< 2.0	128%	70%	130%	86%	80%	120%	103%	70%	130%
Zinc	6459609	6459609	94	95	1.1%	< 5	123%	70%	130%	101%	80%	120%	NA	70%	130%
Chromium, Hexavalent	6459619	6459619	<0.2	<0.2	NA	< 0.2	107%	70%	130%	86%	80%	120%	82%	70%	130%
Cyanide, WAD	6452455	6459627	<0.040	<0.040	NA	< 0.040	99%	70%	130%	90%	80%	120%	104%	70%	130%
Mercury	6459609	6459609	<0.10	<0.10	NA	< 0.10	100%	70%	130%	90%	80%	120%	102%	70%	130%
Electrical Conductivity (2:1)	6459609	6459609	0.144	0.125	14.1%	< 0.005	105%	80%	120%						
Sodium Adsorption Ratio (2:1) (Calc.)	6459609	6459609	0.725	0.651	10.8%	NA									
pH, 2:1 CaCl2 Extraction	6459378		7.48	7.64	2.1%	NA	103%	80%	120%						

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Matrix spike: Spike level < native concentration. Matrix spike acceptance limits do not apply.

More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits by up to 10% absolute.

O. Reg. 153(511) - Metals & Inorganics (Soil)									
Electrical Conductivity (2:1)	6459627	6459627	0.152	0.176	14.4%	< 0.005	102%	80%	120%
pH, 2:1 CaCl2 Extraction	6459625	6459625	7.41	7.57	2.2%	NA	103%	80%	120%

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

Soil Analysis (Continued)

RPT Date: Jan 23, 2025			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:

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AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

Trace Organics Analysis

RPT Date: Jan 23, 2025			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)															
F1 (C6 to C10)	6459627	6459627	<5	<5	NA	< 5	133%	60%	140%	104%	60%	140%	92%	60%	140%
F2 (C10 to C16)	6459609	6459609	< 10	< 10	NA	< 10	119%	60%	140%	96%	60%	140%	108%	60%	140%
F3 (C16 to C34)	6459609	6459609	< 50	< 50	NA	< 50	119%	60%	140%	104%	60%	140%	121%	60%	140%
F4 (C34 to C50)	6459609	6459609	< 50	< 50	NA	< 50	77%	60%	140%	105%	60%	140%	64%	60%	140%
O. Reg. 153(511) - PAHs (Soil)															
Naphthalene	6459616	6459616	<0.05	<0.05	NA	< 0.05	107%	50%	140%	80%	50%	140%	78%	50%	140%
Acenaphthylene	6459616	6459616	<0.05	<0.05	NA	< 0.05	106%	50%	140%	83%	50%	140%	90%	50%	140%
Acenaphthene	6459616	6459616	<0.05	<0.05	NA	< 0.05	102%	50%	140%	80%	50%	140%	93%	50%	140%
Fluorene	6459616	6459616	<0.05	<0.05	NA	< 0.05	103%	50%	140%	80%	50%	140%	90%	50%	140%
Phenanthrene	6459616	6459616	<0.05	<0.05	NA	< 0.05	109%	50%	140%	78%	50%	140%	100%	50%	140%
Anthracene	6459616	6459616	<0.05	<0.05	NA	< 0.05	104%	50%	140%	73%	50%	140%	85%	50%	140%
Fluoranthene	6459616	6459616	<0.05	<0.05	NA	< 0.05	105%	50%	140%	85%	50%	140%	83%	50%	140%
Pyrene	6459616	6459616	<0.05	<0.05	NA	< 0.05	105%	50%	140%	80%	50%	140%	83%	50%	140%
Benzo(a)anthracene	6459616	6459616	<0.05	<0.05	NA	< 0.05	90%	50%	140%	83%	50%	140%	98%	50%	140%
Chrysene	6459616	6459616	<0.05	<0.05	NA	< 0.05	122%	50%	140%	78%	50%	140%	85%	50%	140%
Benzo(b)fluoranthene	6459616	6459616	<0.05	<0.05	NA	< 0.05	91%	50%	140%	95%	50%	140%	88%	50%	140%
Benzo(k)fluoranthene	6459616	6459616	<0.05	<0.05	NA	< 0.05	100%	50%	140%	90%	50%	140%	90%	50%	140%
Benzo(a)pyrene	6459616	6459616	<0.05	<0.05	NA	< 0.05	89%	50%	140%	98%	50%	140%	90%	50%	140%
Indeno(1,2,3-cd)pyrene	6459616	6459616	<0.05	<0.05	NA	< 0.05	88%	50%	140%	85%	50%	140%	90%	50%	140%
Dibenz(a,h)anthracene	6459616	6459616	<0.05	<0.05	NA	< 0.05	81%	50%	140%	90%	50%	140%	75%	50%	140%
Benzo(g,h,i)perylene	6459616	6459616	<0.05	<0.05	NA	< 0.05	107%	50%	140%	93%	50%	140%	93%	50%	140%
O. Reg. 153(511) - VOCs (with PHC) (Soil)															
Dichlorodifluoromethane	6459627	6459627	<0.05	<0.05	NA	< 0.05	70%	50%	140%	83%	50%	140%	74%	50%	140%
Vinyl Chloride	6459627	6459627	<0.02	<0.02	NA	< 0.02	107%	50%	140%	109%	50%	140%	107%	50%	140%
Bromomethane	6459627	6459627	<0.05	<0.05	NA	< 0.05	93%	50%	140%	99%	50%	140%	109%	50%	140%
Trichlorofluoromethane	6459627	6459627	<0.05	<0.05	NA	< 0.05	82%	50%	140%	80%	50%	140%	99%	50%	140%
Acetone	6459627	6459627	<0.50	<0.50	NA	< 0.50	95%	50%	140%	94%	50%	140%	106%	50%	140%
1,1-Dichloroethylene	6459627		<0.05	<0.05	NA	< 0.05	96%	50%	140%	95%	60%	130%	107%	50%	140%
Methylene Chloride	6459627	6459627	<0.05	<0.05	NA	< 0.05	92%	50%	140%	96%	60%	130%	102%	50%	140%
Trans- 1,2-Dichloroethylene	6459627	6459627	<0.05	<0.05	NA	< 0.05	67%	50%	140%	92%	60%	130%	96%	50%	140%
Methyl tert-butyl Ether	6459627	6459627	<0.05	<0.05	NA	< 0.05	68%	50%	140%	74%	60%	130%	102%	50%	140%
1,1-Dichloroethane	6459627	6459627	<0.02	<0.02	NA	< 0.02	73%	50%	140%	78%	60%	130%	78%	50%	140%
Methyl Ethyl Ketone	6459627	6459627	<0.50	<0.50	NA	< 0.50	99%	50%	140%	133%	50%	140%	103%	50%	140%
Cis- 1,2-Dichloroethylene	6459627	6459627	<0.02	<0.02	NA	< 0.02	110%	50%	140%	97%	60%	130%	102%	50%	140%
Chloroform	6459627	6459627	<0.04	<0.04	NA	< 0.04	91%	50%	140%	77%	60%	130%	99%	50%	140%
1,2-Dichloroethane	6459627	6459627	<0.03	<0.03	NA	< 0.03	137%	50%	140%	108%	60%	130%	95%	50%	140%
1,1,1-Trichloroethane	6459627	6459627	<0.05	<0.05	NA	< 0.05	98%	50%	140%	98%	60%	130%	99%	50%	140%
Carbon Tetrachloride	6459627	6459627	<0.05	<0.05	NA	< 0.05	92%	50%	140%	100%	60%	130%	98%	50%	140%

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

Trace Organics Analysis (Continued)

RPT Date: Jan 23, 2025			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Benzene	6459627	6459627	<0.02	<0.02	NA	< 0.02	91%	50%	140%	98%	60%	130%	96%	50%	140%
1,2-Dichloropropane	6459627	6459627	<0.03	<0.03	NA	< 0.03	111%	50%	140%	93%	60%	130%	67%	50%	140%
Trichloroethylene	6459627	6459627	<0.03	<0.03	NA	< 0.03	101%	50%	140%	103%	60%	130%	95%	50%	140%
Bromodichloromethane	6459627	6459627	<0.05	<0.05	NA	< 0.05	103%	50%	140%	87%	60%	130%	71%	50%	140%
Methyl Isobutyl Ketone	6459627	6459627	<0.50	<0.50	NA	< 0.50	99%	50%	140%	91%	50%	140%	102%	50%	140%
1,1,2-Trichloroethane	6459627	6459627	<0.04	<0.04	NA	< 0.04	90%	50%	140%	106%	60%	130%	80%	50%	140%
Toluene	6459627	6459627	<0.05	<0.05	NA	< 0.05	68%	50%	140%	92%	60%	130%	93%	50%	140%
Dibromochloromethane	6459627	6459627	<0.05	<0.05	NA	< 0.05	96%	50%	140%	101%	60%	130%	121%	50%	140%
Ethylene Dibromide	6459627	6459627	<0.04	<0.04	NA	< 0.04	83%	50%	140%	91%	60%	130%	82%	50%	140%
Tetrachloroethylene	6459627		<0.05	<0.05	NA	< 0.05	83%	50%	140%	92%	60%	130%	81%	50%	140%
1,1,1,2-Tetrachloroethane	6459627	6459627	<0.04	<0.04	NA	< 0.04	85%	50%	140%	96%	60%	130%	61%	50%	140%
Chlorobenzene	6459627	6459627	<0.05	<0.05	NA	< 0.05	85%	50%	140%	93%	60%	130%	92%	50%	140%
Ethylbenzene	6459627	6459627	<0.05	<0.05	NA	< 0.05	64%	50%	140%	83%	60%	130%	61%	50%	140%
m & p-Xylene	6459627	6459627	<0.05	<0.05	NA	< 0.05	77%	50%	140%	93%	60%	130%	80%	50%	140%
Bromoform	6459627	6459627	<0.05	<0.05	NA	< 0.05	87%	50%	140%	96%	60%	130%	69%	50%	140%
Styrene	6459627	6459627	<0.05	<0.05	NA	< 0.05	82%	50%	140%	95%	60%	130%	74%	50%	140%
1,1,2,2-Tetrachloroethane	6459627	6459627	<0.05	<0.05	NA	< 0.05	84%	50%	140%	84%	60%	130%	74%	50%	140%
o-Xylene	6459627	6459627	<0.05	<0.05	NA	< 0.05	83%	50%	140%	95%	60%	130%	83%	50%	140%
1,3-Dichlorobenzene	6459627	6459627	<0.05	<0.05	NA	< 0.05	89%	50%	140%	91%	60%	130%	86%	50%	140%
1,4-Dichlorobenzene	6459627	6459627	<0.05	<0.05	NA	< 0.05	94%	50%	140%	92%	60%	130%	89%	50%	140%
1,2-Dichlorobenzene	6459627	6459627	<0.05	<0.05	NA	< 0.05	99%	50%	140%	91%	60%	130%	83%	50%	140%
n-Hexane	6459627	6459627	<0.05	<0.05	NA	< 0.05	67%	50%	140%	96%	60%	130%	83%	50%	140%
O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)															
F2 (C10 to C16)	6462090		71	74	4.1%	< 10	116%	60%	140%	61%	60%	140%	109%	60%	140%
F3 (C16 to C34)	6462090		< 50	< 50	NA	< 50	114%	60%	140%	65%	60%	140%	72%	60%	140%
F4 (C34 to C50)	6462090		< 50	< 50	NA	< 50	96%	60%	140%	72%	60%	140%	69%	60%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

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AGAT Laboratories

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TEL (905)712-5100
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http://www.agatlabs.com

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

ATTENTION TO: Ali Rasoul

RPT Date: Jan 23, 2025

PARAMETER	Sample Id	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)										
Antimony	6459609	99%	70%	130%	74%	80%	120%	76%	70%	130%

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Matrix spike: Spike level < native concentration. Matrix spike acceptance limits do not apply.

More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits by up to 10% absolute.

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	modified from EPA 6010D and MSA PART 3, CH 21	ICP/OES
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium, Hexavalent	INOR-93-6068	modified from EPA 3060 and EPA 7196	SPECTROPHOTOMETER
Cyanide, WAD	INOR-93-6052	modified from ON MOECC E3015, SM 4500-CN- I, G-387	SEGMENTED FLOW ANALYSIS
Mercury	MET-93-6103	modified from EPA 7471B and SM 3112 B	ICP-MS
Electrical Conductivity (2:1)	INOR-93-6075	modified from MSA PART 3, CH 14 and SM 2510 B	PC TITRATE
Sodium Adsorption Ratio (2:1) (Calc.)	INOR-93-6007	modified from EPA 6010D & Analytical Protocol	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6075	modified from EPA 9045D, MCKEAGUE 3.11 E3137	PC TITRATE

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluorene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Chrysene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acridine-d9	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Terphenyl-d14	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Moisture Content	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
F1 (C6 to C10)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method	P&T GC/FID
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34) minus PAHs	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Dichlorodifluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS

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AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Vinyl Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T238982

PROJECT: 8368-BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch

SAMPLED BY:EF

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
m & p-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS

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webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 25T238982

Cooler Quantity: 1 lg

Arrival Temperatures: 3.2 | 3.1 | 3.0

Custody Seal Intact: ☐ Yes ☐ No ☑ N/A

Notes: LIT

Report Information:

Company: A & A Environmental Consultants Inc.
Contact: Dr. Ali Rasoul
Address: 16 Young St
Woodstock, ON
Phone: 519-266-4680 Fax: 519-266-3666
Reports to be sent to:
1. Email: arasoul@aaenvironmental.ca, vsowden@"
2. Email: sscott@"; tdemers@" ; ckennedy@"

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☑ Regulation 153/04
Table (Indicate One): ☑ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One): ☑ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region (Indicate One)
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
(Indicate One)

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: 8368-BVD Puslinch
Site Location: Puslinch
Sampled By: EF
AGAT Quote #: 16288129079 PO: 8368-BVD Puslinch
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:
Contact:
Address:
Email:

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics	All Metals	153 Metals (excl. Hydrides)	Hydride Metals	153 Metals (incl. Hydrides)	ORPs: B-HWS	Cl	CN	Cr^{6+}	EC	FOC	Hg	pH	SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: TP	NH_3	TKN	NO_3	NO_2	NO_3+NO_2	Volatiles: VOC	BTEX	THM	PHCs F1 - F4	ABNs	PAHs	PCBs: Total	Aroclors	Organochlorine Pesticides	TCLP: M&I	VOCs	ABNs	B(a)P	PCBs	Sewer Use	Mettals Soil 93-101	Metals Water 93-196	CCME F1-F4/VOCs Soil 91-248	CCME F1-F4/VOCs Water 91-249	CCME F1-F4/ BTEX Water 91-315	Sieve & texture (75 Micron)
BH25-1@0-2.5	Jan 15		3	S			☑																										☑												☑			
BH25-2@0-5	Jan 15		3	S			☑																										☑												☑			
BH25-3@5-7.5	Jan 15		3	S			☑																										☑												☑			
BH25-4@2.5-5	Jan 15		3	S			☑																										☑												☑			
BH25-5@5-10	Jan 15		3	S			☑																										☑												☑			
BH25-6@5-7.5	Jan 15		3	S			☑																										☑												☑			
BH25-7@5-7.5	Jan 15		3	S			☑																										☑												☑			
BH25-8@7.5-10	Jan 15		3	S			☑																										☑												☑			
DUP 8	Jan 15		3	S			☑																										☑												☑			
BH25-9@5-7.5	Jan 15		3	S	**please adjust soil texture		☑																										☑												☑			
BH25-10@7.5-10	Jan 15		3	S	to results of sieve analysis		☑																										☑												☑			

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
S. Scott [redacted]	Jan 15		[redacted]	Jan 15	3:12

Page 1 of 2

N°:

Document ID: DW78-1511-015

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

Date Issued: March 16, 2015

AGAT Laboratories

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Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 25T238982

Cooler Quantity: 1 | 9

Arrival Temperatures: 5 | 6 | 5 | 1

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes:

Report Information:

Company: A & A Environmental Consultants Inc.
Contact: Dr. Ali Rasoul
Address: 16 Young St
Woodstock, ON
Phone: 519-266-4680 Fax: 519-266-3666
Reports to be sent to:
1. Email: arasoul@aacnvironmental.ca, vsowden@"
2. Email: sscott@"; tdemers@" ; ckennedy@"

Regulatory Requirements:

☐ No Regulatory Requirement

(Please check all applicable boxes)

☑ Regulation 153/04
Table (Indicate One): ☑ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One): ☑ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary ☐ Storm
Region (Indicate One)
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
(Indicate One)

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: 8368-BVD Puslinch
Site Location: Puslinch
Sampled By: EF
AGAT Quote #: 16288129079 PO: 8368-BVD Puslinch
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (incl. Hydrides))	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr6+ ☑ EC ☐ FOC ☐ Hg ☑ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☑ M&I ☑ VOCs ☑ ABNs ☑ B(a)P ☑ PCBs	Sewer Use	Metals Soil 93-101	Metals Water 93-196	CCME F1-F4/VOCs Soil 91-248	CCME F1-F4/VOCs Water 91-249	CCME F1-F4/ BTEX Water 91-315	Sieve & texture (75 Micron)
DUP 10	Jan 15		3	S			☑							☑					☑					
BH25-11@5-7.5	Jan 15		3	S			☑							☑					☑					
DUP 11	Jan 15		3	S			☑							☑					☑					
BH25-12@5-7.5	Jan 15		3	S			☑							☑					☑					
BH25-13@2.5-5	Jan 15		3	S			☑							☑					☑					
BH25-14@5-7.5	Jan 15		3	S			☑							☑					☑					
BH25-15@2.5-5	Jan 15		3	S			☑							☑					☑					
BH25-16@5-7.5	Jan 15		4	S			☑							☑					☑					
					**please adjust soil texture																			
					to results of sieve analysis																			

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
S. Scott [redacted]	Jan 15		[redacted]	Jan 15	3:12p
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time

Page 2 of 2

N°:

Document ID: DW-78-1511.015

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

Date Issued: March 26, 2018

AGAT Laboratories

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CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
16 Young Street
WOODSTOCK, ON N4S3L4
(519) 266-4680

ATTENTION TO: Ali Rasoul

PROJECT: 8368 BVD Puslinch Delineation

AGAT WORK ORDER: 25T239421

SOIL ANALYSIS REVIEWED BY: Chuandi Zhang, Inorganic Supervisor

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Jan 27, 2025

PAGES (INCLUDING COVER): 22

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
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- The test results reported herewith relate only to the samples as received by the laboratory.
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- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Certificate of Analysis

AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-16 **DATE REPORTED: 2025-01-27**

SAMPLE DESCRIPTION:				BH25-17 @ 0-2.5	BH25-18 @ 7. 5-10	DUP 25-18	BH25-19 @2.5-5	BH25-20 @ 5-7.5	BH25-21 @ 5-10	DUP 25-21	BH25-22 @ 7. 5-10
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6461794	6461795	6461796	6461797	6461798	6461799	6461800	6461801
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	9	4	5	9	3	3	3	4
Barium	µg/g	220	2.0	75.3	21.8	20.6	56.8	22.4	20.1	17.8	19.8
Beryllium	µg/g	2.5	0.5	0.5	<0.5	<0.5	1.0	<0.5	<0.5	<0.5	<0.5
Boron	µg/g	36	5	15	9	8	17	9	7	8	9
Boron (Hot Water Soluble)	µg/g	NA	0.10	0.46	<0.10	<0.10	0.73	0.59	0.46	0.32	0.13
Cadmium	µg/g	1.2	0.5	0.5	0.8	0.7	<0.5	<0.5	<0.5	<0.5	0.5
Chromium	µg/g	70	5	15	8	7	24	11	8	8	8
Cobalt	µg/g	21	0.8	9.0	3.9	3.9	14.4	4.7	3.4	3.3	4.3
Copper	µg/g	92	1.0	48.8	16.5	16.8	39.8	12.8	14.5	14.7	15.9
Lead	µg/g	120	1	72	29	27	13	15	52	25	26
Molybdenum	µg/g	2	0.5	1.3	<0.5	<0.5	0.7	0.6	0.9	0.7	<0.5
Nickel	µg/g	82	1	16	7	7	30	10	7	6	8
Selenium	µg/g	1.5	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	2.5	0.50	<0.50	<0.50	<0.50	0.60	<0.50	<0.50	<0.50	<0.50
Vanadium	µg/g	86	2.0	22.3	13.8	12.6	29.7	16.7	17.5	15.1	13.0
Zinc	µg/g	290	5	232	264	253	88	108	137	144	217
Chromium, Hexavalent	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	0.13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.57	0.005	0.203	0.213	0.145	0.802	0.137	0.217	0.197	0.162
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	2.4	N/A	0.328	0.412	0.394	1.13	0.802	0.495	0.562	1.87
pH, 2:1 CaCl2 Extraction	pH Units		NA	8.10	7.44	7.15	7.30	7.10	7.00	6.95	6.87

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-16 **DATE REPORTED: 2025-01-27**

		SAMPLE DESCRIPTION:		DUP 25-22	BH25-23 @ 5-7.5	BH25-24 @ 2. 5-7.5
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6461802	6461803	6461804
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	4	4	7
Barium	µg/g	220	2.0	20.7	20.5	46.7
Beryllium	µg/g	2.5	0.5	<0.5	<0.5	0.7
Boron	µg/g	36	5	9	9	9
Boron (Hot Water Soluble)	µg/g	NA	0.10	<0.10	0.15	0.16
Cadmium	µg/g	1.2	0.5	0.7	0.7	<0.5
Chromium	µg/g	70	5	9	8	17
Cobalt	µg/g	21	0.8	4.8	3.7	7.6
Copper	µg/g	92	1.0	20.6	16.7	25.4
Lead	µg/g	120	1	25	23	40
Molybdenum	µg/g	2	0.5	<0.5	<0.5	0.7
Nickel	µg/g	82	1	8	7	17
Selenium	µg/g	1.5	0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5
Thallium	µg/g	1	0.5	<0.5	<0.5	<0.5
Uranium	µg/g	2.5	0.50	<0.50	<0.50	0.56
Vanadium	µg/g	86	2.0	14.0	12.6	27.4
Zinc	µg/g	290	5	258	393	279
Chromium, Hexavalent	µg/g	0.66	0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.051	0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.57	0.005	0.146	0.156	0.187
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	2.4	N/A	1.04	0.630	0.540
pH, 2:1 CaCl2 Extraction	pH Units		NA	6.85	6.88	7.00

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-16 **DATE REPORTED: 2025-01-27**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON 406/19 T1 RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6461794-6461804 EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio. SAR is a calculated parameter.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2025-01-16 **DATE REPORTED: 2025-01-27**

				BH25-17 @	BH25-18 @ 7.			BH25-20 @			BH25-22 @ 7.
SAMPLE DESCRIPTION:				0-2.5	5-10	DUP 25-18	BH25-19 @2.5-5	5-7.5	BH25-21 @ 5-10	DUP 25-21	5-10
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6461794	6461795	6461796	6461797	6461798	6461799	6461800	6461801
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.12	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.25	0.24	<0.05
Anthracene	µg/g	0.16	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.10	0.08	<0.05
Fluoranthene	µg/g	0.56	0.05	0.07	<0.05	<0.05	<0.05	<0.05	0.37	0.35	<0.05
Pyrene	µg/g	1	0.05	0.06	<0.05	<0.05	<0.05	<0.05	0.27	0.25	<0.05
Benzo(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.11	0.10	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.13	0.13	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.15	0.20	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.08	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.12	0.13	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.08	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.11	0.13	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	11.3	8.6	8.2	7.8	8.1	8.1	6.0	10.4
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		65	65	55	70	60	70		55
Naphthalene-d8		50-140								77	
Acridine-d9	%	50-140		115	115	105	100	85	90	114	85
Terphenyl-d14	%	50-140		125	105	120	100	105	85	75	105

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2025-01-16 **DATE REPORTED: 2025-01-27**

		SAMPLE DESCRIPTION:		DUP 25-22	BH25-23 @ 5-7.5	BH25-24 @ 2. 5-7.5
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6461802	6461803	6461804
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.12	0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.16	0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.56	0.05	<0.05	0.10	<0.05
Pyrene	µg/g	1	0.05	<0.05	0.08	<0.05
Benzo(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	7.0	8.9	15.4
Surrogate	Unit	Acceptable Limits				
Naphthalene-d8	%	50-140		63	61	70
Acridine-d9	%	50-140		61	94	110
Terphenyl-d14	%	50-140		67	99	65

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON 406/19 T1 RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6461794-6461804 Results are based on the dry weight of the soil.
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&j)Fluoranthene isomers because the isomers co-elute on the GC column.
2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)

DATE RECEIVED: 2025-01-16 **DATE REPORTED: 2025-01-27**

		SAMPLE DESCRIPTION:		BH25-17 @ 0-2.5	BH25-18 @ 7. 5-10	DUP 25-18	BH25-19 @2.5-5	BH25-20 @ 5-7.5	BH25-21 @ 5-10	DUP 25-21	BH25-22 @ 7. 5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6461794	6461795	6461796	6461797	6461798	6461799	6461800	6461801
F1 (C6 to C10)	µg/g		5	<5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50	<50	<50	235	194	<50
F3 (C16 to C34) minus PAHs	µg/g	240	50	<50	<50	<50	<50	<50	234	193	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50	<50	74	439	397	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	11.3	8.6	8.2	7.8	8.1	8.1	6.0	10.4
Surrogate	Unit	Acceptable Limits									
Toluene-d8	%	50-140		102	100	97	99	91	93	97	97
Terphenyl	%	60-140		92	88	99	80	98	99	120	130

Certified By: [redacted]

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AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)

DATE RECEIVED: 2025-01-16 **DATE REPORTED: 2025-01-27**

		SAMPLE DESCRIPTION:		DUP 25-22	BH25-23 @ 5-7.5	BH25-24 @ 2. 5-7.5
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6461802	6461803	6461804
F1 (C6 to C10)	µg/g		5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	240	50	<50	<50	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA
Moisture Content	%		0.1	7.0	8.9	15.4
Surrogate	Unit	Acceptable Limits				
Toluene-d8	%	50-140		96	101	96
Terphenyl	%	60-140		110	94	92

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON 406/19 T1 RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6461794-6461804 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX and PAH contributions.
C>10 – C16 (F2- Naphthalene) is a calculated parameter. The calculated value is F2 - Naphthalene.
C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (PAH: sum of Phenanthrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene and Pyrene).
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

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AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-16 **DATE REPORTED: 2025-01-27**

SAMPLE DESCRIPTION:				BH25-17 @ 0-2.5	BH25-18 @ 7. 5-10	DUP 25-18	BH25-19 @2.5-5	BH25-20 @ 5-7.5	BH25-21 @ 5-10	DUP 25-21	BH25-22 @ 7. 5-10
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6461794	6461795	6461796	6461797	6461798	6461799	6461800	6461801
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-16 **DATE REPORTED: 2025-01-27**

				SAMPLE DESCRIPTION:	BH25-17 @ 0-2.5	BH25-18 @ 7. 5-10	DUP 25-18	BH25-19 @2.5-5	BH25-20 @ 5-7.5	BH25-21 @ 5-10	DUP 25-21	BH25-22 @ 7. 5-10
				SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL		6461794	6461795	6461796	6461797	6461798	6461799	6461800	6461801
m & p-Xylene	ug/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	ug/g	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1		11.3	8.6	8.2	7.8	8.1	8.1	6.0	10.4
Surrogate	Unit	Acceptable Limits										
Toluene-d8	% Recovery	50-140			102	100	97	99	91	93	97	97
4-Bromofluorobenzene	% Recovery	50-140			80	73	75	74	74	71	74	73

Certified By: [redacted]

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AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-16 **DATE REPORTED: 2025-01-27**

		SAMPLE DESCRIPTION:		DUP 25-22	BH25-23 @ 5-7.5	BH25-24 @ 2. 5-7.5
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6461802	6461803	6461804
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-16 **DATE REPORTED: 2025-01-27**

			SAMPLE DESCRIPTION:	DUP 25-22	BH25-23 @ 5-7.5	BH25-24 @ 2. 5-7.5
			SAMPLE TYPE:	Soil	Soil	Soil
			DATE SAMPLED:	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6461802	6461803	6461804
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	7.0	8.9	15.4
Surrogate	Unit	Acceptable Limits				
Toluene-d8	% Recovery	50-140		96	101	96
4-Bromofluorobenzene	% Recovery	50-140		74	73	74

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON 406/19 T1 RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6461794-6461804 The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Exceedance Summary

AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
6461797	BH25-19 @2.5-5	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity (2:1)	mS/cm	0.57	0.802
6461799	BH25-21 @ 5-10	ON 406/19 T1 RPIC	O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)	F4 (C34 to C50)	µg/g	120	439
6461800	DUP 25-21	ON 406/19 T1 RPIC	O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)	F4 (C34 to C50)	µg/g	120	397
6461803	BH25-23 @ 5-7.5	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	393

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
AGAT WORK ORDER: 25T239421
PROJECT: 8368 BVD Puslinch Delineation
ATTENTION TO: Ali Rasoul
SAMPLING SITE:7504 McLean Rd., Puslinch, ON
SAMPLED BY:E.F.

Soil Analysis

RPT Date: Jan 27, 2025			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	6461767		<0.8	<0.8	NA	< 0.8	101%	70%	130%	96%	80%	120%	78%	70%	130%
Arsenic	6461767		5	5	0.0%	< 1	127%	70%	130%	93%	80%	120%	113%	70%	130%
Barium	6461767		50.3	49.2	2.2%	< 2.0	109%	70%	130%	100%	80%	120%	117%	70%	130%
Beryllium	6461767		<0.5	<0.5	NA	< 0.5	123%	70%	130%	119%	80%	120%	138%	70%	130%
Boron	6461767		9	8	NA	< 5	94%	70%	130%	103%	80%	120%	111%	70%	130%
Boron (Hot Water Soluble)	6461794	6461794	0.46	0.49	NA	< 0.10	100%	60%	140%	99%	70%	130%	102%	60%	140%
Cadmium	6461767		<0.5	<0.5	NA	< 0.5	123%	70%	130%	100%	80%	120%	108%	70%	130%
Chromium	6461767		12	11	NA	< 5	117%	70%	130%	96%	80%	120%	107%	70%	130%
Cobalt	6461767		6.0	6.1	1.7%	< 0.8	102%	70%	130%	85%	80%	120%	99%	70%	130%
Copper	6461767		32.9	33.6	2.1%	< 1.0	120%	70%	130%	104%	80%	120%	NA	70%	130%
Lead	6461767		17	16	6.1%	< 1	118%	70%	130%	90%	80%	120%	96%	70%	130%
Molybdenum	6461767		<0.5	<0.5	NA	< 0.5	117%	70%	130%	100%	80%	120%	116%	70%	130%
Nickel	6461767		11	11	0.0%	< 1	113%	70%	130%	94%	80%	120%	108%	70%	130%
Selenium	6461767		<0.8	<0.8	NA	< 0.8	81%	70%	130%	97%	80%	120%	114%	70%	130%
Silver	6461767		<0.5	<0.5	NA	< 0.5	103%	70%	130%	88%	80%	120%	99%	70%	130%
Thallium	6461767		<0.5	<0.5	NA	< 0.5	88%	70%	130%	108%	80%	120%	120%	70%	130%
Uranium	6461767		<0.50	<0.50	NA	< 0.50	88%	70%	130%	82%	80%	120%	91%	70%	130%
Vanadium	6461767		19.6	18.1	8.0%	< 2.0	116%	70%	130%	83%	80%	120%	117%	70%	130%
Zinc	6461767		161	154	4.4%	< 5	129%	70%	130%	112%	80%	120%	NA	70%	130%
Chromium, Hexavalent	6461795	6461795	<0.2	<0.2	NA	< 0.2	102%	70%	130%	90%	80%	120%	85%	70%	130%
Cyanide, WAD	6461778		<0.040	<0.040	NA	< 0.040	108%	70%	130%	98%	80%	120%	100%	70%	130%
Mercury	6461767		<0.10	<0.10	NA	< 0.10	103%	70%	130%	96%	80%	120%	102%	70%	130%
Electrical Conductivity (2:1)	6461767		0.152	0.140	8.2%	< 0.005	96%	80%	120%						
Sodium Adsorption Ratio (2:1) (Calc.)	6461767		0.297	0.288	3.1%	NA									
pH, 2:1 CaCl2 Extraction	6464465		6.84	6.86	0.3%	NA	101%	80%	120%						

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.
For a multi-element scan for lab control standards and matrix spikes, up to 10% of analytes may exceed the quoted limits by up to 10% absolute and it is considered acceptable.

O. Reg. 153(511) - Metals & Inorganics (Soil)															
Electrical Conductivity (2:1)	6461764		1.58	1.49	5.9%	< 0.005	99%	80%	120%						

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By:

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

Trace Organics Analysis

RPT Date: Jan 27, 2025			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)															
F1 (C6 to C10)	6459801		<5	<5	NA	< 5	84%	60%	140%	77%	60%	140%	88%	60%	140%
F2 (C10 to C16)	6461957		< 7	< 7	NA	< 10	125%	60%	140%	82%	60%	140%	102%	60%	140%
F3 (C16 to C34)	6461957		< 50	< 50	NA	< 50	125%	60%	140%	87%	60%	140%	110%	60%	140%
F4 (C34 to C50)	6461957		< 50	< 50	NA	< 50	82%	60%	140%	70%	60%	140%	69%	60%	140%
O. Reg. 153(511) - VOCs (with PHC) (Soil)															
Dichlorodifluoromethane	6459801		<0.05	<0.05	NA	< 0.05	118%	50%	140%	82%	50%	140%	66%	50%	140%
Vinyl Chloride	6459801		<0.02	<0.02	NA	< 0.02	103%	50%	140%	74%	50%	140%	66%	50%	140%
Bromomethane	6459801		<0.05	<0.05	NA	< 0.05	93%	50%	140%	52%	50%	140%	68%	50%	140%
Trichlorofluoromethane	6459801		<0.05	<0.05	NA	< 0.05	72%	50%	140%	100%	50%	140%	85%	50%	140%
Acetone	6459801		<0.50	<0.50	NA	< 0.50	112%	50%	140%	102%	50%	140%	94%	50%	140%
1,1-Dichloroethylene	6459801		<0.05	<0.05	NA	< 0.05	61%	50%	140%	79%	60%	130%	103%	50%	140%
Methylene Chloride	6459801		<0.05	<0.05	NA	< 0.05	75%	50%	140%	81%	60%	130%	110%	50%	140%
Trans- 1,2-Dichloroethylene	6459801		<0.05	<0.05	NA	< 0.05	65%	50%	140%	85%	60%	130%	98%	50%	140%
Methyl tert-butyl Ether	6459801		<0.05	<0.05	NA	< 0.05	86%	50%	140%	68%	60%	130%	71%	50%	140%
1,1-Dichloroethane	6459801		<0.02	<0.02	NA	< 0.02	95%	50%	140%	116%	60%	130%	109%	50%	140%
Methyl Ethyl Ketone	6459801		<0.50	<0.50	NA	< 0.50	100%	50%	140%	110%	50%	140%	109%	50%	140%
Cis- 1,2-Dichloroethylene	6459801		<0.02	<0.02	NA	< 0.02	93%	50%	140%	105%	60%	130%	103%	50%	140%
Chloroform	6459801		<0.04	<0.04	NA	< 0.04	101%	50%	140%	112%	60%	130%	109%	50%	140%
1,2-Dichloroethane	6459801		<0.03	<0.03	NA	< 0.03	102%	50%	140%	119%	60%	130%	110%	50%	140%
1,1,1-Trichloroethane	6459801		<0.05	<0.05	NA	< 0.05	93%	50%	140%	96%	60%	130%	98%	50%	140%
Carbon Tetrachloride	6459801		<0.05	<0.05	NA	< 0.05	74%	50%	140%	76%	60%	130%	77%	50%	140%
Benzene	6459801		<0.02	<0.02	NA	< 0.02	88%	50%	140%	93%	60%	130%	98%	50%	140%
1,2-Dichloropropane	6459801		<0.03	<0.03	NA	< 0.03	108%	50%	140%	95%	60%	130%	111%	50%	140%
Trichloroethylene	6459801		<0.03	<0.03	NA	< 0.03	101%	50%	140%	95%	60%	130%	88%	50%	140%
Bromodichloromethane	6459801		<0.05	<0.05	NA	< 0.05	108%	50%	140%	95%	60%	130%	96%	50%	140%
Methyl Isobutyl Ketone	6459801		<0.50	<0.50	NA	< 0.50	103%	50%	140%	103%	50%	140%	90%	50%	140%
1,1,2-Trichloroethane	6459801		<0.04	<0.04	NA	< 0.04	110%	50%	140%	102%	60%	130%	108%	50%	140%
Toluene	6459801		<0.05	<0.05	NA	< 0.05	93%	50%	140%	100%	60%	130%	112%	50%	140%
Dibromochloromethane	6459801		<0.05	<0.05	NA	< 0.05	102%	50%	140%	103%	60%	130%	105%	50%	140%
Ethylene Dibromide	6459801		<0.04	<0.04	NA	< 0.04	95%	50%	140%	108%	60%	130%	111%	50%	140%
Tetrachloroethylene	6459801		<0.05	<0.04	NA	< 0.05	96%	50%	140%	108%	60%	130%	112%	50%	140%
1,1,1,2-Tetrachloroethane	6459801		<0.04	<0.04	NA	< 0.04	101%	50%	140%	117%	60%	130%	108%	50%	140%
Chlorobenzene	6459801		<0.05	<0.05	NA	< 0.05	117%	50%	140%	108%	60%	130%	97%	50%	140%
Ethylbenzene	6459801		<0.05	<0.05	NA	< 0.05	85%	50%	140%	84%	60%	130%	89%	50%	140%
m & p-Xylene	6459801		<0.05	<0.05	NA	< 0.05	91%	50%	140%	95%	60%	130%	100%	50%	140%
Bromoform	6459801		<0.05	<0.05	NA	< 0.05	116%	50%	140%	114%	60%	130%	99%	50%	140%
Styrene	6459801		<0.05	<0.05	NA	< 0.05	103%	50%	140%	93%	60%	130%	102%	50%	140%
1,1,2,2-Tetrachloroethane	6459801		<0.05	<0.05	NA	< 0.05	90%	50%	140%	118%	60%	130%	107%	50%	140%
o-Xylene	6459801		<0.05	<0.05	NA	< 0.05	97%	50%	140%	95%	60%	130%	98%	50%	140%

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
AGAT WORK ORDER: 25T239421
PROJECT: 8368 BVD Puslinch Delineation
ATTENTION TO: Ali Rasoul
SAMPLING SITE:7504 McLean Rd., Puslinch, ON
SAMPLED BY:E.F.

Trace Organics Analysis (Continued)

RPT Date: Jan 27, 2025			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
1,3-Dichlorobenzene	6459801		<0.05	<0.05	NA	< 0.05	98%	50%	140%	111%	60%	130%	97%	50%	140%
1,4-Dichlorobenzene	6459801		<0.05	<0.05	NA	< 0.05	102%	50%	140%	112%	60%	130%	97%	50%	140%
1,2-Dichlorobenzene	6459801		<0.05	<0.05	NA	< 0.05	85%	50%	140%	109%	60%	130%	103%	50%	140%
n-Hexane	6459801		<0.05	<0.05	NA	< 0.05	83%	50%	140%	82%	60%	130%	99%	50%	140%
O. Reg. 153(511) - PAHs (Soil)															
Naphthalene	6467940		<0.05	<0.05	NA	< 0.05	89%	50%	140%	80%	50%	140%	88%	50%	140%
Acenaphthylene	6467940		<0.05	<0.05	NA	< 0.05	81%	50%	140%	75%	50%	140%	78%	50%	140%
Acenaphthene	6467940		<0.05	<0.05	NA	< 0.05	90%	50%	140%	78%	50%	140%	90%	50%	140%
Fluorene	6467940		<0.05	<0.05	NA	< 0.05	88%	50%	140%	70%	50%	140%	75%	50%	140%
Phenanthrene	6467940		<0.05	<0.05	NA	< 0.05	86%	50%	140%	88%	50%	140%	101%	50%	140%
Anthracene	6467940		<0.05	<0.05	NA	< 0.05	86%	50%	140%	80%	50%	140%	98%	50%	140%
Fluoranthene	6467940		0.10	0.11	NA	< 0.05	85%	50%	140%	90%	50%	140%	86%	50%	140%
Pyrene	6467940		0.12	0.11	NA	< 0.05	80%	50%	140%	80%	50%	140%	81%	50%	140%
Benzo(a)anthracene	6467940		<0.05	<0.05	NA	< 0.05	71%	50%	140%	73%	50%	140%	96%	50%	140%
Chrysene	6467940		0.05	0.06	NA	<0.05	112%	50%	140%	90%	50%	140%	86%	50%	140%
Benzo(b)fluoranthene	6467940		<0.05	<0.05	NA	< 0.05	107%	50%	140%	78%	50%	140%	103%	50%	140%
Benzo(k)fluoranthene	6467940		<0.05	<0.05	NA	< 0.05	103%	50%	140%	95%	50%	140%	80%	50%	140%
Benzo(a)pyrene	6467940		<0.05	<0.05	NA	< 0.05	114%	50%	140%	95%	50%	140%	103%	50%	140%
Indeno(1,2,3-cd)pyrene	6467940		<0.05	<0.05	NA	< 0.05	90%	50%	140%	85%	50%	140%	105%	50%	140%
Dibenz(a,h)anthracene	6467940		<0.05	<0.05	NA	< 0.05	86%	50%	140%	85%	50%	140%	83%	50%	140%
Benzo(g,h,i)perylene	6467940		<0.05	<0.05	NA	< 0.05	106%	50%	140%	108%	50%	140%	98%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: [redacted]

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CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

RPT Date: Jan 27, 2025		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)										
Beryllium		123%	70%	130%	119%	80%	120%	138%	70%	130%

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.
For a multi-element scan for lab control standards and matrix spikes, up to 10% of analytes may exceed the quoted limits by up to 10% absolute and it is considered acceptable.

