

Hydrogeological Investigation [FINAL]

8995 Boston Church Road, Milton, Ontario

Prepared for:



KING CONSULTANTS INC.

PNJ Project No:

25-1242-01



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1. INTRODUCTION

PNJ Engineering Inc. (PNJ) was retained by King Consultants Inc. (the Client) to complete a hydrogeological study to support the proposed development located at municipal address 8995 Boston Church Road, Milton, Ontario (the 'Project Area or 'Site').

The Site Plan drawings are included as **Appendix B**.

1.1 Site and Project Description

The Site is located on the east side of the intersection of Boston Church Road and 5 Side Road in Milton, Ontario. The Site is currently undeveloped and used for agricultural purposes.

The proposed development includes a proposed warehouse/storage development, which involves the following specifics:

- Three (3) industrial buildings:
 - Building A, consisting of six (6) units and a building footprint of 8,695.72 m²
 - Building B, consisting of six (6) units and a building footprint of 8,695.72 m²
 - Building C, consisting of seven (7) units and a building footprint of 23,454.54 m²
- Asphalt driveway surrounding the warehouse buildings and a total of 81 loading docks
- 450 surface parking spaces

The proposed project also includes a channel re-alignment of the existing watercourse at the Site towards and across the southwest boundary of the property.

The proposed development concept is shown as an overlay in **Figure 1**.



Figure 1 – Proposed Development

2. SCOPE OF WORK AND PLANNING CONTEXT

2.1 Ontario Water Resources Act (OWRA) – O. Reg. 387/04 Water Takings

Under the OWRA, water takings of over 50,000 L/day require a Permit to Take Water (PTTW). An exception applies for certain lower risk activities, including construction dewatering involving

more than 50,000 L/day and less than or equal to 400,000 L/day, whereby self-registry on the Environmental Activity and Sector Registry is sufficient. As of July 1, 2025, recent amendments to the regulation have since removed the upper limit of the restriction on registering a construction dewatering EASR.

One of the objectives of the hydrogeological investigation is to identify potential water taking sources, or any combination of simultaneous water taking sources with a cumulative daily water taking rate in excess of 50,000 L/day that may necessitate an EASR registration.

2.2 Clean Water Act – Source Water Protection

The Ministry of the Environment, Conservation and Parks (MECP) Source Water Information Atlas was reviewed to identify any significant source water protection designations, including Wellhead Protection Areas (WHPAs), Significant Groundwater Recharge Areas (SGRAs), Highly Vulnerable Aquifers (HVAs), Intake Protection Zones (IPZs) and Event Based Areas (EBAs).

The Site is not located within any significant source water protection designation zone.

A Source Water Protection Map of the Study Area is presented in **Figure 2**.

