



re: Groundwater Monitoring Program
Proposed Commercial Development
301 Somme Street – Ottawa

to: W.O Stinson & Son LTD. – **Scott Stinson** – sstinson@wostinson.com

date: July 15, 2026

file: PH5075-MEMO.02

Further to your request and authorization, Paterson Group (Paterson) conducted a Groundwater Monitoring Program in support of the proposed commercial development at the aforementioned site.

1.0 Background Information

A geotechnical field investigation was carried out on June 2nd and 3rd, 2025. At that time, a total of four (4) boreholes were advanced to a maximum depth of 14.3 m below existing grade. Three (3) boreholes completed during the above noted investigation (BH1-25, BH3B-25, and BH4-25) were instrumented with a monitoring well for the purpose of carrying out a groundwater monitoring program. The boreholes and monitoring well installations were distributed in a manner to provide general coverage of the study area, taking into consideration existing site features.

Field Survey

The borehole locations and ground surface elevations at each borehole location were surveyed by Paterson using a high precision, handheld GPS and referenced to a geodetic datum. The location and ground surface elevation at each borehole location is presented on Drawing PG7567-1 - Test Hole Location Plan, attached to the current memorandum.

Subsurface Profile

The subsurface profile at the borehole locations generally consisted of fill material, consisting of silty sand and/or silty clay with varying amounts of organics, gravel, asphalt, concrete, gravel, cobbles, boulders and bedrock fragments, followed by glacial till. The glacial till layer consisted of various amounts of sand, silt or clay with gravel, cobbles and boulders.

Details of the subsurface profile can be found in the Soil Profile and Test Data Sheets attached to the current report.



Monitoring Well Installation

Typical monitoring well construction details are described below:

- ☐ 1.5 m of slotted 51 mm diameter PVC screen at the base of the aforementioned boreholes.
- ☐ 51 mm diameter PVC riser pipe from the top of the screen to ground surface.
- ☐ No.3 silica sand backfill within annular space around screen.
- ☐ Bentonite hole plug placed directly above PVC slotted screen extending to the existing ground surface.
- ☐ The 51 mm diameter PVC riser was covered with a protective steel flush mount well casing at ground surface.

Specific details of the installation of each monitoring well are further included in the Soil Profile and Test Data Sheets attached to the current report.

2.0 Groundwater Monitoring Program

The monitoring wells installed at BH1-25, BH3B-25, and BH4-25 were equipped with a Van Essen Instrument Mini-Diver Water Level Logger on June 5, 2025, to accurately monitor fluctuations in the groundwater levels. In addition, a Van Essen Instruments Baro-Diver was installed in BH1-25 to monitor changes in atmospheric pressure. The Mini-Divers were programmed to continuously measure and record groundwater levels throughout the subject site at a rate of 1 reading every 24 hours for a period of approximately 12 months.

The results of the groundwater fluctuations and correlated precipitation events for each monitoring well location between June 6, 2025 and June 8, 2026, have been summarized in Figure 1 through Figure 3 attached to the current report.

3.0 Groundwater Monitoring Results

The data presented in Figure 1 through Figure 3 illustrate the collected groundwater elevations between June 6, 2025 and June 8, 2026. The groundwater readings measured within the monitoring wells across the subject site varied from a minimum elevation of 86.83 m asl to a maximum elevation of 89.11 m asl. The low and high groundwater elevation measurements at each monitoring well location is summarized in Table 1 below.



Based on our analysis of the data logger groundwater readings, seasonal groundwater fluctuations can be observed at each monitoring well location with a difference in elevation between the low and high readings ranging from 1.03 to 1.49 m. The low groundwater level across the site was noted at an average elevation of 87.33 m asl throughout the monitoring period. The high groundwater table across the site during this monitoring period was found to be at an average elevation of 87.97 m asl.

Table 1: Groundwater Monitoring Summary				
Monitoring Well ID	Ground Surface Elevation (m asl)	Low Groundwater Elevation (m asl)	High Groundwater Elevation (m asl)	Difference in Groundwater Elevation (m asl)
BH1-25	91.31	87.51	89.00	1.49
BH3B-25	90.80	87.66	89.11	1.45
BH4-25	92.18	86.83	85.80	1.03

We trust that this information satisfies your requirements.

Best Regards,

Paterson Group Inc.