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	modified from EPA 6010D and MSA PART 3, CH 21	ICP/OES
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium, Hexavalent	INOR-93-6068	modified from EPA 3060 and EPA 7196	SPECTROPHOTOMETER
Cyanide, WAD	INOR-93-6052	modified from ON MOECC E3015, SM 4500-CN- I, G-387	SEGMENTED FLOW ANALYSIS
Mercury	MET-93-6103	modified from EPA 7471B and SM 3112 B	ICP-MS
Electrical Conductivity (2:1)	INOR-93-6075	modified from MSA PART 3, CH 14 and SM 2510 B	PC TITRATE
Sodium Adsorption Ratio (2:1) (Calc.)	INOR-93-6007	modified from EPA 6010D & Analytical Protocol	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6075	modified from EPA 9045D, MCKEAGUE 3.11 E3137	PC TITRATE

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluorene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Chrysene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acridine-d9	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Terphenyl-d14	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Moisture Content	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
F1 (C6 to C10)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method	P&T GC/FID
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34) minus PAHs	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Dichlorodifluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Vinyl Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T239421

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
m & p-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS

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AGAT Laboratories

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Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only
Work Order #: 25T239421
Cooler Quantity: 1 lg
Arrival Temperatures: 3.2 | 3.9 | 3.8
Custody Seal Intact: ☐ Yes ☐ No ☑ N/A
Notes: L H

Report Information:
Company: A & A Environmental Consultants Inc.
Contact: Dr. Ali Rasoul
Address: 16 Young St
Woodstock, ON
Phone: 519-266-4680 Fax: 519-266-3666
Reports to be sent to:
1. Email: arasoul@aacnvironmental.ca, vsowden@"
2. Email: sscott@"; tdemers@" ; ckennedy@"

Regulatory Requirements: ☐ No Regulatory Requirement
(Please check all applicable boxes)

☑ Regulation 153/04
Table 1 (Indicate One)
☑ Ind/Com
☑ Res/Park
☐ Agriculture
Soil Texture (Check One)
☑ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region _____ (Indicate One)
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ (Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Turnaround Time (TAT) Required:
Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply): _____
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CPM

Project Information:
Project: 8368 BVD Puslinch Delineation
Site Location: 7504 McLean Rd., Puslinch, ON
Sampled By: E.F.
AGAT Quote #: 16288129079 PO: 8368
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:
Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

Sample Matrix Legend
B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI Y/N	O. Reg 153: Metals and Inorganics	O. Reg 153: All Metals ☐ / 153 Metals (excl. Hydrides) ☐ / Hydride Metals ☐ / 153 Metals (incl. Hydrides) ☐	O. Reg 153: ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☑ EC ☐ FOC ☐ Hg ☑ pH ☑ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☑ M&I ☑ VOCs ☑ ABNs ☑ B(a)P ☑ PCBs	Sewer Use	Metals Soil 93-101	Metals Water 93-196	CCME F1-F4/VOCs Soil 91-248	CCME F1-F4/VOCs Water 91-249	CCME F1-F4/ BTEX Water 91-315	Sieve & texture (75 Micron)
BH25-17 @ 0-2.5	1/15/25		4	S			☑		☑						☑									☑		
BH25-18 @ 7.5-10	1/15/25		4	S			☑		☑						☑									☑		
DUP 25-18	1/15/25		4	S			☑		☑						☑									☑		
BH25-19 @ 2.5-5	1/15/25		4	S			☑		☑						☑									☑		
BH25-20 @ 5-7.5	1/15/25		4	S			☑		☑						☑									☑		
BH25-21 @ 5-10	1/15/25		4	S			☑		☑						☑									☑		
DUP 25-21	1/15/25		4	S			☑		☑						☑									☑		
BH25-22 @ 7.5-10	1/15/25		4	S			☑		☑						☑									☑		
DUP 25-22	1/15/25		4	S			☑		☑						☑									☑		
BH25-23 @ 5-7.5	1/15/25		4	S			☑		☑						☑									☑		
BH25-24 @ 2.5-7.5	1/15/25		4	S			☑		☑						☑									☑		

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
E. Fulsom [redacted]	1/16/25	11am	[redacted]	Jan 16	3:20pm
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time

Page 1 of 1
N°:

AGAT Laboratories

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CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
16 Young Street
WOODSTOCK, ON N4S3L4
(519) 266-4680

ATTENTION TO: Ali Rasoul

PROJECT: 8368 BVD Puslinch Delineation

AGAT WORK ORDER: 25T239704

SOIL ANALYSIS REVIEWED BY: Nivine Basily, Inorganic Team Lead

TRACE ORGANICS REVIEWED BY: Radhika Chakraberty, Trace Organics Lab Manager

DATE REPORTED: Jan 27, 2025

PAGES (INCLUDING COVER): 22

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Certificate of Analysis

AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-17 **DATE REPORTED: 2025-01-27**

				BH25-25 @ 7.	BH25-26 @ 7.	BH25-27 @	BH25-28 @ 7.	BH25-29 @ 2.		BH25-31 @ 7.	BH25-32 @
SAMPLE DESCRIPTION:				5-10	5-10	5-7.5	5-10	5-7.5	BH25-30 @ 0-5	5-10	5-7.5
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6463158	6463162	6463163	6463164	6463165	6463166	6463167	6463168
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	4	4	4	4	5	7	4	4
Barium	µg/g	220	2.0	19.5	21.5	20.1	19.1	47.0	37.2	21.4	19.2
Beryllium	µg/g	2.5	0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.6	<0.5	<0.5
Boron	µg/g	36	5	6	7	6	7	18	18	10	9
Boron (Hot Water Soluble)	µg/g	NA	0.10	<0.10	0.15	0.25	0.18	1.84	0.49	<0.10	<0.10
Cadmium	µg/g	1.2	0.5	0.5	<0.5	<0.5	0.6	<0.5	<0.5	0.7	<0.5
Chromium	µg/g	70	5	7	8	7	7	16	20	8	8
Cobalt	µg/g	21	0.8	3.5	4.0	3.8	4.1	7.7	10.0	4.0	3.5
Copper	µg/g	92	1.0	16.0	15.6	15.8	17.5	22.3	46.7	15.8	14.8
Lead	µg/g	120	1	30	27	27	30	9	11	32	25
Molybdenum	µg/g	2	0.5	<0.5	<0.5	<0.5	<0.5	0.8	0.7	<0.5	0.6
Nickel	µg/g	82	1	6	7	7	7	16	21	7	6
Selenium	µg/g	1.5	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	2.5	0.50	<0.50	<0.50	<0.50	<0.50	1.09	0.57	<0.50	<0.50
Vanadium	µg/g	86	2.0	11.5	12.9	12.9	12.9	21.3	26.2	13.8	13.0
Zinc	µg/g	290	5	233	222	184	288	77	81	219	211
Chromium, Hexavalent	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.57	0.005	0.486	0.120	0.153	0.102	0.233	0.233	0.212	0.106
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	2.4	N/A	0.991	0.618	0.437	0.562	0.586	0.477	0.513	0.223
pH, 2:1 CaCl2 Extraction	pH Units		NA	6.88	6.86	6.87	6.85	7.26	10.4	7.89	7.37

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-17 **DATE REPORTED: 2025-01-27**

				BH25-33 @ 7.	BH25-34 @ 7.	BH25-35 @ 7.	BH25-36 @ 2.	BH25-37 @	BH25-38 @
SAMPLE DESCRIPTION:				5-10	5-10	5-10	5-5	5-7.5	0-2.5
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6463169	6463170	6463171	6463172	6463173	6463174
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	4	4	4	12	5	9
Barium	µg/g	220	2.0	19.5	18.9	17.9	42.7	28.5	35.5
Beryllium	µg/g	2.5	0.5	<0.5	<0.5	<0.5	1.2	<0.5	1.3
Boron	µg/g	36	5	8	9	8	25	12	25
Boron (Hot Water Soluble)	µg/g	NA	0.10	<0.10	0.11	<0.10	1.11	0.55	1.62
Cadmium	µg/g	1.2	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g	70	5	7	8	7	28	13	32
Cobalt	µg/g	21	0.8	3.6	4.1	4.0	16.9	6.2	18.5
Copper	µg/g	92	1.0	13.9	18.8	16.3	30.0	23.5	42.1
Lead	µg/g	120	1	25	31	26	38	29	6
Molybdenum	µg/g	2	0.5	<0.5	0.5	<0.5	0.9	<0.5	<0.5
Nickel	µg/g	82	1	8	8	8	34	13	39
Selenium	µg/g	1.5	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	2.5	0.50	<0.50	<0.50	<0.50	0.57	<0.50	0.67
Vanadium	µg/g	86	2.0	12.1	13.7	13.1	35.1	20.1	37.4
Zinc	µg/g	290	5	207	250	233	123	154	85
Chromium, Hexavalent	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.57	0.005	0.126	0.133	0.129	0.175	0.240	0.322
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	2.4	N/A	0.234	0.178	0.129	0.648	0.859	0.821
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.11	6.96	6.90	6.87	6.88	6.82

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-17 **DATE REPORTED: 2025-01-27**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON 406/19 T1 RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6463158-6463174 EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio. SAR is a calculated parameter.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2025-01-17 **DATE REPORTED: 2025-01-27**

				BH25-25 @ 7.	BH25-26 @ 7.	BH25-27 @	BH25-28 @ 7.	BH25-29 @ 2.		BH25-31 @ 7.	BH25-32 @
SAMPLE DESCRIPTION:				5-10	5-10	5-7.5	5-10	5-7.5	BH25-30 @ 0-5	5-10	5-7.5
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6463158	6463162	6463163	6463164	6463165	6463166	6463167	6463168
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.12	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.16	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.56	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	10.5	8.7	9.0	9.9	10.2	9.4	9.8	7.1
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		75	80	80	80	75	85	85	75
Acridine-d9	%	50-140		90	75	95	90	90	85	100	85
Terphenyl-d14	%	50-140		75	105	105	95	95	90	70	100

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2025-01-17 **DATE REPORTED: 2025-01-27**

				BH25-33 @ 7.	BH25-34 @ 7.	BH25-35 @ 7.	BH25-36 @ 2.	BH25-37 @	BH25-38 @
SAMPLE DESCRIPTION:				5-10	5-10	5-10	5-5	5-7.5	0-2.5
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6463169	6463170	6463171	6463172	6463173	6463174
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.12	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.16	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.56	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	9.8	11.8	8.1	7.6	8.3	8.9
Surrogate	Unit	Acceptable Limits							
Naphthalene-d8	%	50-140		85	70	90	85	85	70
Acridine-d9	%	50-140		115	85	110	110	105	100
Terphenyl-d14	%	50-140		80	85	90	80	90	100

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON 406/19 T1 RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6463158-6463174 Results are based on the dry weight of the soil.
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&j)Fluoranthene isomers because the isomers co-elute on the GC column.
2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)

DATE RECEIVED: 2025-01-17 **DATE REPORTED: 2025-01-27**

				BH25-25 @ 7.	BH25-26 @ 7.	BH25-27 @	BH25-28 @ 7.	BH25-29 @ 2.		BH25-31 @ 7.	BH25-32 @
SAMPLE DESCRIPTION:				5-10	5-10	5-7.5	5-10	5-7.5	BH25-30 @ 0-5	5-10	5-7.5
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6463158	6463162	6463163	6463164	6463165	6463166	6463167	6463168
F1 (C6 to C10)	µg/g		5	<5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50	<50	<50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	240	50	<50	<50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	10.5	8.7	9.0	9.9	10.2	9.4	9.8	7.1
Surrogate	Unit	Acceptable Limits									
Toluene-d8	%	50-140		103	106	103	105	104	107	106	106
Terphenyl	%	60-140		77	95	85	90	86	84	88	87

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)

DATE RECEIVED: 2025-01-17 **DATE REPORTED: 2025-01-27**

				BH25-33 @ 7.	BH25-34 @ 7.	BH25-35 @ 7.	BH25-36 @ 2.	BH25-37 @	BH25-38 @
SAMPLE DESCRIPTION:				5-10	5-10	5-10	5-5	5-7.5	0-2.5
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6463169	6463170	6463171	6463172	6463173	6463174
F1 (C6 to C10)	µg/g		5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	240	50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	9.8	11.8	8.1	7.6	8.3	8.9
Surrogate	Unit	Acceptable Limits							
Toluene-d8	%	50-140		96	107	105	102	102	104
Terphenyl	%	60-140		93	80	84	98	99	84

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON 406/19 T1 RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6463158-6463174 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX and PAH contributions.
C>10 – C16 (F2- Naphthalene) is a calculated parameter. The calculated value is F2 - Naphthalene.
C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (PAH: sum of Phenanthrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene and Pyrene).
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-17 **DATE REPORTED: 2025-01-27**

				BH25-25 @ 7.	BH25-26 @ 7.	BH25-27 @	BH25-28 @ 7.	BH25-29 @ 2.		BH25-31 @ 7.	BH25-32 @
SAMPLE DESCRIPTION:				5-10	5-10	5-7.5	5-10	5-7.5	BH25-30 @ 0-5	5-10	5-7.5
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6463158	6463162	6463163	6463164	6463165	6463166	6463167	6463168
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-17 **DATE REPORTED: 2025-01-27**

				BH25-25 @ 7.	BH25-26 @ 7.	BH25-27 @	BH25-28 @ 7.	BH25-29 @ 2.		BH25-31 @ 7.	BH25-32 @
SAMPLE DESCRIPTION:				5-10	5-10	5-7.5	5-10	5-7.5	BH25-30 @ 0-5	5-10	5-7.5
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6463158	6463162	6463163	6463164	6463165	6463166	6463167	6463168
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	10.5	8.7	9.0	9.9	10.2	9.4	9.8	7.1
Surrogate	Unit	Acceptable Limits									
Toluene-d8	% Recovery	50-140		103	106	103	105	104	107	106	106
4-Bromofluorobenzene	% Recovery	50-140		91	86	90	95	94	88	90	88

Certified By: [redacted]

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AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-17 **DATE REPORTED: 2025-01-27**

				BH25-33 @ 7.	BH25-34 @ 7.	BH25-35 @ 7.	BH25-36 @ 2.	BH25-37 @	BH25-38 @
SAMPLE DESCRIPTION:				5-10	5-10	5-10	5-5	5-7.5	0-2.5
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6463169	6463170	6463171	6463172	6463173	6463174
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-17 **DATE REPORTED: 2025-01-27**

				BH25-33 @ 7.	BH25-34 @ 7.	BH25-35 @ 7.	BH25-36 @ 2.	BH25-37 @	BH25-38 @
		SAMPLE DESCRIPTION:		5-10	5-10	5-10	5-5	5-7.5	0-2.5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15	2025-01-15
Parameter	Unit	G / S	RDL	6463169	6463170	6463171	6463172	6463173	6463174
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	9.8	11.8	8.1	7.6	8.3	8.9
Surrogate	Unit	Acceptable Limits							
Toluene-d8	% Recovery	50-140		96	107	105	102	102	104
4-Bromofluorobenzene	% Recovery	50-140		92	92	92	97	87	93

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON 406/19 T1 RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6463158-6463174 The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

Soil Analysis

RPT Date: Jan 27, 2025			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	6463605		<0.8	<0.8	NA	< 0.8	103%	70%	130%	83%	80%	120%	74%	70%	130%
Arsenic	6463605		3	3	NA	< 1	136%	70%	130%	91%	80%	120%	110%	70%	130%
Barium	6463605		58.0	59.7	2.9%	< 2.0	108%	70%	130%	98%	80%	120%	109%	70%	130%
Beryllium	6463605		<0.5	<0.5	NA	< 0.5	103%	70%	130%	102%	80%	120%	118%	70%	130%
Boron	6463605		9	9	NA	< 5	82%	70%	130%	103%	80%	120%	105%	70%	130%
Boron (Hot Water Soluble)	6463605		0.34	0.33	NA	< 0.10	87%	60%	140%	100%	70%	130%	96%	60%	140%
Cadmium	6463605		<0.5	<0.5	NA	< 0.5	113%	70%	130%	96%	80%	120%	107%	70%	130%
Chromium	6463605		19	18	NA	< 5	112%	70%	130%	98%	80%	120%	94%	70%	130%
Cobalt	6463605		6.1	6.1	0.0%	< 0.8	100%	70%	130%	84%	80%	120%	116%	70%	130%
Copper	6463605		22.2	20.9	6.0%	< 1.0	115%	70%	130%	96%	80%	120%	90%	70%	130%
Lead	6463605		12	11	8.7%	< 1	121%	70%	130%	92%	80%	120%	95%	70%	130%
Molybdenum	6463605		<0.5	<0.5	NA	< 0.5	119%	70%	130%	93%	80%	120%	115%	70%	130%
Nickel	6463605		18	18	0.0%	< 1	111%	70%	130%	94%	80%	120%	106%	70%	130%
Selenium	6463605		<0.8	<0.8	NA	< 0.8	103%	70%	130%	95%	80%	120%	110%	70%	130%
Silver	6463605		<0.5	<0.5	NA	< 0.5	112%	70%	130%	95%	80%	120%	102%	70%	130%
Thallium	6463605		<0.5	<0.5	NA	< 0.5	108%	70%	130%	107%	80%	120%	116%	70%	130%
Uranium	6463605		<0.50	0.52	NA	< 0.50	94%	70%	130%	86%	80%	120%	87%	70%	130%
Vanadium	6463605		25.3	25.1	0.8%	< 2.0	127%	70%	130%	103%	80%	120%	113%	70%	130%
Zinc	6463605		67	69	2.9%	< 5	123%	70%	130%	95%	80%	120%	NA	70%	130%
Chromium, Hexavalent	6469048		<0.2	<0.2	NA	< 0.2	94%	70%	130%	97%	80%	120%	85%	70%	130%
Cyanide, WAD	6463168	6463168	<0.040	<0.040	NA	< 0.040	101%	70%	130%	89%	80%	120%	106%	70%	130%
Mercury	6463605		<0.10	<0.10	NA	< 0.10	103%	70%	130%	100%	80%	120%	98%	70%	130%
Electrical Conductivity (2:1)	6463605		1.11	1.03	7.5%	< 0.005	106%	80%	120%						
Sodium Adsorption Ratio (2:1) (Calc.)	6463605		5.23	5.36	2.5%	NA									
pH, 2:1 CaCl2 Extraction	6463592		6.83	6.85	0.3%	NA	101%	80%	120%						

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits by up to 10% absolute.

O. Reg. 153(511) - Metals & Inorganics (Soil)															
pH, 2:1 CaCl2 Extraction	6463173	6463173	6.88	6.90	0.3%	NA	101%	80%	120%						

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Certified By:

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
AGAT WORK ORDER: 25T239704
PROJECT: 8368 BVD Puslinch Delineation
ATTENTION TO: Ali Rasoul
SAMPLING SITE:7504 McLean Rd., Puslinch, ON
SAMPLED BY:E.F.

Trace Organics Analysis

RPT Date: Jan 27, 2025

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)															
F1 (C6 to C10)	6463174	6463174	<5	<5	NA	< 5	119%	60%	140%	98%	60%	140%	82%	60%	140%
F2 (C10 to C16)	6463169	6463169	< 10	< 10	NA	< 10	119%	60%	140%	117%	60%	140%	80%	60%	140%
F3 (C16 to C34)	6463169	6463169	< 50	< 50	NA	< 50	122%	60%	140%	115%	60%	140%	83%	60%	140%
F4 (C34 to C50)	6463169	6463169	< 50	< 50	NA	< 50	75%	60%	140%	124%	60%	140%	107%	60%	140%
O. Reg. 153(511) - PAHs (Soil)															
Naphthalene	6463169	6463169	<0.05	<0.05	NA	< 0.05	124%	50%	140%	80%	50%	140%	90%	50%	140%
Acenaphthylene	6463169	6463169	<0.05	<0.05	NA	< 0.05	118%	50%	140%	88%	50%	140%	73%	50%	140%
Acenaphthene	6463169	6463169	<0.05	<0.05	NA	< 0.05	113%	50%	140%	85%	50%	140%	80%	50%	140%
Fluorene	6463169	6463169	<0.05	<0.05	NA	< 0.05	116%	50%	140%	78%	50%	140%	73%	50%	140%
Phenanthrene	6463169	6463169	<0.05	<0.05	NA	< 0.05	117%	50%	140%	80%	50%	140%	75%	50%	140%
Anthracene	6463169	6463169	<0.05	<0.05	NA	< 0.05	95%	50%	140%	80%	50%	140%	80%	50%	140%
Fluoranthene	6463169	6463169	<0.05	<0.05	NA	< 0.05	120%	50%	140%	75%	50%	140%	73%	50%	140%
Pyrene	6463169	6463169	<0.05	<0.05	NA	< 0.05	116%	50%	140%	75%	50%	140%	73%	50%	140%
Benzo(a)anthracene	6463169	6463169	<0.05	<0.05	NA	< 0.05	109%	50%	140%	98%	50%	140%	85%	50%	140%
Chrysene	6463169	6463169	<0.05	<0.05	NA	< 0.05	117%	50%	140%	80%	50%	140%	85%	50%	140%
Benzo(b)fluoranthene	6463169	6463169	<0.05	<0.05	NA	< 0.05	112%	50%	140%	80%	50%	140%	73%	50%	140%
Benzo(k)fluoranthene	6463169	6463169	<0.05	<0.05	NA	< 0.05	122%	50%	140%	83%	50%	140%	88%	50%	140%
Benzo(a)pyrene	6463169	6463169	<0.05	<0.05	NA	< 0.05	109%	50%	140%	75%	50%	140%	83%	50%	140%
Indeno(1,2,3-cd)pyrene	6463169	6463169	<0.05	<0.05	NA	< 0.05	105%	50%	140%	78%	50%	140%	78%	50%	140%
Dibenz(a,h)anthracene	6463169	6463169	<0.05	<0.05	NA	< 0.05	99%	50%	140%	90%	50%	140%	78%	50%	140%
Benzo(g,h,i)perylene	6463169	6463169	<0.05	<0.05	NA	< 0.05	113%	50%	140%	83%	50%	140%	83%	50%	140%
O. Reg. 153(511) - VOCs (with PHC) (Soil)															
Dichlorodifluoromethane	6463174	6463174	<0.05	<0.05	NA	< 0.05	99%	50%	140%	119%	50%	140%	115%	50%	140%
Vinyl Chloride	6463174	6463174	<0.02	<0.02	NA	< 0.02	117%	50%	140%	104%	50%	140%	79%	50%	140%
Bromomethane	6463174	6463174	<0.05	<0.05	NA	< 0.05	66%	50%	140%	97%	50%	140%	71%	50%	140%
Trichlorofluoromethane	6463174	6463174	<0.05	<0.05	NA	< 0.05	72%	50%	140%	90%	50%	140%	98%	50%	140%
Acetone	6463174	6463174	<0.50	<0.50	NA	< 0.50	96%	50%	140%	90%	50%	140%	116%	50%	140%
1,1-Dichloroethylene	6463174	6463174	<0.05	<0.05	NA	< 0.05	91%	50%	140%	96%	60%	130%	78%	50%	140%
Methylene Chloride	6463174	6463174	<0.05	<0.05	NA	< 0.05	68%	50%	140%	84%	60%	130%	98%	50%	140%
Trans- 1,2-Dichloroethylene	6463174	6463174	<0.05	<0.05	NA	< 0.05	130%	50%	140%	106%	60%	130%	86%	50%	140%
Methyl tert-butyl Ether	6463174	6463174	<0.05	<0.05	NA	< 0.05	98%	50%	140%	95%	60%	130%	97%	50%	140%
1,1-Dichloroethane	6463174	6463174	<0.02	<0.02	NA	< 0.02	90%	50%	140%	80%	60%	130%	66%	50%	140%
Methyl Ethyl Ketone	6463174	6463174	<0.50	<0.50	NA	< 0.50	101%	50%	140%	99%	50%	140%	100%	50%	140%
Cis- 1,2-Dichloroethylene	6463174	6463174	<0.02	<0.02	NA	< 0.02	80%	50%	140%	116%	60%	130%	94%	50%	140%
Chloroform	6463174	6463174	<0.04	<0.04	NA	< 0.04	105%	50%	140%	87%	60%	130%	128%	50%	140%
1,2-Dichloroethane	6463174	6463174	<0.03	<0.03	NA	< 0.03	73%	50%	140%	87%	60%	130%	65%	50%	140%
1,1,1-Trichloroethane	6463174	6463174	<0.05	<0.05	NA	< 0.05	80%	50%	140%	78%	60%	130%	97%	50%	140%
Carbon Tetrachloride	6463174	6463174	<0.05	<0.05	NA	< 0.05	80%	50%	140%	86%	60%	130%	80%	50%	140%

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

Trace Organics Analysis (Continued)

RPT Date: Jan 27, 2025			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Benzene	6463174	6463174	<0.02	<0.02	NA	< 0.02	81%	50%	140%	74%	60%	130%	62%	50%	140%
1,2-Dichloropropane	6463174	6463174	<0.03	<0.03	NA	< 0.03	63%	50%	140%	70%	60%	130%	71%	50%	140%
Trichloroethylene	6463174	6463174	<0.03	<0.03	NA	< 0.03	85%	50%	140%	83%	60%	130%	80%	50%	140%
Bromodichloromethane	6463174	6463174	<0.05	<0.05	NA	< 0.05	74%	50%	140%	65%	60%	130%	62%	50%	140%
Methyl Isobutyl Ketone	6463174	6463174	<0.50	<0.50	NA	< 0.50	112%	50%	140%	87%	50%	140%	84%	50%	140%
1,1,2-Trichloroethane	6463174	6463174	<0.04	<0.04	NA	< 0.04	87%	50%	140%	81%	60%	130%	87%	50%	140%
Toluene	6463174	6463174	<0.05	<0.05	NA	< 0.05	97%	50%	140%	75%	60%	130%	92%	50%	140%
Dibromochloromethane	6463174	6463174	<0.05	<0.05	NA	< 0.05	61%	50%	140%	69%	60%	130%	75%	50%	140%
Ethylene Dibromide	6463174	6463174	<0.04	<0.04	NA	< 0.04	97%	50%	140%	69%	60%	130%	64%	50%	140%
Tetrachloroethylene	6463174	<0.05	<0.05	<0.05	NA	< 0.05	98%	50%	140%	69%	60%	130%	65%	50%	140%
1,1,1,2-Tetrachloroethane	6463174	6463174	<0.04	<0.04	NA	< 0.04	82%	50%	140%	64%	60%	130%	66%	50%	140%
Chlorobenzene	6463174	6463174	<0.05	<0.05	NA	< 0.05	69%	50%	140%	81%	60%	130%	95%	50%	140%
Ethylbenzene	6463174	6463174	<0.05	<0.05	NA	< 0.05	77%	50%	140%	62%	60%	130%	79%	50%	140%
m & p-Xylene	6463174	6463174	<0.05	<0.05	NA	< 0.05	97%	50%	140%	95%	60%	130%	92%	50%	140%
Bromoform	6463174	6463174	<0.05	<0.05	NA	< 0.05	63%	50%	140%	73%	60%	130%	61%	50%	140%
Styrene	6463174	6463174	<0.05	<0.05	NA	< 0.05	78%	50%	140%	70%	60%	130%	85%	50%	140%
1,1,2,2-Tetrachloroethane	6463174	6463174	<0.05	<0.05	NA	< 0.05	79%	50%	140%	92%	60%	130%	70%	50%	140%
o-Xylene	6463174	6463174	<0.05	<0.05	NA	< 0.05	76%	50%	140%	72%	60%	130%	95%	50%	140%
1,3-Dichlorobenzene	6463174	6463174	<0.05	<0.05	NA	< 0.05	69%	50%	140%	80%	60%	130%	100%	50%	140%
1,4-Dichlorobenzene	6463174	6463174	<0.05	<0.05	NA	< 0.05	81%	50%	140%	89%	60%	130%	104%	50%	140%
1,2-Dichlorobenzene	6463174	6463174	<0.05	<0.05	NA	< 0.05	67%	50%	140%	80%	60%	130%	94%	50%	140%
n-Hexane	6463174	6463174	<0.05	<0.05	NA	< 0.05	81%	50%	140%	95%	60%	130%	72%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

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http://www.agatlabs.com

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

RPT Date: Jan 27, 2025

PARAMETER	Sample Id	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)										
Arsenic		136%	70%	130%	91%	80%	120%	110%	70%	130%

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits by up to 10% absolute.

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	modified from EPA 6010D and MSA PART 3, CH 21	ICP/OES
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium, Hexavalent	INOR-93-6068	modified from EPA 3060 and EPA 7196	SPECTROPHOTOMETER
Cyanide, WAD	INOR-93-6052	modified from ON MOECC E3015, SM 4500-CN- I, G-387	SEGMENTED FLOW ANALYSIS
Mercury	MET-93-6103	modified from EPA 7471B and SM 3112 B	ICP-MS
Electrical Conductivity (2:1)	INOR-93-6075	modified from MSA PART 3, CH 14 and SM 2510 B	PC TITRATE
Sodium Adsorption Ratio (2:1) (Calc.)	INOR-93-6007	modified from EPA 6010D & Analytical Protocol	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6075	modified from EPA 9045D, MCKEAGUE 3.11 E3137	PC TITRATE

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluorene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Chrysene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acridine-d9	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Terphenyl-d14	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Moisture Content	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
F1 (C6 to C10)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method	P&T GC/FID
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34) minus PAHs	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Dichlorodifluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS

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SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Vinyl Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T239704

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
m & p-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: A & A Environmental Consultants Inc.
Contact: Dr. Ali Rasoul
Address: 16 Young St
Woodstock, ON
Phone: 519-266-4680 Fax: 519-266-3666
Reports to be sent to:
1. Email: arasoul@aaenvironmental.ca, vsowden@"
2. Email: sscott@"; tdemers@" ; ckennedy@"

Project Information:

Project: 8625 BVD Puslinch Delineation
Site Location: 7504 McLean Rd., Puslinch, ON
Sampled By: E.F.
AGAT Quote #: 16288129079 PO: 8625
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☑ Regulation 153/04
Table 1 (Indicate One)
☑ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☑ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary ☐ Storm
Region _____ (Indicate One)
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other _____ (Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Laboratory Use Only

Work Order #: 25T239704
Cooler Quantity: 1 @
Arrival Temperatures: 5.3 | 5.0 | 5.2
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes: LLT

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply): _____
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CPM

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN ☐ Cr⁶⁺ ☑ EC ☐ FOC ☐ Hg ☑ pH ☑ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☑ M&I ☑ VOCs ☑ ABNs ☑ B(a)P ☑ PCBs	Sewer Use	Mctals Soil 93-101	Mctals Water 93-196	CCME F1-F4/VOCs Soil 91-248	CCME F1-F4/VOCs Water 91-249	CCME F1-F4/ BTEX Water 91-315	Sieve & texture (75 Micron)
BH25-25 @ 7.5-10	1/15/25		4	S			☑	☑						☑						☑				
BH25-26 @ 7.5-10	1/15/25		4	S			☑	☑						☑						☑				
BH25-27 @ 5-7.5	1/15/25		4	S			☑	☑						☑						☑				
BH25-28 @ 7.5-10	1/15/25		4	S			☑	☑						☑						☑				
BH25-29 @ 2.5-7.5	1/15/25		4	S			☑	☑						☑						☑				
BH25-30 @ 0-5	1/15/25		4	S			☑	☑						☑						☑				
BH25-31 @ 7.5-10	1/15/25		4	S			☑	☑						☑						☑				
BH25-32 @ 5-7.5	1/15/25		4	S			☑	☑						☑						☑				
BH25-33 @ 7.5-10	1/15/25		4	S			☑	☑						☑						☑				
BH25-34 @ 7.5-10	1/15/25		4	S			☑	☑						☑						☑				
BH25-35 @ 7.5-10	1/15/25		4	S			☑	☑						☑						☑				

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
E. Fulsom [redacted]	1/17/25	8am	[redacted]	Jan 17	1:30PM
Samples Relinqu	Date	Time		Date	Time
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time

Page 1 of 2

N°:

Document ID: DW-76-1511-015

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Date Issued: March 16, 2018

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5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 25T239704

Cooler Quantity: 1 @ 9

Arrival Temperatures: 5 | 5.1

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes:

Report Information:

Company: A & A Environmental Consultants Inc.
Contact: Dr. Ali Rasoul
Address: 16 Young St
Woodstock, ON
Phone: 519-266-4680 Fax: 519-266-3666
Reports to be sent to:
1. Email: arasoul@aacnvironmental.ca, vsowden@"
2. Email: sscott@"; tdemers@" ; ckennedy@"

Regulatory Requirements:

☐ No Regulatory Requirement

(Please check all applicable boxes)

☑ Regulation 153/04
Table 1 (Indicate One)
☑ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☑ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary ☐ Storm
Region _____ (Indicate One)
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ (Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply): _____

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: 8625 BVD Puslinch Delineation
Site Location: 7504 McLean Rd., Puslinch, ON
Sampled By: E.F.
AGAT Quote #: 16288129079 PO: 8625
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:
Contact:
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Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics	All Metals / Hydride Metals	153 Metals (excl. Hydrides) / 153 Metals (Incl. Hydrides)	ORPs: B-HWS / Cl / CN / Cr^{6+} / EC / FOC / Hg / pH / SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: TP / NH_3 / TKN / NO_3 / NO_2 / NO_3+NO_2	Volatiles: VOC / BTEX / THM	PHCs F1 - F4	ABNs	PAHs	PCBs: Total / Aroclors	Organochlorine Pesticides	TCLP: M&I / VOCs / ABNs / B(a)P / PCBs	Sewer Use	Metals Soil 93-101	Metals Water 93-196	CCME F1-F4/VOCs Soil 91-248	CCME F1-F4/VOCs Water 91-249	CCME F1-F4/ BTEX Water 91-315	Sieve & texture (75 Micron)
BH25-36 @ 2.5-5	1/15/25		4	S			☑			☑							☑							☑			
BH25-37 @ 5-7.5	1/15/25		4	S			☑			☑							☑							☑			
BH25-38 @ 0-2.5	1/15/25		4	S			☑			☑							☑							☑			

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
E. Fulsom [redacted]	1/17/25	8am	[redacted]	Jan 17	1:30p
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Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time

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Document ID: DIV-78-1511.015

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Date Issued: March 16, 2018

AGAT Laboratories

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CANADA L4Z 1Y2
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http://www.agatlabs.com

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
16 Young Street
WOODSTOCK, ON N4S3L4
(519) 266-4680

ATTENTION TO: Ali Rasoul

PROJECT: 8368 BVD Puslinch Delineation

AGAT WORK ORDER: 25T240863

SOIL ANALYSIS REVIEWED BY: Nivine Basily, Inorganic Team Lead

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Jan 30, 2025

PAGES (INCLUDING COVER): 53

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
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- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

SAMPLE DESCRIPTION:				25-39 @ 0-2.5	25-40 @ 7.5-10	25-41 @ 7.5-10	25-42 @ 2.5-5	25-43 @ 2.5-5	25-43 DUP	25-44 @ 7.5-10	25-45 @ 7.5-10
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
Parameter	Unit	G / S	RDL	6472466	6472473	6472474	6472475	6472476	6472477	6472478	6472479
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	8	3	3	6	5	7	4	4
Barium	µg/g	220	2.0	45.4	22.8	20.8	50.0	56.1	46.8	44.1	43.2
Beryllium	µg/g	2.5	0.5	1.1	<0.5	<0.5	0.6	0.6	0.9	<0.5	<0.5
Boron	µg/g	36	5	25	7	7	8	10	21	7	7
Boron (Hot Water Soluble)	µg/g	NA	0.10	1.50	0.12	<0.10	0.63	0.59	1.90	0.14	0.26
Cadmium	µg/g	1.2	0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	0.5	<0.5
Chromium	µg/g	70	5	30	8	7	16	16	28	14	14
Cobalt	µg/g	21	0.8	17.0	3.7	3.5	7.8	7.9	16.8	6.2	5.3
Copper	µg/g	92	1.0	30.7	13.4	13.9	22.9	20.6	25.0	20.0	14.0
Lead	µg/g	120	1	19	24	29	44	42	6	117	42
Molybdenum	µg/g	2	0.5	0.6	<0.5	<0.5	0.6	0.6	<0.5	<0.5	<0.5
Nickel	µg/g	82	1	35	5	5	16	16	32	12	11
Selenium	µg/g	1.5	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	2.5	0.50	0.74	0.51	<0.50	0.63	0.68	0.68	<0.50	0.59
Vanadium	µg/g	86	2.0	39.5	15.0	12.8	24.9	26.2	36.7	23.4	24.0
Zinc	µg/g	290	5	93	151	200	215	196	71	168	190
Chromium, Hexavalent	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.57	0.005	0.220	0.113	0.153	0.174	0.249	0.162	0.174	0.122
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	2.4	N/A	0.674	0.496	0.347	0.591	0.542	1.16	0.271	0.144
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.55	7.70	7.77	7.60	7.73	7.94	7.58	7.37

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

SAMPLE DESCRIPTION:				25-45 DUP	25-46 @ 5-7.5	25-47 @ 2.5-5	25-48 @ 2.5-5	25-49 @ 7.5-10	25-50 @ 5-7.5	25-51 @ 7.5-10	25-52 @ 7.5-10
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
Parameter	Unit	G / S	RDL	6472671	6472672	6472673	6472674	6472675	6472676	6472677	6472678
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	5	6	6	5	5	4	6	6
Barium	µg/g	220	2.0	48.1	54.9	75.7	41.9	52.7	54.4	58.7	59.4
Beryllium	µg/g	2.5	0.5	<0.5	0.8	0.8	<0.5	0.6	0.5	0.5	0.5
Boron	µg/g	36	5	8	18	19	9	12	11	8	8
Boron (Hot Water Soluble)	µg/g	NA	0.10	0.19	1.25	1.45	0.77	0.38	0.36	0.58	0.50
Cadmium	µg/g	1.2	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	0.6
Chromium	µg/g	70	5	15	24	23	13	19	17	16	17
Cobalt	µg/g	21	0.8	5.2	11.8	11.9	6.6	8.7	8.1	6.9	7.2
Copper	µg/g	92	1.0	15.7	29.6	24.0	18.5	22.0	20.2	22.1	21.7
Lead	µg/g	120	1	37	23	27	37	26	27	69	47
Molybdenum	µg/g	2	0.5	0.5	0.7	1.0	0.6	0.7	0.6	0.7	0.6
Nickel	µg/g	82	1	12	24	25	15	17	16	14	15
Selenium	µg/g	1.5	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	2.5	0.50	0.61	0.70	0.63	0.56	0.63	0.60	0.63	0.70
Vanadium	µg/g	86	2.0	24.9	33.9	32.8	21.6	27.5	26.3	27.1	28.4
Zinc	µg/g	290	5	203	129	105	193	140	143	286	214
Chromium, Hexavalent	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.57	0.005	0.180	0.221	0.284	0.184	0.194	0.130	0.204	0.142
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	2.4	N/A	0.118	0.876	1.07	1.14	0.621	0.341	0.170	0.164
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.42	6.51	7.67	7.47	7.69	7.74	7.48	7.51

Certified By:

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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TEL (905)712-5100
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Certificate of Analysis

AGAT WORK ORDER: 25T240863

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SAMPLED BY:E.F.