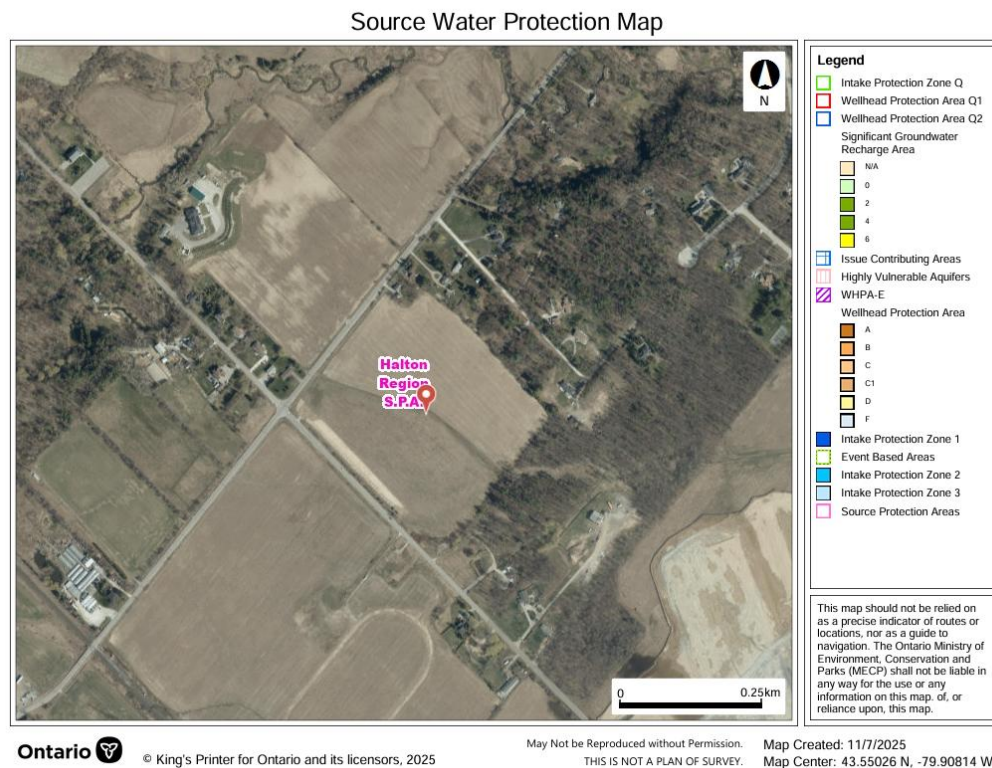


Figure 2 – Source Water Protection

2.3 Conservation Halton (CH)

The Site is regulated by Conservation Halton (CH) as it contains a tributary of Sixteen Mile Creek and a contains a wetland. CH regulates 15 metres from the greater of the limit of the floodplain and/or meander belt associated with the watercourse and 30 metres from the limit of wetlands.

We understand that a channel re-alignment is proposed to promote efficient use of land. CH typically requires a higher-level study to characterize the form and function of a watercourse over a larger, regional extent for proposed major watercourse alterations. We understand that a Comprehensive Environmental, Servicing and Stormwater Study (CESS) Addendum is being prepared by others and characterization of this watercourse feature was outside of the scope of this hydrogeological investigation.

A map showing the CH regulated lands within a 500 m Study Area is presented in **Figure 3**.

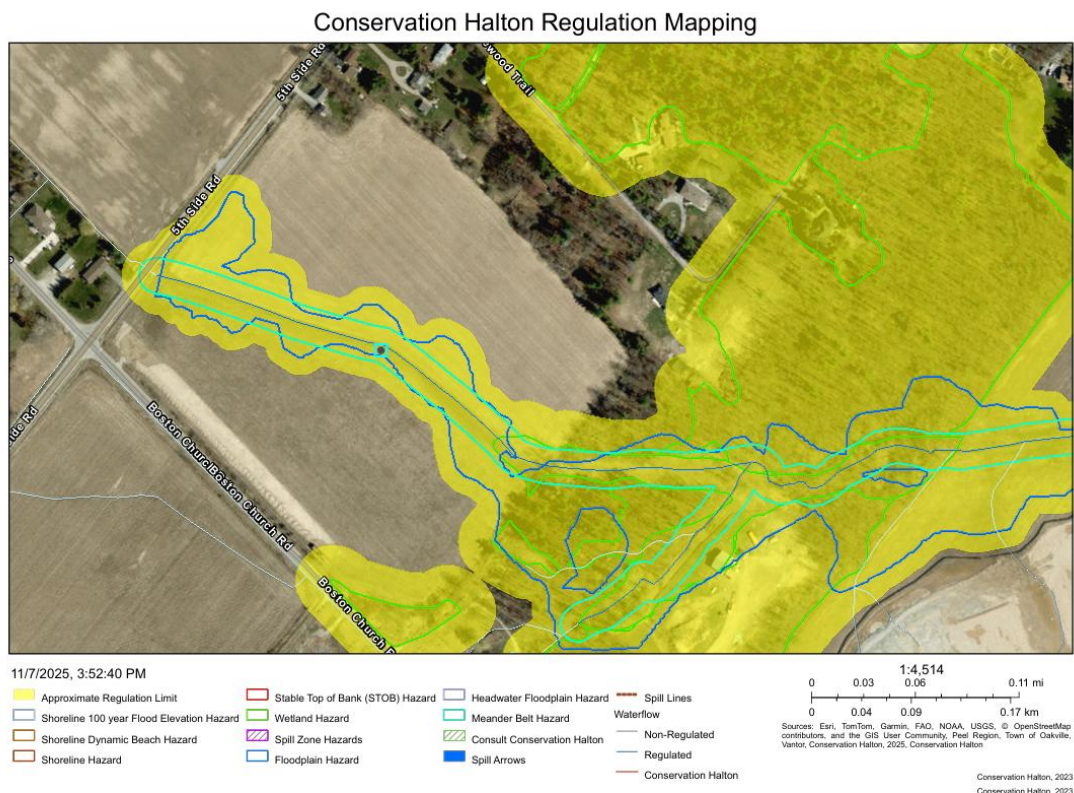


Figure 3 – CH Regulated Land

2.4 Region of Halton Official Plan, 2024 Office Consolidation

The Region of Halton Official Plan outlines its mandates to maintain, restore and enhance water system health to ensure water quality and quantity, and to maintain the natural hydrologic function of water systems within its jurisdiction.

Any development proposal that has the potential to release or discharge contaminants to affect the quality of groundwater are subject to a review by the Region. It mandates that development or site alteration in or near sensitive surface and groundwater features be restricted unless it can be demonstrated that the form and function of such features is not impacted.