Erik Ardley, P.Geo

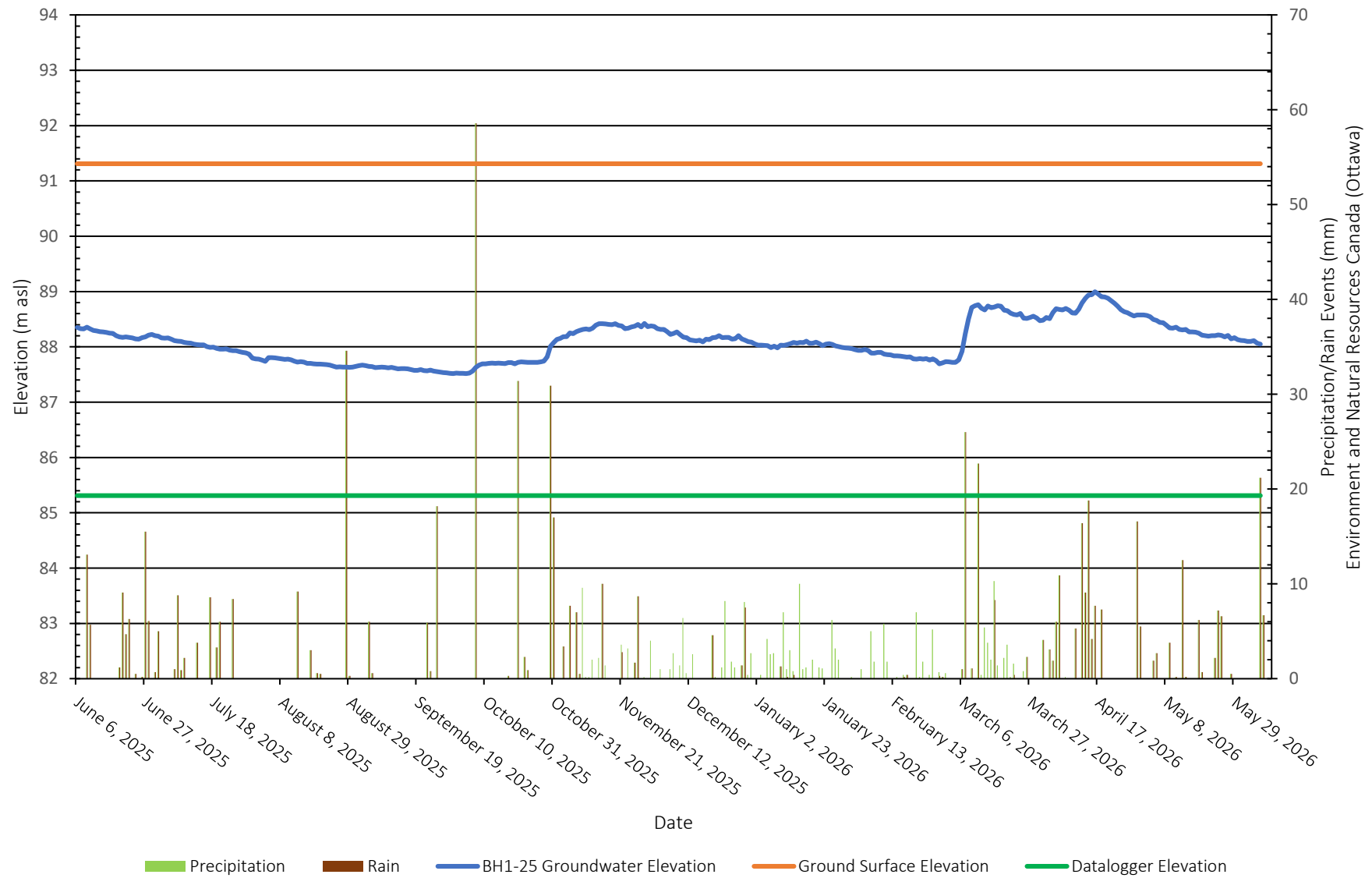


Attachments

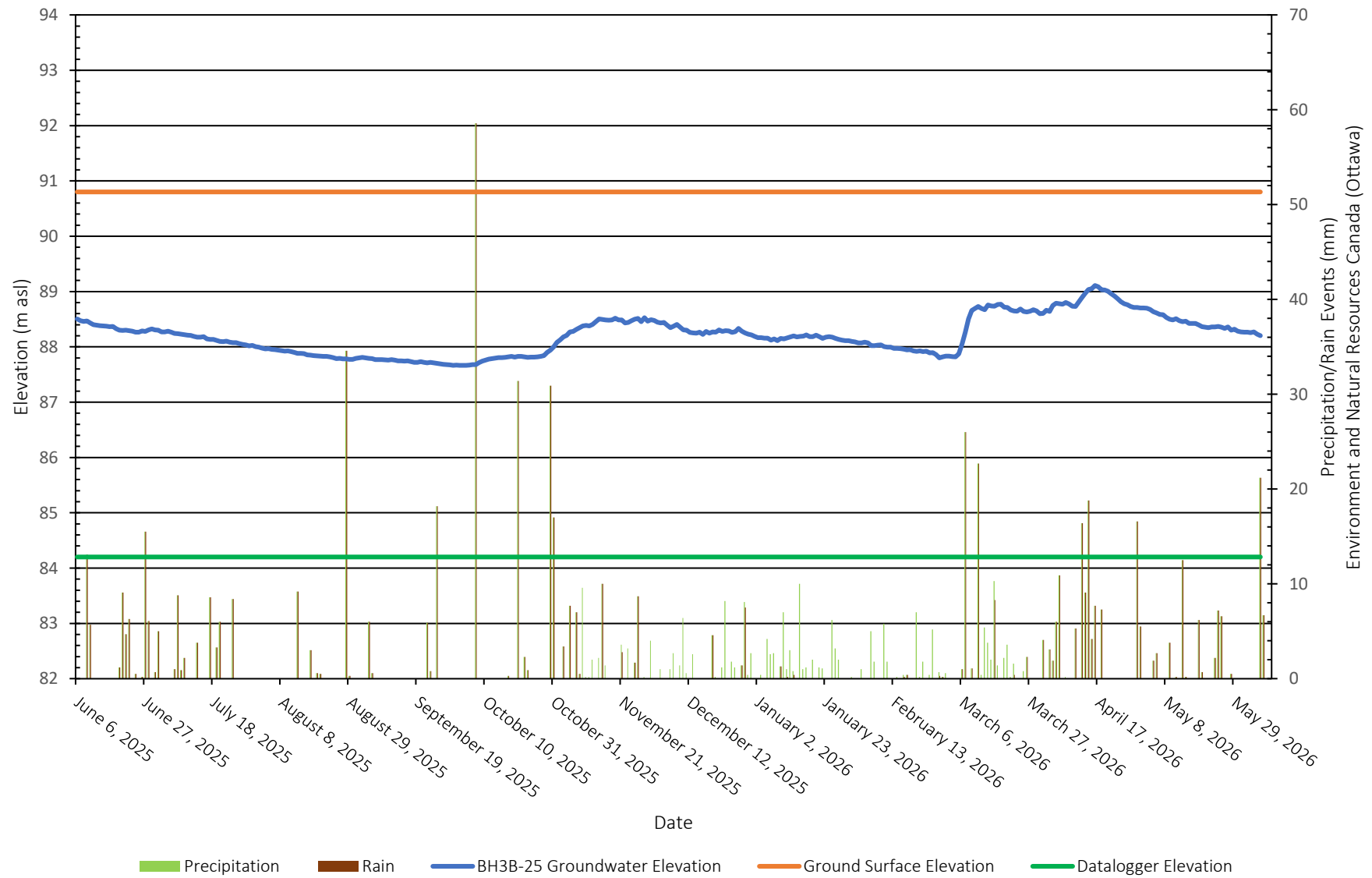
- ☐ Figure 1 to Figure 3 – Groundwater Monitoring Levels
- ☐ Soil Profile and Test Data Sheets
- ☐ Drawing PG7567-1 – Test Hole Location Plan