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		DUP 25-52	25-53 @ 7.5-10	25-54 @ 5-7.5	25-55 @ 5-7.5	25-56 @ 5-7.5	25-57 @ 2.5-5	25-58 @ 2.5-5	25-59 @ 0-2.5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
Parameter	Unit	G / S	RDL	6472679	6472680	6472681	6472682	6472683	6472684	6472685	6472686
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	6	4	6	5	3	6	2	10
Barium	µg/g	220	2.0	56.2	34.4	59.0	51.0	23.9	46.1	15.3	81.3
Beryllium	µg/g	2.5	0.5	0.5	<0.5	0.6	0.5	<0.5	0.7	<0.5	0.8
Boron	µg/g	36	5	9	8	12	14	9	12	<5	19
Boron (Hot Water Soluble)	µg/g	NA	0.10	0.57	0.31	0.62	0.75	0.18	0.76	0.54	0.41
Cadmium	µg/g	1.2	0.5	0.6	<0.5	0.6	0.5	<0.5	0.8	<0.5	0.7
Chromium	µg/g	70	5	16	11	17	16	9	15	8	19
Cobalt	µg/g	21	0.8	6.7	4.7	8.0	7.7	4.1	7.5	2.7	9.7
Copper	µg/g	92	1.0	19.2	16.2	21.5	22.1	16.1	24.6	5.9	36.2
Lead	µg/g	120	1	54	36	49	42	25	44	7	130
Molybdenum	µg/g	2	0.5	0.6	<0.5	0.6	0.6	0.6	0.5	<0.5	1.3
Nickel	µg/g	82	1	14	9	17	15	7	15	5	19
Selenium	µg/g	1.5	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	2.5	0.50	0.64	0.53	0.64	0.54	<0.50	0.59	<0.50	0.63
Vanadium	µg/g	86	2.0	26.9	19.2	27.3	24.8	16.3	24.4	18.4	28.4
Zinc	µg/g	290	5	239	202	226	192	235	252	25	349
Chromium, Hexavalent	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.18
Electrical Conductivity (2:1)	mS/cm	0.57	0.005	0.220	0.132	0.294	0.369	0.179	0.377	0.232	0.225
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	2.4	N/A	0.181	0.134	0.506	0.598	0.431	0.495	0.631	0.588
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.34	7.63	7.56	7.78	7.87	7.70	8.58	9.27

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

SAMPLE DESCRIPTION:				25-60 @ 0-2.5	25-61 @ 2.5-5	25-62 @ 7.5-10	DUP 25-62	25-63 @ 7.5-10	25-64 @ 2.5-5	25-65 @ 5-7.5	25-66 @ 7.5-10
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-17	2025-01-17	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20
Parameter	Unit	G / S	RDL	6472687	6472688	6472689	6472719	6472724	6472725	6472726	6472727
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	5	9	5	6	5	6	7	6
Barium	µg/g	220	2.0	72.3	55.1	53.3	46.1	42.0	55.4	58.0	51.8
Beryllium	µg/g	2.5	0.5	1.0	1.2	0.6	0.6	0.5	0.6	0.6	0.6
Boron	µg/g	36	5	27	25	8	10	9	8	8	7
Boron (Hot Water Soluble)	µg/g	NA	0.10	0.32	1.88	0.34	0.31	0.26	0.35	0.49	0.75
Cadmium	µg/g	1.2	0.5	<0.5	<0.5	0.6	0.6	<0.5	0.6	0.8	0.7
Chromium	µg/g	70	5	25	30	16	15	14	16	15	15
Cobalt	µg/g	21	0.8	12.3	18.5	7.5	6.5	6.3	7.1	6.9	6.4
Copper	µg/g	92	1.0	17.4	30.0	18.8	18.9	18.6	21.8	21.7	18.1
Lead	µg/g	120	1	22	5	42	43	34	43	61	55
Molybdenum	µg/g	2	0.5	1.0	<0.5	0.5	0.7	0.6	0.6	0.7	0.6
Nickel	µg/g	82	1	27	37	14	13	12	14	14	13
Selenium	µg/g	1.5	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	2.5	0.50	0.56	0.60	0.50	0.56	<0.50	0.53	0.50	0.57
Vanadium	µg/g	86	2.0	33.0	37.5	26.0	25.1	24.1	26.9	25.0	25.4
Zinc	µg/g	290	5	109	81	245	276	223	241	336	266
Chromium, Hexavalent	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.57	0.005	0.386	0.222	0.126	0.200	0.145	0.234	0.216	0.244
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	2.4	N/A	0.423	1.09	0.149	0.152	0.231	0.159	0.374	0.161
pH, 2:1 CaCl2 Extraction	pH Units		NA	11.7	8.24	7.99	7.43	6.41	7.46	6.99	7.34

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

SAMPLE DESCRIPTION:				25-67 @ 7.5-10	25-68 @ 5-7.5	25-69 @ 7.5-10	25-70 @ 5-7.5	25-71 @ 2.5-5	25-72 @ 7.5-10	25-73 @ 5-7.5	25-74 @ 5-7.5
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20
Parameter	Unit	G / S	RDL	6472728	6472729	6472780	6472781	6472782	6472783	6472784	6472785
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	5	6	7	5	6	6	6	7
Barium	µg/g	220	2.0	62.3	51.6	60.4	64.4	79.2	17.2	54.0	71.2
Beryllium	µg/g	2.5	0.5	0.7	0.6	0.6	0.9	0.7	<0.5	0.6	<0.5
Boron	µg/g	36	5	7	8	9	17	17	17	18	7
Boron (Hot Water Soluble)	µg/g	NA	0.10	0.49	0.46	0.48	0.63	0.29	0.12	0.44	0.50
Cadmium	µg/g	1.2	0.5	0.6	0.6	1.0	<0.5	<0.5	<0.5	0.7	1.0
Chromium	µg/g	70	5	17	15	16	22	19	6	15	16
Cobalt	µg/g	21	0.8	6.8	7.0	6.7	12.4	8.0	2.9	7.1	6.2
Copper	µg/g	92	1.0	20.7	19.2	19.9	42.2	32.5	13.5	22.0	23.3
Lead	µg/g	120	1	42	47	70	24	44	39	55	94
Molybdenum	µg/g	2	0.5	<0.5	0.6	0.8	0.6	0.8	<0.5	0.6	0.8
Nickel	µg/g	82	1	15	14	14	25	15	3	14	13
Selenium	µg/g	1.5	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	2.5	0.50	0.56	0.57	0.62	0.67	0.54	<0.50	0.58	0.71
Vanadium	µg/g	86	2.0	26.1	24.7	26.2	29.8	23.8	8.8	23.9	26.6
Zinc	µg/g	290	5	229	258	341	109	92	279	292	350
Chromium, Hexavalent	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.57	0.005	0.429	0.270	0.128	0.722	0.398	0.243	0.154	0.226
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	2.4	N/A	0.140	0.249	0.102	3.07	1.18	0.379	0.190	0.114
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.15	7.33	7.27	7.79	9.67	8.06	7.87	7.53

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

SAMPLE DESCRIPTION:				25-75 @ 5-7.5	25-76 @ 5-7.5	25-77 @ 7.5-10	25-78 @ 5-7.5	25-79 @ 7.5-10	25-80 @ 7.5-10	25-81 @ 7.5-10	25-82 @ 5-10
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-21	2025-01-21
Parameter	Unit	G / S	RDL	6472786	6472787	6472788	6472789	6472790	6472791	6472792	6472824
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	7	6	6	6	6	6	7	7
Barium	µg/g	220	2.0	71.8	58.1	52.8	74.2	75.0	61.2	58.5	62.4
Beryllium	µg/g	2.5	0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	µg/g	36	5	7	7	6	5	5	6	6	6
Boron (Hot Water Soluble)	µg/g	NA	0.10	0.45	0.51	0.80	0.60	0.65	0.50	0.49	0.43
Cadmium	µg/g	1.2	0.5	0.8	0.7	0.8	0.6	0.7	0.7	0.9	0.9
Chromium	µg/g	70	5	17	13	12	14	15	15	14	15
Cobalt	µg/g	21	0.8	7.3	5.8	5.4	6.5	6.7	6.0	6.2	6.6
Copper	µg/g	92	1.0	25.6	20.3	18.4	22.1	20.8	19.1	20.3	21.1
Lead	µg/g	120	1	77	64	66	58	57	61	74	68
Molybdenum	µg/g	2	0.5	0.8	0.6	0.6	0.5	0.5	0.6	0.6	0.6
Nickel	µg/g	82	1	15	12	11	13	13	13	12	13
Selenium	µg/g	1.5	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	2.5	0.50	0.71	0.64	0.54	0.57	0.61	0.60	0.61	0.62
Vanadium	µg/g	86	2.0	28.2	22.8	21.0	25.6	26.5	23.9	25.5	26.6
Zinc	µg/g	290	5	340	289	280	259	258	260	342	329
Chromium, Hexavalent	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.57	0.005	0.311	0.176	0.440	0.916	0.173	0.159	0.199	0.138
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	2.4	N/A	0.720	0.160	0.511	0.629	0.244	0.145	0.102	0.093
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.49	7.41	7.33	7.53	7.18	7.26	7.28	6.13

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-83 @ 5-7.5	25-84 @ 5-7.5	25-85 @ 5-7.5	25-86 @ 7.5-10	25-87 @ 7.5-10	25-88 @ 5-7.5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21
Parameter	Unit	G / S	RDL	6472829	6472835	6472840	6472845	6472848	6472849
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	4	5	4	6	8	5
Barium	µg/g	220	2.0	44.7	44.5	38.3	57.4	68.2	72.2
Beryllium	µg/g	2.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron	µg/g	36	5	6	6	<5	6	6	8
Boron (Hot Water Soluble)	µg/g	NA	0.10	0.47	0.42	0.48	0.43	0.56	0.67
Cadmium	µg/g	1.2	0.5	<0.5	0.5	<0.5	0.8	0.9	<0.5
Chromium	µg/g	70	5	13	12	10	13	15	15
Cobalt	µg/g	21	0.8	5.4	5.5	4.5	5.5	6.4	5.0
Copper	µg/g	92	1.0	17.3	22.9	14.7	16.8	17.4	15.6
Lead	µg/g	120	1	38	39	34	78	100	50
Molybdenum	µg/g	2	0.5	0.6	0.7	0.8	0.7	0.8	1.2
Nickel	µg/g	82	1	11	11	9	12	12	11
Selenium	µg/g	1.5	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Silver	µg/g	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/g	1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/g	2.5	0.50	0.50	<0.50	<0.50	0.63	0.66	0.62
Vanadium	µg/g	86	2.0	21.4	20.1	18.2	22.7	26.4	24.2
Zinc	µg/g	290	5	184	211	132	315	335	264
Chromium, Hexavalent	µg/g	0.66	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide, WAD	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	0.57	0.005	0.211	0.399	0.260	0.138	0.192	0.232
Sodium Adsorption Ratio (2:1) (Calc.)	N/A	2.4	N/A	0.226	0.643	0.352	0.132	0.140	0.388
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.54	7.38	7.54	7.22	7.37	7.80

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON 406/19 T1 RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6472466-6472849 EC was determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio. SAR is a calculated parameter.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-39 @ 0-2.5	25-40 @ 7.5-10	25-41 @ 7.5-10	25-42 @ 2.5-5	25-43 @ 2.5-5	25-43 DUP	25-44 @ 7.5-10	25-45 @ 7.5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
Parameter	Unit	G / S	RDL	6472466	6472473	6472474	6472475	6472476	6472477	6472478	6472479
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.12	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.16	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.56	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	7.8	7.8	8.7	13.3	11.5	9.7	16.3	11.1
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		65	70	70	65	65	65	65	65
Acridine-d9	%	50-140		70	65	65	60	70	65	65	70
Terphenyl-d14	%	50-140		90	90	90	100	115	115	115	110

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-45 DUP	25-46 @ 5-7.5	25-47 @ 2.5-5	25-48 @ 2.5-5	25-49 @ 7.5-10	25-50 @ 5-7.5	25-51 @ 7.5-10	25-52 @ 7.5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
Parameter	Unit	G / S	RDL	6472671	6472672	6472673	6472674	6472675	6472676	6472677	6472678
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.12	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.16	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.56	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	9.4	13.9	8.9	8.4	11.5	15.6	13.6	16.5
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		70	65	70	70	65	65	60	65
Acridine-d9	%	50-140		65	100	85	125	125	130	115	105
Terphenyl-d14	%	50-140		125	115	120	135	130	120	115	110

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		DUP 25-52	25-53 @ 7.5-10	25-54 @ 5-7.5	25-55 @ 5-7.5	25-56 @ 5-7.5	25-57 @ 2.5-5	25-58 @ 2.5-5	25-59 @ 0-2.5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
Parameter	Unit	G / S	RDL	6472679	6472680	6472681	6472682	6472683	6472684	6472685	6472686
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.12	0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05	0.29	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.16	0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.56	0.05	<0.05	<0.05	<0.05	0.24	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	1	0.05	<0.05	<0.05	<0.05	0.17	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	<0.05	<0.05	0.11	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	13.9	15.8	15.0	15.5	7.5	16.8	12.6	12.6
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		70	70	70	70	70	75	65	70
Acridine-d9	%	50-140		90	110	85	90	115	85	75	85
Terphenyl-d14	%	50-140		120	125	120	95	130	130	130	125

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-60 @ 0-2.5	25-61 @ 2.5-5	25-62 @ 7.5-10	DUP 25-62	25-63 @ 7.5-10	25-64 @ 2.5-5	25-65 @ 5-7.5	25-66 @ 7.5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-17	2025-01-17	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20
Parameter	Unit	G / S	RDL	6472687	6472688	6472689	6472719	6472724	6472725	6472726	6472727
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.12	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.16	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.56	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	14.2	8.1	15.5	16.6	9.4	16.8	19.3	16.0
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		75	70	65	65	65	97	97	97
Acridine-d9	%	50-140		85	85	90	75	70	71	85	85
Terphenyl-d14	%	50-140		125	120	130	105	105	74	77	71

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-67 @ 7.5-10	25-68 @ 5-7.5	25-69 @ 7.5-10	25-70 @ 5-7.5	25-71 @ 2.5-5	25-72 @ 7.5-10	25-73 @ 5-7.5	25-74 @ 5-7.5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20
Parameter	Unit	G / S	RDL	6472728	6472729	6472780	6472781	6472782	6472783	6472784	6472785
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.12	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.16	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.56	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	22.3	14.8	14.6	13.1	11.8	4.4	19.9	15.8
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		71	97	71	97	71	97	71	97
Acridine-d9	%	50-140		74	85	74	85	74	85	85	85
Terphenyl-d14	%	50-140		85	99	88	77	88	77	77	99

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-75 @ 5-7.5	25-76 @ 5-7.5	25-77 @ 7.5-10	25-78 @ 5-7.5	25-79 @ 7.5-10	25-80 @ 7.5-10	25-81 @ 7.5-10	25-82 @ 5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-21	2025-01-21
Parameter	Unit	G / S	RDL	6472786	6472787	6472788	6472789	6472790	6472791	6472792	6472824
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.12	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.16	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.56	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	19.3	17.6	17.4	19.8	22.5	17.6	16.4	20.7
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140		75	75	75	75	70	65	65	70
Acridine-d9	%	50-140		70	95	90	115	115	80	110	65
Terphenyl-d14	%	50-140		90	105	85	100	70	75	90	85

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PAHs (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-83 @ 5-7.5	25-84 @ 5-7.5	25-85 @ 5-7.5	25-86 @ 7.5-10	25-87 @ 7.5-10	25-88 @ 5-7.5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21
Parameter	Unit	G / S	RDL	6472829	6472835	6472840	6472845	6472848	6472849
Naphthalene	µg/g	0.09	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/g	0.093	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g	0.072	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	µg/g	0.12	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	µg/g	0.69	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/g	0.16	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluoranthene	µg/g	0.56	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/g	1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	µg/g	0.36	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/g	2.8	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g	0.47	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g	0.48	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g	0.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/g	0.23	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	µg/g	0.1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	µg/g	0.68	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-and 1-methyl Naphthalene	µg/g	0.59	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	16.3	16.8	16.1	17.3	17.1	11.3
Surrogate	Unit	Acceptable Limits							
Naphthalene-d8	%	50-140		70	70	70	70	88	70
Acridine-d9	%	50-140		60	85	85	85	74	90
Terphenyl-d14	%	50-140		80	70	65	85	88	70

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON 406/19 T1 RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6472466-6472849 Results are based on the dry weight of the soil.
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&j)Fluoranthene isomers because the isomers co-elute on the GC column.
2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-39 @ 0-2.5	25-40 @ 7.5-10	25-41 @ 7.5-10	25-42 @ 2.5-5	25-43 @ 2.5-5	25-43 DUP	25-44 @ 7.5-10	25-45 @ 7.5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
Parameter	Unit	G / S	RDL	6472466	6472473	6472474	6472475	6472476	6472477	6472478	6472479
F1 (C6 to C10)	µg/g		5	<5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50	<50	56	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	240	50	<50	<50	<50	<50	56	<50	<50	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	7.8	7.8	8.7	13.3	11.5	9.7	16.3	11.1
Surrogate	Unit	Acceptable Limits									
Toluene-d8	%	50-140		99	106	103	103	100	102	103	102
Terphenyl	%	60-140		70	85	66	78	68	81	79	92

		SAMPLE DESCRIPTION:		25-45 DUP	25-46 @ 5-7.5	25-47 @ 2.5-5	25-48 @ 2.5-5	25-49 @ 7.5-10	25-50 @ 5-7.5	25-51 @ 7.5-10	25-52 @ 7.5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
Parameter	Unit	G / S	RDL	6472671	6472672	6472673	6472674	6472675	6472676	6472677	6472678
F1 (C6 to C10)	µg/g		5	<5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	130	<50	<50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	240	50	<50	<50	130	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	92	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	9.4	13.9	8.9	8.4	11.5	15.6	13.6	16.5
Surrogate	Unit	Acceptable Limits									
Toluene-d8	%	50-140		106	101	105	105	98	100	103	102
Terphenyl	%	60-140		85	71	76	68	86	90	75	69

Certified By:

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AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		DUP 25-52	25-53 @ 7.5-10	25-54 @ 5-7.5	25-55 @ 5-7.5	25-56 @ 5-7.5	25-57 @ 2.5-5	25-58 @ 2.5-5	25-59 @ 0-2.5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
Parameter	Unit	G / S	RDL	6472679	6472680	6472681	6472682	6472683	6472684	6472685	6472686
F1 (C6 to C10)	µg/g		5	<5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50	103	<50	<50	59	<50
F3 (C16 to C34) minus PAHs	µg/g	240	50	<50	<50	<50	102	<50	<50	59	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50	113	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	13.9	15.8	15.0	15.5	7.5	16.8	12.6	12.6
Surrogate	Unit	Acceptable Limits									
Toluene-d8	%	50-140		108	102	99	105	103	110	105	102
Terphenyl	%	60-140		76	84	77	76	70	77	83	81

		SAMPLE DESCRIPTION:		25-60 @ 0-2.5	25-61 @ 2.5-5	25-62 @ 7.5-10	DUP 25-62	25-63 @ 7.5-10	25-64 @ 2.5-5	25-65 @ 5-7.5	25-66 @ 7.5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-17	2025-01-17	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20
Parameter	Unit	G / S	RDL	6472687	6472688	6472689	6472719	6472724	6472725	6472726	6472727
F1 (C6 to C10)	µg/g		5	<5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50	<50	<50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	240	50	<50	<50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	14.2	8.1	15.5	16.6	9.4	16.8	19.3	16.0
Surrogate	Unit	Acceptable Limits									
Toluene-d8	%	50-140		100	102	105	97	100	102	108	102
Terphenyl	%	60-140		83	76	76	73	78	69	72	68

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-67 @ 7.5-10	25-68 @ 5-7.5	25-69 @ 7.5-10	25-70 @ 5-7.5	25-71 @ 2.5-5	25-72 @ 7.5-10	25-73 @ 5-7.5	25-74 @ 5-7.5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20
Parameter	Unit	G / S	RDL	6472728	6472729	6472780	6472781	6472782	6472783	6472784	6472785
F1 (C6 to C10)	µg/g		5	<5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50	<50	<50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	240	50	<50	<50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	22.3	14.8	14.6	13.1	11.8	4.4	19.9	15.8
Surrogate	Unit	Acceptable Limits									
Toluene-d8	%	50-140		103	103	103	98	107	106	104	105
Terphenyl	%	60-140		89	96	79	91	71	67	96	95

		SAMPLE DESCRIPTION:		25-75 @ 5-7.5	25-76 @ 5-7.5	25-77 @ 7.5-10	25-78 @ 5-7.5	25-79 @ 7.5-10	25-80 @ 7.5-10	25-81 @ 7.5-10	25-82 @ 5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-21	2025-01-21
Parameter	Unit	G / S	RDL	6472786	6472787	6472788	6472789	6472790	6472791	6472792	6472824
F1 (C6 to C10)	µg/g		5	<5	<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5	<5	<5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50	<50	<50	<50	<50	<50	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	240	50	<50	<50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	120	50	<50	<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1	19.3	17.6	17.4	19.8	22.5	17.6	16.4	20.7
Surrogate	Unit	Acceptable Limits									
Toluene-d8	%	50-140		104	100	102	102	104	104	104	105
Terphenyl	%	60-140		73	84	81	67	82	81	90	65

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

				SAMPLE DESCRIPTION:	25-83 @ 5-7.5	25-84 @ 5-7.5	25-85 @ 5-7.5	25-86 @ 7.5-10	25-87 @ 7.5-10	25-88 @ 5-7.5
				SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21
Parameter	Unit	G / S	RDL		6472829	6472835	6472840	6472845	6472848	6472849
F1 (C6 to C10)	µg/g		5		<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	25	5		<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	10	10		<10	<10	<10	<10	<10	<10
F2 (C10 to C16) minus Naphthalene	µg/g		10		<10	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	240	50		<50	<50	91	<50	<50	<50
F3 (C16 to C34) minus PAHs	µg/g	240	50		<50	<50	91	<50	<50	<50
F4 (C34 to C50)	µg/g	120	50		<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50		NA	NA	NA	NA	NA	NA
Moisture Content	%		0.1		16.3	16.8	16.1	17.3	17.1	11.3
Surrogate	Unit	Acceptable Limits								
Toluene-d8	%	50-140			103	103	101	105	103	105
Terphenyl	%	60-140			70	66	92	73	70	74

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON 406/19 T1 RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6472466-6472849 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
C6–C10 (F1 minus BTEX) is a calculated parameter. The calculated value is F1 minus BTEX. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX and PAH contributions.
C>10 – C16 (F2- Naphthalene) is a calculated parameter. The calculated value is F2 - Naphthalene.
C>16 - C34 (F3-PAH) is a calculated parameter. The calculated value is F3-PAH (PAH: sum of Phenanthrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Fluoranthene, Dibenzo(a,h)anthracene, Indeno(1,2,3-c,d)pyrene and Pyrene).
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-39 @ 0-2.5	25-40 @ 7.5-10	25-41 @ 7.5-10	25-42 @ 2.5-5	25-43 @ 2.5-5	25-43 DUP	25-44 @ 7.5-10	25-45 @ 7.5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
Parameter	Unit	G / S	RDL	6472466	6472473	6472474	6472475	6472476	6472477	6472478	6472479
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-39 @ 0-2.5	25-40 @ 7.5-10	25-41 @ 7.5-10	25-42 @ 2.5-5	25-43 @ 2.5-5	25-43 DUP	25-44 @ 7.5-10	25-45 @ 7.5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
Parameter	Unit	G / S	RDL	6472466	6472473	6472474	6472475	6472476	6472477	6472478	6472479
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	7.8	7.8	8.7	13.3	11.5	9.7	16.3	11.1
Surrogate	Unit	Acceptable Limits									
Toluene-d8	% Recovery	50-140		99	106	103	103	100	102	103	102
4-Bromofluorobenzene	% Recovery	50-140		86	85	88	88	94	94	86	86

Certified By: [redacted]

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PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-45 DUP	25-46 @ 5-7.5	25-47 @ 2.5-5	25-48 @ 2.5-5	25-49 @ 7.5-10	25-50 @ 5-7.5	25-51 @ 7.5-10	25-52 @ 7.5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
Parameter	Unit	G / S	RDL	6472671	6472672	6472673	6472674	6472675	6472676	6472677	6472678
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-45 DUP	25-46 @ 5-7.5	25-47 @ 2.5-5	25-48 @ 2.5-5	25-49 @ 7.5-10	25-50 @ 5-7.5	25-51 @ 7.5-10	25-52 @ 7.5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
Parameter	Unit	G / S	RDL	6472671	6472672	6472673	6472674	6472675	6472676	6472677	6472678
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	9.4	13.9	8.9	8.4	11.5	15.6	13.6	16.5
Surrogate	Unit	Acceptable Limits									
Toluene-d8	% Recovery	50-140		106	101	105	105	98	100	103	102
4-Bromofluorobenzene	% Recovery	50-140		90	93	92	94	90	95	87	95

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		DUP 25-52	25-53 @ 7.5-10	25-54 @ 5-7.5	25-55 @ 5-7.5	25-56 @ 5-7.5	25-57 @ 2.5-5	25-58 @ 2.5-5	25-59 @ 0-2.5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
Parameter	Unit	G / S	RDL	6472679	6472680	6472681	6472682	6472683	6472684	6472685	6472686
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: [redacted]

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AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		DUP 25-52	25-53 @ 7.5-10	25-54 @ 5-7.5	25-55 @ 5-7.5	25-56 @ 5-7.5	25-57 @ 2.5-5	25-58 @ 2.5-5	25-59 @ 0-2.5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17	2025-01-17
Parameter	Unit	G / S	RDL	6472679	6472680	6472681	6472682	6472683	6472684	6472685	6472686
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	13.9	15.8	15.0	15.5	7.5	16.8	12.6	12.6
Surrogate	Unit	Acceptable Limits									
Toluene-d8	% Recovery	50-140		108	102	99	105	103	110	105	102
4-Bromofluorobenzene	% Recovery	50-140		92	93	92	94	93	93	93	83

Certified By: [redacted]

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AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-60 @ 0-2.5	25-61 @ 2.5-5	25-62 @ 7.5-10	DUP 25-62	25-63 @ 7.5-10	25-64 @ 2.5-5	25-65 @ 5-7.5	25-66 @ 7.5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-17	2025-01-17	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20
Parameter	Unit	G / S	RDL	6472687	6472688	6472689	6472719	6472724	6472725	6472726	6472727
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-22

DATE REPORTED: 2025-01-30

SAMPLE DESCRIPTION:				25-60 @ 0-2.5	25-61 @ 2.5-5	25-62 @ 7.5-10	DUP 25-62	25-63 @ 7.5-10	25-64 @ 2.5-5	25-65 @ 5-7.5	25-66 @ 7.5-10
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2025-01-17	2025-01-17	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20
Parameter	Unit	G / S	RDL	6472687	6472688	6472689	6472719	6472724	6472725	6472726	6472727
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	14.2	8.1	15.5	16.6	9.4	16.8	19.3	16.0
Surrogate	Unit	Acceptable Limits									
Toluene-d8	% Recovery	50-140		100	102	105	97	100	102	108	102
4-Bromofluorobenzene	% Recovery	50-140		91	88	88	91	90	93	94	93

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-67 @ 7.5-10	25-68 @ 5-7.5	25-69 @ 7.5-10	25-70 @ 5-7.5	25-71 @ 2.5-5	25-72 @ 7.5-10	25-73 @ 5-7.5	25-74 @ 5-7.5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20
Parameter	Unit	G / S	RDL	6472728	6472729	6472780	6472781	6472782	6472783	6472784	6472785
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-67 @ 7.5-10	25-68 @ 5-7.5	25-69 @ 7.5-10	25-70 @ 5-7.5	25-71 @ 2.5-5	25-72 @ 7.5-10	25-73 @ 5-7.5	25-74 @ 5-7.5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20
Parameter	Unit	G / S	RDL	6472728	6472729	6472780	6472781	6472782	6472783	6472784	6472785
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	22.3	14.8	14.6	13.1	11.8	4.4	19.9	15.8
Surrogate	Unit	Acceptable Limits									
Toluene-d8	% Recovery	50-140		103	103	103	98	107	106	104	105
4-Bromofluorobenzene	% Recovery	50-140		95	89	89	94	93	88	86	89

Certified By: [redacted]

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AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-75 @ 5-7.5	25-76 @ 5-7.5	25-77 @ 7.5-10	25-78 @ 5-7.5	25-79 @ 7.5-10	25-80 @ 7.5-10	25-81 @ 7.5-10	25-82 @ 5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-21	2025-01-21
Parameter	Unit	G / S	RDL	6472786	6472787	6472788	6472789	6472790	6472791	6472792	6472824
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-75 @ 5-7.5	25-76 @ 5-7.5	25-77 @ 7.5-10	25-78 @ 5-7.5	25-79 @ 7.5-10	25-80 @ 7.5-10	25-81 @ 7.5-10	25-82 @ 5-10
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-20	2025-01-21	2025-01-21
Parameter	Unit	G / S	RDL	6472786	6472787	6472788	6472789	6472790	6472791	6472792	6472824
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	19.3	17.6	17.4	19.8	22.5	17.6	16.4	20.7
Surrogate	Unit	Acceptable Limits									
Toluene-d8	% Recovery	50-140		104	100	102	102	104	104	104	105
4-Bromofluorobenzene	% Recovery	50-140		89	86	91	90	90	90	93	94

Certified By: [redacted]

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CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-83 @ 5-7.5	25-84 @ 5-7.5	25-85 @ 5-7.5	25-86 @ 7.5-10	25-87 @ 7.5-10	25-88 @ 5-7.5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21
Parameter	Unit	G / S	RDL	6472829	6472835	6472840	6472845	6472848	6472849
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: [redacted]

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Certificate of Analysis

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

O. Reg. 153(511) - VOCs (with PHC) (Soil)

DATE RECEIVED: 2025-01-22 **DATE REPORTED: 2025-01-30**

		SAMPLE DESCRIPTION:		25-83 @ 5-7.5	25-84 @ 5-7.5	25-85 @ 5-7.5	25-86 @ 7.5-10	25-87 @ 7.5-10	25-88 @ 5-7.5
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21	2025-01-21
Parameter	Unit	G / S	RDL	6472829	6472835	6472840	6472845	6472848	6472849
Bromoform	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	ug/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes (Total)	ug/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
n-Hexane	µg/g	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content	%		0.1	16.3	16.8	16.1	17.3	17.1	11.3
Surrogate	Unit	Acceptable Limits							
Toluene-d8	% Recovery	50-140		103	103	101	105	103	105
4-Bromofluorobenzene	% Recovery	50-140		91	93	94	95	92	90

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON 406/19 T1 RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6472466-6472849 The sample was analyzed using the high level technique. The sample was extracted using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.
The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

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Exceedance Summary

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
6472686	25-59 @ 0-2.5	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Lead	µg/g	120	130
6472686	25-59 @ 0-2.5	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	349
6472726	25-65 @ 5-7.5	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	336
6472780	25-69 @ 7.5-10	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	341
6472781	25-70 @ 5-7.5	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity (2:1)	mS/cm	0.57	0.722
6472781	25-70 @ 5-7.5	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Sodium Adsorption Ratio (2:1) (Calc.)	N/A	2.4	3.07
6472784	25-73 @ 5-7.5	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	292
6472785	25-74 @ 5-7.5	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	350
6472786	25-75 @ 5-7.5	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	340
6472789	25-78 @ 5-7.5	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity (2:1)	mS/cm	0.57	0.916
6472792	25-81 @ 7.5-10	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	342
6472824	25-82 @ 5-10	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	329
6472845	25-86 @ 7.5-10	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	315
6472848	25-87 @ 7.5-10	ON 406/19 T1 RPIC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Zinc	µg/g	290	335

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
AGAT WORK ORDER: 25T240863
PROJECT: 8368 BVD Puslinch Delineation
ATTENTION TO: Ali Rasoul
SAMPLING SITE:7504 McLean Rd., Puslinch, ON
SAMPLED BY:E.F.

Soil Analysis

RPT Date: Jan 30, 2025			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	6472466	6472466	<0.8	<0.8	NA	< 0.8	110%	70%	130%	84%	80%	120%	85%	70%	130%
Arsenic	6472466	6472466	8	8	2.2%	< 1	111%	70%	130%	87%	80%	120%	81%	70%	130%
Barium	6472466	6472466	45.4	46.9	3.2%	< 2.0	110%	70%	130%	99%	80%	120%	92%	70%	130%
Beryllium	6472466	6472466	1.1	1.0	NA	< 0.5	100%	70%	130%	95%	80%	120%	97%	70%	130%
Boron	6472466	6472466	25	24	NA	< 5	88%	70%	130%	91%	80%	120%	75%	70%	130%
Boron (Hot Water Soluble)	6472886		0.37	0.36	NA	< 0.10	107%	60%	140%	99%	70%	130%	94%	60%	140%
Cadmium	6472466	6472466	<0.5	<0.5	NA	< 0.5	86%	70%	130%	103%	80%	120%	90%	70%	130%
Chromium	6472466	6472466	30	31	3.0%	< 5	105%	70%	130%	91%	80%	120%	95%	70%	130%
Cobalt	6472466	6472466	17.0	16.7	1.5%	< 0.8	102%	70%	130%	88%	80%	120%	91%	70%	130%
Copper	6472466	6472466	30.7	31.9	3.7%	< 1.0	99%	70%	130%	96%	80%	120%	95%	70%	130%
Lead	6472466	6472466	19	18	5.7%	< 1	113%	70%	130%	94%	80%	120%	97%	70%	130%
Molybdenum	6472466	6472466	0.6	0.5	NA	< 0.5	117%	70%	130%	99%	80%	120%	96%	70%	130%
Nickel	6472466	6472466	35	34	3.1%	< 1	100%	70%	130%	89%	80%	120%	86%	70%	130%
Selenium	6472466	6472466	<0.8	<0.8	NA	< 0.8	99%	70%	130%	99%	80%	120%	92%	70%	130%
Silver	6472466	6472466	<0.5	<0.5	NA	< 0.5	113%	70%	130%	92%	80%	120%	92%	70%	130%
Thallium	6472466	6472466	<0.5	<0.5	NA	< 0.5	110%	70%	130%	97%	80%	120%	100%	70%	130%
Uranium	6472466	6472466	0.74	0.72	NA	< 0.50	110%	70%	130%	87%	80%	120%	93%	70%	130%
Vanadium	6472466	6472466	39.5	40.5	2.6%	< 2.0	125%	70%	130%	85%	80%	120%	92%	70%	130%
Zinc	6472466	6472466	93	94	0.7%	< 5	101%	70%	130%	98%	80%	120%	112%	70%	130%
Chromium, Hexavalent	6472466	6472466	<0.2	<0.2	NA	< 0.2	108%	70%	130%	88%	80%	120%	83%	70%	130%
Cyanide, WAD	6472897		<0.040	<0.040	NA	< 0.040	91%	70%	130%	99%	80%	120%	101%	70%	130%
Mercury	6472466	6472466	<0.10	<0.10	NA	< 0.10	114%	70%	130%	100%	80%	120%	99%	70%	130%
Electrical Conductivity (2:1)	6470400		0.456	0.437	4.2%	< 0.005	103%	80%	120%						
Sodium Adsorption Ratio (2:1) (Calc.)	6472466	6472466	0.674	0.677	0.4%	NA									
pH, 2:1 CaCl2 Extraction	6472675	6472675	7.69	7.66	0.4%	NA	100%	80%	120%						

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

O. Reg. 153(511) - Metals & Inorganics (Soil)															
Boron (Hot Water Soluble)	6472466	6472466	1.50	1.49	0.5%	< 0.10	107%	60%	140%	99%	70%	130%	97%	60%	140%
Chromium, Hexavalent	6472683	6472683	<0.2	<0.2	NA	< 0.2	109%	70%	130%	88%	80%	120%	84%	70%	130%
Cyanide, WAD	6472787	6472787	<0.040	<0.040	NA	< 0.040	91%	70%	130%	92%	80%	120%	87%	70%	130%
Electrical Conductivity (2:1)	6472466	6472466	0.220	0.194	12.9%	< 0.005	95%	80%	120%						
Sodium Adsorption Ratio (2:1) (Calc.)	6472683	6472683	0.431	0.372	14.5%	NA									

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

O. Reg. 153(511) - Metals & Inorganics (Soil)

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
AGAT WORK ORDER: 25T240863
PROJECT: 8368 BVD Puslinch Delineation
ATTENTION TO: Ali Rasoul
SAMPLING SITE:7504 McLean Rd., Puslinch, ON
SAMPLED BY:E.F.

Soil Analysis (Continued)

RPT Date: Jan 30, 2025			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Boron (Hot Water Soluble)	6472683	6472683	0.18	0.16	NA	< 0.10	106%	60%	140%	99%	70%	130%	95%	60%	140%
Chromium, Hexavalent	6472786	6472786	<0.2	<0.2	NA	< 0.2	106%	70%	130%	87%	80%	120%	86%	70%	130%
Cyanide, WAD	6472674	6472674	<0.040	<0.040	NA	< 0.040	101%	70%	130%	92%	80%	120%	101%	70%	130%
Electrical Conductivity (2:1)	6472683	6472683	0.179	0.198	10.4%	< 0.005	94%	80%	120%						
Sodium Adsorption Ratio (2:1) (Calc.)	6472786	6472786	0.720	0.694	3.7%	NA									

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

O. Reg. 153(511) - Metals & Inorganics (Soil)

Boron (Hot Water Soluble)	6472786	6472786	0.45	0.44	NA	< 0.10	106%	60%	140%	99%	70%	130%	92%	60%	140%
Electrical Conductivity (2:1)	6472786	6472786	0.311	0.284	9.0%	< 0.005	97%	80%	120%						

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

O. Reg. 153(511) - Metals & Inorganics (Soil)

Antimony	6472683	6472683	<0.8	<0.8	NA	< 0.8	111%	70%	130%	97%	80%	120%	78%	70%	130%
Arsenic	6472683	6472683	3	3	NA	< 1	120%	70%	130%	83%	80%	120%	81%	70%	130%
Barium	6472683	6472683	23.9	23.6	1.3%	< 2.0	105%	70%	130%	91%	80%	120%	91%	70%	130%
Beryllium	6472683	6472683	<0.5	<0.5	NA	< 0.5	115%	70%	130%	112%	80%	120%	122%	70%	130%
Boron	6472683	6472683	9	8	NA	< 5	98%	70%	130%	106%	80%	120%	105%	70%	130%
Cadmium	6472683	6472683	<0.5	<0.5	NA	< 0.5	96%	70%	130%	101%	80%	120%	87%	70%	130%
Chromium	6472683	6472683	9	9	NA	< 5	108%	70%	130%	108%	80%	120%	89%	70%	130%
Cobalt	6472683	6472683	4.1	3.8	NA	< 0.8	107%	70%	130%	90%	80%	120%	90%	70%	130%
Copper	6472683	6472683	16.1	15.7	2.6%	< 1.0	108%	70%	130%	104%	80%	120%	80%	70%	130%
Lead	6472683	6472683	25	26	1.3%	< 1	97%	70%	130%	95%	80%	120%	73%	70%	130%
Molybdenum	6472683	6472683	0.6	0.6	NA	< 0.5	112%	70%	130%	103%	80%	120%	94%	70%	130%
Nickel	6472683	6472683	7	7	2.9%	< 1	114%	70%	130%	96%	80%	120%	91%	70%	130%
Selenium	6472683	6472683	<0.8	<0.8	NA	< 0.8	77%	70%	130%	96%	80%	120%	95%	70%	130%
Silver	6472683	6472683	<0.5	<0.5	NA	< 0.5	99%	70%	130%	86%	80%	120%	83%	70%	130%
Thallium	6472683	6472683	<0.5	<0.5	NA	< 0.5	97%	70%	130%	87%	80%	120%	86%	70%	130%
Uranium	6472683	6472683	<0.50	<0.50	NA	< 0.50	92%	70%	130%	93%	80%	120%	78%	70%	130%
Vanadium	6472683	6472683	16.3	14.8	9.3%	< 2.0	130%	70%	130%	83%	80%	120%	87%	70%	130%
Zinc	6472683	6472683	235	228	3.2%	< 5	115%	70%	130%	108%	80%	120%	NA	70%	130%
Mercury	6472683	6472683	<0.10	<0.10	NA	< 0.10	100%	70%	130%	98%	80%	120%	101%	70%	130%

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

O. Reg. 153(511) - Metals & Inorganics (Soil)

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

Soil Analysis (Continued)

RPT Date: Jan 30, 2025			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Antimony	6472786	6472786	<0.8	<0.8	NA	< 0.8	137%	70%	130%	82%	80%	120%	83%	70%	130%
Arsenic	6472786	6472786	7	7	11.3%	< 1	118%	70%	130%	91%	80%	120%	93%	70%	130%
Barium	6472786	6472786	71.8	66.2	8.2%	< 2.0	114%	70%	130%	99%	80%	120%	108%	70%	130%
Beryllium	6472786	6472786	0.6	<0.5	NA	< 0.5	86%	70%	130%	95%	80%	120%	94%	70%	130%
Boron	6472786	6472786	7	7	NA	< 5	86%	70%	130%	81%	80%	120%	75%	70%	130%
Cadmium	6472786	6472786	0.8	0.8	NA	< 0.5	119%	70%	130%	93%	80%	120%	102%	70%	130%
Chromium	6472786	6472786	17	15	NA	< 5	101%	70%	130%	92%	80%	120%	87%	70%	130%
Cobalt	6472786	6472786	7.3	6.3	15.6%	< 0.8	105%	70%	130%	92%	80%	120%	91%	70%	130%
Copper	6472786	6472786	25.6	28.4	10.4%	< 1.0	102%	70%	130%	94%	80%	120%	NA	70%	130%
Lead	6472786	6472786	77	72	6.5%	< 1	110%	70%	130%	98%	80%	120%	NA	70%	130%
Molybdenum	6472786	6472786	0.8	0.7	NA	< 0.5	122%	70%	130%	95%	80%	120%	101%	70%	130%
Nickel	6472786	6472786	15	13	15.3%	< 1	106%	70%	130%	92%	80%	120%	87%	70%	130%
Selenium	6472786	6472786	<0.8	<0.8	NA	< 0.8	103%	70%	130%	95%	80%	120%	99%	70%	130%
Silver	6472786	6472786	<0.5	<0.5	NA	< 0.5	109%	70%	130%	93%	80%	120%	97%	70%	130%
Thallium	6472786	6472786	<0.5	<0.5	NA	< 0.5	104%	70%	130%	NA	80%	120%	96%	70%	130%
Uranium	6472786	6472786	0.71	0.66	NA	< 0.50	109%	70%	130%	93%	80%	120%	100%	70%	130%
Vanadium	6472786	6472786	28.2	25.3	11.1%	< 2.0	111%	70%	130%	91%	80%	120%	89%	70%	130%
Zinc	6472786	6472786	340	297	13.5%	< 5	112%	70%	130%	94%	80%	120%	NA	70%	130%
Mercury	6472786	6472786	<0.10	<0.10	NA	< 0.10	119%	70%	130%	100%	80%	120%	101%	70%	130%

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits by up to 10% absolute.