2.5 Town of Milton Official Plan, 1996 (2024 Office Consolidation)

The Town of Milton Official Plan outlines its policy to protect the Niagara Escarpment as well as air, water and land within its boundaries as a natural inheritance for future generations. The Town defers to Regional Guidelines for the implementation of hydrogeological studies to protect, improve or restore sensitive surface and groundwater features that may be impacted by development or site alteration.

3. EXISTING CONDITIONS

3.1 Location and Site Description

The Site is located in UTM Zone 17, with the centre of the Site having approximate coordinates of Easting 588,222 m and Northing 4,822,452 m.

The City of Milton Official Plan designates the land use of the Site to be Agricultural Zone (A1) and Greenlands A (GA), and the Site currently lies within the City's Rural Zoning classification. Currently, the Site is used as agricultural land. Surrounding land uses are agricultural and rural residential.

Due to the rural nature of the Study Area, other groundwater users in the Study Area are expected to be present. A MECP Well Record Map of a 500 m Study Area around the Site is presented on **Figure 4**, below.

Your search returns **48** well records, which are displayed as red pins over blue dots.

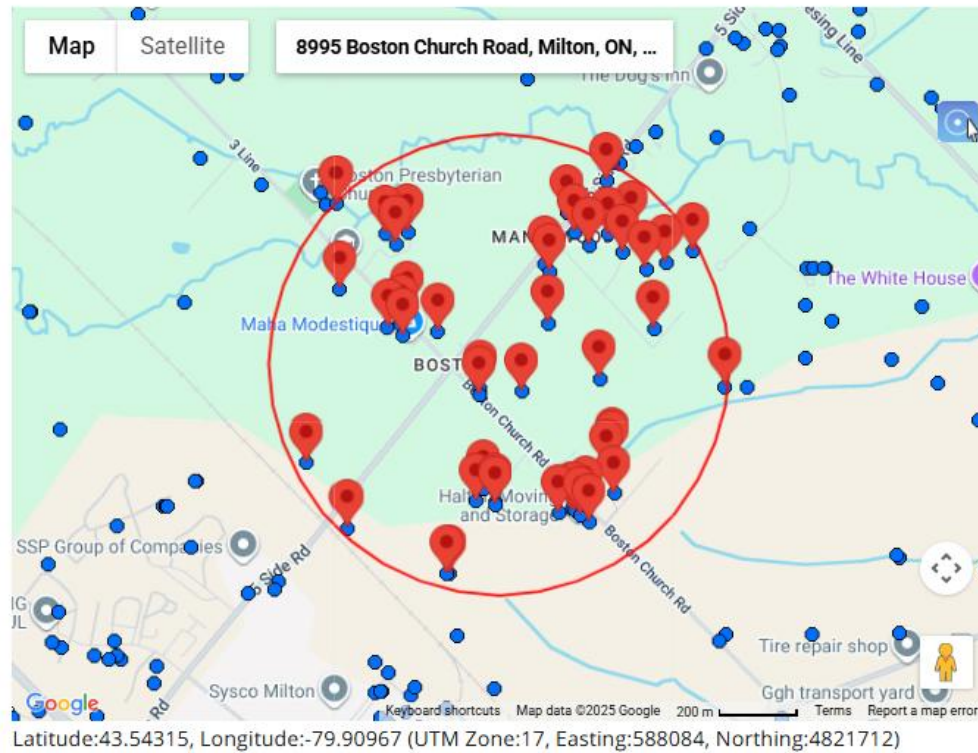


Figure 4 – MECP Well Record Map

3.2 Site Topography and Drainage

Ground elevation across the Site ranges between 224 metres above sea level on the northern side of the property to a low of approximately 220 metres above sea level towards the eastern boundary of the Site within the watercourse feature. At a regional scale across the Study Area, topography generally slopes down to the east-southeast.

Drainage across the Site is primarily directed towards the tributary that runs across the Site, which exits the Site along the eastern Site boundary. Regional drainage is generally towards the Sixteen Mile Creek and its tributaries, with a large part of precipitation infiltrating or running off toward surface water features.

3.3 Regional Physiography and Geology

The Study Area lies within a physiological region consisting of beveled till plains, which are surfaces that are cut or planed by running water but not generally underlain by fluvial materials.

Due to the relative impermeability of the till plains, less precipitation percolates down into the groundwater system to recharge the aquifer, which also helps to prevent contaminants from entering the ground and reaching water wells.

A map illustrating the physiographic region of the Study Area at a regional scale is presented on **Figure 5**, below.