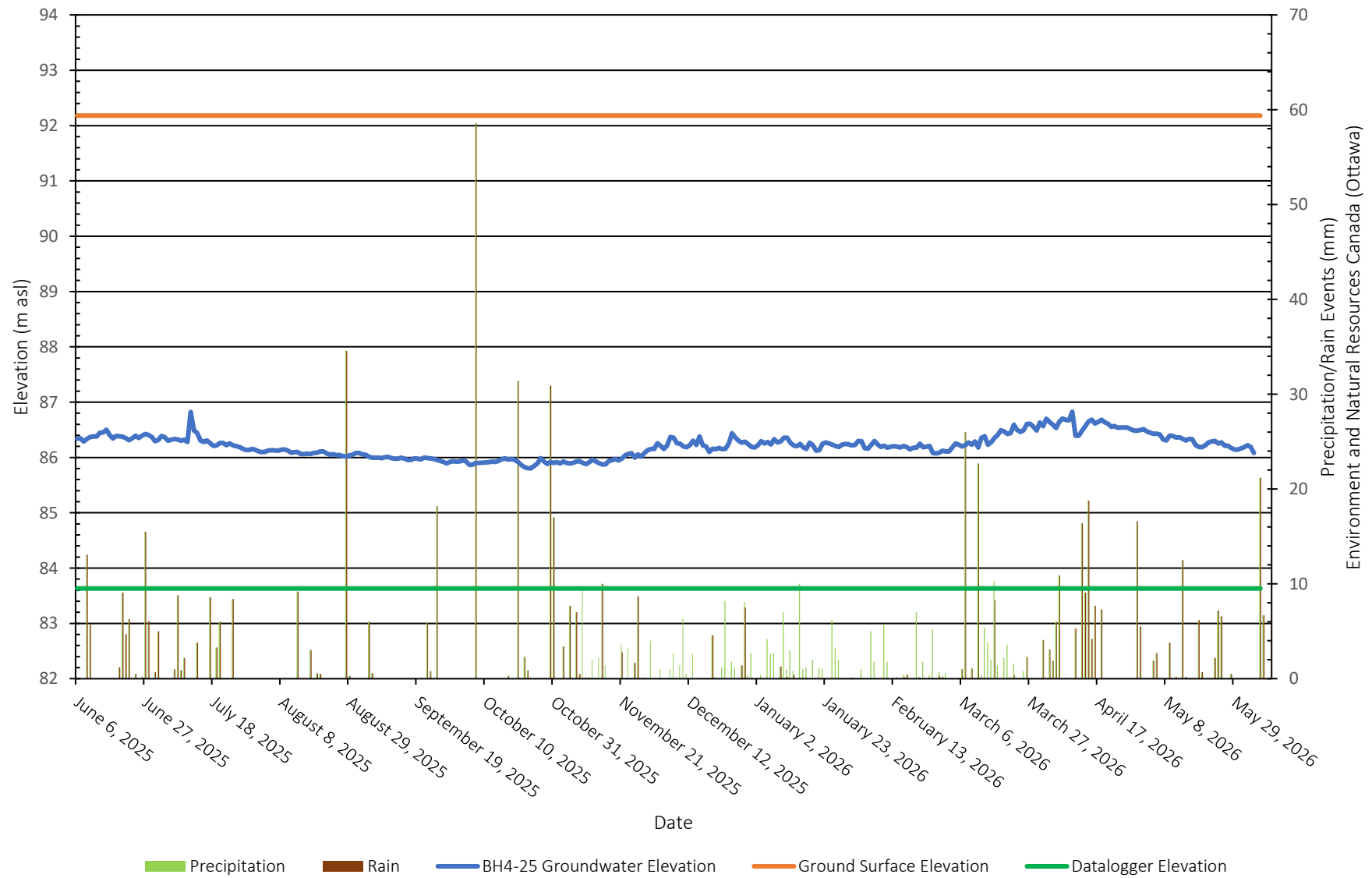
BH1-25 - Monitoring Well Water Elevations