Certified By:

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
AGAT WORK ORDER: 25T240863
PROJECT: 8368 BVD Puslinch Delineation
ATTENTION TO: Ali Rasoul
SAMPLING SITE:7504 McLean Rd., Puslinch, ON
SAMPLED BY:E.F.

Trace Organics Analysis

RPT Date: Jan 30, 2025

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)															
F1 (C6 to C10)	6472672	6472672	<5	<5	NA	< 5	97%	60%	140%	81%	60%	140%	98%	60%	140%
F2 (C10 to C16)	6472466	6472466	< 10	< 10	NA	< 10	105%	60%	140%	101%	60%	140%	116%	60%	140%
F2 (C10 to C16) minus Naphthalene	6472466	6472466	< 10	< 10	NA	< 10									
F3 (C16 to C34)	6472466	6472466	< 50	< 50	NA	< 50	113%	60%	140%	120%	60%	140%	118%	60%	140%
F3 (C16 to C34) minus PAHs	6472466	6472466	< 50	< 50	NA	< 50									
F4 (C34 to C50)	6472466	6472466	< 50	< 50	NA	< 50	81%	60%	140%	90%	60%	140%	84%	60%	140%
Terphenyl	6472466	6472466	< 1	< 1	0.0%	< 1									
O. Reg. 153(511) - PAHs (Soil)															
Naphthalene	6472466	6472466	<0.05	<0.05	NA	< 0.05	106%	50%	140%	93%	50%	140%	88%	50%	140%
Acenaphthylene	6472466	6472466	<0.05	<0.05	NA	< 0.05	98%	50%	140%	88%	50%	140%	93%	50%	140%
Acenaphthene	6472466	6472466	<0.05	<0.05	NA	< 0.05	101%	50%	140%	78%	50%	140%	75%	50%	140%
Fluorene	6472466	6472466	<0.05	<0.05	NA	< 0.05	100%	50%	140%	73%	50%	140%	78%	50%	140%
Phenanthrene	6472466	6472466	<0.05	<0.05	NA	< 0.05	102%	50%	140%	75%	50%	140%	85%	50%	140%
Anthracene	6472466	6472466	<0.05	<0.05	NA	< 0.05	89%	50%	140%	98%	50%	140%	100%	50%	140%
Fluoranthene	6472466	6472466	<0.05	<0.05	NA	< 0.05	90%	50%	140%	85%	50%	140%	98%	50%	140%
Pyrene	6472466	6472466	<0.05	<0.05	NA	< 0.05	90%	50%	140%	80%	50%	140%	95%	50%	140%
Benzo(a)anthracene	6472466	6472466	<0.05	<0.05	NA	< 0.05	98%	50%	140%	75%	50%	140%	98%	50%	140%
Chrysene	6472466	6472466	<0.05	<0.05	NA	< 0.05	123%	50%	140%	83%	50%	140%	108%	50%	140%
Benzo(b)fluoranthene	6472466	6472466	<0.05	<0.05	NA	< 0.05	71%	50%	140%	88%	50%	140%	103%	50%	140%
Benzo(k)fluoranthene	6472466	6472466	<0.05	<0.05	NA	< 0.05	73%	50%	140%	75%	50%	140%	95%	50%	140%
Benzo(a)pyrene	6472466	6472466	<0.05	<0.05	NA	< 0.05	76%	50%	140%	78%	50%	140%	98%	50%	140%
Indeno(1,2,3-cd)pyrene	6472466	6472466	<0.05	<0.05	NA	< 0.05	81%	50%	140%	90%	50%	140%	98%	50%	140%
Dibenz(a,h)anthracene	6472466	6472466	<0.05	<0.05	NA	< 0.05	70%	50%	140%	93%	50%	140%	95%	50%	140%
Benzo(g,h,i)perylene	6472466	6472466	<0.05	<0.05	NA	< 0.05	75%	50%	140%	78%	50%	140%	93%	50%	140%
O. Reg. 153(511) - VOCs (with PHC) (Soil)															
Dichlorodifluoromethane	6472672	6472672	<0.05	<0.05	NA	< 0.05	64%	50%	140%	72%	50%	140%	83%	50%	140%
Vinyl Chloride	6472672	6472672	<0.02	<0.02	NA	< 0.02	112%	50%	140%	94%	50%	140%	97%	50%	140%
Bromomethane	6472672	6472672	<0.05	<0.05	NA	< 0.05	85%	50%	140%	80%	50%	140%	103%	50%	140%
Trichlorofluoromethane	6472672	6472672	<0.05	<0.05	NA	< 0.05	69%	50%	140%	80%	50%	140%	92%	50%	140%
Acetone	6472672	6472672	<0.50	<0.50	NA	< 0.50	87%	50%	140%	96%	50%	140%	92%	50%	140%
1,1-Dichloroethylene	6472672	6472672	<0.05	<0.05	NA	< 0.05	61%	50%	140%	86%	60%	130%	79%	50%	140%
Methylene Chloride	6472672	6472672	<0.05	<0.05	NA	< 0.05	87%	50%	140%	91%	60%	130%	90%	50%	140%
Trans- 1,2-Dichloroethylene	6472672	6472672	<0.05	<0.05	NA	< 0.05	95%	50%	140%	61%	60%	130%	79%	50%	140%
Methyl tert-butyl Ether	6472672	6472672	<0.05	<0.05	NA	< 0.05	75%	50%	140%	80%	60%	130%	74%	50%	140%
1,1-Dichloroethane	6472672	6472672	<0.02	<0.02	NA	< 0.02	67%	50%	140%	69%	60%	130%	60%	50%	140%
Methyl Ethyl Ketone	6472672	6472672	<0.50	<0.50	NA	< 0.50	105%	50%	140%	87%	50%	140%	116%	50%	140%
Cis- 1,2-Dichloroethylene	6472672	6472672	<0.02	<0.02	NA	< 0.02	65%	50%	140%	62%	60%	130%	80%	50%	140%

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
AGAT WORK ORDER: 25T240863
PROJECT: 8368 BVD Puslinch Delineation
ATTENTION TO: Ali Rasoul
SAMPLING SITE:7504 McLean Rd., Puslinch, ON
SAMPLED BY:E.F.

Trace Organics Analysis (Continued)

RPT Date: Jan 30, 2025			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Chloroform	6472672	6472672	<0.04	<0.04	NA	< 0.04	98%	50%	140%	84%	60%	130%	90%	50%	140%
1,2-Dichloroethane	6472672	6472672	<0.03	<0.03	NA	< 0.03	76%	50%	140%	81%	60%	130%	80%	50%	140%
1,1,1-Trichloroethane	6472672	6472672	<0.05	<0.05	NA	< 0.05	70%	50%	140%	70%	60%	130%	67%	50%	140%
Carbon Tetrachloride	6472672	6472672	<0.05	<0.05	NA	< 0.05	75%	50%	140%	70%	60%	130%	98%	50%	140%
Benzene	6472672	6472672	<0.02	<0.02	NA	< 0.02	67%	50%	140%	66%	60%	130%	93%	50%	140%
1,2-Dichloropropane	6472672	6472672	<0.03	<0.03	NA	< 0.03	96%	50%	140%	62%	60%	130%	67%	50%	140%
Trichloroethylene	6472672	6472672	<0.03	<0.03	NA	< 0.03	88%	50%	140%	73%	60%	130%	95%	50%	140%
Bromodichloromethane	6472672	6472672	<0.05	<0.05	NA	< 0.05	65%	50%	140%	69%	60%	130%	96%	50%	140%
Methyl Isobutyl Ketone	6472672	6472672	<0.50	<0.50	NA	< 0.50	93%	50%	140%	97%	50%	140%	87%	50%	140%
1,1,2-Trichloroethane	6472672	6472672	<0.04	<0.04	NA	< 0.04	82%	50%	140%	76%	60%	130%	77%	50%	140%
Toluene	6472672	6472672	<0.05	<0.05	NA	< 0.05	77%	50%	140%	66%	60%	130%	84%	50%	140%
Dibromochloromethane	6472672	6472672	<0.05	<0.05	NA	< 0.05	69%	50%	140%	80%	60%	130%	63%	50%	140%
Ethylene Dibromide	6472672	6472672	<0.04	<0.04	NA	< 0.04	88%	50%	140%	98%	60%	130%	83%	50%	140%
Tetrachloroethylene	6472672	6472672	<0.05	<0.05	NA	< 0.05	87%	50%	140%	90%	60%	130%	78%	50%	140%
1,1,1,2-Tetrachloroethane	6472672	6472672	<0.04	<0.04	NA	< 0.04	72%	50%	140%	95%	60%	130%	75%	50%	140%
Chlorobenzene	6472672	6472672	<0.05	<0.05	NA	< 0.05	90%	50%	140%	68%	60%	130%	89%	50%	140%
Ethylbenzene	6472672	6472672	<0.05	<0.05	NA	< 0.05	71%	50%	140%	81%	60%	130%	75%	50%	140%
m & p-Xylene	6472672	6472672	<0.05	<0.05	NA	< 0.05	84%	50%	140%	102%	60%	130%	92%	50%	140%
Bromoform	6472672	6472672	<0.05	<0.05	NA	< 0.05	63%	50%	140%	69%	60%	130%	83%	50%	140%
Styrene	6472672	6472672	<0.05	<0.05	NA	< 0.05	88%	50%	140%	64%	60%	130%	91%	50%	140%
1,1,2,2-Tetrachloroethane	6472672	6472672	<0.05	<0.05	NA	< 0.05	68%	50%	140%	93%	60%	130%	60%	50%	140%
o-Xylene	6472672	6472672	<0.05	<0.05	NA	< 0.05	80%	50%	140%	61%	60%	130%	91%	50%	140%
1,3-Dichlorobenzene	6472672	6472672	<0.05	<0.05	NA	< 0.05	98%	50%	140%	62%	60%	130%	92%	50%	140%
1,4-Dichlorobenzene	6472672	6472672	<0.05	<0.05	NA	< 0.05	99%	50%	140%	60%	60%	130%	90%	50%	140%
1,2-Dichlorobenzene	6472672	6472672	<0.05	<0.05	NA	< 0.05	77%	50%	140%	60%	60%	130%	89%	50%	140%
n-Hexane	6472672	6472672	<0.05	<0.05	NA	< 0.05	65%	50%	140%	100%	60%	130%	75%	50%	140%
O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)															
F1 (C6 to C10)	6472849	6472849	<5	<5	NA	< 5	118%	60%	140%	95%	60%	140%	80%	60%	140%
F2 (C10 to C16)	6472683	6472683	< 10	< 10	NA	< 10	115%	60%	140%	91%	60%	140%	105%	60%	140%
F2 (C10 to C16) minus Naphthalene	6472683	6472683	< 10	< 10	NA	< 10									
F3 (C16 to C34)	6472683	6472683	< 50	< 50	NA	< 50	111%	60%	140%	110%	60%	140%	126%	60%	140%
F3 (C16 to C34) minus PAHs	6472683	6472683	< 50	< 50	NA	< 50									
F4 (C34 to C50)	6472683	6472683	< 50	< 50	NA	< 50	84%	60%	140%	109%	60%	140%	86%	60%	140%
Terphenyl	6472683	6472683	< 1	< 1	0.0%	< 1									
O. Reg. 153(511) - PHCs F1 - F4 (with PAHs and VOC) (Soil)															
F2 (C10 to C16)	6472786	6472786	< 10	< 10	NA	< 10	115%	60%	140%	91%	60%	140%	86%	60%	140%
F3 (C16 to C34)	6472786	6472786	< 50	< 50	NA	< 50	111%	60%	140%	110%	60%	140%	112%	60%	140%
F4 (C34 to C50)	6472786	6472786	< 50	< 50	NA	< 50	84%	60%	140%	109%	60%	140%	109%	60%	140%

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Trace Organics Analysis (Continued)

RPT Date: Jan 30, 2025

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PAHs (Soil)															
Naphthalene	6472786	6472786	<0.05	<0.05	NA	< 0.05	95%	50%	140%	75%	50%	140%	88%	50%	140%
Acenaphthylene	6472786	6472786	<0.05	<0.05	NA	< 0.05	104%	50%	140%	88%	50%	140%	83%	50%	140%
Acenaphthene	6472786	6472786	<0.05	<0.05	NA	< 0.05	102%	50%	140%	103%	50%	140%	83%	50%	140%
Fluorene	6472786	6472786	<0.05	<0.05	NA	< 0.05	111%	50%	140%	103%	50%	140%	80%	50%	140%
Phenanthrene	6472786	6472786	<0.05	<0.05	NA	< 0.05	114%	50%	140%	105%	50%	140%	73%	50%	140%
Anthracene	6472786	6472786	<0.05	<0.05	NA	< 0.05	113%	50%	140%	93%	50%	140%	78%	50%	140%
Fluoranthene	6472786	6472786	<0.05	<0.05	NA	< 0.05	117%	50%	140%	103%	50%	140%	78%	50%	140%
Pyrene	6472786	6472786	<0.05	<0.05	NA	< 0.05	117%	50%	140%	105%	50%	140%	75%	50%	140%
Benzo(a)anthracene	6472786	6472786	<0.05	<0.05	NA	< 0.05	105%	50%	140%	88%	50%	140%	85%	50%	140%
Chrysene	6472786	6472786	<0.05	<0.05	NA	< 0.05	122%	50%	140%	98%	50%	140%	80%	50%	140%
Benzo(b)fluoranthene	6472786	6472786	<0.05	<0.05	NA	< 0.05	101%	50%	140%	100%	50%	140%	80%	50%	140%
Benzo(k)fluoranthene	6472786	6472786	<0.05	<0.05	NA	< 0.05	104%	50%	140%	80%	50%	140%	73%	50%	140%
Benzo(a)pyrene	6472786	6472786	<0.05	<0.05	NA	< 0.05	101%	50%	140%	75%	50%	140%	90%	50%	140%
Indeno(1,2,3-cd)pyrene	6472786	6472786	<0.05	<0.05	NA	< 0.05	103%	50%	140%	95%	50%	140%	90%	50%	140%
Dibenz(a,h)anthracene	6472786	6472786	<0.05	<0.05	NA	< 0.05	102%	50%	140%	75%	50%	140%	73%	50%	140%
Benzo(g,h,i)perylene	6472786	6472786	<0.05	<0.05	NA	< 0.05	113%	50%	140%	85%	50%	140%	85%	50%	140%
O. Reg. 153(511) - VOCs (with PHC) (Soil)															
Dichlorodifluoromethane	6472849	6472849	<0.05	<0.05	NA	< 0.05	99%	50%	140%	106%	50%	140%	90%	50%	140%
Vinyl Chloride	6472849	6472849	<0.02	<0.02	NA	< 0.02	110%	50%	140%	112%	50%	140%	99%	50%	140%
Bromomethane	6472849	6472849	<0.05	<0.05	NA	< 0.05	118%	50%	140%	104%	50%	140%	108%	50%	140%
Trichlorofluoromethane	6472849	6472849	<0.05	<0.05	NA	< 0.05	109%	50%	140%	101%	50%	140%	94%	50%	140%
Acetone	6472849	6472849	<0.50	<0.50	NA	< 0.50	101%	50%	140%	98%	50%	140%	87%	50%	140%
1,1-Dichloroethylene	6472849	6472849	<0.05	<0.05	NA	< 0.05	99%	50%	140%	116%	60%	130%	85%	50%	140%
Methylene Chloride	6472849	6472849	<0.05	<0.05	NA	< 0.05	91%	50%	140%	106%	60%	130%	92%	50%	140%
Trans- 1,2-Dichloroethylene	6472849	6472849	<0.05	<0.05	NA	< 0.05	102%	50%	140%	95%	60%	130%	92%	50%	140%
Methyl tert-butyl Ether	6472849	6472849	<0.05	<0.05	NA	< 0.05	80%	50%	140%	89%	60%	130%	62%	50%	140%
1,1-Dichloroethane	6472849	6472849	<0.02	<0.02	NA	< 0.02	87%	50%	140%	83%	60%	130%	72%	50%	140%
Methyl Ethyl Ketone	6472849	6472849	<0.50	<0.50	NA	< 0.50	99%	50%	140%	100%	50%	140%	87%	50%	140%
Cis- 1,2-Dichloroethylene	6472849	6472849	<0.02	<0.02	NA	< 0.02	91%	50%	140%	98%	60%	130%	87%	50%	140%
Chloroform	6472849	6472849	<0.04	<0.04	NA	< 0.04	83%	50%	140%	88%	60%	130%	81%	50%	140%
1,2-Dichloroethane	6472849	6472849	<0.03	<0.03	NA	< 0.03	88%	50%	140%	94%	60%	130%	97%	50%	140%
1,1,1-Trichloroethane	6472849	6472849	<0.05	<0.05	NA	< 0.05	88%	50%	140%	83%	60%	130%	67%	50%	140%
Carbon Tetrachloride	6472849	6472849	<0.05	<0.05	NA	< 0.05	97%	50%	140%	95%	60%	130%	94%	50%	140%
Benzene	6472849	6472849	<0.02	<0.02	NA	< 0.02	93%	50%	140%	100%	60%	130%	79%	50%	140%
1,2-Dichloropropane	6472849	6472849	<0.03	<0.03	NA	< 0.03	69%	50%	140%	99%	60%	130%	74%	50%	140%
Trichloroethylene	6472849	6472849	<0.03	<0.03	NA	< 0.03	92%	50%	140%	94%	60%	130%	74%	50%	140%
Bromodichloromethane	6472849	6472849	<0.05	<0.05	NA	< 0.05	76%	50%	140%	81%	60%	130%	65%	50%	140%

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AGAT Laboratories

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

Trace Organics Analysis (Continued)

RPT Date: Jan 30, 2025			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Methyl Isobutyl Ketone	6472849	6472849	<0.50	<0.50	NA	< 0.50	83%	50%	140%	109%	50%	140%	73%	50%	140%
1,1,2-Trichloroethane	6472849	6472849	<0.04	<0.04	NA	< 0.04	74%	50%	140%	94%	60%	130%	85%	50%	140%
Toluene	6472849	6472849	<0.05	<0.05	NA	< 0.05	89%	50%	140%	80%	60%	130%	89%	50%	140%
Dibromochloromethane	6472849	6472849	<0.05	<0.05	NA	< 0.05	69%	50%	140%	82%	60%	130%	75%	50%	140%
Ethylene Dibromide	6472849	6472849	<0.04	<0.04	NA	< 0.04	91%	50%	140%	93%	60%	130%	76%	50%	140%
Tetrachloroethylene	6472849	6472849	<0.05	<0.05	NA	< 0.05	91%	50%	140%	94%	60%	130%	77%	50%	140%
1,1,1,2-Tetrachloroethane	6472849	6472849	<0.04	<0.04	NA	< 0.04	66%	50%	140%	67%	60%	130%	62%	50%	140%
Chlorobenzene	6472849	6472849	<0.05	<0.05	NA	< 0.05	95%	50%	140%	97%	60%	130%	78%	50%	140%
Ethylbenzene	6472849	6472849	<0.05	<0.05	NA	< 0.05	77%	50%	140%	94%	60%	130%	86%	50%	140%
m & p-Xylene	6472849	6472849	<0.05	<0.05	NA	< 0.05	95%	50%	140%	108%	60%	130%	105%	50%	140%
Bromoform	6472849	6472849	<0.05	<0.05	NA	< 0.05	84%	50%	140%	94%	60%	130%	94%	50%	140%
Styrene	6472849	6472849	<0.05	<0.05	NA	< 0.05	99%	50%	140%	95%	60%	130%	91%	50%	140%
1,1,2,2-Tetrachloroethane	6472849	6472849	<0.05	<0.05	NA	< 0.05	67%	50%	140%	85%	60%	130%	81%	50%	140%
o-Xylene	6472849	6472849	<0.05	<0.05	NA	< 0.05	74%	50%	140%	91%	60%	130%	116%	50%	140%
1,3-Dichlorobenzene	6472849	6472849	<0.05	<0.05	NA	< 0.05	78%	50%	140%	87%	60%	130%	99%	50%	140%
1,4-Dichlorobenzene	6472849	6472849	<0.05	<0.05	NA	< 0.05	78%	50%	140%	97%	60%	130%	88%	50%	140%
1,2-Dichlorobenzene	6472849	6472849	<0.05	<0.05	NA	< 0.05	67%	50%	140%	91%	60%	130%	79%	50%	140%
n-Hexane	6472849	6472849	<0.05	<0.05	NA	< 0.05	69%	50%	140%	88%	60%	130%	68%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

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CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

RPT Date: Jan 30, 2025

PARAMETER	Sample Id	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)										
Antimony	6472786	137%	70%	130%	82%	80%	120%	83%	70%	130%

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits by up to 10% absolute.

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	modified from EPA 6010D and MSA PART 3, CH 21	ICP/OES
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium, Hexavalent	INOR-93-6068	modified from EPA 3060 and EPA 7196	SPECTROPHOTOMETER
Cyanide, WAD	INOR-93-6052	modified from ON MOECC E3015, SM 4500-CN- I, G-387	SEGMENTED FLOW ANALYSIS
Mercury	MET-93-6103	modified from EPA 7471B and SM 3112 B	ICP-MS
Electrical Conductivity (2:1)	INOR-93-6075	modified from MSA PART 3, CH 14 and SM 2510 B	PC TITRATE
Sodium Adsorption Ratio (2:1) (Calc.)	INOR-93-6007	modified from EPA 6010D & Analytical Protocol	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6075	modified from EPA 9045D, MCKEAGUE 3.11 E3137	PC TITRATE

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25T240863

PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acenaphthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluorene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Chrysene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(b)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Dibenz(a,h)anthracene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Benzo(g,h,i)perylene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Naphthalene-d8	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Acridine-d9	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Terphenyl-d14	ORG-91-5106	modified from EPA 3570 and EPA 8270E	GC/MS
Moisture Content	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
F1 (C6 to C10)	VOL-91-5009	modified from CCME Tier 1 Method	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	modified from CCME Tier 1 Method	P&T GC/FID
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
F2 (C10 to C16)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F2 (C10 to C16) minus Naphthalene	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F3 (C16 to C34) minus PAHs	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
F4 (C34 to C50)	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	modified from CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009	modified from CCME Tier 1 Method	GC/FID
Dichlorodifluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS

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Method Summary

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ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Vinyl Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromomethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Acetone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trans- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Cis- 1,2-Dichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS

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PROJECT: 8368 BVD Puslinch Delineation

ATTENTION TO: Ali Rasoul

SAMPLING SITE:7504 McLean Rd., Puslinch, ON

SAMPLED BY:E.F.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
m & p-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Bromoform	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Styrene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
n-Hexane	VOL-91-5002	modified from EPA 5035A and EPA 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	modified from EPA 5035A & EPA 8260D	(P&T)GC/MS

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AGAT Laboratories

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webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 25T240863

Cooler Quantity: 4 | 9

Arrival Temperatures: See attached

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes: Loose ice

Report Information:

Company: A & A Environmental Consultants Inc.
Contact: Dr. Ali Rasoul
Address: 16 Young St
Woodstock, ON
Phone: 519-266-4680 Fax: 519-266-3666
Reports to be sent to:
1. Email: arasoul@aaenvironmental.ca, vsowden@"
2. Email: sscott@"; tdemers@" ; ckennedy@"

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☑ Regulation 153/04
Table 1 *Indicate One*
☑ Ind/Com
☑ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☑ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region *Indicate One*
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
Indicate One

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: 8368 BVD Puslinch Delineation
Site Location: 7504 McLean Rd., Puslinch, ON
Sampled By: E.F.
AGAT Quote #: 16288129079 PO: 8368
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y / N
25-39 @ 0-2.5	1/17/25		4	S		
25-40 @ 7.5-10	1/17/25		4	S		
25-41 @ 7.5-10	1/17/25		4	S		
25-42 @ 2.5-5	1/17/25		4	S		
25-43 @ 2.5-5	1/17/25		4	S		
25-43 DUP	1/17/25		4	S		
25-44 @ 7.5-10	1/17/25		4	S		
25-45 @ 7.5-10	1/17/25		4	S		
25-45 DUP	1/17/25		4	S		
25-46 @ 5-7.5	1/17/25		4	S		
25-47 @ 2.5-5	1/17/25		4	S		

Field Filtered - Metals, Hg, CrVI

O. Reg 153

Sample Identification	Metals and Inorganics	All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides)	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr⁶⁺ ☑ EC ☐ FOC ☐ Hg ☑ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_4 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☑ M&I ☑ VOCs ☑ ABNs ☑ B(a)P ☑ PCBs	Sewer Use	Metals Soil 93-101	Metals Water 93-196	CCME F1-F4/VOCs Soil 91-248	CCME F1-F4/VOCs Water 91-249	CCME F1-F4/ BTEX Water 91-315	Sieve & texture (75 Micron)
25-39 @ 0-2.5	☑		☑							☑							☑		
25-40 @ 7.5-10	☑		☑							☑							☑		
25-41 @ 7.5-10	☑		☑							☑							☑		
25-42 @ 2.5-5	☑		☑							☑							☑		
25-43 @ 2.5-5	☑		☑							☑							☑		
25-43 DUP	☑		☑							☑							☑		
25-44 @ 7.5-10	☑		☑							☑							☑		
25-45 @ 7.5-10	☑		☑							☑							☑		
25-45 DUP	☑		☑							☑							☑		
25-46 @ 5-7.5	☑		☑							☑							☑		
25-47 @ 2.5-5	☑		☑							☑							☑		

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
E. Fulson [redacted]	1/22/25	11am	[redacted] J	Jan 22	1:30pm
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time

Page 1 of 5

N°:

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT

Document ID: DIV-78-1511.015

Date Issued: March 16, 2018

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #:

Cooler Quantity: 4 lg

Arrival Temperatures: see pg 1

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes:

Report Information:

Company: A & A Environmental Consultants Inc.
Contact: Dr. Ali Rasoul
Address: 16 Young St
Woodstock, ON
Phone: 519-266-4680 Fax: 519-266-3666
Reports to be sent to:
1. Email: arasoul@aaenvironmental.ca, vsowden@"
2. Email: sscott@"; tdemers@" ; ckennedy@"

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☑ Regulation 153/04
Table 1 *Indicate One*
☑ Ind/Com
☑ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☑ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region _____ *Indicate One*
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: 8368 BVD Puslinch Delineation
Site Location: 7504 McLean Rd., Puslinch, ON
Sampled By: E.F.
AGAT Quote #: 16288129079 PO: 8368
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr6+ ☑ EC ☐ FOC ☐ Hg ☑ pH ☑ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☑ M&I ☑ VOCs ☑ ABNs ☑ B(a)P ☑ PCBs	Sewer Use	Metals Soil 93-101	Metals Water 93-196	CCME F1-F4/VOCs Soil 91-248	CCME F1-F4/VOCs Water 91-249	CCME F1-F4/ BTEX Water 91-315	Sieve & texture (75 Micron)
25-48 @ 2.5-5	1/17/25		4	S			☑	☑							☑								☑			
25-49 @ 7-5.10	1/17/25		4	S			☑	☑							☑								☑			
25-50 @ 5-7.5	1/17/25		4	S			☑	☑							☑								☑			
25-51 @ 7.5-10	1/17/25		4	S			☑	☑							☑								☑			
25-52 @ 7.5-10	1/17/25		4	S			☑	☑							☑								☑			
DUP 25-52	1/17/25		4	S			☑	☑							☑								☑			
25-53 @ 7.5-10	1/17/25		4	S			☑	☑							☑								☑			
25-54 @ 5-7.5	1/17/25		4	S			☑	☑							☑								☑			
25-55 @ 5-7.5	1/17/25		4	S			☑	☑							☑								☑			
25-56 @ 5-7.5	1/17/25		4	S			☑	☑							☑								☑			
25-57 @ 2.5-5	1/17/25		4	S			☑	☑							☑								☑			

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
E. Fulsom [redacted]	1/22/25	11am	[redacted]	Jan 22	1:30pm
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time

Page 2 of 5

N°:

AGAT Laboratories
5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: A & A Environmental Consultants Inc.
Contact: Dr. Ali Rasoul
Address: 16 Young St
Woodstock, ON
Phone: 519-266-4680 Fax: 519-266-3666
Reports to be sent to:
1. Email: arasoul@aaenvironmental.ca, vsowden@"
2. Email: sscott@"; tdemers@" ; ckennedy@"

Project Information:

Project: 8368 BVD Puslinch Delineation
Site Location: 7504 McLean Rd., Puslinch, ON
Sampled By: E.F.
AGAT Quote #: 16288129079 PO: 8368
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☑ Regulation 153/04
Table 1 *Indicate One*
☑ Ind/Com
☑ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☑ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region _____ *Indicate One*
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ *Indicate One*

Is this submission for a Record of Site Condition? ☐ Yes ☑ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Laboratory Use Only

Work Order #:
Cooler Quantity: 4 19
Arrival Temperatures:
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CPM

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y / N	Field Filtered - Metals, Hg, CrVI	O. Reg 153: Metals and Inorganics	All Metals / 153 Metals (excl. Hydrides) / Hydride Metals / 153 Metals (Incl. Hydrides)	ORPs: B-HWS / Cl / CN / Cr6+ / EC / FOC / Hg / pH / SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: TP / NH3 / TKN / NO3 / NO2 / NO3+NO2	Volatiles: VOC / BTEX / THM	PHCs F1 - F4	ABNs	PAHs	PCBs: Total / Aroclors	Organochlorine Pesticides	TCLP: M&I / VOCs / ABNs / B(a)P / PCBs	Sewer Use	Metals Soil 93-101	Metals Water 93-196	CCME F1-F4/VOCs Soil 91-248	CCME F1-F4/VOCs Water 91-249	CCME F1-F4/ BTEX Water 91-315	Sieve & texture (75 Micron)
25-58 @ 2.5-5	1/17/25		4	S				☑		☑							☑							☑			
25-59 @ 0-2.5	1/17/25		4	S				☑		☑							☑							☑			
25-60 @ 0-2.5	1/17/25		4	S				☑		☑							☑							☑			
25-61 @ 2.5-5	1/17/25		4	S				☑		☑							☑							☑			
25-62 @ 7.5-10	1/20/25		4	S				☑		☑							☑							☑			
DUP 25-62	1/20/25		3	S				☑		☑							☑							☑			
25-63 @ 7.5-10	1/20/25		4	S				☑		☑							☑							☑			
25-64 @ 2.5-5	1/20/25		4	S				☑		☑							☑							☑			
25-65 @ 5-7.5	1/20/25		4	S				☑		☑							☑							☑			
25-66 @ 7.5-10	1/20/25		4	S				☑		☑							☑							☑			
25-67 @ 7.5-10	1/20/25		4	S				☑		☑							☑							☑			

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
E. Fulsom [redacted]	1/22/25	11am	[redacted]	Jan 22	1:30pm
Samples Relinqu [redacted]	Date	Time	[redacted]	Date	Time
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time

Page 3 of 5
N°:

AGAT Laboratories
5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
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Phone: 519-266-4680 Fax: 519-266-3666
Reports to be sent to:
1. Email: arasoul@aacnvironmental.ca, vsowden@"
2. Email: sscott@"; tdemers@" ; ckennedy@"

Project Information:

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Site Location: 7504 McLean Rd., Puslinch, ON
Sampled By: E.F.
AGAT Quote #: 16288129079 PO: 8368
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☑ Regulation 153/04
Table 1 *Indicate One*
☑ Ind/Com
☑ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☑ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region _____ *Indicate One*
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Laboratory Use Only

Work Order #:
Cooler Quantity: 4 9
Arrival Temperatures:
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
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Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y / N
25-68 @ 5-7.5	1/20/25		4	S		
25-69 @ 7.5-10	1/20/25		3	S		
25-70 @ 5-7.5	1/20/25		3	S		
25-71 @ 2.5-5	1/20/25		3	S		
25-72 @ 7.5-10	1/20/25		3	S		
25-73 @ 5-7.5	1/20/25		3	S		
25-74 @ 5-7.5	1/20/25		3	S		
25-75 @ 5-7.5	1/20/25		3	S		
25-76 @ 5-7.5	1/20/25		3	S		
25-77 @ 7.5-10	1/20/25		3	S		
25-78 @ 5-7.5	1/20/25		3	S		

Field Filtered - Metals, Hg, CrVI	O. Reg 153: Metals and Inorganics	O. Reg 153: All Metals / 153 Metals (excl. Hydrides) / Hydride Metals / 153 Metals (Incl. Hydrides)	O. Reg 153: ORPs: B-HWS, Cl, CN, Cr⁶⁺, EC, FOC, Hg, pH, SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: TP, NH_3, TKN, NO_3, NO_2, NO_3+NO_2	Volatiles: VOC, BTEX, THM	PHCs F1 - F4	ABNs	PAHs	PCBs: Total, Aroclors	Organochlorine Pesticides	TCLP: M&I, VOCs, ABNs, B(a)P, PCBs	Sewer Use	Metals Soil 93-101	Metals Water 93-196	CCME F1-F4/VOCs Soil 91-248	CCME F1-F4/VOCs Water 91-249	CCME F1-F4/ BTEX Water 91-315	Sieve & texture (75 Micron)
	☑		☑							☑							☑		
	☑		☑							☑							☑		
	☑		☑							☑							☑		
	☑		☑							☑							☑		
	☑		☑							☑							☑		
	☑		☑							☑							☑		
	☑		☑							☑							☑		
	☑		☑							☑							☑		
	☑		☑							☑							☑		
	☑		☑							☑							☑		
	☑		☑							☑							☑		

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
E. Fuls [redacted]	1/22/25	11am	[redacted]	Jan 22	1:30pm

Page 4 of 5
N°:

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: A & A Environmental Consultants Inc.
Contact: Dr. Ali Rasoul
Address: 16 Young St
Woodstock, ON
Phone: 519-266-4680 Fax: 519-266-3666
Reports to be sent to:
1. Email: arasoul@aaenvironmental.ca, vsowden@"
2. Email: sscott@"; tdemers@" ; ckennedy@"

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☑ Regulation 153/04
Table 1 *Indicate One*
☑ Ind/Com
☑ Res/Park
☐ Agriculture

Soil Texture *(Check One)*
☑ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region _____ *Indicate One*
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ *Indicate One*

Project Information:

Project: 8368 BVD Puslinch Delineation
Site Location: 7504 McLean Rd., Puslinch, ON
Sampled By: E.F.
AGAT Quote #: 16288129079 PO: 8368
Please note: If quotation number is not provided, client will be billed full price for analysis.

Is this submission for a **Record of Site Condition?** ☐ Yes ☑ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

Laboratory Use Only

Work Order #:
Cooler Quantity: 4 1a 1
Arrival Temperatures:
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply):
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Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (incl. Hydrides))	ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN ☐ Cr^{6+} ☑ EC ☐ FOC ☐ Hg ☑ pH ☑ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☑ M&I ☑ VOCs ☑ ABNs ☑ B(a)P ☑ PCBs	Sewer Use	Metals Soil 93-101	Metals Water 93-196	CCME F1-F4/VOCs Soil 91-248	CCME F1-F4/VOCs Water 91-249	CCME F1-F4/ BTEX Water 91-315	Sieve & texture (75 Micron)
25-79 @ 7.5-10	1/20/25		3	S			☑	☑						☑						☑					
25-80 @ 7.5-10	1/20/25		3	S			☑	☑						☑						☑					
25-81 @ 7.5-10	1/21/25		3	S			☑	☑						☑						☑					
25-82 @ 5-10	1/21/25		3	S			☑	☑						☑						☑					
25-83 @ 5-7.5	1/21/25		3	S			☑	☑						☑						☑					
25-84 @ 5-7.5	1/21/25		3	S			☑	☑						☑						☑					
25-85 @ 5-7.5	1/21/25		3	S			☑	☑						☑						☑					
25-86 @ 7.5-10	1/21/25		3	S			☑	☑						☑						☑					
25-87 @ 7.5-10	1/21/25		3	S			☑	☑						☑						☑					
25-88 @ 5-7.5	1/21/25		3	S			☑	☑						☑						☑					

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
E. Fulsom [redacted]	1/22/25	11am	[redacted]	Jan 22	1:30p
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time

Page 5 of 5

AGAT Laboratories

Sample Temperature Log

Client: A & A

COC# or Work Order #:

# of Coolers: 4 Large

# of Submissions:

	Arrival Temperatures - Branch/Driver	Arrival Temperatures - Laboratory
Cooler #1:	3.0 / 2.9 / 3.2	/ /
Cooler #2:	2.1 / 1.5 / 1.1	/ /
Cooler #3:	1.3 / 1.2 / 1.0	/ /
Cooler #4:	3.2 / 3.8 / 4.0	/ /
Cooler #5:	/ /	/ /
Cooler #6:	/ /	/ /
Cooler #7:	/ /	/ /
Cooler #8	/ /	/ /
Cooler #9:	/ /	/ /
Cooler #10:	/ /	/ /

Loose ice

IR Gun ID:

Taken By: [redacted]

Date (yyyy/mm/dd): 2025/01/22 **Time:** 1 : 30 AM / PM

IR Gun ID:

Taken By:

Date (yyyy/mm/dd): **Time:** : AM / PM

Instructions for use of this form: 1) complete all fields of info including total # of coolers and # of submissions rec'd, 2) photocopy and place in each submission prior to giving a WO#, 3) Proceed as normal, write the WO# and scan (please make sure to scan along with the COC)

Document ID: SR-78-9511.003
Date Issued: 2017-2-23

Page: of

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC
16 Young Street
WOODSTOCK, ON N4S3L4
(519) 266-4680

ATTENTION TO: Ali Rasoul

PROJECT: 8368 - BVD Puslinch

AGAT WORK ORDER: 25L245525

SOIL ANALYSIS REVIEWED BY: Chuandi Zhang, Inorganic Supervisor

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Feb 18, 2025

PAGES (INCLUDING COVER): 14

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

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Western Enviro-Agricultural Laboratory Association (WEALA)
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AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.