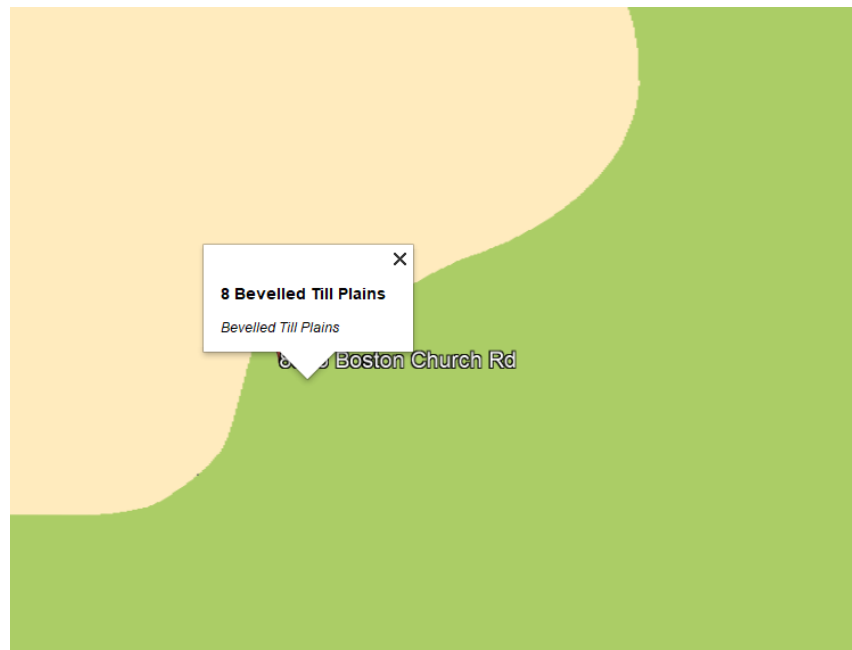


Figure 5 – Physiographic Region

Based on review of available maps from the Ministry of Northern Development and Mines, the surficial geology at the Site consists primarily of fine-textured glaciolacustrine deposits of silt and clay with minor sand and gravel (light blue). This is surrounded by a clay to silt-textured till (dark green).

Alluvial deposits of clay, silt, sand and gravel with organic muck and marl are mapped along the defined permanent watercourse features (brown). A surficial geology map is included as **Figure 6**, below:

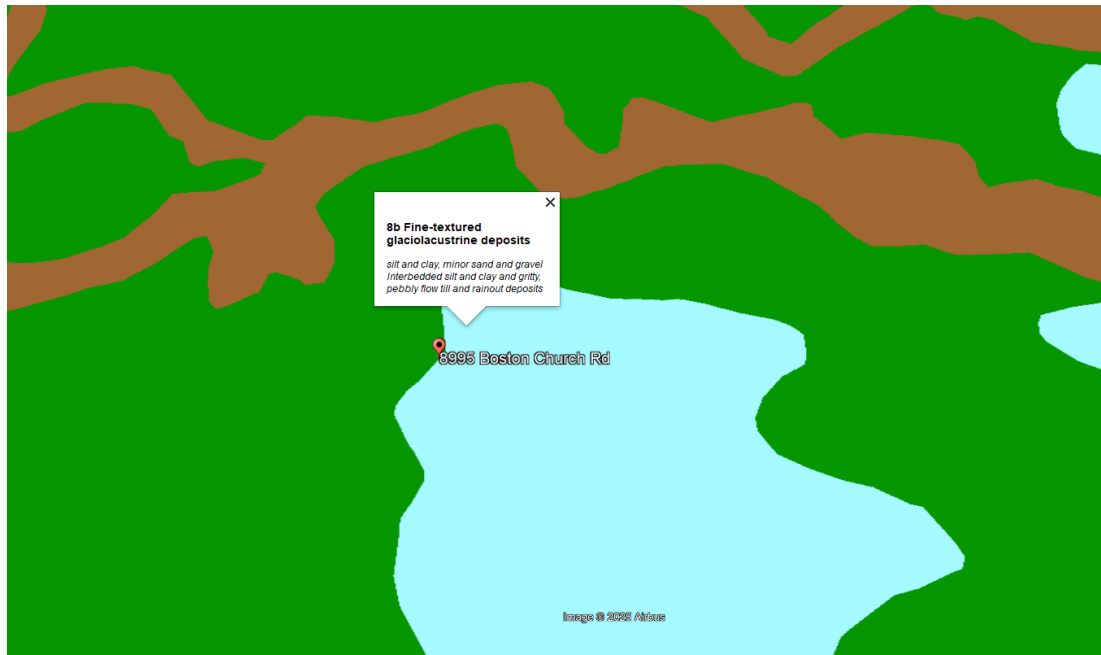


Figure 6 – Surficial Geology

Bedrock was not encountered during the drilling activities conducted as part of this Study. Based on the Ontario Bedrock Geology map available from the Ministry of Northern Development and Mines, bedrock underlying the Project Area is Queenston Formation shale, with minor limestone. A map illustrating bedrock geology is included as **Figure 7**, below:

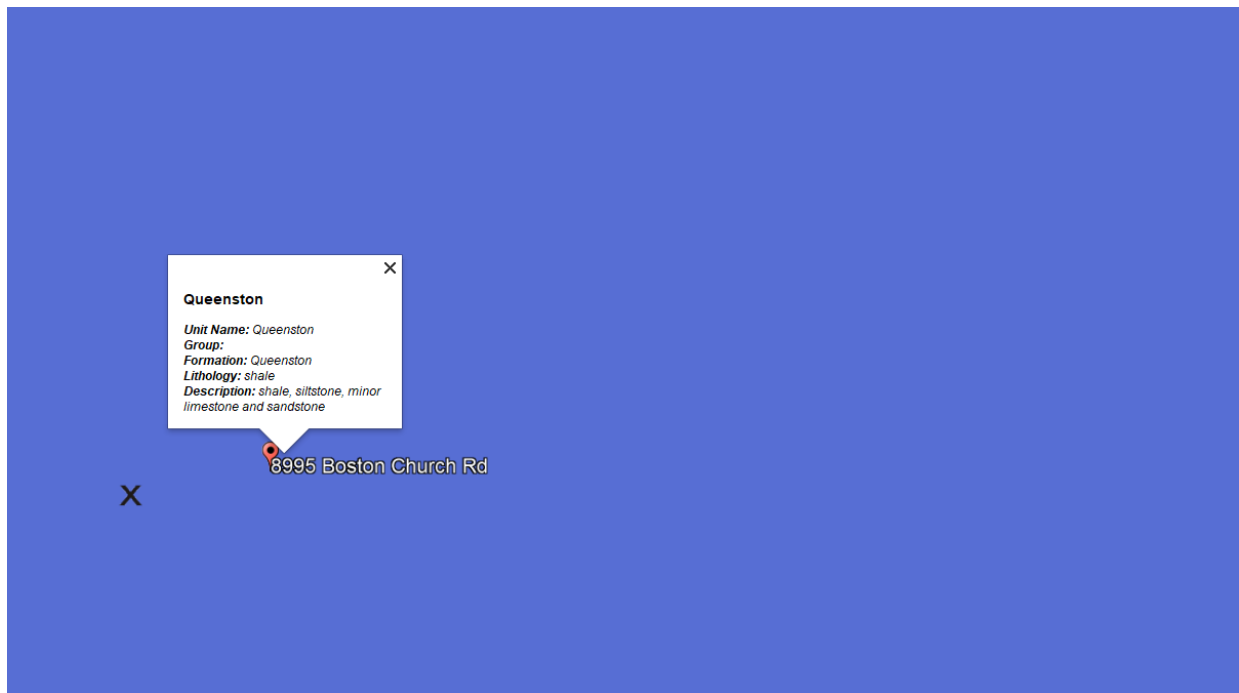


Figure 7 – Bedrock Geology

The shale bedrock is expected to lie at depths of approximately 19 metres below grade (mbg), based on available mapping and water well records in the Study Area.

3.4 Regional Hydrology and Hydrogeology

The Study Area lie within the Sixteen Mile Creek watershed and the Middle Branch subwatershed, under the jurisdiction of CH. The Sixteen Mile Creek watershed drains an area of approximately 54 square kilometres and a tributary of the Sixteen Mile Creek runs across the Site, flowing from west to east.

Regional hydrogeology is expected to mimic a subdued version of natural topography, with groundwater flowing towards natural valley features and topographic lows. At a local scale, this is expected to be towards the watercourse feature located at the Site and towards the wetland feature located on the east portion of the Site. At a regional scale, groundwater is expected to flow east, towards the main branch of the Sixteen Mile Creek.

3.5 Subsurface Investigation Program

A total of ten (10) boreholes were advanced across the Site as part of the geotechnical investigation to a depth of approximately 8.2 mbgs. Four (4) of these boreholes were completed with a monitoring well installation. The encountered stratigraphy, as described in the geotechnical investigation report, is as follows:

3.5.1 Topsoil

Topsoil of approximate thickness ranging from 90 mm to 120 mm was encountered in all boreholes. It should be noted that the thickness of the topsoil may vary significantly across the site and may not closely align with the conditions observed during drilling.

3.5.2 Fill Soils / Reworked Native Material

Fill or reworked native soils were encountered in all boreholes and compose of mostly sandy silt material with some clay, gravels and organics content with brown to dark brown in colour and moist condition. The fill/reworked native layer extended to depths ranging from approximately 0.24 to 0.27 mbgs.

3.5.3 Native Silty Clay to Clayey Silt

This layer, primarily composed of Silty Clay/Clayey Silt was observed in all boreholes immediately beneath the Fill layer, extending to depths ranging from approximately 4.5 mbgs to 8.2 mbgs. The moisture content within this layer ranged from approximately 9.9% to 27.8%.