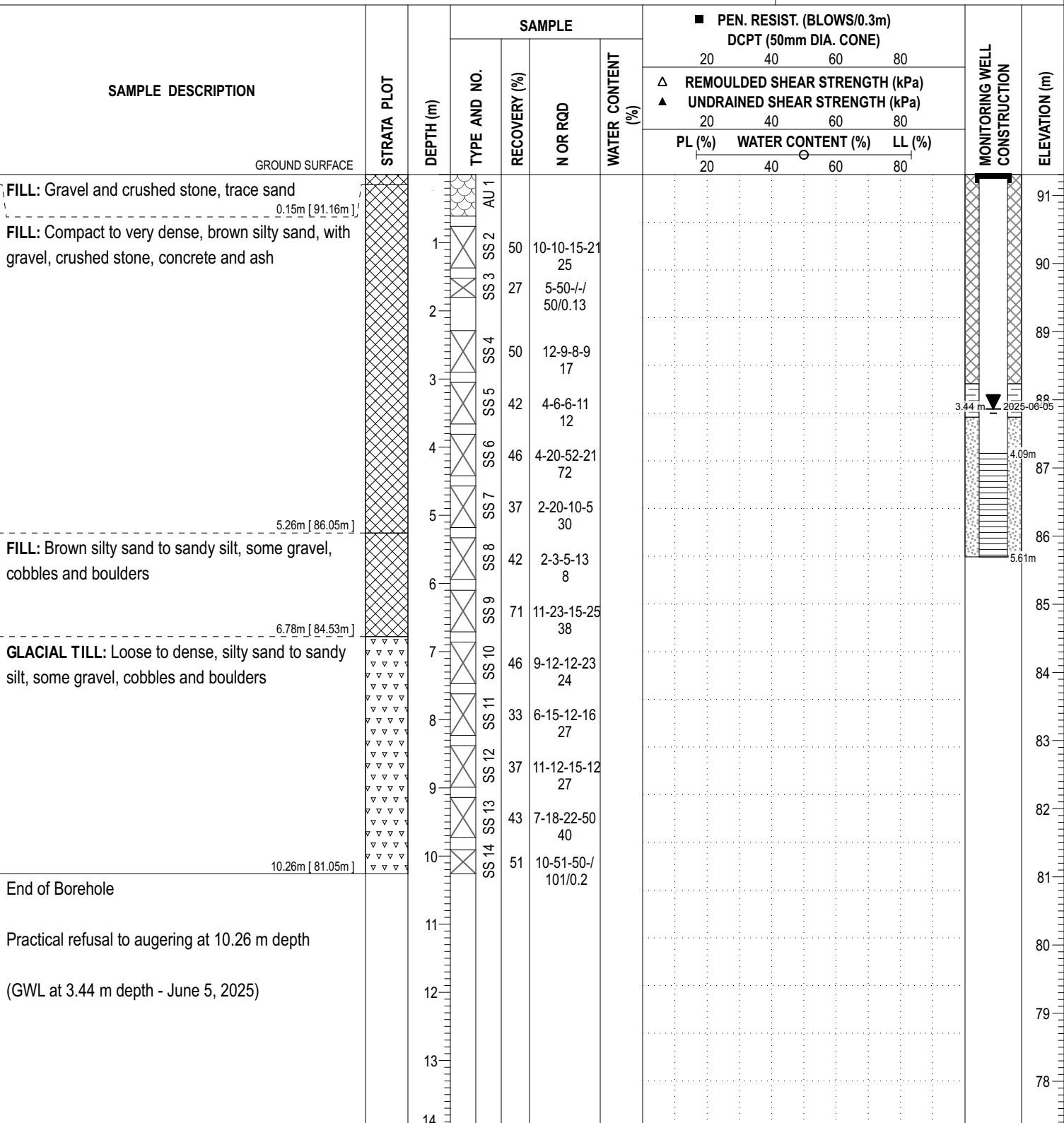
BH3B-25 - Monitoring Well Water Elevations