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Certificate of Analysis

AGAT WORK ORDER: 25L245525

PROJECT: 8368 - BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch, Ontario

SAMPLED BY:E. Fulsom

O. Reg. 406/19 - SPLP Metals

DATE RECEIVED: 2025-02-06 **DATE REPORTED: 2025-02-18**

		SAMPLE DESCRIPTION:		BH25-4	BH25-10	BH25-18	BH25-27	BH25-33	BH25-39	BH25-46	BH25-55
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-02-05	2025-02-05	2025-02-05	2025-02-05	2025-02-05	2025-02-05	2025-02-05	2025-02-05
Parameter	Unit	G / S	RDL	6509219	6509220	6509221	6509222	6509223	6509224	6509225	6509226
Antimony Leachate	µg/L	-	0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Arsenic Leachate	µg/L	-	5	<5	<5	<5	<5	<5	<5	<5	<5
Barium Leachate	µg/L	-	100	<100	<100	<100	<100	<100	<100	<100	<100
Beryllium Leachate	µg/L	-	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Boron Leachate	µg/L	-	500	<500	<500	<500	<500	<500	<500	<500	<500
Cadmium Leachate	µg/L	-	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chromium Leachate	µg/L	-	10	<10	<10	<10	<10	<10	<10	<10	<10
Cobalt Leachate	µg/L	-	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Copper Leachate	µg/L	-	6.9	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9	<6.9
Lead Leachate	µg/L	-	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Molybdenum Leachate	µg/L	23	1.5	<1.5	<1.5	2.6	<1.5	<1.5	<1.5	<1.5	<1.5
Nickel Leachate	µg/L	-	10	<10	<10	<10	<10	<10	<10	<10	<10
Selenium Leachate	µg/L	-	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Silver Leachate	µg/L	0.3	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Thallium Leachate	µg/L	2	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium Leachate	µg/L	-	2	<2	<2	<2	<2	<2	<2	<2	<2
Vanadium Leachate	µg/L	-	0.6	<0.6	8.9	9.6	2.6	0.8	6.4	2.2	0.6
Zinc Leachate	µg/L	-	20	<20	<20	<20	<20	<20	<20	<20	<20

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 25L245525

PROJECT: 8368 - BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch, Ontario

SAMPLED BY:E. Fulsom

O. Reg. 406/19 - SPLP Metals

DATE RECEIVED: 2025-02-06

DATE REPORTED: 2025-02-18

		SAMPLE DESCRIPTION:		BH25-62	BH25-70	BH25-79	BH25-86
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-02-05	2025-02-05	2025-02-05	2025-02-05
Parameter	Unit	G / S	RDL	6509227	6509228	6509229	6509230
Antimony Leachate	µg/L	-	0.6	<0.6	<0.6	<0.6	<0.6
Arsenic Leachate	µg/L	-	5	<5	<5	<5	<5
Barium Leachate	µg/L	-	100	<100	<100	<100	<100
Beryllium Leachate	µg/L	-	0.8	<0.8	<0.8	<0.8	<0.8
Boron Leachate	µg/L	-	500	<500	<500	<500	<500
Cadmium Leachate	µg/L	-	0.20	<0.20	<0.20	<0.20	<0.20
Chromium Leachate	µg/L	-	10	<10	<10	<10	<10
Cobalt Leachate	µg/L	-	0.3	<0.3	<0.3	<0.3	<0.3
Copper Leachate	µg/L	-	6.9	<6.9	<6.9	<6.9	<6.9
Lead Leachate	µg/L	-	1.0	<1.0	<1.0	<1.0	<1.0
Molybdenum Leachate	µg/L	23	1.5	<1.5	2.8	<1.5	3.5
Nickel Leachate	µg/L	-	10	<10	<10	<10	<10
Selenium Leachate	µg/L	-	5.0	<5.0	<5.0	<5.0	<5.0
Silver Leachate	µg/L	0.3	0.10	<0.10	<0.10	<0.10	<0.10
Thallium Leachate	µg/L	2	0.5	<0.5	<0.5	<0.5	<0.5
Uranium Leachate	µg/L	-	2	<2	<2	<2	<2
Vanadium Leachate	µg/L	-	0.6	1.3	10.2	0.9	3.4
Zinc Leachate	µg/L	-	20	<20	<20	<20	<20

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 1: Full Depth Background Site Condition - RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6509219-6509230 Leachate for metal testing was prepared in accordance with Ontario MECP Method E9003, which has been modified from SW846-1312 by Ontario MECP. MECP has recommended that Method E9003 be used for leachate testing of soil samples under O'Reg 406/19 by MECP.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

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AGAT WORK ORDER: 25L245525

PROJECT: 8368 - BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch, Ontario

SAMPLED BY:E. Fulsom

O. Reg. 406/19 - SPLP BNA

DATE RECEIVED: 2025-02-06 **DATE REPORTED: 2025-02-18**

		SAMPLE DESCRIPTION:		BH25-4	BH25-10	BH25-18	BH25-27	BH25-33	BH25-39	BH25-46	BH25-55
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-02-05	2025-02-05	2025-02-05	2025-02-05	2025-02-05	2025-02-05	2025-02-05	2025-02-05
Parameter	Unit	G / S	RDL	6509219	6509220	6509221	6509222	6509223	6509224	6509225	6509226
Bis(2-chloroethyl)ether Leachate	µg/L	5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bis(2-chloroisopropyl)ether Leachate	µg/L	4	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
p-Chloroaniline Leachate	µg/L	10	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
3,3'-Dichlorobenzidine Leachate	µg/L	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diethyl phthalate Leachate	µg/L	2	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethylphthalate Leachate	µg/L	2	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dinitrophenol Leachate	µg/L	10	10	<10	<10	<10	<10	<10	<10	<10	<10
2,4-Dinitrotoluene Leachate	µg/L		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,6-Dinitrotoluene Leachate	µg/L		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dinitrotoluene (2,4 & 2,6) Leachate	µg/L	5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,6-Trichlorophenol Leachate	µg/L	0.75	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
SPLP BNAs-EXTR				Y	Y	Y	Y	Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits									
2-Fluorophenol	%	50-140		62	65	69	67	70	61	63	61
phenol-d6 surrogate	%	50-140		81	90	80	81	90	79	71	64
2,4,6-Tribromophenol	%	50-140		72	62	76	62	60	65	68	64
Chrysene-d12	%	50-140		110	94	94	67	110	91	100	77

Certified By: [redacted]

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AGAT WORK ORDER: 25L245525

PROJECT: 8368 - BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch, Ontario

SAMPLED BY:E. Fulsom

O. Reg. 406/19 - SPLP BNA

DATE RECEIVED: 2025-02-06

DATE REPORTED: 2025-02-18

		SAMPLE DESCRIPTION:		BH25-62	BH25-70	BH25-79	BH25-86
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-02-05	2025-02-05	2025-02-05	2025-02-05
Parameter	Unit	G / S	RDL	6509227	6509228	6509229	6509230
Bis(2-chloroethyl)ether Leachate	µg/L	5	0.5	<0.5	<0.5	<0.5	<0.5
Bis(2-chloroisopropyl)ether Leachate	µg/L	4	0.5	<0.5	<0.5	<0.5	<0.5
p-Chloroaniline Leachate	µg/L	10	1.0	<1.0	<1.0	<1.0	<1.0
3,3'-Dichlorobenzidine Leachate	µg/L	0.5	0.5	<0.5	<0.5	<0.5	<0.5
Diethyl phthalate Leachate	µg/L	2	0.5	<0.5	<0.5	<0.5	<0.5
Dimethylphthalate Leachate	µg/L	2	0.5	<0.5	<0.5	<0.5	<0.5
2,4-Dinitrophenol Leachate	µg/L	10	10	<10	<10	<10	<10
2,4-Dinitrotoluene Leachate	µg/L		0.5	<0.5	<0.5	<0.5	<0.5
2,6-Dinitrotoluene Leachate	µg/L		0.5	<0.5	<0.5	<0.5	<0.5
Dinitrotoluene (2,4 & 2,6) Leachate	µg/L	5	0.5	<0.5	<0.5	<0.5	<0.5
2,4,6-Trichlorophenol Leachate	µg/L	0.75	0.2	<0.2	<0.2	<0.2	<0.2
SPLP BNAs-EXTR				Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits					
2-Fluorophenol	%	50-140		70	71	76	80
phenol-d6 surrogate	%	50-140		80	74	79	104
2,4,6-Tribromophenol	%	50-140		103	61	92	62
Chrysene-d12	%	50-140		64	107	78	78

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 1: Full Depth Background Site Condition - RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6509219-6509230 Leachate was prepared in accordance with Ontario MECP Method E9003, which has been modified from SW846-1312 by Ontario MECP. MECP has recommended that Method E9003 be used for leachate testing of soil samples under O'Reg 406/19 by MECP. This is a validated, unaccredited procedure.
2,4 & 2,6-Dinitrotoluene is a calculated parameter. The calculated value is the sum of 2,4-Dinitrotoluene and 2,6-Dinitrotoluene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

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AGAT WORK ORDER: 25L245525

PROJECT: 8368 - BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch, Ontario

SAMPLED BY:E. Fulsom

O. Reg. 406/19 - SPLP VOCs

DATE RECEIVED: 2025-02-06 **DATE REPORTED: 2025-02-18**

		SAMPLE DESCRIPTION:		BH25-4	BH25-10	BH25-18	BH25-27	BH25-33	BH25-39	BH25-46	BH25-55
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-02-05	2025-02-05	2025-02-05	2025-02-05	2025-02-05	2025-02-05	2025-02-05	2025-02-05
Parameter	Unit	G / S	RDL	6509219	6509220	6509221	6509222	6509223	6509224	6509225	6509226
Bromomethane Leachate	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethylene Leachate	µg/L	0.5	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Trans 1,2-Dichloroethylene Leachate	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane Leachate	µg/L	0.5	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Cis 1,2-Dichloroethylene Leachate	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroform Leachate	µg/L	1	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloroethane Leachate	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Carbon Tetrachloride Leachate	µg/L	0.2	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloropropane Leachate	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trichloroethylene Leachate	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,2-Trichloroethane Leachate	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Ethylene Dibromide Leachate	µg/L	0.2	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tetrachloroethylene Leachate	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane Leachate	µg/L	0.5	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane Leachate	µg/L	0.5	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene Leachate	µg/L	0.5	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene Leachate	µg/L	0.55	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichloropropene Total Leachate	µg/L	0.5	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Surrogate	Unit	Acceptable Limits									
Toluene-d8	% Recovery	50-140		98	100	110	104	106	110	101	105

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 25L245525

PROJECT: 8368 - BVD Puslinch

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch, Ontario

SAMPLED BY:E. Fulsom

O. Reg. 406/19 - SPLP VOCs

DATE RECEIVED: 2025-02-06 **DATE REPORTED: 2025-02-18**

		SAMPLE DESCRIPTION:		BH25-62	BH25-70	BH25-79	BH25-86
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2025-02-05	2025-02-05	2025-02-05	2025-02-05
Parameter	Unit	G / S	RDL	6509227	6509228	6509229	6509230
Bromomethane Leachate	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethylene Leachate	µg/L	0.5	0.30	<0.30	<0.30	<0.30	<0.30
Trans 1,2-Dichloroethylene Leachate	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane Leachate	µg/L	0.5	0.30	<0.30	<0.30	<0.30	<0.30
Cis 1,2-Dichloroethylene Leachate	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20
Chloroform Leachate	µg/L	1	0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloroethane Leachate	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20
Carbon Tetrachloride Leachate	µg/L	0.2	0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloropropane Leachate	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20
Trichloroethylene Leachate	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20
1,1,2-Trichloroethane Leachate	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20
Ethylene Dibromide Leachate	µg/L	0.2	0.10	<0.10	<0.10	<0.10	<0.10
Tetrachloroethylene Leachate	µg/L	0.5	0.20	<0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane Leachate	µg/L	0.5	0.10	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane Leachate	µg/L	0.5	0.10	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene Leachate	µg/L	0.5	0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene Leachate	µg/L	0.55	0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichloropropene Total Leachate	µg/L	0.5	0.30	<0.30	<0.30	<0.30	<0.30
Surrogate	Unit	Acceptable Limits					
Toluene-d8	% Recovery	50-140		108	100	98	113

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 406/19 TABLE 1: Full Depth Background Site Condition - RPIC
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

6509219-6509230 Leachate was prepared in accordance with Ontario MECP Method E9003, which has been modified from SW846-1312 by Ontario MECP. MECP has recommended that Method E9003 be used for leachate testing of soil samples under O'Reg 406/19 by MECP.
1,3-Dichloropropene total is a calculated parameter. The calculated value is the sum of Cis-1,3-Dichloropropene and Trans-1,3-Dichloropropene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: [redacted]

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25L245525

PROJECT: 8368 - BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch, Ontario

SAMPLED BY:E. Fulsom

Soil Analysis

RPT Date: Feb 18, 2025			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 406/19 - SPLP Metals															
Antimony Leachate	6504967		<0.6	<0.6	NA	< 0.6	99%	70%	130%	99%	80%	120%	101%	70%	130%
Arsenic Leachate	6504967		<5	<5	NA	< 5	96%	70%	130%	97%	80%	120%	97%	70%	130%
Barium Leachate	6504967		<100	<100	NA	< 100	103%	70%	130%	103%	80%	120%	106%	70%	130%
Beryllium Leachate	6504967		<0.8	<0.8	NA	< 0.8	93%	70%	130%	95%	80%	120%	96%	70%	130%
Boron Leachate	6504967		<500	<500	NA	< 500	98%	70%	130%	101%	80%	120%	101%	70%	130%
Cadmium Leachate	6504967		<0.20	<0.20	NA	< 0.20	100%	70%	130%	104%	80%	120%	102%	70%	130%
Chromium Leachate	6504967		<10	<10	NA	< 10	95%	70%	130%	98%	80%	120%	95%	70%	130%
Cobalt Leachate	6504967		<0.3	<0.3	NA	< 0.3	97%	70%	130%	100%	80%	120%	99%	70%	130%
Copper Leachate	6504967		<6.9	<6.9	NA	< 6.9	95%	70%	130%	101%	80%	120%	96%	70%	130%
Lead Leachate	6504967		<1.0	<1.0	NA	< 1.0	96%	70%	130%	103%	80%	120%	100%	70%	130%
Molybdenum Leachate	6504967		4.0	4.0	NA	< 1.5	103%	70%	130%	104%	80%	120%	106%	70%	130%
Nickel Leachate	6504967		<10	<10	NA	< 10	95%	70%	130%	98%	80%	120%	97%	70%	130%
Selenium Leachate	6504967		<5.0	<5.0	NA	< 5.0	110%	70%	130%	113%	80%	120%	112%	70%	130%
Silver Leachate	6504967		<0.10	<0.10	NA	< 0.10	98%	70%	130%	100%	80%	120%	101%	70%	130%
Thallium Leachate	6504967		<0.5	<0.5	NA	< 0.5	99%	70%	130%	102%	80%	120%	104%	70%	130%
Uranium Leachate	6504967		<2	<2	NA	< 2	97%	70%	130%	98%	80%	120%	102%	70%	130%
Vanadium Leachate	6504967		<0.6	0.6	NA	< 0.6	97%	70%	130%	100%	80%	120%	99%	70%	130%
Zinc Leachate	6504967		<20	<20	NA	< 20	95%	70%	130%	113%	80%	120%	112%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By: [redacted]

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Results relate only to the items tested. Results apply to samples as received.

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Quality Assurance

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25L245525

PROJECT: 8368 - BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch, Ontario

SAMPLED BY:E. Fulsom

Trace Organics Analysis

RPT Date: Feb 18, 2025			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 406/19 - SPLP BNA															
Bis(2-chloroethyl)ether Leachate	6509230	6509230	< 0.5	< 0.5	NA	< 0.5	109%	50%	140%	101%	50%	140%	77%	50%	140%
Bis(2-chloroisopropyl)ether Leachate	6509230	6509230	< 0.5	< 0.5	NA	< 0.5	126%	50%	140%	108%	50%	140%	87%	50%	140%
p-Chloroaniline Leachate	6509230	6509230	< 1.0	< 1.0	NA	< 1.0	96%	50%	140%	68%	50%	140%	72%	50%	140%
3,3'-Dichlorobenzidine Leachate	6509230	6509230	< 0.5	< 0.5	NA	< 0.5	75%	30%	130%	87%	30%	130%	78%	30%	130%
Diethyl phthalate Leachate	6509230	6509230	< 0.5	< 0.5	NA	< 0.5	112%	50%	140%	69%	50%	140%	99%	50%	140%
Dimethylphthalate Leachate	6509230	6509230	< 0.5	< 0.5	NA	< 0.5	93%	50%	140%	70%	50%	140%	95%	50%	140%
2,4-Dinitrophenol Leachate	6509230	6509230	< 10	< 10	NA	< 10	76%	30%	130%	88%	30%	130%	107%	30%	130%
2,4-Dinitrotoluene Leachate	6509230	6509230	< 0.5	< 0.5	NA	< 0.5	93%	50%	140%	67%	50%	140%	107%	50%	140%
2,6-Dinitrotoluene Leachate	6509230	6509230	< 0.5	< 0.5	NA	< 0.5	101%	50%	140%	82%	50%	140%	104%	50%	140%
2,4,6-Trichlorophenol Leachate	6509230	6509230	< 0.2	< 0.2	NA	< 0.2	96%	50%	140%	108%	50%	140%	107%	50%	140%
O. Reg. 406/19 - SPLP VOCs															
Bromomethane Leachate	6517627		<0.20	<0.20	NA	< 0.20	97%	50%	140%	83%	50%	140%	113%	50%	140%
1,1-Dichloroethylene Leachate	6517627		<0.30	<0.30	NA	< 0.30	76%	50%	140%	102%	60%	130%	104%	50%	140%
Trans 1,2-Dichloroethylene Leachate	6517627		<0.20	<0.20	NA	< 0.20	68%	50%	140%	89%	60%	130%	90%	50%	140%
1,1-Dichloroethane Leachate	6517627		<0.30	<0.30	NA	< 0.30	91%	50%	140%	114%	60%	130%	107%	50%	140%
Cis 1,2-Dichloroethylene Leachate	6517627		<0.20	<0.20	NA	< 0.20	81%	50%	140%	113%	60%	130%	87%	50%	140%
Chloroform Leachate	6517627		<0.20	<0.20	NA	< 0.20	90%	50%	140%	115%	60%	130%	97%	50%	130%
1,2-Dichloroethane Leachate	6517627		<0.20	<0.20	NA	< 0.20	74%	50%	140%	107%	60%	130%	108%	50%	140%
Carbon Tetrachloride Leachate	6517627		<0.20	<0.20	NA	< 0.20	74%	50%	140%	99%	60%	130%	104%	50%	140%
1,2-Dichloropropane Leachate	6517627		<0.20	<0.20	NA	< 0.20	80%	50%	140%	115%	60%	130%	112%	50%	140%
Trichloroethylene Leachate	6517627		<0.20	<0.20	NA	< 0.20	80%	50%	140%	108%	60%	130%	110%	50%	140%
1,1,2-Trichloroethane Leachate	6517627		<0.20	<0.20	NA	< 0.20	112%	50%	140%	113%	60%	130%	110%	50%	140%
Ethylene Dibromide Leachate	6517627		<0.10	<0.10	NA	< 0.10	79%	50%	140%	119%	60%	130%	107%	50%	140%
Tetrachloroethylene Leachate	6517627		<0.20	<0.20	NA	< 0.20	101%	50%	140%	109%	60%	130%	103%	50%	140%
1,1,1,2-Tetrachloroethane Leachate	6517627		<0.10	<0.10	NA	< 0.10	91%	50%	140%	109%	60%	130%	98%	50%	140%
1,1,2,2-Tetrachloroethane Leachate	6517627		<0.10	<0.10	NA	< 0.10	110%	50%	140%	105%	60%	130%	104%	50%	140%
1,4-Dichlorobenzene Leachate	6517627		<0.10	<0.10	NA	< 0.10	101%	50%	140%	109%	60%	130%	92%	50%	140%
1,2-Dichlorobenzene Leachate	6517627		<0.10	<0.10	NA	< 0.10	92%	50%	140%	91%	60%	130%	102%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

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Results relate only to the items tested. Results apply to samples as received.

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25L245525

PROJECT: 8368 - BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch, Ontario

SAMPLED BY:E. Fulsom

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP/MS
Arsenic Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP/MS
Barium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Beryllium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Boron Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Cadmium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Chromium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Cobalt Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Copper Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Lead Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Molybdenum Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Nickel Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Selenium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Silver Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Thallium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Uranium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Vanadium Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS
Zinc Leachate	MET-93-6103	modified from EPA 1312 & EPA 6020B	ICP-MS

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AGAT WORK ORDER: 25L245525

PROJECT: 8368 - BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch, Ontario

SAMPLED BY:E. Fulsom

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Bis(2-chloroethyl)ether Leachate	ORG-91-5114	modified from EPA 1312, 3510, 8270E & MOE E3265	GC/MS
Bis(2-chloroisopropyl)ether Leachate	ORG-91-5114	modified from EPA 1312, 3510, 8270E & MOE E3265	GC/MS
p-Chloroaniline Leachate	ORG-91-5114	modified from EPA 1312, 3510, 8270E & MOE E3265	GC/MS
3,3'-Dichlorobenzidine Leachate	ORG-91-5114	modified from EPA 3510 & EPA 8270E & MOEC E3265	GC/MS
Diethyl phthalate Leachate	ORG-91-5114	modified from EPA 1312, 3510, 8270E & MOE E3265	GC/MS
Dimethylphthalate Leachate	ORG-91-5114	modified from EPA 1312, 3510, 8270E & MOE E3265	GC/MS
2,4-Dinitrophenol Leachate	ORG-91-5114	modified from EPA 1312, 3510, 8270E & MOE E3265	GC/MS
2,4-Dinitrotoluene Leachate	ORG-91-5114	modified from EPA 1312, 3510, 8270E & MOE E3265	GC/MS
2,6-Dinitrotoluene Leachate	ORG-91-5114	modified from EPA 1312, 3510, 8270E & MOE E3265	GC/MS
Dinitrotoluene (2,4 & 2,6) Leachate	ORG-91-5114	modified from EPA 1312, 3510, 8270E & MOE E3265	GC/MS
2,4,6-Trichlorophenol Leachate	ORG-91-5114	modified from EPA 1312, 3510, 8270E & MOE E3265	GC/MS
2-Fluorophenol	ORG-91-5114	modified from EPA 1312, 3510, 8270E & MOE E3265	GC/MS
phenol-d6 surrogate	ORG-91-5114	modified from EPA 3510C, 8270E & ON MOECC E3265	GC/MS
2,4,6-Tribromophenol	ORG-91-5114	modified from EPA 3510C, 8270E & ON MOECC E3265	GC/MS
Chrysene-d12	ORG-91-5114	modified from EPA 1312, 3510, 8270E & MOE E3265	GC/MS
SPLP BNAs-EXTR	LAB-93-4030	EPA SW-846 1312	PH METER
Bromomethane Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1-Dichloroethylene Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
Trans 1,2-Dichloroethylene Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1-Dichloroethane Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
Cis 1,2-Dichloroethylene Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
Chloroform Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,2-Dichloroethane Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
Carbon Tetrachloride Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,2-Dichloropropane Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
Trichloroethylene Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1,2-Trichloroethane Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
Ethylene Dibromide Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS

Results relate only to the items tested. Results apply to samples as received.

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Method Summary

CLIENT NAME: A & A ENVIRONMENTAL CONSULTANTS INC

AGAT WORK ORDER: 25L245525

PROJECT: 8368 - BVD Puslinch

ATTENTION TO: Ali Rasoul

SAMPLING SITE:Puslinch, Ontario

SAMPLED BY:E. Fulsom

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Tetrachloroethylene Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1,1,2-Tetrachloroethane Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,4-Dichlorobenzene Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,2-Dichlorobenzene Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
1,3-Dichloropropene Total Leachate	VOL-91-5001	modified from EPA 1312, EPA SW-846 5030C & 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

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Have feedback? Scan here for a quick survey!

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: A & A Environmental Consultants Inc.
Contact: Dr. Ali Rasoul
Address: 16 Young St
Woodstock, Ontario
Phone: 519-266-4680 Fax: 519-266-3666
Reports to be sent to:
1. Email: arasoul@aaenvironmental.ca, vsowden@"
2. Email: sscott@", tdemers@", ckennedy@",

Project Information:

Project: 8368-BVD Puslinch
Site Location: Puslinch, Ontario
Sampled By: E. Fulsom
AGAT Quote #: 29117325681 PO: 8368-BVD Puslinch
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04
Table ___ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☑ Regulation 406
Table 1 *Indicate One*
☑ Ind/Com
☐ Res/Park
☐ Agriculture
☐ Regulation 558
☐ CCME

☐ Sewer Use
☐ Sanitary ☐ Storm
___ *Region*
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
___ *Indicate One*

Is this submission for a **Record of Site Condition (RSC)**? ☐ Yes ☑ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Legal Sample ☐

Sample Matrix Legend

GW	Ground Water	**SD**	Sediment
O	Oil	**SW**	Surface Water
P	Paint	**R**	Rock/Shale
S	Soil		

Laboratory Use Only

Work Order #: 25L045525
Cooler Quantity: 1 LRG
Arrival Temperatures: Triage Free 6.0 - 6.7 - 6.5
Depot Temperatures:
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CSR

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC Y/N	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs	VOC	PAHs	PCBs: Arochlors ☐	O. Reg 406: Regulation 406 Characterization Package	O. Reg 406: pH, Metals, BTEX, F1-F4	O. Reg 406: EC, SAR	O. Reg 406: Regulation 406 SPLP Rainwater Leach mSPLP: ☑ Metals ☑ VOCs ☑ SVOCs ☐ OC	O. Reg 558: Landfill Disposal Characterization TCLP: TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Corrosivity: ☐ Moisture ☐ Sulphide	O.Reg 406/19 SPLP - A						Potentially Hazardous or High Concentration (Y/N)
1. BH25-4	Feb 05/25	AM/PM	3	S												☑			☑						
2. BH25-10	Feb 05/25	AM/PM	3	S												☑			☑						
3. BH25-18	Feb 05/25	AM/PM	3	S												☑			☑						
4. BH25-27	Feb 05/25	AM/PM	3	S												☑			☑						
5. BH25-33	Feb 05/25	AM/PM	3	S												☑			☑						
6. BH25-39	Feb 05/25	AM/PM	3	S												☑			☑						
7. BH25-46	Feb 05/25	AM/PM	3	S												☑			☑						
8. BH25-55	Feb 05/25	AM/PM	3	S												☑			☑						
9. BH25-62	Feb 05/25	AM/PM	3	S												☑			☑						
10. BH25-70	Feb 05/25	AM/PM	3	S												☑			☑						
11. BH25-79	Feb 05/25	AM/PM	3	S												☑			☑						

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
E. Fulsom [redacted]	2/6/25	12pm	[redacted]	020625	3:01 PM
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time

Page 1 of 2
N°:

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Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: A & A Environmental Consultants Inc.
Contact: Dr. Ali Rasoul
Address: 16 Young St
Woodstock, Ontario
Phone: 519-266-4680 Fax: 519-266-3666
Reports to be sent to:
1. Email: arasoul@aaenvironmental.ca, vsowden@"
2. Email: sscott@", tdemers@", ckennedy@",

Project Information:

Project: 8368- BVD Puslinch
Site Location: Puslinch, Ontario
Sampled By: E. Fulsom
AGAT Quote #: 29117325681 PO: 8368 - BVD Puslinch
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04
Table _____ (Indicate One)
☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☑ Regulation 406
Table 1 (Indicate One)
☑ Ind/Com ☐ Res/Park ☐ Agriculture
☐ Regulation 558
☐ CCME

☐ Sewer Use ☐ Sanitary ☐ Storm
_____ Region
☐ Prov. Water Quality Objectives (PWQO)
☐ Other _____ Indicate One

Is this submission for a **Record of Site Condition (RSC)**? ☐ Yes ☑ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Legal Sample ☐

Sample Matrix Legend

GW	Ground Water	**SD**	Sediment
O	Oil	**SW**	Surface Water
P	Paint	**R**	Rock/Shale
S	Soil		

Laboratory Use Only

Work Order #: 25L245525
Cooler Quantity: 1 LRG
Arrival Temperatures:
Depot Temperatures:
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CSR

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC Y/N	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs	VOC	PAHs	PCBs: Arocolors ☐	O. Reg 406: Regulation 406 Characterization Package	O. Reg 406: pH, Metals, BTEX, F1-F4	O. Reg 406: EC, SAR	O. Reg 406: Regulation 406 SPLP Rainwater Leach mSPLP: ☑ Metals ☑ VOCs ☐ OC	O. Reg 558: Landfill Disposal Characterization TCLP: TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Corrosivity: ☐ Moisture ☐ Sulphide	O.Reg 406/19 SPLP - ABNs	Metals Water 93-215		F1-F4/VOCs Water 91-249			Potentially Hazardous or High Concentration (Y/N)
1. BH25-86	Feb 05/25	AM PM	3	S												☑			☑					
2.		AM PM																						
3.		AM PM																						
4.		AM PM																						
5.		AM PM																						
6.		AM PM																						
7.		AM PM																						
8.		AM PM																						
9.		AM PM																						
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11.		AM PM																						

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
E. Fulsom [redacted]	2/6/25	12pm	[redacted]	020625	3:01 PM
Samples Relinquished By (Print Name and Sign)	Date	Time		Date	Time
Samples Relinquished By (Print Name and Sign)	Date	Time		Date	Time

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Date Issued: Jan 18, 2024

HSGROUP

DUE DILIGENCE RISK ASSESSMENT REPORT

human health, ecological risk assessment, and toxicology

Prepared By:

Hugh Scobie, MSc., DABT, C.Chem, QP_{RA}

HSGROUP

PROJECT TITLE:	Due Diligence Risk Assessment – 7504 McLean Road, Puslinch, Ontario
PREPARED FOR:	BVD Real Estate Inc. [redacted]
DATE:	Revised May 14, 2025

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EXECUTIVE SUMMARY

Hugh Scobie o/a HS Group (HS Group) in association with BVD Real Estate Inc. ('the client') has prepared this due diligence risk assessment (DDRA) for the purpose of evaluating potential risks to human receptors for the property located at 7504 McLean Road, Puslinch, Ontario (the 'Site'). The RA is being conducted as part of due diligence and while the format generally follows that of a risk assessment conducted under Ontario Regulation 153/04 (O. Reg. 153/04) (as amended) that would be used to support a Record of Site Condition (RSC) the DDRA will not be submitted to the Ontario Ministry of the Environment, nor be used to support the filing of an RSC.

The subject site is a rectangular shaped lot located in the northwest area of Puslinch, Ontario at 7504 McLean Road. The site is bound by vacant land located northeast and northwest and industrial buildings to the southwest and southeast of the site. The site is currently vacant land. The subject site area is located within the Mill Creek-Grand River watershed which contains Mill Creek and the Grand River. The site is zoned as being "Industrial" as quoted from the Township of Puslinch Comprehensive Zoning By-law No. 023-18 as amended and is located on the northwest side of McLean Road. Sub-surface intrusive investigations have been conducted at the Site by A&A Environmental Consultants Inc.. The investigations noted impacts of both soil and ground water. The impacts in soil were identified Electrical Conductivity (EC), Sodium Adsorption Ratio (SAR), zinc, lead and PHC F4. The impacts in groundwater were identified as cobalt and copper. Importation of impacted fill has been identified as the likely source of the exceedances noted in soil and groundwater.

The Table 1 Site Condition Standards have been used for the identification of impacts in soil and groundwater, as the Township of Puslinch requires its use as part of a bylaw issue. In the discussions presented below, soil and ground water are considered to be impacted or contaminated if they exceed the Table 1 Site Condition Standards. As previously noted, on this basis, EC, SAR, zinc, lead and PHC F4 were found to exceed their applicable MECP Table 1 Site Condition Standards (SCS) in soil, while cobalt and copper were found to exceed their applicable MECP Table 1 SCS. As a result, the above compounds in soil and groundwater were evaluated further in the DDRA.

As discussed, the Site is used for industrial/commercial use and is currently vacant. The Site is to be used for truck parking in the future, along with the construction of an on-site building. Therefore, the primary human receptors are workers at the Site. In the case of soil, there is the potential for direct contact with soil and the inhalation of dust. There is the potential for direct contact with groundwater as it may be used as a potable source. In the case of ecological receptors, the primary receptors are terrestrial plants, soil invertebrates, birds and mammals. In the case of soil, there is the potential for root uptake, direct contact, inhalation of dust, ingestion of food items and prey. In the case of groundwater given the minimum depth to groundwater (3.77 mbgs), there is no potential exposure for ecological receptors.

For the Human Health Risk Assessment (HHRA), further screening of the exceedances in soil and groundwater was completed with a comparison to the applicable MECP Table 2 (industrial/commercial, coarse soil, potable groundwater) human health component values, as the Table 1 SCS were only applicable for the identification of impacts at the Site given the requirement of the Township of Puslinch. For soil, the values for direct contact were used for comparison. In the case of soil, no exceedances were noted. In the case of lead, no human health component values are currently available. The MEPC has released updated TRVs for lead and these will be used to determine potential risks to risks at the Site due to exposure to soil. In the case of groundwater, cobalt

exceeded the human health component value associated with the ingestion of potable groundwater and will be evaluated further in the HHRA.

For the Ecological Risk Assessment (ERA), further screening of the exceedances in soil and groundwater was completed with a comparison to the applicable MECP Table 2 (industrial/commercial, coarse soil, potable groundwater) ecological component values. In the case of soil, lead exceeded for birds and mammals, while zinc exceeded for both terrestrial plants/soil invertebrates and birds and mammals requiring further assessment in the ERA. In the case of groundwater, no exceedances were noted, as such groundwater in association with ecological receptors will not be evaluated further in the ERA.

The HHRA concluded that no unacceptable risks were present in association with soil. In the case of groundwater, the calculated HQ was above the MECP's target HQ of 0.2 for cobalt and as a result it was concluded that there may be unacceptable risks from the ingestion of potable groundwater. Therefore, measures need to be in place to reduce or eliminate exposure to groundwater via the ingestion of potable groundwater. As a result, there is the requirement to have a restriction on the installation of potable wells at the Site. With this risk management measure in place no unacceptable risks are present due to groundwater at the Site.

The ERA concluded that in the absence of risk management measures, SIs for terrestrial plants and soil invertebrates were greater than one for zinc in soil. It may be inferred from this result that growth and reproduction of sensitive plants and soil invertebrates may be inhibited in areas of the Site with concentrations of zinc exceeding their associated TRVs. In the case of mammals and birds exposed to soil at the soil, in the absence of risk management measures, SIs for were greater than one for lead and zinc for the American woodcock. It may be inferred from this result that there is the potential for unacceptable risks to birds at the Site. As a result, there is the requirement to have capping of the impacted soil with 0.5 m of gravel or soil meeting the Table 1 SCS is required to mitigate potential risks to ecological health. With this risk management measure in place no unacceptable risks are present due soil at the Site.

With the recommended risk management measures in place, no unacceptable risks exist at the Site and the Site is suitable for continued industrial use without any remediation.

1 INTRODUCTION

Hugh Scobie o/a HS Group (HS Group) in association with BVD Real Estate Inc. ('the client') has prepared this due diligence risk assessment (DDRA) for the purpose of evaluating potential risks to human receptors for the property located at 7504 McLean Road, Puslinch, Ontario (the 'Site'). The RA is being conducted as part of due diligence and while the format generally follows that of a risk assessment conducted under Ontario Regulation 153/04 (O. Reg. 153/04) (as amended) that would be used to support a Record of Site Condition (RSC) the DDRA will not be submitted to the Ontario Ministry of the Environment, nor be used to support the filing of an RSC.

The risk assessment format will follow the general approach, analysis and protocol utilized in conducting a risk assessment under O.Reg. 153/04 (as amended), however a formal risk assessment document will not be submitted to the MECP for review, nor will it be used to support the filing of an RSC.

1.1 Risk Assessment Assumptions

The RA was prepared using the following assumptions:

- The site is currently vacant but will be developed to include a track parking area and an on-site building.
- The Table 1 Site Condition Standards have been used for the identification of impacts in soil and groundwater, as the Township of Puslinch requires its use as part of a bylaw issue
- The Site is considered to have potable ground water with coarse-textured soil with use for commercial/industrial purposes as defined under O.Reg.153/04 (as amended) resulting in the use of the MECP Table 2 Site Condition Standards for further screening of the identified impacts in soil and groundwater within the Human Health Risk Assessment (HHRA) and Ecological Risk Assessment (ERA).

1.2 Risk Management Requirements

Capping of impacted soil with 0.5 m of gravel or soil meeting the Table 1 SCS is required to mitigate potential risks to ecological health. Additionally, there is a requirement to restrict the installation of potable wells at the Site to mitigate risks to human health.

2 PROPERTY INFORMATION, SUMMARY OF ENVIRONMENTAL CONDITIONS AND IDENTIFICATION OF COCS

Site characterization involves assessing the degree and extent of contamination at the Site. Information is provided in the following sections regarding the site history, neighboring properties, current and where required future land uses, the geologic conditions at the Site, and the identification of the contaminants of concern.

The subject site is a rectangular shaped lot located in the northwest area of Puslinch, Ontario at 7504 McLean Road. The site is bound by vacant land located northeast and northwest and industrial buildings to the southwest and southeast of the site. The site is currently vacant land. The subject site area is located within the Mill Creek-Grand River watershed which contains Mill Creek and the Grand River. The site is zoned as being "Industrial" as quoted from the Township of Puslinch Comprehensive Zoning By-law No. 023-18 as amended and is located on the northwest side of McLean Road (Figure 1). Sub-surface intrusive investigations have been conducted at the Site by A&A Environmental Consultants Inc.. The investigations noted impacts of both soil and ground water (Figure 2). The impacts in soil were identified Electrical Conductivity (EC), Sodium Adsorption Ratio (SAR), zinc, lead and PHC F4. The impacts in groundwater were identified as cobalt and copper. Importation of impacted fill has been identified as the likely source of the exceedances noted in soil and groundwater.

2.1 Contaminants of Concern

According to O. Reg. 153/04 (as amended), any chemical detected at the risk assessment (RA) property that exceeds the applicable site condition standards (SCS) are considered to be a chemical of concern and are required to be assessed in the RA. Observed concentrations of chemicals in soil or ground water numerically greater than the standard were considered to exceed the standard. Furthermore, any chemicals detected at the RA property for which no applicable SCS is prescribed under the Regulation were also assessed in the RA.

The contaminants of potential concern (COPC) were identified based on exceeding the Table 9 ground water and soil SCS, as outlined under the Ministry's *Soil, Ground Water and Sediment Standards for Use Under XV.1 of the Environmental Protection Act* (MOE 2011a). The criteria for coarse-textured soil for a residential land use was used in the identification of COPCs.

In the case where any analytical results were reported as "below detection limit" or "non- detect," the chemical was dropped from further consideration in the RA if the chemical could not be linked to historical site use. There is also high confidence that these parameters are not present on-site, regardless of whether the laboratory-reporting limit was greater than the screening criteria. The COPCs identified through the chemical screening process presented below are further evaluated in Section 3 (Human Health Risk Assessment). Chemicals retained for either quantitative and/or qualitative analysis are discussed in the human health detailed chemical screening sub-sections.

2.1.1 Selection of COPCs in Soil

The identified COPCs for soil are summarized in Table 2-1.

Table 2-1: Identification of COPCs in Soil

Parameter	Maximum Conc. (µg/g)	Table 1 SCS (µg/g)
Metals		
Lead	130	120
Zinc	678	290
PHCs		
PHC F4	439	120
Inorganics		
EC (mS/cm)	0.92	0.57
SAR	3.07	2.4

It is noted that the concentrations of lead, zinc, PHC F4, EC and SAR were above their applicable MECP Table 1 SCS for soil, and as such were carried forward for formal quantitative screening and assessment.

2.1.2 Selection of COPCs in Ground Water

The identified COPCs for ground water are summarized in Table 2-2.

Table 2-2: Identification of COPCs in Groundwater

Parameter	Maximum Conc. (µg/L)	Table 1 SCS (µg/L)
Metals		
Cobalt	4.97	3.8
Copper	6.6	5

It is noted that the concentrations of cobalt and copper were above their applicable MECP Table 1 SCS for groundwater, and as such were carried forward for formal quantitative screening and assessment.

3 HUMAN HEALTH RISK ASSESSMENT

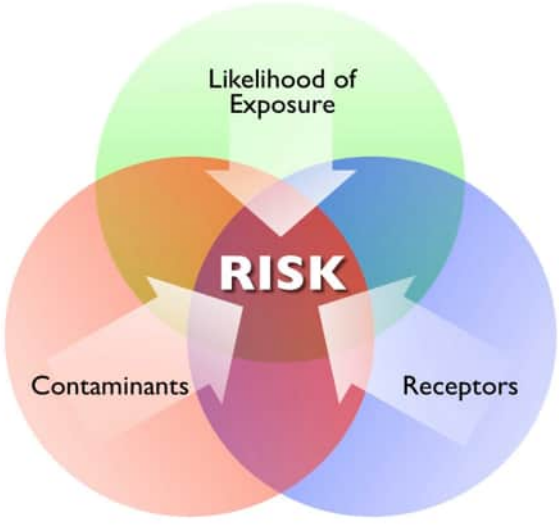
This section examines the potential human health risks associated with the presence of contaminants in soil and groundwater at the Site. While the risk assessment is not being used to support an RSC for the Site, the approach to completing a risk assessment at this contaminated site was still conducted according to risk assessment procedures outlined in Schedule C of O. Reg. 153/04.

3.1 Problem Formulation

Problem formulation provides the initial framework and methodology used to select compounds for evaluation in the human health risk assessment component and identifying the relevant components of the HHRA, including a qualitative description of exposed receptors and potential pathways that are summarized in the conceptual exposure model. In addition to providing a discussion of the human health conceptual site and exposure models, a discussion of the risk assessment objectives is also provided.

Risk assessment, in the context of properties potentially impacted by contaminants, is the process of estimating the likelihood of undesirable effects on human and ecological health resulting from exposure to chemical contaminants. Three components must be present for risks to human health to exist at contaminated sites impacted by chemicals (as illustrated in the graphic below):

- The chemical must be present at concentration sufficient to cause a possible adverse effect.
- A receptor (theoretical human receptor) must be present; and
- There must be a complete exposure pathway by which the receptor can come into contact with the chemical.



In general, there can only be a health concern or potential for risk when there is a complete link from a substance (e.g., a metal or volatile organic compound, etc.) through an environmental medium (e.g., air, water, soil) to a person (e.g., a visitor). Subsequently, for there to be a potential risk (i.e., represented

by the shaded section in the middle of the Venn diagram presented above), there must be three factors present: (1) a substance, (2) a receptor, and (3) an operable exposure pathway or route.

If there is no possible exposure to a chemical (e.g., an inorganic or non-volatile chemical found at significant depth), regardless of its inherent toxicity or potency or environmental concentration, there would be no potential for the development of an adverse human health effect. It is to say that without all three factors described above, there can be no risk. The Conceptual Exposure Model (CEM) for human receptors is predicted based on the above noted principles and is described in the following Section of the RA report.