3.5.4 Native Silty Sand to Sandy Silt

A sandy silt/silty sand layer was encountered in borehole MW-1, BH-2, and BH-3. The depth of this layer extending approximately of 1.6 meters in MW-1, 0.6 meters in BH-2, and 0.18 meter in BH-3. The moisture content within this layer ranging from 24.2% to 24.6%.

3.5.5 Native Sand

A sand layer was encountered in borehole MW-1, BH-5, MW-6 and BH-7 at different depths, with thickness ranging from approximately 0.6 m to 5.7 m. The layer was encountered at depth from 6.1 mbgs to termination depth of 6.71 mbgs in MW-1 and MW-6. In BH-5 it was encountered from 4.5 mbgs to 5.1 mbgs. For BH-7, sand layer was identified from 1.8 mbgs to 7.6 mbgs.

Borehole logs are included as **Appendix C**.

3.6 Groundwater Levels

Upon the completion of each borehole, the groundwater level and sidewall cave-ins were measured. Groundwater was observed in all boreholes except BH-3 and BH-13, with recorded water levels as shallow as 1.7 mbgs. No cave-in was observed in all boreholes.

Groundwater monitoring was completed on the newly installed monitoring wells on eight (8) occasions between July 10, 2025 and April 14, 2026.

Well development was completed using dedicated Waterra tubing, with a foot valve attachment, prior to water level measurements.

A summary of the groundwater monitoring program is provided below:

Well ID	Date	Well Depth (mbgs)	Stick Up (m)	Water Level (mbgs)	Water Level (masl)
MW-1	July 10, 2025	6.1	0.79	2.61	219.39
	July 11, 2025			2.68	219.32
	October 9, 2025			3.10	218.90
	December 17, 2025			3.20	218.80
	January 9, 2026			2.90	219.10

Well ID	Date	Well Depth (mbgs)	Stick Up (m)	Water Level (mbgs)	Water Level (masl)
	February 17, 2026			3.00	219.00
	March 18, 2026			2.54	219.46
	April 14, 2026			2.31	219.69
MW-6	July 10, 2025	6.1	0.81	5.26	216.74
	July 11, 2025			4.90	217.10
	October 9, 2025			5.24	216.76
	December 17, 2025			5.29	216.71
	January 9, 2026			5.16	216.84
	February 17, 2026			5.14	216.86
	March 18, 2026			4.95	217.05
	April 14, 2026			4.64	217.36
MW-9	July 10, 2025	6.1	0.75	4.21	217.79
	July 11, 2025			-	-
	October 9, 2025			2.27	219.73
	December 17, 2025			2.85	219.15
	January 9, 2026			1.59	220.41
	February 17, 2026			1.83	220.17
	March 18, 2026			1.37	220.63
	April 14, 2026			1.28	220.72
MW-11	July 10, 2025	6.1	0.96	1.74	220.26
	July 11, 2025			1.88	220.12
	October 9, 2025			2.07	219.93
	December 17, 2025			2.06	219.94
	January 9, 2026			1.61	220.39
	February 17, 2026			1.80	220.20
	March 18, 2026			1.36	220.64
	April 14, 2026			1.59	220.41

The observed high groundwater level was identified in MW-9 on April 14, 2026, at approximately 220.72 masl. The April 14, 2026 readings can be considered representative of the seasonally high groundwater conditions.

4. WATER BALANCE ASSESSMENT

A water balance assessment was completed for the Site using the Thornthwaite and Mather approach where water surplus at a site is estimated based on precipitation minus evapotranspiration. The analysis was completed based on general imperviousness values to determine how the post-development land use conditions are expected to impact the runoff and infiltration rates at the Site.

The water balance analysis was completed on an average annual basis in accordance with the procedure demonstrated in the MOECC Stormwater Management Planning and Design Manual (2003). This water balance analysis is based on the Conceptual Site Plan prepared for the Site, prepared by King Consultant Inc. (March 2025). The climate data was obtained from Environment Canada at the Toronto Pearson (Airport) climate station (Climate ID 6158733). The 30-year climate normal (1991-2020) data was used as the most representative of average site conditions.

A summary of the pre-development and post-development water budget analysis for infiltration is shown in the below table:

Water Balance Component	Pre-Development (m ³ /year)	Post-Development (m ³ /year)
Precipitation	97,055	97,055
Infiltration	12,042	1,997
Evapotranspiration	72,972	28,294
Runoff	12,042	66,765

Note: Water balance values are based on Table 3.1 of the MOECC Stormwater Management Planning and Design Manual (2003).

The introduction of increased impervious asphalt pavement for the proposed parking spaces and building footprints in the post-development scenario will result in a significant increase in site runoff. Similarly, the post-development scenario will also result in reduced infiltration, even across the generally poor-infiltrating soils on-site. Based on the results of the water balance analysis, an infiltration reduction of 10,045 m³/year is anticipated as a result of the proposed development without any mitigation, while surface runoff is expected to increase by 54,723 m³/year.