BH4-25 - Monitoring Well Water Elevations

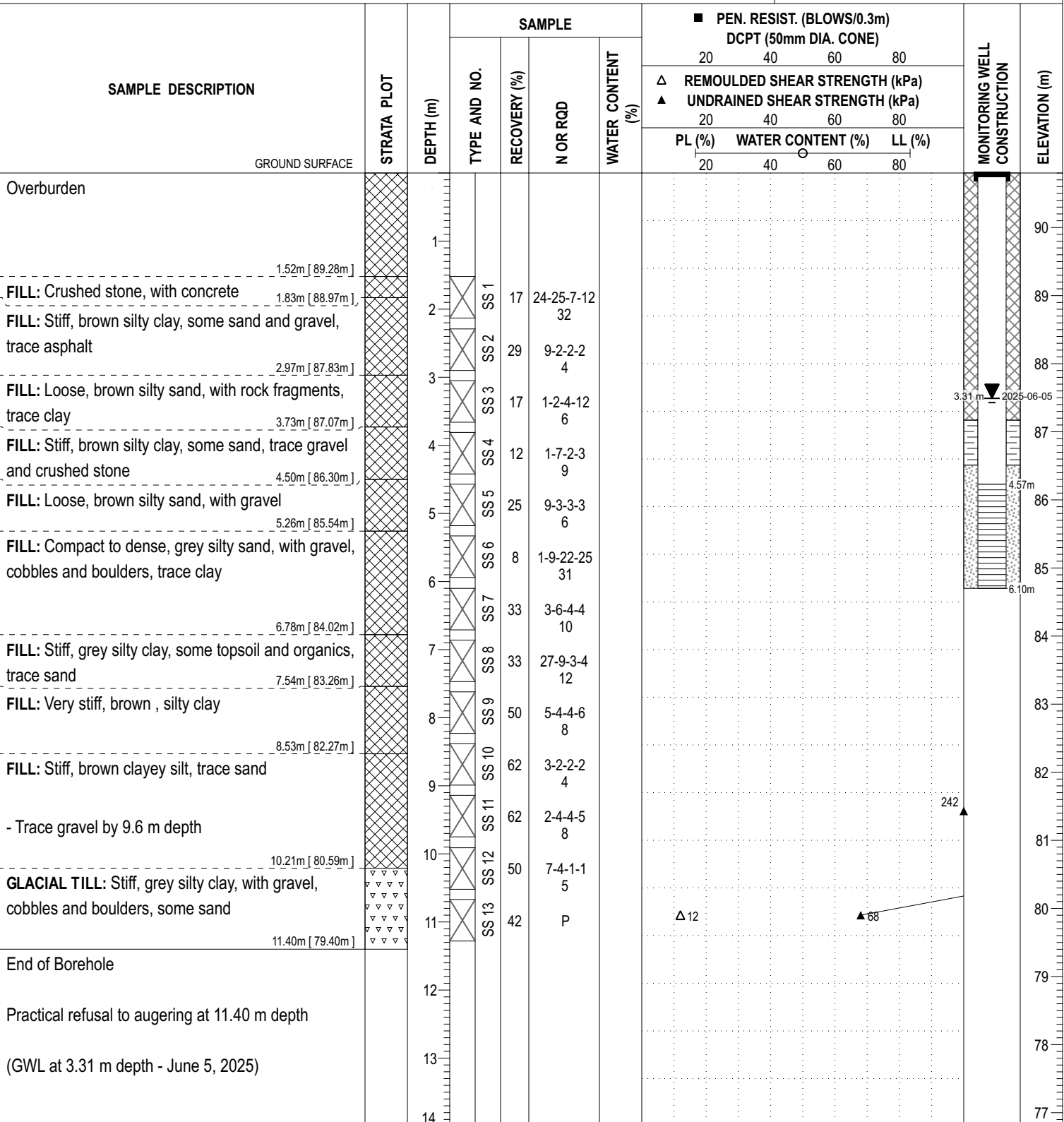


COORD. SYS.: MTM ZONE 9	EASTING: 379013.78	NORTHING: 5019022.56	ELEVATION: 91.31
PROJECT: Proposed Commercial Development			FILE NO. : PG7567
ADVANCED BY: CME-55 Low Clearance Drill			HOLE NO. : BH 1-25
REMARKS:			
DATE: June 2, 2025			