3.1.1 Human Health Conceptual Site (Exposure) Model

The risk components identified above, namely contaminants of concern detected in on-Site media, exposure pathways, and receptors, as well as the current Site configuration, are combined to synthesize the CEM for the human health risk assessment. The CEM is used to focus the quantitative assessment to ensure that all the critical aspects of the RA are properly addressed. It uses the site-specific information as provided in Section 2 as its basis, combined with information presented in the following sections of the RA.

The development of the CEM was considered under the following headings in sections that follow:

- Contaminant screening for applicable human receptors.
- Release, transport, and intermediate transfer of COCs.
- Human exposure routes and pathways of concern; and
- Human health risk assessment receptors.

Based on the site characterization, chemistry, and the anticipated receptors on the Site, several exposure pathways will be assessed.

Figure 3 depicts the CEM in detail. The CEM identifies the complete exposure pathways where receptors may make direct contact with chemicals in soil or ground water through the three possible exposure pathways (ingestion, dermal contact, inhalation). The CEM was used as the basis for the quantitative, and qualitative risk assessment identifying the sources of chemicals, pathways or potential pathways, and receptor combinations that appear to be complete and, therefore, require an evaluation of the magnitude and nature of the risks present. Significant pathways were quantitatively assessed in the exposure assessment and risk characterization stages that follow.

As discussed, the Site is used for industrial/commercial use and is currently vacant. The Site is to be used for truck parking in the future, along with the construction of an on-site building. Therefore, the primary human receptors are workers at the Site. In the case of soil, there is the potential for direct contact with soil and the inhalation of dust. There is the potential for direct contact with groundwater as it may be used as a potable source.

From the environmental investigations conducted at the Site, some compounds were found to exceed the MECP Table 1 SCS in association with soil and groundwater. The maximum concentration of these compounds in soil and groundwater were used for the purposes of the identification of COCs for human

receptors. Further discussion of the relevant exposure pathways is provided in Section 3.2 (Exposure Assessment).

3.1.2 Identification of Chemicals of Concern for HHRA

In Section 2.3, COPCs were identified based on their presence in ground water at levels in excess of their applicable MECP Table 1 SCS. Additional screening for the identification of COCs was undertaken to establish those relevant for the HHRA. Additional screening was conducted by comparing the previously identified COPCs in soil and groundwater with the MECP Table 2 (industrial/commercial, coarse soil, potable groundwater) human health component values, as the Table 1 SCS were only applicable for the identification of impacts at the Site given the requirement of the Township of Puslinch. Table 3-1 provides the comparison of the COPCs to the MECP Table 2 SCS human health component values for the identification of the COCs for soil being carried forward in the HHRA, while Table 3-2 provides the comparison of the COPCs to the MECP Table 2 SCS human health component values for the identification of the COCs for groundwater being carried forward in the HHRA

Table 3-1: Identification of Contaminants of Concern in Soil for the HHRA

COPC	Maximum concentration detected in Soil (µg/g)	MECP Table 1 SCS (µg/g)	MECP Table 2 SCS - Human Health Component Value for Direct Contact (coarse-textured soil – Commercial) (µg/g)	COC for the HHRA?
Metals				
Lead	130	120	No Value	**Yes**
Zinc	678	290	57,000	No
PHCs				
PHC F4	439	120	42,000	No
Inorganics				No
EC (mS/cm)	0.92	0.57	Not applicable. Only relevant for terrestrial plants	No

COPC	Maximum concentration detected in Soil (µg/g)	MECP Table 1 SCS (µg/g)	MECP Table 2 SCS - Human Health Component Value for Direct Contact (coarse-textured soil – Commercial) (µg/g)	COC for the HHRA?
SAR	3.07	2.4	Not applicable. Only relevant for terrestrial plants	No

No exceedances were noted, however, in the case of lead, no human health component values are currently available. The MEPC has released updated TRVs for lead and these will be used to determine potential risks to risks at the Site due to exposure to soil.

Table 3-2: Identification of Contaminants of Concern in Groundwater for the HHRA

COPC	Maximum Groundwater Concentration (ug/L)	MECP Table 1 SCS (µg/g)	MECP Table 2 SCS - Human Health Component Value for the Ingestion of Potable GW (coarse-textured soil – Commercial)	COC for the HHRA?
Metals				
Cobalt	4.97	3.8	3	**Yes**

COPC	Maximum Groundwater Concentration (ug/L)	MECP Table 1 SCS (µg/g)	MECP Table 2 SCS - Human Health Component Value for the Ingestion of Potable GW (coarse-textured soil – Commercial)	COC for the HHRA?
Copper	6.6	5	1000	No

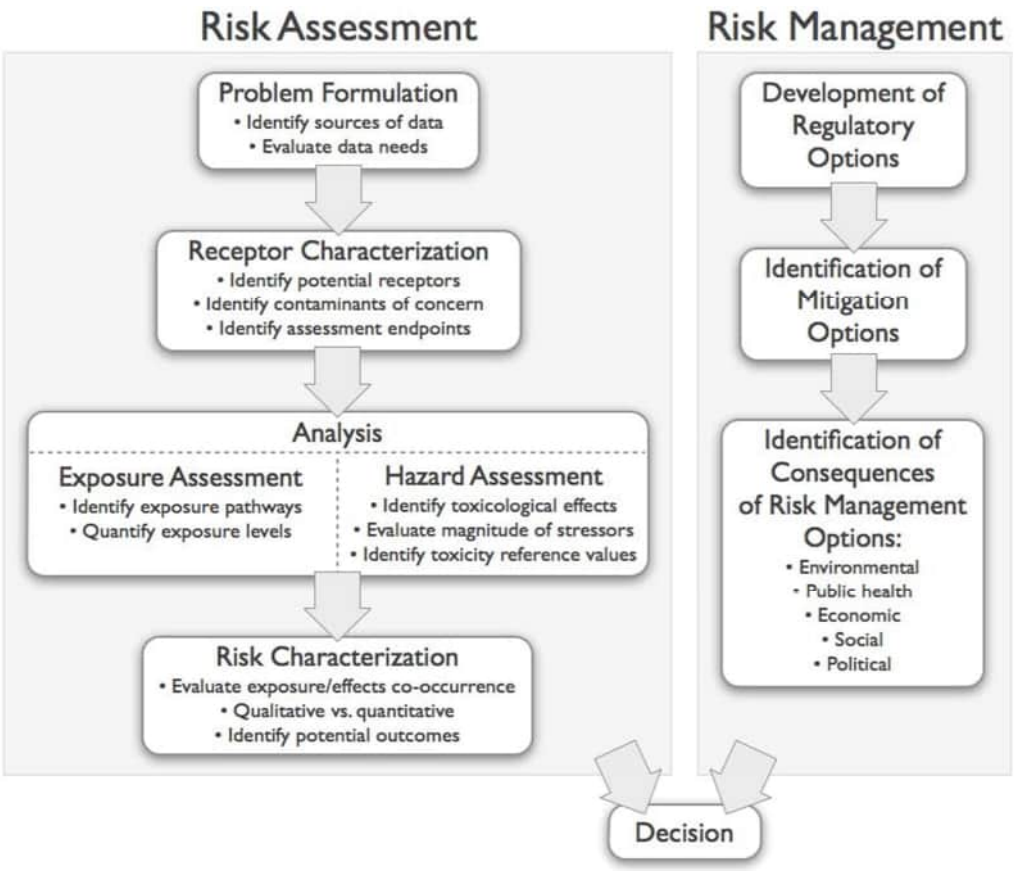
Cobalt was noted to exceed the human health component value associated with the ingestion of potable groundwater and will be evaluated further in the HHRA.

3.1.3 Risk Assessment Objectives (Human Health Component)

The objectives of the human health risk assessment component were to estimate the potential health risks and potential hazard estimates to human receptors that may be present at the Site. Following the formal determination of risk and hazard estimates for various receptors that may contact the chemicals of potential concern through the various source-to-receptor pathways.

Receptors to be considered in the HHRA included residents (all ages). Based on an understanding of the site characteristics and distribution of COCs in soil and ground water as described in Section 2, pathways of exposure included only the inhalation of indoor air as a complete pathway.

A quantitative estimate of potential exposure and commensurate risk was carried out for the receptors and pathways identified in the following sections of this RA. The framework for carrying out the risk assessment (represented in the graphic below) is considered to be standard, and follows guidance developed by MOECC (2011b), U.S EPA (2004).



Modified from U.S. EPA (2004)

A standard RA approach was used. Point-of-exposure doses/concentrations of COCs were modeled for the various human receptors using standard exposure models. As described above, the receptors examined in the HHRA were:

- Workers (i.e., adults).

The sole pathway of exposure examined in this HHRA was the inhalation of indoor air for workers. Exposure point concentrations received by resident receptors as exposure doses were compared to relevant toxicity reference values (TRV) obtained from MOECC (2011b), if not available, other recognized regulatory jurisdictions (e.g., US EPA).

3.2 Exposure Assessment

The exposure assessment component of the HHRA is intended to estimate potential exposure for individuals (i.e., receptors) that could be expected to inhale indoor air due to impacts identified in soil and groundwater. It identifies the receptors and the exposure pathways that could contribute to exposures and uses this information to estimate the potential exposure for each receptor. The exposure

assessment also provides an indication of the relative contribution that each exposure pathway makes to the total daily exposure experienced by each receptor. The exposure assessment can be summarized by these three basic components:

1. Receptor Characteristics.
2. Pathway Analysis; and
3. Exposure Estimates.

Each of the three components of the exposure assessment are detailed below.

3.2.1 Receptor Characteristics and Pathway Analysis

As discussed, the Site is used for commercial use. Therefore, the primary receptors are workers at the Site. In the case of soil, as determined through the additional screening in Section 3.1.2 the only complete exposure pathway is the inhalation of indoor air due to impacts in both soil and groundwater.

Workers

As discussed previously, Workers may be exposed to the identified COCs in soil in association with direct contact and the inhalation of dust and groundwater via the ingestion of potable groundwater. The rationale for the identification of these exposure pathways for the Workers is provided in Table 3-3.

Table 3-3: Summary of Potential Pathways of Exposure for Workers

Potential pathway of exposure	Complete exposure pathway (Yes/No)	Comment
Soil Ingestion	Yes	No human health component value for direct contact with soil was available for lead
Soil Inhalation	Yes	No human health component value for direct contact with soil was available for lead
Soil Skin Contact	Yes	No human health component value for direct contact with soil was available for lead
Ground Water Ingestion	Yes	The groundwater is not used as a source of potable water
Ground Water Skin Contact	Yes	The groundwater is not used as a source of potable water
Surface Water Ingestion	No	It is unlikely that a worker would be exposed to surface water

Potential pathway of exposure	Complete exposure pathway (Yes/No)	Comment
Surface Water Skin Contact	No	It is unlikely that a worker would be exposed to surface water
Garden Produce Ingestion	No	There is no garden produce present at the Site for consumption.
Livestock Ingestion	No	As the Site is located in a mainly commercial area no livestock will be present.
Vapour Inhalation	No	No COCs are volatile
Vapour Skin Contact	No	No COCs are volatile
Other Pathways	No	

3.2.2 Exposure Estimates

As discussed previously, Workers may be exposed to the identified COCs in soil in association with direct contact and the inhalation of dust and groundwater via the ingestion of potable groundwater. Potential exposures for direct contact with soil as well as soil inhalation have been calculated. The maximum groundwater concentrations have been used as the exposure estimate for the potential ingestion of the potable groundwater.

3.2.3 Receptor Exposure Estimates

The estimated exposures of workers to soil have been provided in Table 3-4.

Table 3-4: Exposure Estimates from Soil COC – Ingestion, Dermal Contact and Dust Inhalation

COC	Soil Incidental Ingestion & Dermal Contact (mg/kg-day)	Soil Dust Inhalation (mg/kg-day)	Total Direct Contact Exposure from Soil (mg/kg-day)
Lead	7.57E-05	5.55E-09	7.57E-05

The estimated exposures of workers to groundwater have been provided in Table 3-5.

Table 3-5: Exposure Estimates from Groundwater COC – Ingestion

COC	Groundwater Ingestion (ug/L)
Cobalt	4.97

3.3 Toxicity Assessment

The purpose of the toxicity assessment is to identify both the types of adverse health effects a COC may potentially cause, as well as the relationship between the magnitude of COCs to which receptors may be exposed (dose) and the likelihood of an adverse effect (response). This is called the dose-response relationship. In addition, the toxicity assessment involves the classification of the potential toxicological effects of chemicals as carcinogenic or non-carcinogenic, and the subsequent estimation of the amounts of chemicals that can be received by human receptors without experiencing adverse effects on their health. A toxicity assessment is conducted for all COCs and considers possible modes of toxicity associated following different routes and durations of exposure. The toxicity assessment provides an estimate of how much chemical exposure may occur without unacceptable health effects occurring from lifetime exposure (or significant portion of a lifetime) and provides a basis to interpret exposure rates.

In general, carcinogenic chemicals are considered to work through a non-threshold mechanism of action. This implies that there is no dose below in which an adverse effect (i.e., the development of cancer) will not occur. Current regulatory guidance considers that any exposure to a genotoxic carcinogen is considered to be associated with some level of risk. At very low doses, the probability that an adverse effect (i.e., cancer) will occur is extremely small (e.g., 1 in 1 million lifetime cancer risk). The probability of developing cancer increases as the dose increases. Because it is possible for cancer to develop after exposure to a chemical has ceased (i.e., a latency period), the toxicity values are expressed as the probability of developing cancer over a lifetime. This is based on the assumption that the risk associated with an elevated exposure to a carcinogenic chemical for a short period of time is equivalent to the risk associated with a lower level of exposure over a longer period of time.

3.3.1 Hazard Assessment (Nature of Toxicity)

Chemicals are classified based on their mode of action (i.e., threshold versus non-threshold substance). For substances exhibiting a threshold for toxicity, an acceptable level of exposure at or below which no adverse effects are anticipated is established. For non-threshold-acting chemicals, any level of exposure is assumed to theoretically pose a potential risk, and a slope factor (or in the case of a volatile compound, a unit risk factor) is used to predict risks from estimated exposures. Carcinogenic substances, which act through a mechanism involving damage to the genetic material (i.e., DNA) are usually considered to be non-threshold-acting substances. The following sections provide a summary of the effects associated with exposure to each of the identified COCs.

3.3.2 Dose Response Assessment

Dose-response assessment is the process of characterizing the relationship between the dose of an agent administered or received and the incidence of an adverse health effect in the exposed population. The intensity of exposure and potency of the agent play key roles in understanding the potential adverse health effects.

Potency values, generally established by regulatory agencies, describe the relative toxicity of carcinogenic substances and are typically expressed as cancer slope factors (CSFs). For the non-carcinogenic substances, oral reference doses (RfDs) and tolerable daily intakes (TDIs) are used as an indicator of the relative toxicity of an agent.

The MOECC (2011b) and U.S. EPA were the primary source of all toxicological dose-response data for this assessment, in accordance with MOECC guidance (MOE 2011b). In several instances, U.S. EPA values were chosen over those published by MOECC because of the toxicity criteria were based on more recent studies or more robust assessments of the original toxicology data available for the chemical of concern. A list of TRV values used in the assessment is provided in Table 3-6.

Many chemicals exhibit both types of dose-response relationships, exhibiting different adverse effect end points. Some of the COCs that are the subject of this assessment are assumed to have shown both threshold and non-threshold adverse effects. It is appropriate to assess both health endpoints in this type of risk assessment, to ensure that both potential risk and hazard are properly addressed. A list of TRV values used in the assessment is provided in Table 3-6.

The following definitions have been extracted from the U.S. EPA's Integrated Risk Information System (IRIS) documentation:

- Reference Concentration (RfC): An estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. It can be derived from a No Observed Adverse Effect Level (NOAEL), Lowest Observed Adverse Effect Level (LOAEL), or benchmark concentration, with uncertainty factors generally applied to reflect limitations of the data used. This estimate is generally used in U.S. EPA's non-cancer health assessments.

- Reference Dose (RfD): An estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. It can be derived from a NOAEL, LOAEL, or benchmark dose, with uncertainty factors generally applied to reflect limitations of the data used. This estimate is generally used in U.S. EPA's non-cancer health assessments.

- Slope Factor: An upper bound, approximating a 95 percent confidence limit, on the increased cancer risk from a lifetime exposure to an agent. This estimate, usually expressed in units of proportion (of a population) affected per mg/kg/day, is generally reserved for use in the low-

dose region of the dose-response relationship, that is, for exposures corresponding to risks less than 1 in 100.

- Unit Risk: The upper-bound excess lifetime cancer risk estimated to result from continuous exposure to an agent at a concentration of 1 µg/L in water, or 1 µg/m^3 in air. The interpretation of unit risk would be as follows: if unit risk = 1.5 x 10^{-6} per µg/L, 1.5 excess tumors are expected to develop per 1,000,000 people if exposed daily for a lifetime to 1 µg of the chemical in 1 litre of drinking water. Cancer slope factors (CSF) are generally derived using mathematical models that, in most cases, extrapolate results from animal studies conducted at high doses to low doses that may occur in human populations. This approach assumes that a threshold for the carcinogenic low dose response does not exist and that some risk is associated with any dose of the chemical. It should also be noted that for many compounds carcinogenicity has only been demonstrated in experimental animal models. Slope factors for each compound are derived for the most sensitive or affected organ or system (the target) in the studied species. In cases where only animal data are available, it is generally assumed that the target organ or system would be the same for a human subject. The limitations of using animal data for dose response assessment have been discussed in many publications over the past 20 years (Paustenbach 1989; Paustenbach 1990; Crump 2000). In addition to CSFs, toxicity values for carcinogens can also be expressed in terms of risk per unit concentration of the substance in the medium in which human contact occurs (U.S. EPA 1989). The chemical-specific unit risk value (or unit risk factor: URF) defines the relationship between air concentration and carcinogenic response. This potency value represents the upper bound estimate of the probability of response per unit concentration of the chemical in air over a 70-year lifetime.

Many chemicals exhibit both types of dose-response relationships, exhibiting different adverse effect end points. Some of the COCs that are the subject of this assessment are assumed to have shown both threshold and non-threshold adverse effects. It is appropriate to assess both health endpoints in this type of risk assessment, to ensure that both potential risk and hazard is properly accounted for.

A full list of TRV values used in the HHRA are presented in Table 3-6 below:

Table 3-6: Summary of TRV Values Used in the HHRA

COC	RfD (mg/kg/d)	Endpoint	Source
Metals			
Lead	6.3E-04	increased prevalence of chronic kidney disease and increased systolic blood pressure as well as protecting the fetus from neurodevelop	EFSA, 2013

COC	RfD (mg/kg/d)	Endpoint	Source
		mental effects	

3.4 Risk Characterization

The purpose of the risk characterization is to estimate potential risks associated with Site contaminants for each exposure scenario. The findings of the dose-response assessment are integrated with the results of the exposure assessment to derive quantitative estimates of risk and hazard for carcinogenic and non-carcinogenic COCs, respectively. Therefore, risk characterization is the step in the risk assessment process that combines the results of the exposure assessment and the toxicity assessment for each COC to estimate the potential for carcinogenic and non-carcinogenic human health effects from chronic exposure to that constituent.

The risk characterization compares estimated site-specific risk levels to target risk levels. For this risk assessment, the allowable incremental lifetime target cancer risk is set at 10^{-6} (1 in 1,000,000). In addition, MOE's target non-cancer hazard index is set at 0.2 (0.5 for PHCs) to allow for the potential exposure to other contaminants unrelated to the site.

3.4.1 Approach to Risk Characterization

For the assessment of non-carcinogenic health effects, the calculated acceptable daily dose (ADD) is compared to the Tolerable Daily Intake (TDI). The TDI is defined as an estimate of compound intake that is unlikely to cause adverse health effects even if exposure occurs for an entire lifetime.

For each exposure pathway, the predicted concentration or dose rate is compared to the reference concentration (RfC) or tolerable daily intake/reference dose (TDI/RfD) for non-carcinogens. The ratio of the predicted exposure to the TDI is termed the hazard quotient (HQ):

$$HQ = ADD / TDI$$

where: ADD = Average daily dose; estimated daily intake averaged over the exposure period (mg kg^{-1} d^{-1})

TDI = Tolerable daily intake (mg kg^{-1} d^{-1} or mg m^{-3}).

In the absence of a multi-media exposure assessment, the limit for acceptable risk is set at 0.2 for all COCs. The use of an HQ of 0.2 for the majority of COCs assumes that 80% of allowable exposure occurs via other exposure pathways (i.e., exposure to the COCs from food, consumer products, etc.). While the allocation factor can be adjusted based on a multi-media exposure assessment, this was not included as part of this assessment and therefore the 20% source allocation factor was retained in the investigation.

For carcinogens that are assumed to operate via a non-threshold mechanism of action, the risk characterization identifies the incremental cancer risk associated with a particular exposure pathway. Incremental lifetime cancer risks are a unitless value that expresses the probability of developing cancer

for a specified level of exposure averaged over a lifetime. Acceptable incremental lifetime risk is defined as 10^{-6}.

Cancer risks as a result of exposure to several of the chlorinated VOCs (e.g., tetrachloroethylene and trichloroethylene in ground water) were calculated as the product of the predicted exposures and the TRV. The risk characterization is expressed as:

ILCR = Dose Rate x TRV

where: ILCR = Incremental lifetime cancer risk;

Dose rate = Absorbed dose rate received from a contaminant via an exposure pathway (mg/kg/day); and

TRV = Non-threshold acting toxicity reference value $(ug/m^3\ day)^{-1}$.

As recommended by MOECC, an incremental lifetime cancer risk of less than 1 in one million (1×10^{-6}) is considered protective of human health and the associated risk from the contaminant of concern via that exposure pathway are considered to be acceptable.

3.4.2 Interpretation of Health Risks

In the following section, the risks attributable to each of the pathways of exposure are presented. These include all complete pathways determined in the Exposure Assessment section.

3.4.2.1 Quantitative Interpretation of Health Risks

Quantitative Interpretation of Health Risks – Workers

Table 3-7 provides the interpretation of risks due to direct contact with soil.

Table 3-7: Interpretation of Risks – Workers – Direct Contact with Soil

COC	Maximum Soil Concentration (µg/g)	Non-Cancer Hazard		
		Total Conc. (mg/kg/day)	Oral TRV (mg/kg/day)	HQ
Lead	130	7.57E-05	6.30E-04	1.20E-01

The calculated HQ is below the MECP's target HQ of 0.2 and as a result it can be concluded that there are no unacceptable risks from direct contact with soil.

Table 3-8 provides the interpretation of risks due to the inhalation of dust.

Table 3-8: Interpretation of Risks – Workers – Inhalation of Dust

COC	Maximum Soil Concentration (µg/g)	Non-Cancer Hazard		
		Total Inhaled Conc. (mg/kg/day)	Inhal. TRV (mg/kg/day)	HQ
Lead	130	5.55E-09	6.30E-04	8.82E-06

The calculated HQ is below the MECP's target HQ of 0.2 and as a result it can be concluded that there are no unacceptable risks from the inhalation of dust.

Table 3-9 provides the interpretation of risks due to the ingestion of groundwater.

Table 3-9: Summary of Human Health-Based Standards for Potable Groundwater

COC	Maximum Groundwater Concentration (µg/L)	GW-1 Human Health Component Value	HQ
Cobalt	4.97	3	1.66

The calculated HQ is above the MECP's target HQ of 0.2 and as a result it can be concluded that there may be unacceptable risks from the ingestion of potable groundwater. Therefore, measures need to be in place to reduce or eliminate exposure to groundwater via the ingestion of potable groundwater.

4 ECOLOGICAL RISK ASSESSMENT (ERA)

An ecological risk assessment (ERA) was conducted to characterize the risks for ecological receptors from exposure to COCs in soil and groundwater at the Site. The ERA was conducted generally following the ecological risk assessment procedures as prescribed by the Ontario MOECC guidance document, Procedures for the Use of Risk Assessment under Part XV.1 of the Environmental Protection Act, and O. Reg. 153/04 (as amended).

4.1 Problem Formulation

The Problem Formulation step of the ERA defines the issues at the Site as they relate to ecological receptors. A risk assessment must be based on a fundamental understanding of the Site conditions, the potential exposure pathways, and the characteristics of the receptors present at the Site. The Site conditions were discussed previously in Section 2 of this report. A discussion is presented below concerning the development of the ecological Conceptual Site Model (CSM) for the Site, including examination of potential receptors and exposure pathways.

4.1.1 Ecological Conceptual Site Model

The site characterization (Section 2) indicated that lead, zinc, PHC F4, EC and SAR were present in soil at concentrations exceeding the Table 1 SCS. In the case of groundwater, cobalt and copper were present above Table 1 SCS.

There are several environmental transport pathways that may apply at the Site. Volatile chemicals may evaporate from shallow soil and groundwater to the atmosphere. Once in the atmosphere, volatile chemicals are rapidly diluted such that exposure to ecological receptors is typically negligible. Chemicals with sufficient aqueous solubility, including some inorganic parameters, a few PAHs, and VOCs may undergo subsurface transport in groundwater.

The Site is an industrial property surrounded by predominantly industrial land uses. The site is currently vacant. The primary receptors are terrestrial plants, soil invertebrates, birds and mammals. In the case of soil, there is the potential for root uptake, direct contact, inhalation of dust, ingestion of food items and prey. As will be noted in Section 4.1.3.2, no COCs are present in groundwater at the Site with respect to the ERA, as such off-site aquatic receptors are not at risk due to the impacts identified at the risk assessment site.

The following terrestrial ecological receptors were identified as on-Site Valued Ecosystem Components (VECs):

- Terrestrial plants, including trees, shrubs, herbs, and grasses that potentially may be present under a future land use.

- Soil invertebrates, represented by earthworms.

- Mammals, represented by the herbivorous meadow vole, insectivorous short-tailed shrew and the red fox; and

- Birds, represented by the herbivorous red-winged blackbird, insectivorous American woodcock and the carnivorous red-tailed hawk.

Soil COCs are assumed to be (potentially) available to terrestrial plants and soil organisms via root uptake and direct contact pathways, and to wildlife via dermal contact and via ingestion of soil and food items that have accumulated COCs from soil. Terrestrial receptors may be exposed to COCs via the inhalation of dust. Based on the minimum depth to groundwater (3.77 mbgs), direct contact/root uptake pathways for groundwater are considered incomplete for terrestrial plants and soil organisms.

A graphical illustration of the ecological conceptual exposure model is presented in Figure 4.

4.1.2 Risk Assessment Objectives

The objectives of the ERA were to:

- Assess the potential risks, is any, related to COCs identified in on-Site soil and groundwater to on-Site terrestrial receptors (namely terrestrial plants, soil invertebrates, terrestrial mammals and terrestrial birds).

- Assess the risks due to direct contact with COCs in soil (invertebrates)

- Assess the risks to plants exposed to COCs in soil by root contact/uptake

- Assess the risks to terrestrial mammals and birds exposed to COCs in soil by direct contact and through prey/food ingestion

- The assessment of exposure and risks will be conducted both qualitatively and quantitatively

- The ERA assumes a full-depth approach for assessing exposures and risks.

- Both qualitative and quantitative assessment of risks were completed in the ERA with a qualitative assessment being completed for plants and soil invertebrates and a more quantitative assessment being completed for mammals and birds.

4.1.3 Contaminants of Concern for ERA

As described in Section 2, several contaminants in soil and groundwater were retained as COCs that exceeded the Table 1 SCS. COCs were compared to the Table 2 ecological component values, calculated through the MGRA model.

4.1.3.1 COCs in Soil

Soil COCs requiring quantitative evaluation in the ERA were identified by screening maximum concentrations against the applicable Table 2 SCS (coarse textured soil) component values for direct contact (plants and soil organisms), and ingestion (mammals and birds). The screening of soil parameters is summarized in Table 4-1. No screening to the soil leaching to groundwater component value as Section 4.1.3.2 notes no exceedances in groundwater at the Site.

Table 4-1: Screening of Soil COCs for Quantitative Evaluation in ERA

Chemical Parameter	Maximum Soil Concentration (ug/g)	Plants & Soil Org.	Mammals & Birds	COC (Yes/No)
Metals				
Lead	130	1,100	32	**Yes, mammals and birds**
Zinc	678	600	340	**Yes, plants/soil organisms, mammals and birds**
PHCs				
PHC F4	439	3,300	No value	No

Chemical Parameter	Maximum Soil Concentration (ug/g)	Plants & Soil Org.	Mammals & Birds	COC (Yes/No)
Inorganics				
EC (mS/cm)	0.92	1.4	Only applicable to terrestrial plants	No
SAR	3.07	12	Only applicable to terrestrial plants	No

It is noted that lead and zinc had exceedances of their ecological component values and will be assessed further in the ERA. In the case of PHC F4 for mammals and birds, PHCs are not of concern to these receptors as PHCs do not accumulate to any significant degree in these receptors. As a result, PHC F4 will not be evaluated further in the ERA.

4.1.3.2 COCs in Groundwater

To identify COCs requiring quantitative evaluation in the ERA, maximum concentrations of COCs were screened against the GW3 component value used to derive the Table 2 SCS (MOE 2011b). The GW3 component value refers to the pathway involving discharge of groundwater to surface water and is intended to protect aquatic receptors. The GW3 value also is considered to offer sufficient protection for terrestrial receptors (plants, soil invertebrates, mammals, birds). In developing the generic standards, the MOECC noted that GW3 values are "assumed to provide a sufficient degree of protection to plants, soil organisms, mammals and birds such that separate calculations for these receptors for ingestion or exposure to shallow ground water or ground water seeps is not needed" (MOE 2011b). However, given the minimum depth to groundwater at the site of 3.77 mbgs, direct contact with the groundwater is not expected, with this pathway not being examined further in the ERA.

The secondary screening of COCs using the ecological component value for groundwater is presented in Table 4-2.

Table 4-2: Screening of Groundwater COCs for Quantitative Evaluation in ERA

Chemical Parameter	Maximum Groundwater Concentration (ug/L)	Table 2 GW3	COC (Yes/No)
Cobalt	4.97	66	No
Copper	6.60	87	No

No exceedances were noted in association with groundwater at the Site. As a result, groundwater will not be examined further in the ERA as no unacceptable risks are present.

4.2 Receptor Characterization

4.2.1 Identification of Potential Receptors

Valued Ecosystem Components (VECs) are receptors that have an intrinsic, economic, or social value. VECs are typically selected based on surveys of the site and knowledge of receptors typically found in similar environments.

With the anticipated absence of ecological habitat at the Site following redevelopment for residential use, potential ecological receptors are limited to plants and soil organisms typically found in ornamental gardens or landscaping, as well as urban-adapted wildlife. The following ecological receptors were identified as VECs:

- Terrestrial plants.
- Soil invertebrates (earthworm).
- Mammals: herbivorous meadow vole, insectivorous short-tailed shrew and red fox.
- Birds: herbivorous red-winged blackbird; insectivorous American woodcock and carnivorous red-tailed hawk.

Descriptions of VECs are provided below.

4.2.1.1 Terrestrial Plants

Future land use is assumed to support typical urban plants including grass, ornamental shrubs, and trees. As autotrophs, plants are the foundation of any terrestrial ecosystem, including those heavily modified or influenced by humans. Consistent with MECP guidance, plants were assessed as a group, rather than a separate species. Plants are potentially exposed to COCs in soil via root uptake and root contact.

4.2.1.2 Soil Invertebrates

Soil at the Site is assumed to support indigenous soil invertebrates such as earthworms, grubs, arthropods, etc. In terms of sensitivity to toxicants, earthworms are considered to be one of the most sensitive receptors for soil contaminants. Earthworms are in near-constant direct dermal contact with soil. Earthworms are probably the most important soil invertebrate in promoting soil fertility (Edwards 1992). The feeding and burrowing activities of worms break down organic matter and release nutrients and improve aeration, drainage, and aggregation of soil. Earthworms are also important components of the diets of many higher animals. Due to their importance in a healthy ecosystem, as well as their ubiquity in the environment, earthworms were selected as a representative surrogate for all soil invertebrate species.

4.2.1.3 Meadow Vole

Portions of the Site under some future land use (i.e., landscaped areas) may be suitable for supporting small herbivorous mammals. Of the mammals that may be present, voles are most likely to receive relatively large doses of COCs, as they have a small home range (0.083 ha; U.S. EPA 1993) and therefore are likely to spend more time within contaminated areas and consume a relatively high proportion of soil in their diet.

The meadow vole (Microtus pennsylvanicus) was chosen as a representative surrogate for small herbivorous mammals that may be found at the Site. Voles are small (44 g; Sample and Suter 1994) herbivorous rodents found throughout Canada and the U.S. wherever there is grass cover. The meadow vole makes its burrows along surface runways in grasses or other herbaceous vegetation. Voles inhabit grassy fields, marshes, and bogs (Getz 1961). Microtus voles consume green vegetation, sedges, seeds, roots, bark, fungi, insects, and animal matter. Meadow voles favor green vegetation when it is available and consume other foods more when green vegetation is less available (Riewe 1973; Johnson and Johnson 1982; Getz 1985). Although there is some evidence of food selection, meadow voles generally eat the most common plants in their habitat (Zimmerman 1965). The overall ingestion rate of meadow voles has been estimated to be 0.005 kg/day (Sample and Suter 1994).

4.2.1.4 Short-tailed Shrew

The shrew is proposed as a VEC representative of small omnivorous mammals. The northern short-tailed shrew (Blarina brevicauda) is the most widespread shrew species in southern Canada and the north-central and northeastern U.S. (George et al. 1986)). Shrews are an important component of the diet of many raptors (Palmer and Fowler 1975) and are also prey for carnivores such as fox and weasels (Buckner 1966). Shrews inhabit a wide variety of habitats and are common in areas with abundant vegetative cover (Miller and Getz 1977). Shrews burrow in the upper layers of soil. Underground runways and nests are usually constructed within the upper 10 cm of soil (George et al. 1986). The diet of the short-tailed shrew consists of small arthropods such as grasshoppers and beetles, worms, and limited amounts of seeds and berries (Sample and Suter 1994).

4.2.1.5 Red Fox

The red fox (Vulpes vulpes) was selected as a VEC representing larger carnivorous/omnivorous mammals. Red foxes are abundant throughout North America, except in parts of the central and southwestern U.S. Red foxes are approximately 56 to 63 cm in length, and weigh 3 to 7 kg. Red fox prey extensively on small rodents such as meadow vole, field mice, and hare, but also consume game birds, insects, and occasionally fruit, berries, seeds, and nuts (Palmer and Fowler 1975). The home range of the red fox varies considerably according to landscape; in a non-urban area, home ranges can be as large as 3,000 ha (U.S. EPA 1993).

4.2.1.6 Red-winged Blackbird

The red-winged blackbird (Agelarius phoeniceus) is a passerine bird very common near fresh water marshes, lakes, and rivers across Ontario during summer months. The red-winged blackbird inhabits open grassy areas and prefers wetlands, particularly if cattail (Typha) is present. It is also found in dry upland areas, where it inhabits meadows, prairies, and old fields. Given that a Creek is located approximately 120m west of the Site, and the red-winged blackbird also inhabits upland areas, the presence of this

species at the Site is possible. The red-winged blackbird nests in cattails, rushes, grasses, sedge, or in alder or willow bushes over the water. The most sensitive life stage of this species (developmental stage) is spent in Ontario. During most of the year, the red-winged blackbird is herbivorous or granivorous, consuming primarily grains and seeds. However, during breeding seasons, insects such as dragonflies, damselflies, butterflies, moths, and flies form a significant fraction of the diet. Consistent with assumptions employed by the Ministry in the development of the generic SCS, the red-winged blackbird was assumed in the ERA to be strictly herbivorous. The red-winged blackbird was selected as a surrogate for all herbivorous passerine birds that may be found at the site.

4.2.1.7 American Woodcock

The American woodcock (Turdus migratorius) was selected to represent birds that would consume a diet comprised of a significant amount of soil invertebrates. The MECP has adopted the American woodcock to represent omnivorous birds in Ontario. The American woodcock inhabits "both woodlands and abandoned fields, particularly those with risk and moderately to poorly drained loamy soils, which then don't support abundant earthworm populations" (US EPA, 1993). The American woodcock was selected as a surrogate for all omnivorous or insectivorous passerine birds that may be found at the Site.

4.2.1.8 Red-Tailed Hawk

The red-tailed hawk was considered for assessment and was assumed to consume a diet entirely composed of small mammals. The red-tailed hawk was included in the derivation of the component values protective of mammals and birds. However, only the red-winged blackbird and American woodcock were selected for quantitative assessment in the ERA as these birds have smaller home ranges than larger birds (e.g., red-tailed hawk) and are anticipated to forage all food items from the site. Using smaller birds as a surrogate for other larger species potentially present on-site provides a conservative quantitative estimate of chemical dosage that is likely greater than other species present on the site.

4.3 Exposure Assessment

The exposure assessment consists of the pathway analysis, which provides a summary of the complete exposure pathways evaluated in the ERA, and the exposure estimate, which determines the exposure of the terrestrial VECs to the COCs identified at the Site.

4.3.1 Pathway Analysis

The potential exposure pathways for COCs in soil and groundwater to VECs are discussed in the following section.

4.3.1.1 Terrestrial Plants and Soil Invertebrates

The primary pathway from soil and groundwater exposure for terrestrial plants on the Site is through root uptake and/or direct contact with the impacted media. Incidental soil ingestion, and dermal contact by soil invertebrates is the predominant pathway. The vapour (sourced from volatile COCs in soil) inhalation by soil invertebrates is a potential pathway of exposure but expected to be negligible and therefore not considered further in the ERA. The dispersion of fugitive dust and inhalation of particulates is considered to be a potential exposure pathway, however there are no toxicological values upon which

to either qualitatively or quantitatively evaluate this exposure pathway. The uptake of soil by food items and the subsequent ingestion of food items by vegetation and/or soil organisms as well as mammals and birds are considered to be a potential exposure pathway and is included in the ERA. The following exposure pathways were quantitatively evaluated within the ERA:

- Root uptake from soil for terrestrial plants
- Incidental soil ingestion, and dermal contact with soil-by-soil invertebrates

4.3.1.2 Mammals and Birds

Although dermal exposure through direct contact with soil may be a complete exposure pathway for mammals and birds, it is generally considered to be insignificant due to the low frequency and duration of exposures. Additionally, the information required to estimate dermal exposure of mammals and birds is not available. Fur on mammals is believed to reduce exposure by limiting contact with skin and the contaminated media. Consequently, dermal contact will not be quantitatively assessed for mammals and birds. The dispersion of fugitive dust and inhalation of particulates are potential exposure pathways but considered to be negligible and therefore not considered further in the ERA. The primary route of exposure for mammals and birds is via the ingestion of food/prey that may have accumulated contaminants from soil and groundwater, as well as incidental ingestion of soil during the consumption of food items or through interactions with soil (e.g., burrowing activities). The following exposure pathways are qualitatively evaluated within the ERA:

- Ingestion of impacted food/prey (i.e., plant and animal tissue) by terrestrial mammals and birds
- Incidental ingestion of soil

4.3.1.3 Exposure Estimates

This section consists of assessing the exposure of aquatic and terrestrial VECs to the COCs identified in soil and groundwater. Table 5-4 provides the exposure estimates for COCs in soil at the site.

Table 4-3: Exposure Estimates for COCs in Soil

Chemical Parameter	Exposure Estimates for Soil (mg/kg)

4.4 Hazard Assessment

The hazard assessment involves identifying screening benchmarks and TRVs used in the ERA. These were selected to be protective of ecological receptors and are based on changes to growth, reproduction, or survival. The relevant adverse ecological effects are provided in the MECP Rationale Document (MOE 2011b).

4.5 Risk Characterization

4.5.1 Interpretation of Ecological Risks

The assessment of potential risks to ecological receptors, defined as the screening index (SI), was determined by dividing the REM by the ecological component value as shown in the following equation:

Where:

SI = Screening Index [-]

REM = Reasonable Estimates of the Maximum Concentrations [µg/g or µg/L]

Ecological Component = Applicable ecological component value for the COC [µg/g or µg/L]

Conservative uncertainty factors have been incorporated into the ecological component values for each COC. The calculated SIs were compared with an acceptable value of 1. If the SI of a COC is less than or equal to 1, it is unlikely to pose an adverse health risk to the exposed ecological receptors on the site, while a further examination of the exposure pathways is needed if it exceeds.

4.5.2 Quantitative Interpretation of Ecological Risks

A quantitative evaluation of potential risk was undertaken for the on-site receptors (vegetation, soil organisms, mammals, and birds). Exposures to soil COCs were assessed using the SI approach. If the maximum concentrations of the COCs are greater than the applicable ecological component values (i.e. SI > 1), they would require measures to decrease or eliminate exposure.

4.5.3 Qualitative Interpretation of Ecological Risks

Terrestrial plants are potentially exposed to COC in soil via root uptake (direct contact) and soil invertebrates are exposed via direct contact. Exposure estimates for plants and soil invertebrates were based on the maximum concentrations of COCs at the Site. In the absence of risk management measures (RMM), SIs for terrestrial plants and soil invertebrates were greater than one for zinc (Table 4-4). It may be inferred from this result that growth and reproduction of sensitive plants and soil invertebrates may be inhibited in areas of the Site with concentrations of COCs exceeding their associated TRVs.