These changes to the natural water balance are common consequences of continued urban development within the watershed. In order to mitigate the impact of the proposed development on the pre-development infiltration rates and runoff to the surface water features at the Site, Low Impact Development (LID) measures can be considered as part of the Site's stormwater management strategy, and the civil design should also consider appropriate erosion and sediment control measures to reduce the impact of increased surface runoff to the wetland features and proposed channel re-alignment.

The site-specific inputs and assumptions used to develop the water balance model are included as **Appendix D**.

5. NATURAL FEATURE MONITORING PROGRAM

5.1 Wetland Features

The Ontario Ministry of Natural Resources Make a Map tool was reviewed to identify key surface water features within the Study Area. There are no mapped wetlands located within the Study Area. The NHIC Make a Map search result is shown in **Figure 8**:

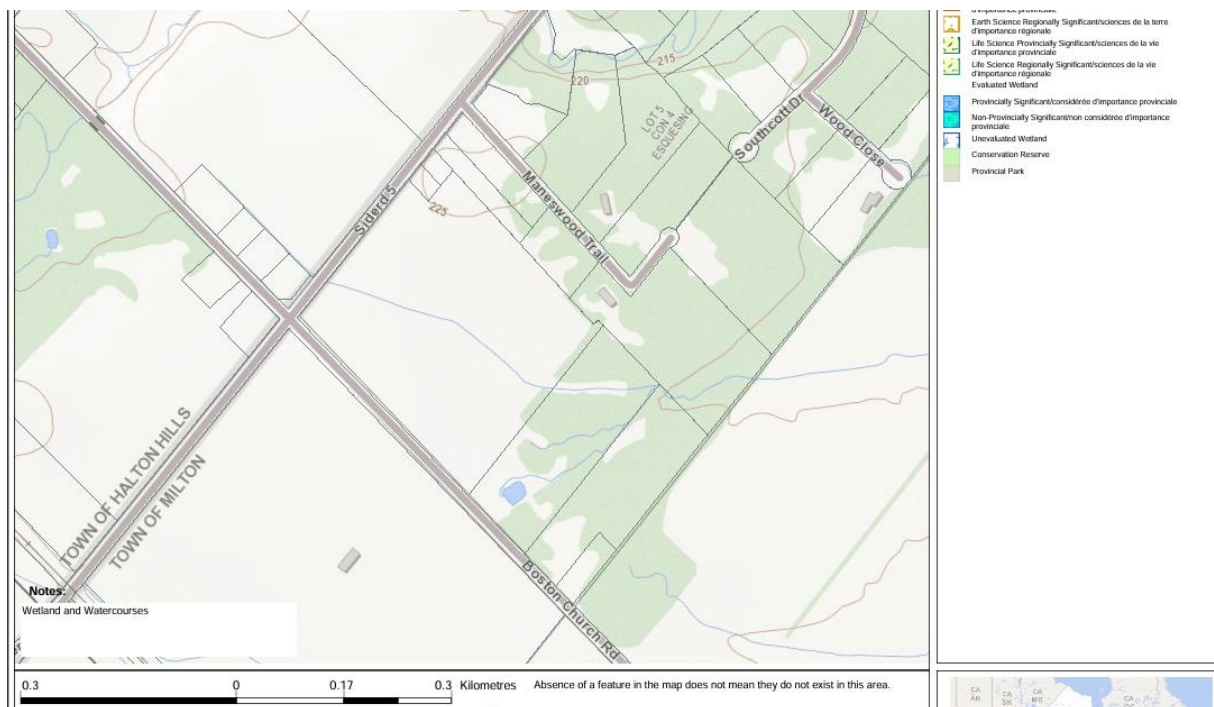


Figure 8 – NHIC Make a Map Natural Features

However, we understand that Conservation Halton has visited the Site in 2024 and staked three (3) small wetland features along the eastern boundary of the Site. These wetland features are all

located partially within the Site but also extend into a neighboring property as well. The location of these wetlands are shown in **Figure 9**, and these will be referred to as Wetlands 1, 2 and 3.