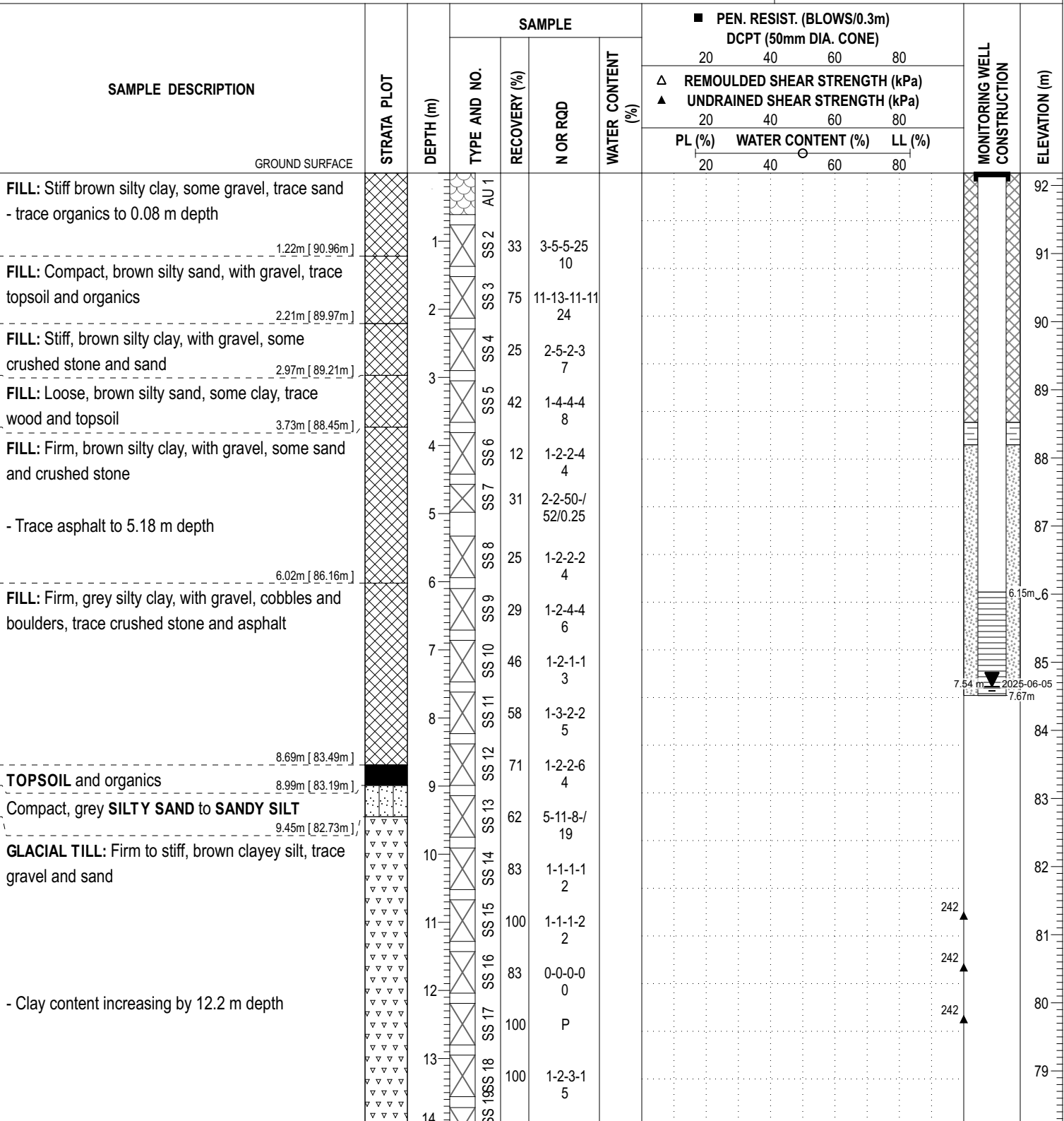
DISCLAIMER: THE DATA PRESENTED IN THIS SHEET IS THE PROPERTY OF PATERSON GROUP AND THE CLIENT FOR WHOM IT WAS PRODUCED. THIS SHEET SHOULD BE READ IN CONJUNCTION WITH ITS CORRESPONDING REPORT. PATERSON GROUP IS NOT RESPONSIBLE FOR THE UNAUTHORIZED USE OF THIS DATA.

COORD. SYS.: MTM ZONE 9	EASTING: 379087.71	NORTHING: 5019059.84	ELEVATION: 90.80
PROJECT: Proposed Commercial Development			FILE NO. : PG7567
ADVANCED BY: CME-55 Low Clearance Drill			HOLE NO. : BH 3B-25
REMARKS:			
DATE: June 2, 2025			



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COORD. SYS.: MTM ZONE 9	EASTING: 379135.75	NORTHING: 5019162.49	ELEVATION: 92.18
PROJECT: Proposed Commercial Development			FILE NO. : PG7567
ADVANCED BY: CME-55 Low Clearance Drill			HOLE NO. : BH 4-25
REMARKS:			DATE: June 3, 2025



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COORD. SYS.: MTM ZONE 9	EASTING: 379135.75	NORTHING: 5019162.49	ELEVATION: 92.18
PROJECT: Proposed Commercial Development			FILE NO. : PG7567
ADVANCED BY: CME-55 Low Clearance Drill			HOLE NO. : BH 4-25
REMARKS:			
DATE: June 3, 2025			

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE				PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE)			MONITORING WELL CONSTRUCTION	ELEVATION (m)
			TYPE AND NO.	RECOVERY (%)	N OR RQD	WATER CONTENT (%)	20 40 60 80				
							△ REMOULDED SHEAR STRENGTH (kPa) ▲ UNDRAINED SHEAR STRENGTH (kPa)				
							PL (%) WATER CONTENT (%) LL (%) 20 40 60 80				
14.33m [77.85m] Dynamic cone penetration test commenced at 14.33 m depth		14	△ SS 19	83	1-2-4-4 6						78
15.42m [76.76m] End of Borehole		15					■ 11			■ 100	77
Practical refusal to DCPT at 15.42 m depth		16									76
DCPT Pushed from 14.33 m to 15.01 m depth		17									75
(GWL at 7.54 m depth - June 5, 2025)		18									74
		19									73
		20									72
		21									71
		22									70
		23									69
		24									68
		25									67
		26									66
		27									65
		28									

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SYMBOLS AND TERMS

SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the relative strength of cohesionless soils is the compactness condition, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm. An SPT N value of "P" denotes that the split-spoon sampler was pushed 300 mm into the soil without the use of a falling hammer.

Compactness Condition	'N' Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory shear vane tests, unconfined compression tests, or occasionally by the Standard Penetration Test (SPT). Note that the typical correlations of undrained shear strength to SPT N value (tabulated below) tend to underestimate the consistency for sensitive silty clays, so Paterson reviews the applicable split spoon samples in the laboratory to provide a more representative consistency value based on tactile examination.