Table 4-4: Interpretation of Risks – Plants and Soil Invertebrates

Parameter	TRV (mg/kg)	Without RMM	
		Exposure Concentration (mg/kg)	SI (Screening Index)
Zinc	600	678	**1.13**

Table 5-5 presents the result of comparing the maximum soil concentrations with individual ecological component values for birds and mammals. Bolded and shaded values indicate an exceedance of an SI of greater than the acceptable level of 1.0. In the absence of RMMs, SIs for were greater than one for lead and zinc (Table 4-4) for the American woodcock. It may be inferred from this result that there is the potential for unacceptable risks to birds at the Site.

Table 4-~~5~~5: Comparison of Maximum Soil Concentrations to Mammal and Bird Ecological Component Values

Parameter	Units	Maximum Soil Concentration	American Woodcock	Meadow Vole	Red Fox	Red Winged Black Bird	Red Tailed Hawk	Short-Tailed Shrew
Lead	µg/g	130	**32**	185000	88200	140	163000	1760
Zinc	µg/g	678	**337**	492000	36900	2770	79000	5520

NV – No value

5 CONCLUSIONS

As discussed, the Site is used for industrial/commercial use and is currently vacant. The Site is to be used for truck parking in the future, along with the construction of an on-site building. Therefore, the primary human receptors are workers at the Site. In the case of soil, there is the potential for direct contact with soil and the inhalation of dust. There is the potential for direct contact with groundwater as it may be used as a potable source. In the case of ecological receptors, the primary receptors are terrestrial plants, soil invertebrates, birds and mammals. In the case of soil, there is the potential for root uptake, direct contact, inhalation of dust, ingestion of food items and prey. In the case of groundwater given the minimum depth to groundwater (3.77 mbgs), there is no potential exposure for ecological receptors.

For the Human Health Risk Assessment (HHRA), further screening of the exceedances in soil and groundwater was completed with a comparison to the applicable MECP Table 2 (industrial/commercial, coarse soil, potable groundwater) human health component values, as the Table 1 SCS were only applicable for the identification of impacts at the Site given the requirement of the Township of Puslinch. For soil, the values for direct contact were used for comparison. In the case of soil, no exceedances were noted. In the case of lead, no human health component values are currently available. The

MEPC has released updated TRVs for lead and these will be used to determine potential risks to risks at the Site due to exposure to soil. In the case of groundwater, cobalt exceeded the human health component value associated with the ingestion of potable groundwater and will be evaluated further in the HHRA.

For the Ecological Risk Assessment (ERA), further screening of the exceedances in soil and groundwater was completed with a comparison to the applicable MECP Table 2 (industrial/commercial, coarse soil, potable groundwater) ecological component values. In the case of soil, lead exceeded for birds and mammals, while zinc exceeded for both terrestrial plants/soil invertebrates and birds and mammals requiring further assessment in the ERA. In the case of groundwater, no exceedances were noted, as such groundwater in association with ecological receptors will not be evaluated further in the ERA.

The HHRA concluded that no unacceptable risks were present in association with soil. In the case of groundwater, the calculated HQ was above the MECP's target HQ of 0.2 for cobalt and as a result it was concluded that there may be unacceptable risks from the ingestion of potable groundwater. Therefore, measures need to be in place to reduce or eliminate exposure to groundwater via the ingestion of potable groundwater. As a result, there is the requirement to have a restriction on the installation of potable wells at the Site. With this risk management measure in place no unacceptable risks are present due to groundwater at the Site.

The ERA concluded that in the absence of risk management measures, SIs for terrestrial plants and soil invertebrates were greater than one for zinc in soil. It may be inferred from this result that growth and reproduction of sensitive plants and soil invertebrates may be inhibited in areas of the Site with concentrations of zinc exceeding their associated TRVs. In the case of mammals and birds exposed to soil at the soil, in the absence of risk management measures, SIs for were greater than one for lead and zinc for the American woodcock. It may be inferred from this result that there is the potential for unacceptable risks to birds at the Site. As a result, there is the requirement to have capping of the impacted soil with 0.5 m of gravel or soil meeting the Table 1 SCS is required to mitigate potential risks to ecological health. With this risk management measure in place no unacceptable risks are present due soil at the Site.

- On this basis, the following property specific standards were developed based on the presence of risk management at the site.

Table 4-6: Calculated Property Specific Standards for Soil

Parameter	Units	Maximum Soil Concentration	Calculated Property Specific Standard	Basis of Property Specific Standard
Lead	µg/g	130	**156**	Maximum concentration x 1.2

Parameter	Units	Maximum Soil Concentration	Calculated Property Specific Standard	Basis of Property Specific Standard
Zinc	µg/g	678	**814**	Maximum concentration x 1.2

With the recommended risk management measures in place, no unacceptable risks exist at the Site and the Site is suitable for continued industrial use without any remediation.

6 CLOSURE

This report has been prepared and the work referred to in this report has been undertaken by HS Group for BVD Real Estate Inc.. It is intended for the sole and exclusive use of BVD Real Estate Inc... Any use, reliance on or decision made by any person other than BVD Real Estate Inc. based on this report is the sole responsibility of such other person. HS Group makes no representation or warranty to any such other person with regard to this report and the work referred to in this report and accepts no duty of care to any person and any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the report of the work referred to in this report.

This report has been prepared for the exclusive use of BVD Real Estate Inc. for specific application to the Site as identified in Figure 1. Any conclusions or recommendations made in this report reflect HS Group's best judgment based on information available at the time of the report's preparation based, in part, on monitoring at various locations of the site, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report and other reports referenced herein.

Other than BVD Real Estate Inc., copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of BVD Real Estate Inc.. Nothing in this report is intended to constitute or provide a legal opinion.

Thank you for considering me for this project. If you have any questions regarding the content of this report, please feel free to contact me at 519-857-2777, or via email at: hscobie@hsgroupra.ca

Sincerely,

[redacted]

Hugh Scobie, MSc., DABT, C.Chem, QP$_{RA}$
Risk Assessor / Toxicologist

[redacted]

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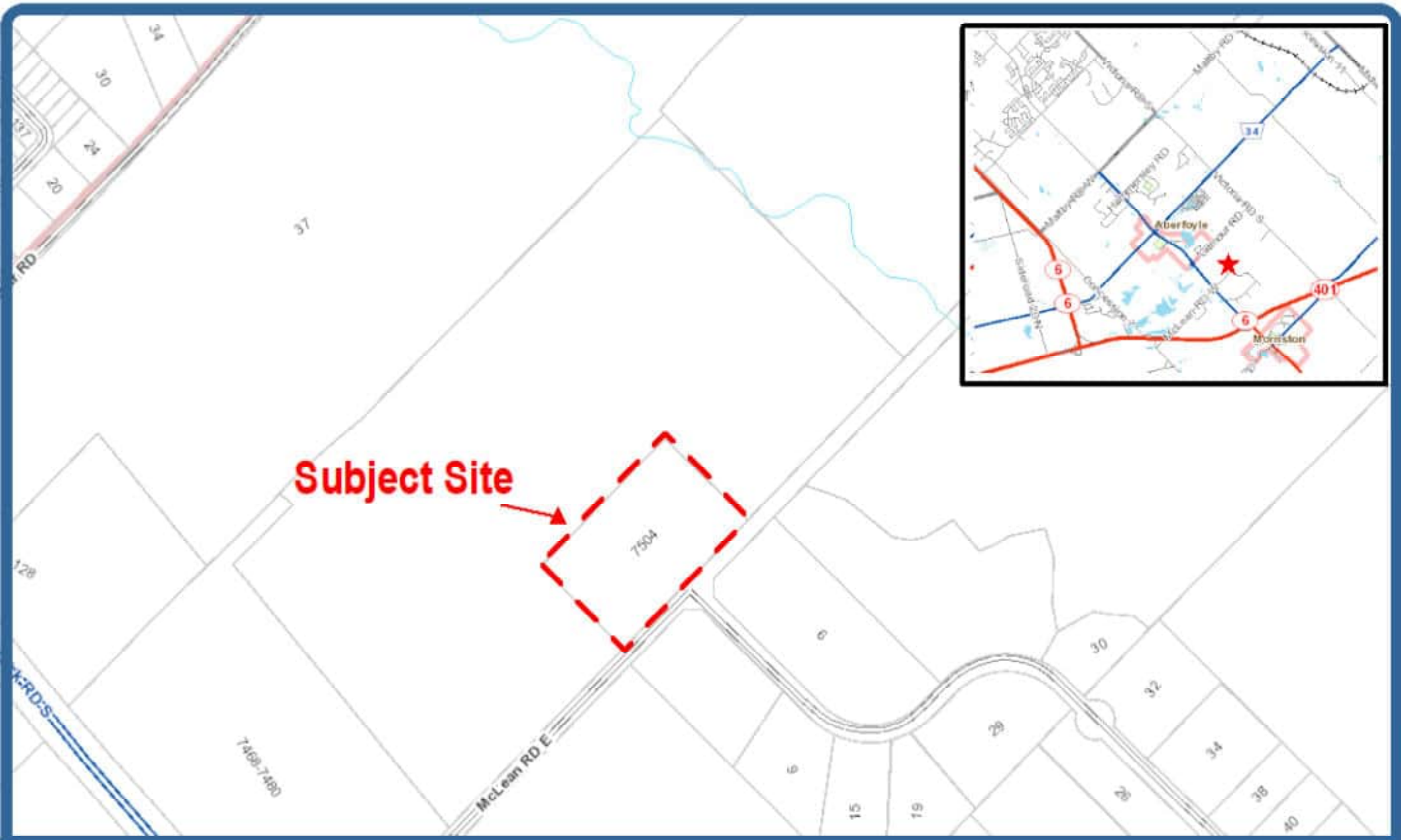
Figures



A&A ENVIRONMENTAL CONSULTANTS INC.

16 Young St,
Woodstock, ON, N4S 3L4
Tel: 519 266-4680

Site Location Map Located at 7504 McLean Road, Puslinch, Ontario

0 m — 200 m

Project #8296
June 2024

Map Source:
ERIS 2024

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A&A ENVIRONMENTAL CONSULTANTS INC.
16 Young St,
Woodstock, ON, N4S 3L4
Tel: 519 266-4680

Satellite Image Indicating Borehole Locations in Exceedence & Monitoring Well Locations at 7504 McLean Road East, Puslinch, Ontario

0 m — 40 m

Project: 8368
March 2025

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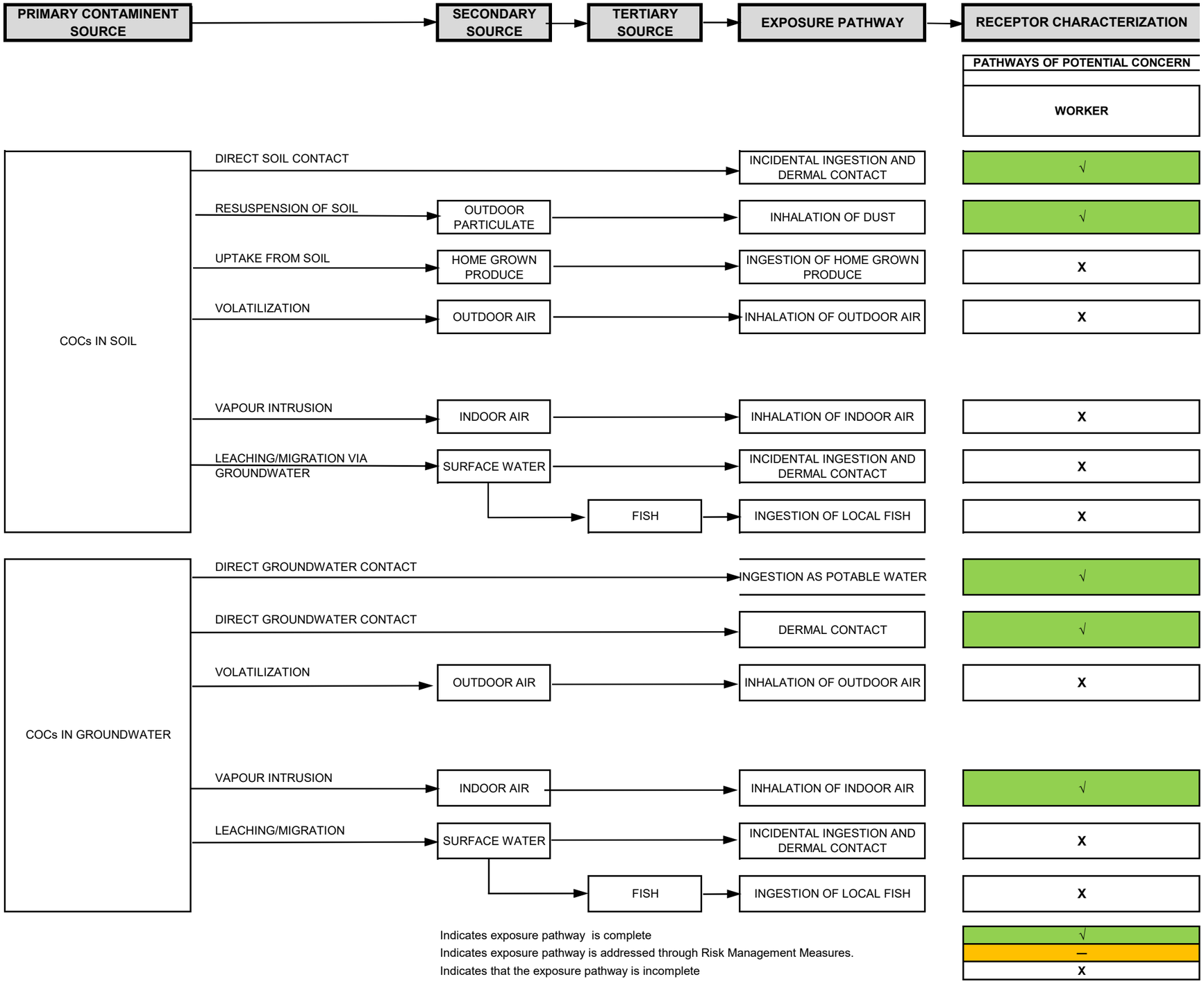
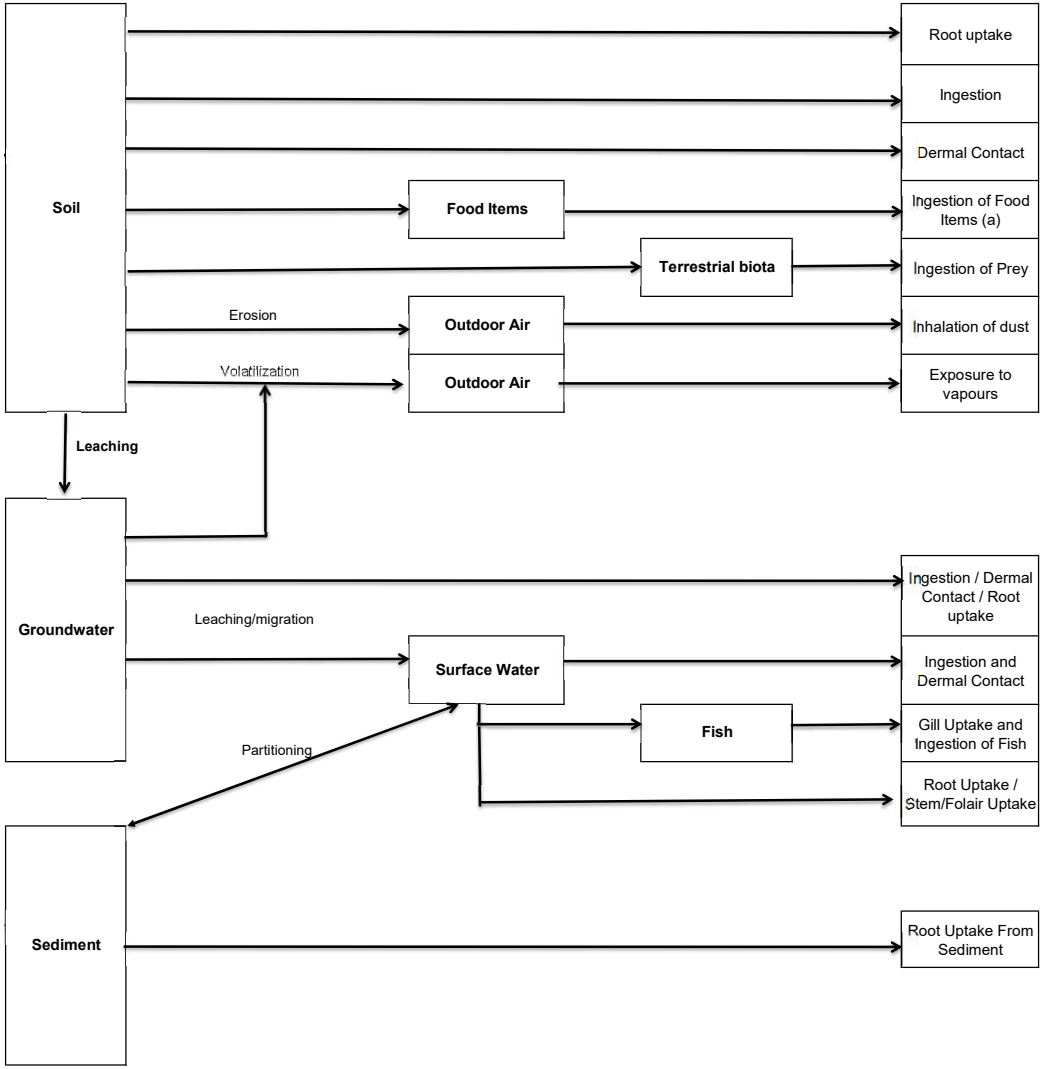


Figure 3. Human Health Conceptual Model - 7504 McLean Road, Puslinch, Ontario

Figure 4 - Ecological Conceptual Site Model - 7504 McLean Road, Puslinch, Ontario



Receptor Characterization		
On-Site		
Terrestrial Plants	Soil Invertebrates	Birds and Mammals
☑	X	X
X	☑	☑
X	☑	☑
X	X	☑
X	X	☑
X	X	X
X	X	X
X	X	X
X	X	X
X	X	X
X	X	X
X	X	X

Appendix A

HSGROUP

Hugh Scobie, MSc., DABT, C.Chem, QP_{RA}

E-mail: hscobie@hsgroupra.ca

Professional Summary

Mr. Scobie is a board-certified toxicologist and chartered chemist with over 25 years of experience in conducting human health and environmental risk assessment. Mr. Scobie provides expert advice in the fields of human health risk assessment and toxicology, site-specific risk assessment, environmental toxicology, probabilistic exposure assessment, multi-media risk assessment, review of risk assessments and toxicology and development of regulatory standards for chemicals in soil and other media. He was previously employed with the Ontario Ministry of the Environment (MOE) as a Regulatory Toxicologist in the Human Toxicology and Air Standards section of the Standards Development Branch. In his previous work at the MOE, he provided expert advice in assessing the risk of adverse effects resulting from exposure to a wide range of hazardous chemicals. He has experience in the assessment of human health risks associated with contaminants in air, water and soil from numerous investigations conducted at various contaminated sites and exposure situations. With his years of experience and expertise in conducting risk assessments in Ontario, Mr. Scobie has been designated by the MOE as a Qualified Person (QP_{RA}) for conducting risk assessments under Ontario Regulation 153/04 (as amended).

Mr. Scobie has performed site-specific risk assessments throughout Canada associated with site contamination by various chemicals including a wide variety of metals. His work in the field of contaminated sites has provided him with extensive knowledge of both federal and a number of the province's environmental regulations.

Education

M.Sc., Pharmaceutical Science, University of Toronto, 2000
B.Sc., Biomedical Toxicology, University of Guelph, 1998
Professional Short Course: Advanced Probabilistic Risk Assessment, Syracuse Research Corporation, Syracuse, New York, 2003

Memberships / Affiliations

Associate Member, Society of Toxicology (SOT)
Member, Society for Risk Analysis
Diplomate of the American Board of Toxicology (DABT)
Chartered Chemist of Ontario (C.Chem)

Summary of Core Skills

Risk Assessment – Hugh provides expert advice in the fields of human health risk assessment, site-specific risk assessment, human health and environmental toxicology, probabilistic exposure assessment, multi-media risk assessment; and expert review of risk assessments. Hugh has a comprehensive understanding of the Ontario's amended Brownfield Regulation (O.Reg.511/09) and its requirements. In addition, he is knowledgeable on the MOE's internal risk assessment processes, internal procedures being an employee of the Ministry's Standards Development Branch

Hugh is also familiar with risk assessment procedures of the US EPA (i.e., RAGS – Risk Assessment Guidance for Superfund; Soil Screening Guidance, etc.), Health Canada, Canadian Council of Ministers of the Environment and Massachusetts Department of Environmental Protection brownfields programs.

Indoor Air Quality Assessments – Hugh has designed and reviewed the results of many indoor air sampling programs. He has been involved in worker exposure scenarios in cases when adverse health effects have been noted. He has been involved in emergency response situations, where rapid identification of the adverse volatile compound is critical. He has extensive knowledge of vapour intrusion, its modelling and its common sources and mitigation strategies. He has experience in both residential and commercial building applications dealing with both environmental and occupational source exposures. He has knowledge and experience with all of the available sampling technologies and can provide recommendations with respect to both efficacy as well as reliability for each of the methodologies.

Regulatory Guideline Development - As a regulatory toxicologist with the Ontario MOE, Hugh developed human health-based air quality standards for over 30 high priority air contaminants, including benzene, benzo(a)pyrene and the group of dioxins and furans. Used knowledge of toxicology and MOE policies and professional judgment and experience in creating the Information Draft documents to be made available to the public for comment. Additionally, Hugh authored the Ontario MOE's guidance concerning the submission of toxicological data in support of Basic Comprehensive Certificate of Approval application for air.

Regulatory Submission - Hugh has expertise in providing submissions to Health Canada, including pesticide formulations and products (Pest Management Regulatory Agency). Hugh also has extensive experience in the submission of air permitting approval documentation to the Ontario MOE.

Litigation Support - Hugh has provided litigation support in several cases both related to regulatory compliance (e.g., Ministry of the Environment offences) and personal injury. Dossier preparation and expert testimony in the area of human toxicology and exposure assessment have been provided in support of litigation.

Professional Experience

MGRA and Tier III Risk Assessment in Support of a Record of Site Condition, Block 60, Vaughan, Ontario

Conducted a MGRA and Tier III HHERA for a Record of Site Condition for separate sections of a large lot in Vaughan, Ontario for residential redevelopment. Concerns at the properties included elevated metal, inorganic, PAH, PHC, VOC, and PCB parameters in soil and elevated metals, inorganic, PAH, PHC, and VOC parameters in soil and groundwater. The risk assessment addressed vapour intrusion as well as direct contact pathways associated with a number of volatile organic compounds found to be present in on-site and groundwater and soil. In addition, a risk management plan was prepared to mitigate unacceptable risks present at the Site.

Risk Assessment in Support of a Record of Site Condition, 550 & 552 Booth Street, Ottawa, Ontario

Conducted a risk assessment for a Record of Site Condition at an industrial property for redevelopment as a residential building in Ottawa, Ontario. Concerns at the property were elevated VOC and SVOC parameters in groundwater. The risk assessment addressed vapour intrusion as well as direct contact pathways associated with a number of volatile organic compounds found to be present in on-site and groundwater. In addition, a risk management plan was prepared to mitigate unacceptable risks present at the Site.

Risk Assessment in Support of a Record of Site Condition, 71 Rebecca Street, Hamilton, Ontario

Conducted a risk assessment for a Record of Site Condition at a commercial use property for redevelopment as a community use in Hamilton, Ontario. The concerns at the RA property included elevated PHC parameters in soil and elevated VOC and PHC parameters in groundwater. The risk assessment addressed vapour intrusion as well as direct contact pathways associated with a number of volatile organic compounds found to be present in on-site and groundwater and soil. In addition, a risk management plan was prepared to mitigate unacceptable risks present at the Site.

Risk in Support of a Record of Site Condition, 693-713 Davis Drive, Newmarket, Ontario

Conducted a risk assessment for a Record of Site Condition at a commercial property in Newmarket, Ontario with elevated VOC and PHC parameters in soil and groundwater. The property is proposed to be redeveloped for residential uses. The risk assessment addressed vapour intrusion as well as direct contact pathways associated with a number of volatile organic compounds found to be present in on-site and groundwater and soil

Risk Assessment in Support of a Record of Site Condition, 1161 Kingston Road, Toronto, Ontario

Conducted a risk assessment for a Record of Site Condition at an industrial property for redevelopment for residential use in Toronto, Ontario. Concerns at the property include elevated PAH, VOC, and PHC parameters in soil and elevated VOC parameters in groundwater. The risk assessment addressed vapour intrusion as well as direct contact pathways associated with a number of volatile organic compounds found to be present in on-site and groundwater and soil. In addition, a risk management plan was prepared to mitigate unacceptable risks present at the Site.

Risk Assessment in Support of a Record of Site Condition, 1799 St. Clair Avenue West, Toronto, Ontario

Conducted a risk assessment for a Record of Site Condition at an industrial property for redevelopment for residential use in Toronto, Ontario. Concerns at the RA property included elevated metal, inorganic, PAH and PHC parameters in soil and elevated VOC and PAH parameters in groundwater. The risk assessment addressed vapour intrusion associated with a number of volatile organic compounds found to be present in on-site and groundwater and soil as well as direct contact pathways for all other contaminants of concern.

Modified Generic Risk Assessment in Support of a Record of Site Condition, 40 St. Clair Avenue West, Toronto, Ontario

Conducted a MGRA for a Record of Site Condition at an commercial property for redevelopment for parkland use in Toronto, Ontario. The primary concern at the RA property was elevated PHC parameters in soil. The approved MECP MGRA model was used to determine property specific standards for contaminants of concern and to apply approved risk management measures to mitigate undue risk estimated by the model

Municipality of Port Hope – Peer Reviewer, Various Projects

Provide peer reviewer support to the Municipality of Port Hope for all remediation and risk assessment projects related to Low Level Radioactive Waste and former industrial sites. Many large scale risk assessment projects going through O.Reg.153/04 risk assessments are being peer reviewed to ensure compliance with the regulation as well as assessing potential liabilities to the Municipality of Port Hope.

Pinnacle International (Dundas) Ltd. - Risk Assessment for Parts of 5421 – 5435, 5449 -5453, 5475 and 5481 Dundas Street West, Toronto

Completed a risk assessment as the Qualified Person for Risk Assessment (QPRA) for a contaminated site in Toronto for a parkland redevelopment to be conveyed to the City of Toronto. The risk assessment is being completed under the requirements of O.Reg.153/04 (as amended). The site had identified metals, PAHs and VOCs in soil and groundwater at the site that required further assessment in both the human health and ecological risk assessments. Risk management measures have been proposed for the site to mitigate potentially unacceptable risks to potential human and ecological receptors at the site.

Southbound Developments (Aurora) Inc. - Risk Assessment for 15186 Yonge Street, 55, 57, And 57A Temperance Street and 12 And 16 Tyler Street Aurora, Ontario

Completing a risk assessment for a contaminated site in Aurora for a redevelopment for a church and a retirement home. The risk assessment is being completed under the requirements of O.Reg.153/04 (as amended). The site had identified PHCs and BTEX in soil and groundwater at the site that required further assessment in both the human health and ecological risk assessments. Risk management measures have been proposed for the site to mitigate potentially unacceptable risks to potential human and ecological receptors at the site.

2, 16, 18 and 20 Cordova Ave, Toronto Ontario

Completing a risk assessment for a contaminated site in Toronto for a redevelopment for residential high-rise buildings. The risk assessment is being completed under the requirements of O.Reg.153/04 (as amended). The site had identified VOCs in groundwater at the site that required further assessment in both the human health and ecological risk assessments. Risk management measures have been proposed for the site to mitigate potentially unacceptable risks to potential human and ecological receptors at the site.

Human Health Risk Assessment Study - Remediation of the Sydney Tar Ponds and Coke Oven Sites - Worked on the team conducting the human health risk assessment of the remedial strategy for the Sydney Tar Ponds and Coke Ovens. Lead a group examining exposures and risks to workers involved in the various remedial activities at the site. In addition, provided support in evaluating the potential risks and exposure to nearby residential as a result of the proposed remedial activities. The study examined the risks associated with a number of compounds including PAHs, BTEX, various metals and PCBs.

Risk Assessment and Risk Communication, Northstar Aerospace, Cambridge, Ontario -Provided support and managed day-to-day activities in the areas of risk assessment and risk communication associated with significant indoor air impacts due to TCE plumes in a shallow sand and gravel aquifer beneath a residential area. Conducted in-home visits to hundreds of impacted residences in order to communicate the health issues related to TCE exposure. Provided communications with all regulatory agencies involved in the project including the City of Cambridge, Grand River Conservation Authority, Region of Waterloo Health Unit and the District Ontario Ministry of the Environment office.

Risk Assessment to Support a Record of Site Condition, R&W Timber Property, Red Lake, Ontario - Qualified Person for Risk Assessment (QP(RA)) in a human health and ecological risk assessment for the redevelopment of a commercial/industrial property for residential use. The risk assessment addressed petroleum hydrocarbon and mercury impacts in ground water, as well as petroleum hydrocarbon and metal impacts in soil. The risk assessment assessed as a key exposure pathway, vapour intrusion through the use of soil vapour data. In addition, a risk management plan was prepared that was accepted by the Ontario Ministry of the Environment to mitigate unacceptable risks present at the Site.

Risk Assessment to Support a Record of Site Condition, 3091 Appleby Line, Burlington, Ontario - Qualified Person for Risk Assessment (QP(RA)) in a human health and ecological risk assessment for the sale and redevelopment of commercial/industrial property for strictly commercial use. The risk assessment

addressed impacts of volatile organic compounds and petroleum hydrocarbons in ground water, as well as impacts of petroleum hydrocarbons, polycyclic aromatic hydrocarbons and metals in soil. In addition, a risk management plan was prepared that was accepted by the Ontario Ministry of the Environment to mitigate unacceptable risks present at the Site.

Risk Assessment to Support a Record of Site Condition, 5 Hanna Avenue, Toronto, Ontario - Qualified Person for Risk Assessment (QP(RA)) in a human health and ecological risk assessment for a residential redevelopment in Toronto. The risk assessment examined potential risks due to vapour intrusion as the result of impacted ground water under the foundation of a proposed high-rise condominium. The risk assessment provided expert advice on vapour intrusion and mitigation of risks to residents at the site due to potential inhalation of vapours from the impacted ground water.

Risk Assessment to Support a Record of Site Condition, 14 Algoma Street (Former Municipal Sewage Treatment Plant), Toronto, Ontario - Qualified Person for Risk Assessment (QP(RA)) in a human health and ecological risk assessment for a City of Toronto parkland redevelopment. The risk assessment addressed polycyclic aromatic hydrocarbons and metals impacts related to soil and ground water at the Site. In addition, a risk management plan was prepared that was accepted by the Ontario Ministry of the Environment to mitigate unacceptable risks present at the Site for recreational users.

Risk Assessment to Support a Record of Site Condition, 55 Columbia Street, Waterloo, Ontario - Qualified Person for Risk Assessment (QP(RA)) in a human health and ecological risk assessment for a mixed used (commercial/industrial property). The risk assessment addressed the flow through of volatile organic compounds in ground water due to an upgradient source. In addition, a risk management plan was prepared that was accepted by the Ontario Ministry of the Environment to mitigate unacceptable risks present at the Site.

Risk Assessment to Support a Record of Site Condition for the Phoenix Advanced Exploration Project, Red Lake, Ontario - Was retained by Rubicon Minerals to conduct a risk assessment to support the filing of a Record of Site Condition for the Phoenix Advanced Exploration Project near Red Lake, Ontario. The Site is an active mining camp, but an RSC was required by the Municipality of Red Lake to move into production phase. Waste rock from exploration activities used as fill at the site contained metals at concentrations greater than Table 3 standards. Completed an ecological risk assessment to demonstrate metals in waste rock fill exceeded ecological TRVs, but risks to plants, mammals, birds, and reptile populations were within acceptable limits. Metals at the site were found to pose some risk to various human receptors, and risk management measures were proposed to limit exposure of site workers. Submitted for regulatory review.

Risk Assessment in Support of a Record of Site Condition, 51-75 Bradford Street, Barrie, Ontario - Prepared a risk assessment to support a RSC filing for a 3.5-ha property for the proposed Blue Sails Redevelopment located in Barrie, Ontario. The Site was previously used for industrial purposes, and included historical rail sidings, coal and lumber yards, and leather tanning operations. The property was considered 'sensitive' under O. Reg. 153/04 due to the presence of a stream on-site. The potential contaminants of concern in soil included antimony, arsenic, mercury, copper, lead, petroleum hydrocarbons, vinyl chloride, and naphthalene. The RA was completed to support the redevelopment plans for the Site, which include residential land uses. Submitted for regulatory review.

Risk Assessment to Support a Record of Site Condition for 298 Lawrence Avenue, Kitchener, Ontario - Conducted a risk assessment in support of a filing a Record of Site Condition for a former commercial/industrial site to be redeveloped for use as a regional hospice. The risk assessment considered potential impacts in ground water in relation to the redevelopment. The risk assessment was accepted by the MOE with a RSC filed for the property.

Risk Assessment in Support of a Record of Site Condition, 301 Front Street, Toronto, Ontario - Completed a risk assessment on behalf of a developer at a vacant fill-impacted Site being redeveloped to house an

aquarium (commercial development). Intrusive investigations at the site revealed elevated levels of inorganics and PAHs in deep soil and ground water as a result of the use of poor quality fill when the site was originally developed over a century ago. Calculated risks for both ecological receptors and humans potentially exposed to contaminated soil and ground water, and proposed risk management measures to address residual concentrations following redevelopment.

Risk Assessment in Support of a Record of Site Condition, 300 West Hunt Club Road, Ottawa, Ontario - Conducted a risk assessment in support of a Record of Site Condition for a large property formerly used as a fuel depot in Ottawa, Ontario. The site is contaminated with petroleum hydrocarbons from on-site activities as well as migration of free phase product from adjacent properties. Critical ecological exposure pathways included direct exposure for soil organisms and vapour inhalation for small burrowing mammals. The ERA supported the development of Property Specific Standards (PSS) allowing redevelopment of the property while ensuring protection for ecological receptors. September 2009.

Risk Assessment in Support of a Record of Site Condition, Woodbine Avenue and 14th Avenue, Markham, Ontario - On behalf of a major developer in Toronto, completed a risk assessment for a former quarry being redeveloped for mixed commercial/residential use. This large property had elevated concentrations of heavy metals, PHC, PAHs, and other parameters distributed at various depths in a heterogeneous manner owing to the placement of fill at the site. Property Specific Standards for human health and ecological exposure pathways were developed using a stratified approach under O. Reg. 153/04.

Risk Assessment in Support of a Record of Site Condition, 15 Lake Street, Grimsby, Ontario - Conducted a risk assessment for a Record of Site Condition at a proposed residential development in Grimsby, Ontario. The site was considered "sensitive" due to its location adjacent to Lake Ontario. Soils at the site were impacted by petroleum hydrocarbons and metals as a result of historic activities from a marina and drydock. Sediment and surface water adjacent to the site were potentially impacted by upstream loading. A modified version of the Domenico subsurface transport model implemented by Atlantic RBCA was employed to estimate concentrations of contaminants in surface water and demonstrate that off-site impacts were negligible.

Risk Assessment to Support a Record of Site Condition, 76-86 Dalhousie Street, Brantford, Ontario - Qualified Person for Risk Assessment (QP(RA)) in a human health and ecological risk assessment for a mixed used (commercial/residential) property. The risk assessment addressed polycyclic aromatic hydrocarbons and metals impacts related to soil and ground water at the Site. In addition, a risk management plan was prepared that was accepted by the Ontario Ministry of the Environment to mitigate unacceptable risks present at the Site.

Risk Assessment to Support a Record of Site Condition, 80 Willow Street, Paris, Ontario - Qualified Person for Risk Assessment (QP(RA)) in a human health and ecological risk assessment for the redevelopment of a property for residential use. The risk assessment addressed a sensitive site (MOE Table 1) due to its proximity to a surface water body.

Risk Assessment in Support of a Record of Site Condition – 140 West River Street, Paris, Ontario - Qualified Person for Risk Assessment (QP(RA)) in a human health and ecological risk assessment for the redevelopment of a property for residential use. The risk assessment addressed polycyclic aromatic hydrocarbons and metals impacts related to soil and ground water at the Site.

Risk Assessment in Support of a Record of Site Condition, 41 Oliver Street, Hamilton, Ontario - Conducted a risk assessment for a Record of Site Condition at a heavy industrial property in Hamilton, Ontario with elevated inorganic parameters in soil. The primary concern at the site was elevated soil conductivity and beryllium concentrations exceeding provincial standards. A toxicological review of effects in non-agricultural plant species was used to demonstrate that soil could remain on-site with low likelihood of adverse effects to biota.

Risk Assessment in Support of a Record of Site Condition, 76-86 Dalhousie Street, Brantford, Ontario - Conducted a risk assessment for a Record of Site Condition at a residential/commercial property in Brantford, Ontario impacted by metals in soil.

Risk Assessment to Support a Record of Site Condition, 210-240 Canarctic Drive, North York, Ontario - Conducted human health and ecological risk assessments in support of a Record of Site Condition for a light industrial/commercial property in North York, Ontario with VOC contamination of groundwater.

Risk Assessment in Support of a Record of Site Condition – Schneider Electric – Toronto, Ontario - Lead human health toxicologist in preparing a risk assessment for the property located at 19 Waterman Avenue in Toronto, Ontario. The risk assessment was carried out in accordance with the relevant provisions and mandatory requirements of Schedule C – Risk Assessment of Ontario Regulation 153/04 ('O.Reg 153/04'), Records of Site Condition ('RSC'), following submission of, and the subsequent receipt of comments relating to a Risk Assessment Pre-submission Form (Appendix A) prepared for the Site. The risk assessment addressed vapour intrusion as well as direct contact pathways associated with a number of volatile organic compounds found to be present in both on-site and off-site ground water and soil.

Risk Assessment in Support of a Record of Site Condition – CCL Industries – Concord, Ontario - Qualified Person for Risk Assessment (QP(RA)) in a human health and ecological risk assessment for an industrial/commercial property located in Concord, Ontario. The risk assessment is addressing potential vapour intrusion issues related to elevated levels of chlorinated solvents present in soil and groundwater potential impacting both on-site and off-site receptors.

Risk Assessment in Support of a Record of Site Condition – City of Cambridge – Cambridge, Ontario - Qualified Person for Risk Assessment (QP(RA)) in a human health and ecological risk assessment for an industrial/commercial property located in Cambridge, Ontario. The risk assessment is addressing development of this Brownfield site as a municipal parking lot and issues surrounding petroleum hydrocarbon and metals impacted throughout the site.

Risk Assessment for Albert Street Area, Haileybury, Ontario – Prepared for the Ontario Ministry of the Environment - Was retained by the Ontario Ministry of the Environment to conduct a risk assessment at a petroleum-impacted site in Ontario to direct the development of remedial/risk management options. Worked as the Qualified Person for Risk Assessment (QP(RA)) on the project and provided a risk assessment compliant with the conditions of O.Reg153/04. Developed a number of property-specific standards for petroleum hydrocarbons and related compounds based on multi-pathway exposure (including vapour intrusion) to several potential receptors at the site (e.g., construction workers, residents). The property-specific standards in conjunction with the developed conceptual site exposure model were used to identify options to mitigate risks, in addition to further examination of each of the available remedial/risk management options for their feasibility.

Development of Preliminary Property Specific Standards (PSS), Lakeshore and Cherry St., Toronto, ON. - Compiled environmental information pertaining to the Site in Toronto in order to summarize the pertinent historical information as well as information on the current soil and ground water conditions as they relate to the redevelopment potential for the Site. As the objective of the risk assessment was to provide a preliminary understanding of the extent to which soil and/or ground water conditions would exceed risk-based target levels, the assessment relied on standard models for assessing exposure incorporating existing data.

Regulatory Review of Site-Specific Risk Assessments

As an MOE Regulatory Toxicologist was responsible for regulatory review of site specific risk assessments and remediation criteria to ensure compliance with Ontario's Guidelines for use at contaminated sites in Ontario (MOEE, 1997). Thorough knowledge of the scientific and policy based decisions regarding O.Reg

153/04 as well as the upcoming revisions of the regulation that will be promulgated in Ontario, and Ministry's overall site-specific risk assessment approval process. Participating in many MOE workshops related to the development of the revisions to the regulation and provided feedback on my issues related to its development (feasibility, scientific defensibility).

For many years under an ongoing standing offer, regulatory reviews of Risk Assessment Pre-Submission Forms and Risk Assessments have been conducted on behalf of the MOE.

Human Health and Ecological Risk Assessment - Transport Canada – Port Colborne Lands.

The project objectives included development of an interim risk assessment in order to address the current risk of contaminated soils and/or groundwater to humans; completion of a SSRA to address the potential human and ecological health risks; development of remedial options for various land use scenarios and for habitat management concerning an ecologically sensitive area present on the properties.

Ontario Municipal Board Hearing - Canadian Tire Real Estate Limited, 4100 Garden Rd., Whitby, ON

Initially, was retained by Canadian Tire Real Estate Limited ('CTREL') to provide a "Letter of opinion" concerning the potential risks to human health and the environment for a portion of the Canadian Tire property (designated to be severed) located at the northwest corner of Taunton Road and Garden Street in Whitby, Ontario. As part of the Approvals process to obtain severance of the subject Site, the Region of Durham insisted that an RSC be filed for the entire property (Civic address was 4100 Garden Road) prior to approving the severance of the parcel. It was recommended that CTREL file for a hearing with the Ontario Municipal Board (OMB) objecting to the need to complete a Record of Site Condition to support a land severance application and approvals process. Based on our interpretation of the Regulations, we determined that no "land use" change was occurring at the subject site, despite a change in municipal zoning. Hence, it was outr position that an RSC was not required to be filed to satisfy Provincial statutes. Provided expert testimony regarding sections of the RSC Regulations, in addition to a conclusory evidence that no adverse effects would result following severance of the Site based on on-going commercial Land Use. A decision on the hearing has not yet been received by CTREL.

Human Health Risk Assessment – City of Port Colborne, Ontario, Canada.

Risk Assessment Specialist responsible for conducting a comprehensive assessment related to metal and PAH impacted soil in an area to be developed as a recreational centre. Employed Toxic Equivalency Factor (TEF) approach to the assessment of carcinogenic PAHs and derived a novel inhalation unit risk factor specific for nickel oxide present in the area, which was accepted by the regulators.

Risk Assessment for Birchwood Park – City of Mississauga – Mississauga, ON

Conducted a human health and ecological risk assessment of former landfill containing coal fly ash to assess the potential exposures and risks based on its current use as parkland. The risk assessment examined metals exposure for various receptors and integrated the results in the development of a comprehensive risk management plan involving long-term monitoring/maintenance and installation of a cap at the site.

Expert Review – Human Health Risk Assessment for Chlorinated Solvent Exposure – 186 University Park Drive – Regina, Saskatchewan

Previous investigations at the University Park Mall in Regina, Saskatchewan had identified significant concentrations of chlorinated solvents in the subsurface soils. The delineation of the extent of the impacts had determined that the contamination had migrated to areas outside of the building. Westfield Real Estate Investment Trust requested an evaluation of the potential health risks to workers and patrons of University Park Mall from possible exposures to the chlorinated solvents. Conducted the expert final review of the

report prior to submission to the client. The risk assessment examined potential inhalation exposure as a result of vapour intrusion based on elevated levels of chlorinated solvents present in ground water.

Preliminary Quantitative Risk Assessment (PQRA), Building 107, 9 Wing Gander, Newfoundland and Labrador – Defence Construction Canada (DCC)

Was the lead toxicologist in conducting a Human Health Preliminary Quantitative Risk Assessment (PQRA) and a Screening Level ecological risk assessment for Building 107, 9 Wing Gander, Newfoundland and Labrador. The PQRA was requested in conjunction with a data gap analysis and a detailed testing program in support of the development of a remediation/risk management strategy for the Site. The PQRA addressed potential risks to Department of Defence staff present at the Site through all relevant exposure pathways in association with identified impacts in both soil and ground water based on available historical and current Site data.

Detailed Quantitative Risk Assessment (PQRA), Grand Falls Armoury Property in Grand Falls, Newfoundland and Labrador – Defence Construction Canada (DCC)

Was the lead toxicologist in conducting a Human Health Detailed Quantitative Risk Assessment (DQRA) for the Grand Falls Armoury Property in Grand Falls, Newfoundland and Labrador (NL). Within the Site to be assessed two distinct properties were identified. The first was the Grand Falls Armoury, which is owned by DND and is located off Memorial Drive, on the western side of the Town of Grand Falls-Windsor, Newfoundland. This property was approximately 0.5 hectares in size and is primarily used for Army Reserve and cadet training. The second, is the Woodland Primary School, which is located on the adjoining property to the north of the Armoury. The PQRA was requested in conjunction with a data gap analysis and a detailed testing program in support of the development of a remediation/risk management strategy for the Site. The PQRA addresses potential risks to human receptors present at both properties through all relevant exposure pathways in association with identified impacts in both soil and ground water based on available historical and current Site data. Given the different land use at each of the properties, separate PQRAs were conducted for each of the properties to appropriate address any potential risks to human receptors. The PQRA was submitted to Health Canada for review, with only minimal comments received.

Detailed Quantitative Risk Assessment (PQRA), Risk Assessment for the Airside Operations and Maintenance Centre, Edmonton International Airport Leduc County, AB – Public Works Government Services Canada

Was the lead toxicologist in conducting a Human Health Detailed Quantitative Risk Assessment (DQRA) for the Airside Operations and Maintenance Centre, Edmonton International Airport Leduc County, AB. The DQRA was requested in conjunction with a data gap analysis and a detailed testing program in support of the development of a remediation/risk management strategy for the Site. The DQRA addressed potential risks to human receptors present at the site through all relevant exposure pathways in association with identified impacts in both soil and ground water based on available historical and current Site data. Indoor air and soil vapour data were used in the conduct of the risk assessment to refine the assumptions associated with inhalation exposures to workers at the Site. Risk management and remediation strategies were proposed based on the results of the risk assessment to mitigate risks to due the inhalation of benzene at the site.

Human Health Risk Assessment in Support of the Development of a Remediation / Risk Management Strategy – Site 230, Shearwater, Nova Scotia – Defence Construction Canada

The human health risk assessment was requested in conjunction with a detailed testing program in support of the development of a remediation/risk management strategy for the Site. The PQRA addressed potential risks to human receptors present at the Site due to historical activities at the Site that resulted in BTEX and petroleum hydrocarbon as well as TCE, PAHs and several metals. The risk assessment examined direct contact with soil and ground water as well as potential vapour intrusion due to the identification of several volatile and semi-volatile compounds as potential COCs.

Screening Level Risk Assessment – Former Chamberlain Avenue Landfill – City of Ottawa

The purpose of the SLRA was to identify and characterize any potential health risks associated with the footprint of the former landfill, including that portion, which is comprised of private residences located at 35 through 45 Glendale Avenue, which is not City owned. The SLRA addressed potential human health risks in association with subsurface soil containing elevated levels of several metals and polycyclic aromatic hydrocarbons. Human health risks associated with the consumption of backyard garden produce were examined following the completion of a conceptual site model, which was used to identify relevant exposure pathways and human receptors. Based on the use of the maximum detected concentrations from the Site, the risks to receptors were noted to be unacceptable in association with lead and the carcinogenic PAHs. In the case of mercury only the risks to residents were noted to exceed the MOE target. Based on the results of the SLRA communication material was produced for distribution to the affected residents.

Human Health Risk Assessment in Reference to California EPA's Safe Cosmetics Act and California Safe Drinking Water and Toxics Enforcement Act (Proposition 65) – Three Bond International

Worked on a team at ChemRisk evaluating the potential health risks associated with the compliance of specific ingredients in cosmetic products with the California Safe Cosmetics Act & California' Proposition 65 regulations. Provided an estimation of potential exposure to various receptors related to the use of the products and its ingredients in demonstrating the potential risks to users in support of its compliance.

Indoor Air Quality Assessment, 165 Miler Holdings c/o Humbold Properties – North York, ON

Designed and conducted an indoor air quality sampling program in support of refinancing of a commercial/industrial property. Potential vapour intrusion due to historical activities resulting in chlorinated VOCs impacts in soil and ground water. The study involved both thermal desorption and sorbent charcoal tubes for the collection of samples with comparison to available regulatory benchmarks. The assessment was externally reviewed by the financial institution and accepted in support of the client's application for refinancing.

Review of Available Information Concerning Estimated Daily Intakes (EDIs) for the Canadian Population - Health Canada, Environmental Health Assessment Services

Provided Health Canada with information concerning estimated daily intakes (EDIs) for environmental contaminants for the Canadian population. These values are essential in establishing risks to receptors in the conduct of human health risk assessments for contaminated sites across Canada.

Identification of Information and Probabilistic Assessment of Estimated Daily Intakes for the Canadian Population – Health Canada, Contaminated Sites Division

The objective was to review information pertinent for determining likely background exposures (Estimated Daily Intakes, EDI) of the Canadian population for several compounds. The results of the work were intended to provide information to Health Canada for updating EDI values for the development of new or updating of existing Soil Quality Guidelines (SQG) in conjunction with the Canadian Council of Ministers of the Environment (CCME). In addition to the identification of pertinent information and conducting an assessment of a deterministic estimate of the EDI for each compound, a probabilistic assessment was undertaken to determine the uncertainties and underlying distributions for each of the media.

Preparation of Background Summary Fact Sheets and Screening Level Risk Assessment of Priority Substances, Health Canada, Existing Substances Division, Ottawa, Ontario

A comprehensive search, review and compilation of toxicity and exposure data for priority substances on Canada's Domestic Substances List (DSL) was conducted for Health Canada. Contract required expert review and summary of authoritative studies outlining exposure and effects data for various chemical

compounds. The fact sheets were part of a pilot project to assist Health Canada's Healthy Environments and Consumer Safety Branch with the health risk assessment component of screening level risk assessments (SLRAs) for chemical agents that were in commerce in Canada between January 1984 and December 1986.

Indoor Air Quality Assessment - Former C.P.R. John Street Roundhouse, located at 255 Bremner Boulevard, Toronto, Ontario

Carried out indoor air testing within the interior areas of the on-site building to investigate the potential for vapour intrusion associated with any potential soil and ground water impacts beneath the Roundhouse building. The indoor air results from the sampling program were compared to the Ontario Ministry of Labour (MOL) Time Weighted Average Exposure Values (TWAEV) limits, as well as Ministry of the Environment (MOE) Ambient Air Quality Criteria (AAQC) and human health risk-based limits as recommended by the Canadian Council of Ministers of the Environment (CCME) with respect to petroleum hydrocarbon compounds (PHCs). The laboratory analyses were reviewed and interpreted with respect to their potential to result in adverse effects on human health.

Analysis Of Uncertainties in the Delineation of a Reference Exposure Level (REL) For Mercury Vapour- Health Canada, Environmental Health Assessment Services

Was contracted by Health Canada to critically and quantitatively evaluate those scientific data and issues that may contribute to the uncertainty in the establishment of a Reference Exposure Level (REL) for mercury vapour. As part of the project we examined in detail the methods and means of establishing appropriate uncertainty factors (UFs) in the REL derivation process, the inter-conversion between various dose measurement methods and the application of probabilistic methods to quantify uncertainties. The recommendations made will be used by Health Canada in recommending an exposure limit for mercury vapour at Federal contaminated sites located across Canada.

Revisions & Updates to Draft Manuscript - Pulmonary Bioavailability of Particle-Bound Contaminants: A Review – Health Canada

The project scope involved expanding, updating and completion of a draft manuscript related to in vitro lung fluid solubility tests as a surrogate for respiratory bioavailability of particle-bound contaminants. The manuscript evaluated the available data in this area and its potential impacts on environmental risk assessment as it pertained to exposure and uptake of contaminants via particulate inhalation. The review of the draft manuscript included an examination of all pertinent peer reviewed literature that was deemed to be critical for updating the draft manuscript to allow its submission and acceptance by a peer-reviewed journal.

Human Health Assessment of Lead due to a Baghouse Explosion, Confidential Client

Was requested to provide an assessment of the potential health effects associated with lead as a result of the upset conditions at a battery plant. As the main focus of the assessment, a review of the results of predictive air modelling for lead were examined (based on ICRP) during the upset conditions and assessed the potential for adverse effects on human health for potential receptors located at the maximum concentration of lead resulting off-site. The modeling of resulting blood lead levels in determining the potential risks to exposed individuals was conducted using a sophisticated biokinetic model to address the short-term exposure of receptors as a result of the upset conditions.

Indoor Air Quality Assessment, Fond du Lac, Saskatchewan - Health Canada

Provided support in the study design and expert review in the interpretation of the results of the indoor air sampling related to BTEX and petroleum impacted dwellings. Historical spills of fuel resulted in the potential for adverse impacts on indoor air quality. The indoor air study examined ambient air concentrations of a number of volatile compounds with the concentrations compared to available Health Canada TRVs. Based on the assessment recommendations were made with respect to the need for additional sampling and potential risk management strategies.

Expert Review – Chromium in Blood Evaluation due to a Chromic Acid Spill – Fredericton, NB

Provided expert review of a report prepared for the New Brunswick Medical Officer of Health regarding the interpretation of plasma and erythrocyte chromium levels in blood in association with a chromic acid spill nearby a residential community. The interpretation was based on summaries of data obtained following collection of blood samples from residents that live in proximity to a residential community that was potentially impacted by a chromic acid spill. Based on the statistical assessment and evaluation, and based on the information currently available and provided to us, no statistical difference in chromium levels was found in either the plasma or erythrocytes for residents that live in proximity to the spill Site when compared to a control population that lives outside of the spill area. The report indicated that residential exposure to chromium was no different than that found in the normal control population.

Expert Review – Human Health Risk Assessment for the Proposed Gahcho Kué Project – De Beers Canada Inc.

Conducted final expert review of the multimedia risk assessment examining potential impacts associated with a proposed mining project. Issues related to exposure to First Nations community were carefully examining given their potential for increased exposure with the consumption of wild game, fish and vegetation in the area. The report was submitted to Health Canada for regulatory approval.

Human Health Risk Assessment in Support of a Closure Plan - Victoria Junction Coal Preparation Plant, Nova Scotia.

A screening level human health risk assessment was conducted to support the closure of the former coal preparation facility. The Victoria Junction Coal Preparation Plant processed coal from the mid 1970's to the late 1990's. A human health risk assessment was undertaken for the closure plan to determine the need for additional remediation measures and/or site use limitations based on the need to address acid mine drainage, contaminated soil, groundwater and surface water. The risk assessment utilized information from a multi-disciplinary closure planning project team to provide suitable site-specific recommendations.

Town of Walkerton

Worked on a team conducting a multimedia risk assessment to identify the sources, pathways and risks in the town of Walkerton resulting from the contamination of drinking water. The results of the site-specific risk assessment were used in the completion of the O'Connor report (Walkerton Inquiry) in delineating the risks due to contamination of drinking water and have led to the development of the number of new initiatives within the Ontario Ministry of the Environment.

Development of Air Standards for the Ontario Ministry of the Environment (MOE)

Worked as the lead toxicologist both while a staff member of the MOE and as an external consult in providing toxicological expertise in the development of ambient air quality standards (AAQCs) for the MOE. Human health-based air quality standards for over 30 high priority air contaminants were completed, including benzene, benzo(a)pyrene, chromium, arsenic and the group of dioxins and furans.

Review and Summary of Approaches to Risk Assessment of Air Pollutants – Health Canada, Air Health Effects Division

Examined the available approaches to conducting risk assessment for air contaminants by identified and summarizing policies and procedures used by regulatory agencies worldwide. The report produced identified all agencies with guidance, summarized their approach and provided a critical analysis of the technical approach used (e.g., robustness of database required to conduct a risk assessment, data sources examined, application of risk assessment outcomes)

Expert Review – Health Canada Risk Assessment Guidance Documents – Defence Construction Canada

Conducted a review of the draft Health Canada documents entitled "Supplemental Guidance on Developing a Contract Statement of Work (SOW) for Human Health Preliminary Quantitative Risk Assessment (PQRA) and Site Specific Risk Assessment (SSRA)" and "Guidance on Using Soil Quality Guidelines from Sources other than CCME". Provided feedback based on experience concerning feasibility and scientific rigor of the proposed guidance from Health Canada on aspects related to the conduct of human health risk assessments.

Expert Review – Risk Assessment in Support of A Record of Site Condition – Lakeshore Drive and Bradford Street in Barrie

Provided expert review of a risk assessment in support of a Record of Site Condition for the proposed Blue Sails Development site located at Lakeshore Drive and Bradford Street in Barrie, Ontario. The Site contains an area within 30m of a water body requiring further assessment against the MOE Table 1 SCS and the filing of two RSCs. The assessment examined a number of metals and PHCs.

Indoor Air Quality Assessment – Rio Tinto – Toronto, ON

Designed and conducted an indoor air sampling program for a residential area potentially impacted with chlorinated VOCs. Vacuum canisters, passive sampling devices (3M OVM) and sorbent charcoal tubes were used for the collection of samples from a number of locations within potentially impacted homes. Performed the analysis of the results with comparison to acceptable regulatory benchmarks from the Ontario Ministry of the Environment in producing a letter report for each of the homes tested. Where required risk management measures were recommended to reduce the exposure to the residents.

Comprehensive Human Health Risk Assessment – Community in New Brunswick, Canada – Confidential Client

Risk Assessment Specialist responsible for conducting a comprehensive assessment related to potential human health impacts associated with soil contamination with metals due to historical industrial emissions with a community.

Indoor Air Quality Assessment – TDL – Various Sites in Ontario

Designed and conducted indoor air quality assessments for various sites across Ontario for TDL due to potential environmental liabilities based on known environmental conditions at the Site. Where it was identified that there may be a potential issue as a result of vapour intrusion, a sampling program was developed in consultation with TDL to evaluate the potential risks to both workers and customers at the site. Where the potential for unacceptable risks may be present a risk management plan was developed to mitigate exposure.

Human Health Risk Assessment – City of Halifax, Nova Scotia, Canada

Used Risk Based Corrective Action (RBCA) modelling in conducting a site- specific risk assessment in a residential community. Assessed the potential health risks due to chlorinated solvent contamination of groundwater and provided advice as to potential remediation strategies and risk mitigation.

Site-Specific Risk Assessment - McNaughton Road Alignment - York Major Holdings Inc., Vaughan, Ontario

Lead risk assessor in conducting a Site-Specific Risk Assessment (SSRA) related to a former landfill in Vaughan. The SSRA evaluated the potential human health and ecological impacts associated with the placement of contaminated materials present in soil at the Site within a roadway allowance. The SSRA determined feasibility and potential human health/ecological impacts of managing contaminated materials on site.

Peer Review – Risk Assessments – City of Toronto – Toronto, ON

Conducted expert review of incoming risk assessments on behalf of the City of Toronto. Reviews were conducted to ensure regulatory compliance as well as to ensure potential environmental liabilities to the City were mitigated and appropriately addressed.

Environmental Impact Assessment – Human Health Risk Assessment – Proposed Avon Energy Centre – Invenergy

Conducted a multi-media human health risk assessment to determine potential risks associated with a proposed natural gas powered generating station to be built in the City of Oakville. Results of the assessment were provided to stakeholders via public meetings. The assessment included an analysis of potential health outcomes using the Canadian Medical Association's ICAP for Ontario. The risk assessment was presented to the Ontario Ministry of the Environment as well as regional health units for review and discussion.

Environmental Assessment of Proposed Ethanol Production Facility – Human Health Risk Assessment – Suncor Energy Products Inc.

Conducted a human health risk assessment to examine the potential impacts associated with a proposed ethanol production plant to supply ethanol for blending in their gasoline products in the Township of St. Clair in southwestern Ontario. To assess the potential effects associated with exposure, a range of toxicity benchmark values for non-cancer effects and Inhalation Unit Risk (IUR) values for cancer effects were identified for each COC in order to address uncertainties in the available science pertaining to the assessment of the potential for adverse human health risks. These toxicity values (both cancer and non-cancer) were used to determine potential risks to exposed individuals in the surrounding area. Based on an examination of the potential receptors and the environmental fate of the identified COCs from the facility, the sole route of exposure was determined to be via inhalation from air. In determining the potential human health risks with exposure to the identified receptors, the maximum modelled air concentrations (using AERMOD) at the property line (Resident – property line) and at the location of the closest resident (Closest Resident) were compared to the toxicity benchmark values (non-cancer effects) and/or Inhalation Unit Risk (IUR) values (cancer effects) for each COC. The assessment was submitted and accepted by the Ontario Ministry of the Environment for regulatory approval of the project.

Expert Peer Review – Preliminary Quantitative Risk Assessment and Risk Management Plan, Former Landfill – Ottawa, ON – City of Ottawa

Provided an expert peer review of human health related issues within the preliminary quantitative risk assessment and risk management plan on behalf of the City of Ottawa. The purpose of the review was to identify any technical issues in the conduct of the risk assessment or the design of the risk management plan, which may have resulted in liabilities for the City. Based on the review, a plan to address the issues was formulated and recommendations made to ensure a scientifically sound approach to the risk assessment and associated risk management plan.

Indoor Air Quality Assessment – Goodwill Amity – Hamilton, ON

Designed and conducted an indoor air quality sampling program in support of refinancing of a property. Potential vapour intrusion due to historical activities resulting in chlorinated VOCs, BTEX and petroleum hydrocarbon impacts in ground water. The study involved both thermal desorption and sorbent charcoal tubes for the collection of samples with comparison to available regulatory benchmarks. The assessment was externally reviewed by the financial institution and accepted in support of the client's application for refinancing.

QRA Document Review, Soil Sampling and Remedial Action Plan Update Site 1107B Dockyard Annex, Dartmouth, NS - Maritime Forces Atlantic – Defence Construction Canada

Was the lead human health toxicologist retained by Defence Construction Canada (DCC), and the Department of National Defence (DND), to complete a review of the quantitative risk assessment (QRA) document, collect soil (fill) samples, and update the remedial action plan (RAP) for Site 1107B, located at the Dockyard Annex. The review noted issues with respect to the risk assessment outcome and the need for additional sampling and risk management considerations. Additional work was conducted to revise the risk assessment and previously proposed risk management measures.

Indoor Air Quality Assessment and Speciation of Particulate – Home Depot Canada – Toronto, ON

In conjunction with AirZone Inc., designed and conducted an indoor air sampling program to determine potential worker exposure and speciation of particulate related to some consumer products present in the store. Due to worker complaints the sampling program and speciation was conducted to determine if indoor air quality was being impacted by some identified consumer products. Review of associated symptoms of exposure from workers was examined in conjunction with the resulting concentrations of compounds found in indoor air and as a result of particulate matter to determine if it was the source of the reported adverse health effects. Based on the analysis of the available data, recommendations were made to Home Depot.

Confidential Client

Appeared as an expert witness in court and was responsible for providing expert opinion evidence and testimony to assist the trial Judge in determining an issue before the Court concerning pesticide exposure and adverse effects.

Confidential Client

Appeared as an expert witness in a case related to potential provincial environmental offences. Argued regulatory and toxicology based points on behalf of the client in defending against the charge related to formaldehyde exposure in a residential scenario via stack emissions and waste water discharge.

Confidential Client

Preparation of an emergency preparedness plan for a U.S. fertilizer manufacturer. Prepared air modelling simulations of accidental spill scenarios and assessed the potential for off-site impacts on human health and the surrounding ecosystem. Provided advice to the company in mitigating the potential human health risks associated with an accidental release.

5 Wing Goose Bay, Risk/Exposure Assessment related to Ingestion of Berries and Mushrooms

As the lead risk assessment, completed an exposure assessment and risk assessment of individuals consuming various native foods potentially impacted with metals due to historical activities at an adjacent military base. The assessment was conducted on behalf on Health Canada in support of public communication with the adjacent residents.

Revisions & Updates to Draft Manuscript - Pulmonary Bioavailability of Particle-Bound Contaminants: A Review – Health Canada

The project scope involved expanding, updating and completion of a draft manuscript related to in vitro lung fluid solubility tests as a surrogate for respiratory bioavailability of particle-bound contaminants. The manuscript evaluated the available data in this area and its potential impacts on environmental risk assessment as it pertained to exposure and uptake of contaminants via particulate inhalation. The review of the draft manuscript included an examination of all pertinent peer reviewed literature that was deemed to be critical for updating the draft manuscript to allow its submission and acceptance by a peer- reviewed journal.

Peer Review - enHealth Guidance Documents - Review of Environmental Health Risk Assessment - Guidelines for assessing human health risks from environmental hazards & Australian Exposure Factors Guidance

Provided a peer review of Australia's regulatory guidelines with respect to risk assessment, as well as their guidance on the use of specific exposure factors.

Peer Review - Review of HSLs for Petroleum Hydrocarbons in Soil and Groundwater: Part 1: Technical Development Document

Provided a peer review of Australia's petroleum hydrocarbon guidance on behalf of the Petroleum Programme of CRC CARE Pty Ltd. Was asked to provide a critical review of the risk assessment methodologies used in the development of the guidance document as it related to petroleum hydrocarbon compounds in the environment.

Peer Review - CCME Soil Quality Guidelines for PAHs

While a regulatory toxicologist at the Ontario Ministry of the Environment, conducted a peer review of the draft SQG for PAHs on behalf of the CCME.

Select Publications

Richardson, G.M., Brecher, R., **Scobie, H**., Hamblen, J., Philips, K., Samuelian, J. and Smith, C. 2009. Mercury Vapour (Hgo): Continuing Toxicological Uncertainties and Establishing a Canadian Reference Exposure Level. Regul Toxicol Pharmacol 53(1):32-8

Moridani, M.Y., Siraki, A., Chevaldina, T., **Scobie, H**. and O'Brien, P.J. 2004. Quantitative structure toxicity relationships for catechols in isolated rat hepatocytes. Chem Biol Inter 147: 297-307.

Moridani, M.Y., **Scobie, H**. and O'Brien, P.J. 2002. Metabolism of caffeic acid by isolated rat hepatocytes and subcellular fractions. Toxicol Lett 133:141-151.

Chan, T.S., Moridani, M., Siraki, A., **Scobie, H.,** Beard, K., Eghbal, M.A., Galati, G. and O'Brien, P.J. 2001. Hydrogen peroxide supports hepatocyte P450 catalysed xenobiotic/drug metabolic activation to form cytotoxic reactive intermediates. Adv Exp Med Biol 500:233-236.

Moridani, M.Y., **Scobie, H**., Jamshidzadeh, A., Salehi, P. and O'Brien, P.J. 2001. Caffeic acid, chlorogenic acid, and dihydrocaffeic acid metabolism: glutathione conjugate formation. Drug Metab Dispos 29:1432-1439.

Moridani, M.Y., **Scobie, H**., Salehi, P. and O'Brien, P.J. 2001. Catechin metabolism: glutathione conjugate formation catalyzed by tyrosinase, peroxidase, and cytochrome P450. Chem Res Toxicol 14:841-848.

Select Presentations

Cumulative Effects Assessment in Support of a C of A Application (Air). Presented at AWMA Ontario Meeting.

Introduction to the Threshold of Toxicological Concern: Presented to Health Canada Staff under contract with the Canadian Network of Toxicology Centres.

Air Abatement in Ontario: Effects of Air Pollution and the Development of Air Standards in Ontario. Training module presented to Environmental Officers, Ontario Ministry of the Environment.

Antimicrobial Residues in Food and Risks to Human Health: Application of the Risk Assessment Paradigm. Prepared for the First International Conference on Antimicrobial Agents in Veterinary Medicine, Helsinki, Finland.

Hydrogen peroxide supports hepatocyte P450 catalysed xenobiotic/drug metabolism to form cytotoxic reactive intermediates. Poster presented at the Biological Reactive Intermediates Sixth International Symposium, Paris, France.

Metabolism of dietary antioxidants: GSH conjugate formation by dietary plant phenolics. Poster presented at the Canadian Federation of Biological Societies Annual Meeting, Ottawa, Ontario.

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April 1, 2025

Township of Puslinch
C/O
HBC Real Estate 1 Inc.
[redacted]

Re: Site Alteration Permit – Schedule & Timing

To Whom this May Concern,

A&A Environmental Consultants Inc. (A&A) has been working toward completing and obtaining an application for a site alteration permit for the site located at 7504 McLean Road, Puslinch, Ontario. Site Alteration activities and hauling that confirms that no activities would occur:

1. Between the hours of 5:00 p.m. and 8:30 a.m. Monday to Friday;
2. Anytime on a Saturday, Sunday, or Statutory Holiday;
3. During any period in which a wind warning has been issued by Environment Canada;
4. During any weather conditions where the ability to mitigate Site Alteration activity impacts is severely compromised (e.g., heavy rain, etc.); and
5. During any situation where Site Alteration activities can unduly impact adjacent landowners (e.g., brush fires, floods, unsuitable road conditions, etc.);

SIGNED:

Dr. Ali A. Rasoul, Ph.D., P. Geo, Q.P.
Senior Consultant, A & A Environmental Consultants Inc.

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16 Young Street
Woodstock, Ontario N4S 3L4
Tel: 519-266-4680
Fax: 519-266-3666

April 1, 2025

Township of Puslinch
C/O
HBC Real Estate 1 Inc.
[redacted]

Re: Site Alteration Permit – Owner and Qualified Person Declaration

To Whom this May Concern,

A&A Environmental Consultants Inc. (A&A) has been working toward completing and obtaining an application for a site alteration permit for the site located at 7504 McLean Road, Puslinch, Ontario. The owner of the site, HBC Real Estate 1 Inc., and the Qualified Person (QP) declare and confirm that the QP will be person at the property and be responsible for all activities associated with the site alteration. The site alteration pertains to the importation of ill and removal of fill from the property.

SIGNED:

[redacted]

Dr. Ali A. Rasoul, Ph.D., P. Geo, Q.P.
Senior Consultant, A & A Environmental Consultants Inc.

Administration Centre: 400 Clyde Road, P.O. Box 729 Cambridge, ON N1R 5W6
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September 25, 2025
via email
GRCA File: Site Alteration Permit- 7504 McLean Road E

Olive Zhang
Township of Puslinch
7404 County Road 34
Puslinch, Ontario, N0B 2J0

Dear Olive Zhang,

Re: Site Alteration Permit Application
7504 McLean Road E, Puslinch
Gagandeep Dhinsa

Grand River Conservation Authority (GRCA) staff have reviewed the above-noted Site Alteration Permit Application to develop the property with a warehouse and transportation terminal.

Recommendation

Prior to recommending approval of the site alteration application, the GRCA requires clarification about the extent of the floodplain delineated on the property. Please see our detailed comments below.

Documents Reviewed by Staff

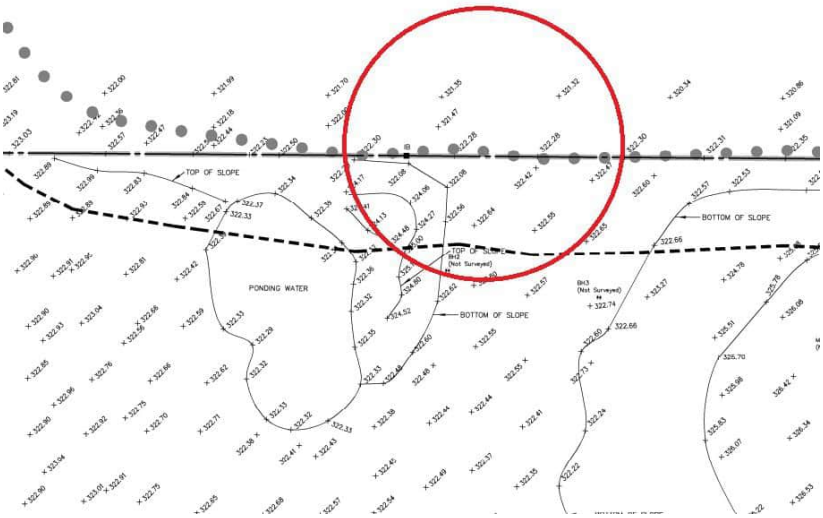
Staff have reviewed the following documents submitted with this application:

- Site Development Plan, prepared by MTE Engineers, Scientist, Surveyors, revised September 20, 2025;

GRCA Comments

GRCA staff have reviewed this application under the Mandatory Programs and Services Regulation (Ontario Regulation 686/21), including acting on behalf of the Province regarding natural hazards identified in Section 5.2 of the Provincial Planning Statement (PPS, 2024), as a regulatory authority under Ontario Regulation 41/24 and as a public body under the *Planning Act* as per our CA Board approved policies.

The Regulatory flood elevation (RFE) at this property is 322.3 m (CGVD28). We understand that that the floodplain and the GRCA regulated area are added on the site plan. However, based on our review of the survey, the floodplain still appears to extend onto the property in several locations. Some elevations along the west boundary of the property (e.g., 322.08 m) are below the regulatory floodplain line. Therefore, it is unclear whether the floodplain elevation has been accurately delineated on-site, and whether the proposed development activity is appropriately setback from the floodplain.



Drawing C1.1: Original Conditions Plan

Please provide clarification regarding the extent of the floodplain in the area shown above. Based on the current delineation, additional survey points may be required and should be shown on the plans. Please kindly review and revise as necessary.

Should you have any questions, please contact me at 519-621-2761 extension 2231 or iezorlu@grandriver.ca

Sincerely,

[redacted]

Ismet Esgin Zorlu
Resource Planner
Grand River Conservation Authority

Copy: Gagandeep Dhinsa, owner – (via email)

Dougan Ecology
3 - 7 Edinburgh Road South, Guelph, ON, N1H 5N8

September 25, 2025

Township of Puslinch
7404 Wellington Rd. 34
Puslinch, Ontario
N0B 2J0
Attn. Monika Farncombe

RE: 7504 McLean Rd. E. – 2nd Submission Ecology Comments

Dear Monika,

Dougan Ecology has completed a review of the 2nd submission Site Plan Application documents for 7504 McLean Rd E, including:

1. Scoped Environmental Impact Study (NRSI, May 2025)
2. Landscape Plan (MHBC, 29 July 2025)
3. Tree Preservation Plan (NRSI, 5 September 2025)
4. Comment Response Matrix (April 2025)

We offer the following comments, structured according to the Township's request.

1. Determination of Completeness

Complete.

2. Additional Requirements

n/a

3. Application Support - If the application can be deemed complete, then are you in support of the application?

Yes.

4. **If you support the application - What condition(s) of approval are required to be included in the site plan agreement?**

Enhancement/Restoration Plan for lands on the proponent's property following the direction provided in Section 7.6 of the scoped EIS, and as conceptualized on EIS Map 4.

5. **If you cannot support the application - why?**

n/a

6. **Are there any technical items required to support the application?**

All technical comments on the 1st submission have been adequately addressed in the applicant's comment response matrix and revised materials. For continuity purposes, comment responses are included in Appendix A.

Please do not hesitate to contact the undersigned with any questions on the above.

Regards,

[redacted]

Christina Olar, HBSc, Eco. Mgmt. Tech., ISA
Ecology Manager

[redacted]

Steven Hill, BEnvSc, MSc, PhD
Principal, Senior Ecologist

APPENDIX A. COMMENT RESPONSE MATRIX

Dougan Ecology 1st Submission Comment (May 12, 2025)	NRSI Response	Dougan Ecology Response (Sept. 26, 2025)
Section 5.3.4 states that the cultural meadow is not considered to be preferred habitat for butterflies due to its small size and poor quality. The Plant List contains Common Milkweed (Asclepias syriaca) which is the host plant for Monarch (Special Concern). It is recommended that enhancement seeding/plantings include Common Milkweed to mitigate potential impacts to this species.	Section 7.6 in the EIS report has been updated to include enhancement recommendations, including seeding with a native species mix including Common Milkweed in the cultural meadow ecosites.	Addressed.
Section 6.0 notes that the subject property contains loose gravel/sand fill. This substrate, coupled with the proximity to wetland habitat and sun exposure should be considered suitable for turtle nesting in the absence of formal field studies. Possible SWH for turtle nesting should be considered. It is acknowledged that section 7.4.2 recommends sediment barrier fencing that will	NRSI maintains that the subject property should not be considered a candidate SWH for turtle nesting, but can increase to Possible within the Subject Property to match the Study Area. No evidence of turtle nesting has been observed at the site and similar to the exclusion of road shoulders or embankments, man-made parking areas are not suitable to be significant wildlife habitat areas. It is possible that the occasional turtle may try to nest in the area, therefore mitigation has been provided.	Addressed.

Dougan Ecology 1st Submission Comment (May 12, 2025)	NRSI Response	Dougan Ecology Response (Sept. 26, 2025)
also function to prevent turtles and other wildlife from the work area during construction. The location of this fencing should be shown on a figure. The report should clarify that fencing should be in place prior to pre-grading. It is further recommended that a SAR (Species at Risk) encounter protocol be developed for on-site workers in the event that SAR are encountered within the work area.	Map 3 shows locations of sediment/turtle exclusion fencing as provided by MTE's ESC plan. Section 7.4.3 of the EIS report updated to specify that sediment fencing should be established prior to grading activities. NRSI provides a SAR/SCC (Wildlife) encounter protocol for any herpetological SAR/SCC encounters that occur on site in an appendix included in the updated EIS.	
Section 7.3.1 specifies that tree protective fencing and sediment barriers should be installed at the limit of development. Further, the report notes "the development will require the removal of the cultural meadow vegetation and individual trees across the subject property. Hedgerow trees along the east and south boundaries of the subject property will be protected by avoiding and minimizing grading and asphalt within the dripline and providing a 1m buffer	Site assessment by NRSI arborist only identified one tree adjacent to but outside of the subject property at potential risk. NRSI prepared a brief TPP.	Addressed. The TPP is acceptable.

Dougan Ecology 1st Submission Comment (May 12, 2025)	NRSI Response	Dougan Ecology Response (Sept. 26, 2025)
where possible." A Tree Preservation Plan should be prepared		
Section 7.4.1 – Please show the recommended Erosion & Sediment Control/Wildlife Exclusion Fencing on an EIS figure.	NRSI provides sediment and exclusion fencing locations as a layer within Map 3 of the EIS report.	Addressed.
Section 7.6 – the proposed enhancements are supported. Please show the conceptual enhancement area(s) on a figure. It is also recommended to include a pollinator friendly seed mix (including *Asclepias syriaca* – Monarch host plant, which was documented in the Cultural Meadow proposed to be impacted).	NRSI includes a conceptual enhancement plantings area in an attached map (Map 4), and includes Common Milkweed within a list of species to be included in a native seed mix for the cultural meadow ecosite. Section 7.6 in the EIS report updated to include enhancement recommendations.	Addressed. Enhancement/Restoration Plan required for lands on the proponent's property following the direction provided in Section 7.6 of the scoped EIS, and as conceptualized on EIS Map 4.
Section 8.0 - a summary of enhancement recommendations should be included in addition to the mitigation measures.	NRSI updated Section 8 to include details for the proposed enhancement plantings.	Addressed.
Significant Wildlife Habitat Screening Table Appendix: Woodland Area-Sensitive Bird Breeding Habitat: The Assessment Details note that there is no interior habitat within the subject	NRSI updated Significant Wildlife Screening Table Appendix to include Woodland Area- Sensitive Bird Breeding Habitat	Addressed.

Dougan Ecology 1st Submission Comment (May 12, 2025)	NRSI Response	Dougan Ecology Response (Sept. 26, 2025)
property or subject area. Based on our review of aerial imagery and LIO mapping, the adjacent natural feature appears to be much larger than 30 ha of contiguous habitat, and certainly contains interior forest habitat measured at least 200m from the forest edge. Please revise.		
Appendix IV Reptiles and Amphibians Species List: Jefferson Salamander (Endangered) is included in the background species records summary table. Given that targeted surveys were not undertaken and suitable habitat presence within the adjacent lands, the EIS should include a discussion of how potential impacts to this species will be avoided and mitigated	Jefferson Salamander requires fishless wetlands or vernal pools for breeding and deciduous or mixed forest for overwintering and foraging. They will travel through a variety of habitats to reach breeding or overwintering areas. The wooded natural area adjacent to the subject property may provide suitable habitat for this species. Movement through the subject property is unlikely given the nature of the site (open, exposed, etc.) and would likely be limited to nighttime hours during warm, rainy nights in March-April and September-October. Sediment and erosion control fencing encircling the work area is considered sufficient mitigation to prohibit salamanders from	Addressed.

Dougan Ecology 1st Submission Comment (May 12, 2025)	NRSI Response	Dougan Ecology Response (Sept. 26, 2025)
	entering the work area. NRSI included Jefferson's Salamander within the Species at Risk (SAR) Encounter Protocol and provided avoidance and mitigation recommendations in the event that the species is observed within the work area or adjacent lands.	
Map 2 displays a 10 m buffer from the feature boundary. Please revise to show the greater of either the PSW (30 m buffer) or woodland buffer (10 m). There appear to be some areas where the PSW is very close to the woodland edge, and therefore has not been afforded an adequate buffer. Further, section 6.0 should include a brief rationale on the proposed buffer widths shown on Map 2 in the context of the ecological sensitivities present in the adjacent natural area.	NRSI updated Map 2 to include a revised natural feature buffer that amalgamates the 10m woodland and 30m PSW buffer to show the greatest buffer extent along the natural feature. Section 6.0 of the EIS reported updated to provide rational for the revised buffer.	Addressed.
LP01/LP02 - There are a number of non-native / native cultivar species proposed. Given the proximity of the site to a high-quality natural area, it is recommended that	Where applicable, non-native cultivars have been replaced with equivalent native counterparts.	Addressed.

Dougan Ecology 1st Submission Comment (May 12, 2025)	NRSI Response	Dougan Ecology Response (Sept. 26, 2025)
the species list is revised to replace non-native/cultivars with suitable native species to maintain and enhance biodiversity. Suggestions for native replacement species are included in Table 1		