Consistency	Undrained Shear Strength (kPa)	'N' Value
Very Soft	<12	<2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their “sensitivity”. The sensitivity, S_t , is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil. The classes of sensitivity may be defined as follows:

Low Sensitivity:	$S_t < 2$
Medium Sensitivity:	$2 < S_t < 4$
Sensitive:	$4 < S_t < 8$
Extra Sensitive:	$8 < S_t < 16$
Quick Clay:	$S_t > 16$

ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NQ or larger size core. However, it can be used on smaller core sizes, such as BQ, if the bulk of the fractures caused by drilling stresses (called “mechanical breaks”) are easily distinguishable from the normal in situ fractures.

RQD %	ROCK QUALITY
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube, generally recovered using a piston sampler
G	-	"Grab" sample from test pit or surface materials
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size BQ, NQ, HQ, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

PLASTICITY LIMITS AND GRAIN SIZE DISTRIBUTION

WC%	-	Natural water content or water content of sample, %
LL	-	Liquid Limit, % (water content above which soil behaves as a liquid)
PL	-	Plastic Limit, % (water content above which soil behaves plastically)
PI	-	Plasticity Index, % (difference between LL and PL)
Dxx	-	Grain size at which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D10	-	Grain size at which 10% of the soil is finer (effective grain size)
D60	-	Grain size at which 60% of the soil is finer
Cc	-	Concavity coefficient = $(D_{30})^2 / (D_{10} \times D_{60})$
Cu	-	Uniformity coefficient = D_{60} / D_{10}

Cc and Cu are used to assess the grading of sands and gravels:

Well-graded gravels have: $1 < Cc < 3$ and $Cu > 4$

Well-graded sands have: $1 < Cc < 3$ and $Cu > 6$

Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.

Cc and Cu are not applicable for the description of soils with more than 10% silt and clay
(more than 10% finer than 0.075 mm or the #200 sieve)

CONSOLIDATION TEST

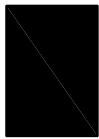
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidation ratio = p'_c / p'_o
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
Wo	-	Initial water content (at start of consolidation test)

PERMEABILITY TEST

k	-	Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.
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SYMBOLS AND TERMS (continued)

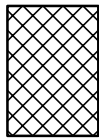
STRATA PLOT



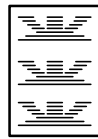
Topsoil



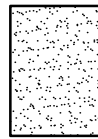
Asphalt



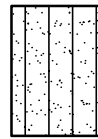
Fill



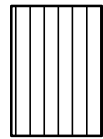
Peat



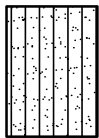
Sand



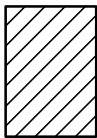
Silty Sand



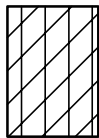
Silt



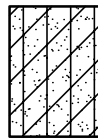
Sandy Silt



Clay



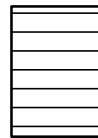
Silty Clay



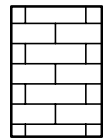
Clayey Silty Sand



Glacial Till



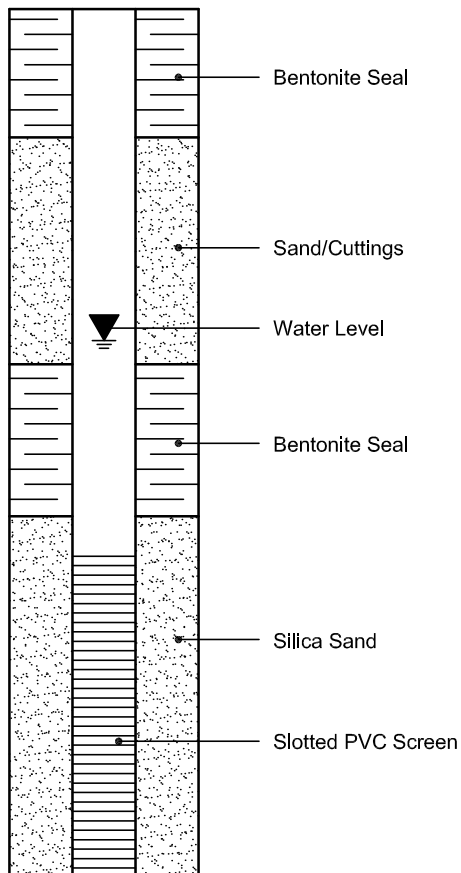
Shale



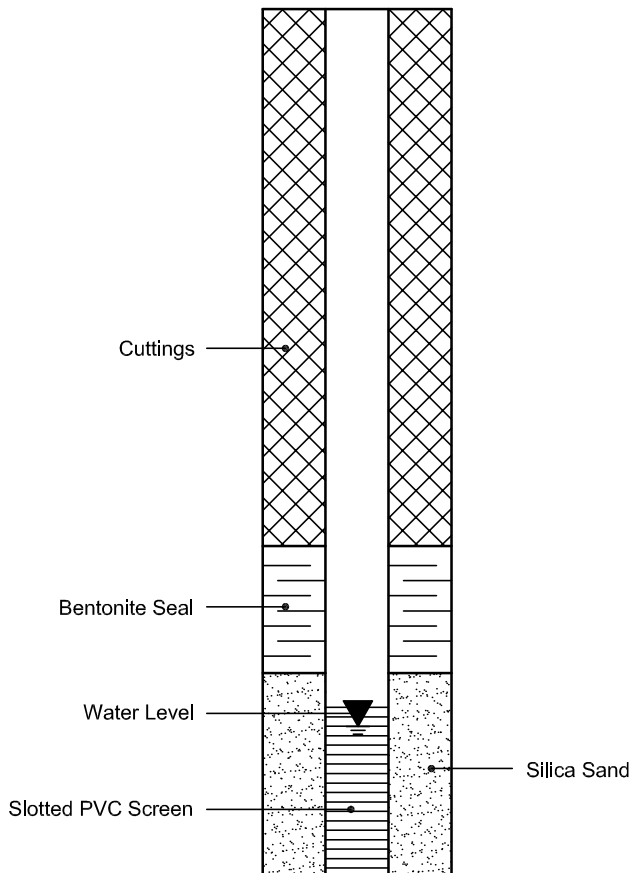
Bedrock

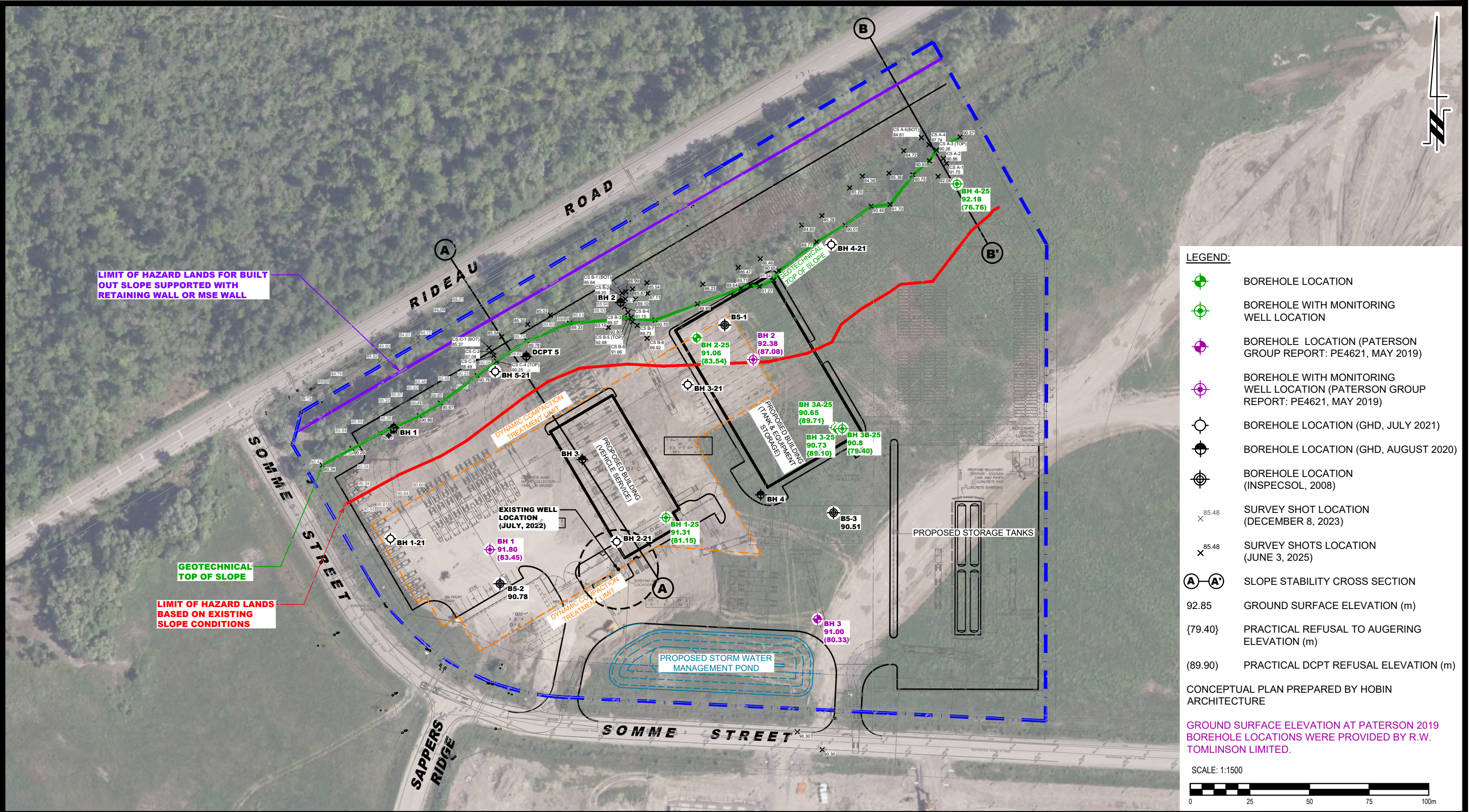
MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION







9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

1	UPDATED TO NEW CONCEPTUAL PLAN	14/08/2025	SD
NO.	REVISIONS	DD/MM/YYYY	INITIAL

OTTAWA,
Title:

W.O. STINSON & SON LTD.
GEOTECHNICAL INVESTIGATION
PROPOSED COMMERCIAL DEVELOPMENT
301 SOMME STREET
ONTARIO

TEST HOLE LOCATION PLAN

Scale:	1:1500	Date:	07/2025
Drawn by:	ZS	Report No.:	PG7567-1
Checked by:	PB	Dwg. No.:	PG7567-1
Approved by:	SD	Revision No.:	1