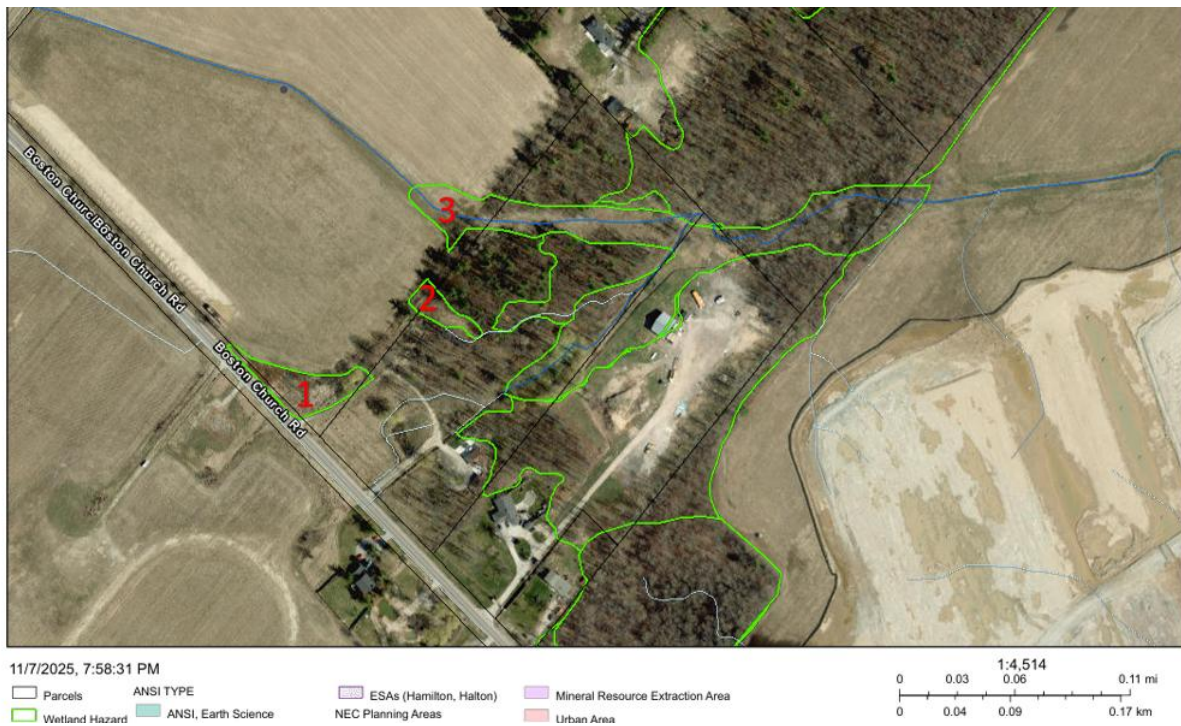


Figure 9 – Conservation Halton Wetland Mapping

5.2 Monitoring Program

Three (3) sets of nested mini-piezometers (MPs) were installed at the Site, with one (1) nested pair in each of Wetlands 1, 2 and 3. The nested MPs were installed at a depth of approximately 1 mbgs in the shallow one and 1.5 mbgs in the deeper one.

Dataloggers were installed in all three (3) of the mini-piezometer stations to monitor surface water flows leaving the wetland features to confirm the groundwater/surface water interactions in the features.

A summary of the wetland monitoring program is provided below:

Wetland 1

Well ID	Date	Well Depth (mbgs)	Stick Up (m)	Water Level (mbgs)	Vertical Hydraulic Gradient
PZ-3s	October 9, 2025	0.84	1.16	0.415	1.73
PZ-3d		1.38	0.62	1.35	

Well ID	Date	Well Depth (mbgs)	Stick Up (m)	Water Level (mbgs)	Vertical Hydraulic Gradient
PZ-3s	December 17, 2025	0.84	1.16	0.68	0.56
PZ-3d		1.38	0.62	0.985	
PZ-3s	January 9, 2026	0.84	1.16	-0.02	2.24
PZ-3d		1.38	0.62	1.19	
PZ-3s	February 17, 2026	0.84	1.16	-1.16	4.02
PZ-3d		1.38	0.62	1.01	
PZ-3s	March 18, 2026	0.84	1.16	-0.10	1.98
PZ-3d		1.38	0.62	0.97	
PZ-3s	April 14, 2026	0.84	1.16	-0.11	1.75
PZ-3d		1.38	0.62	0.84	

Note: red – upward gradient, green – downward gradient

Groundwater levels in Wetland 1 were measured at or above surface during the winter and spring months in the shallow piezometer, however, they were well below surface in the deeper piezometer at this location. A consistent downward gradient was observed throughout the monitoring program, suggesting that groundwater contributions to this feature can be considered to be negligible at this time.

Wetland 2

Well ID	Date	Well Depth (mbgs)	Stick Up (m)	Water Level (mbgs)	Vertical Hydraulic Gradient
PZ-2s	October 9, 2025	0.94	1.06	0.94	0.57
PZ-2d		1.40	0.60	1.20	
PZ-2s	December 17, 2025	0.94	1.06	-1.06	4.80
PZ-2d		1.40	0.60	1.15	
PZ-2s	January 9, 2026	0.94	1.06	0.78	0.59
PZ-2d		1.40	0.60	1.05	
PZ-2s	February 17, 2026	0.94	1.06	0.80	0.57
PZ-2d		1.40	0.60	1.06	
PZ-2s	March 18, 2026	0.94	1.06	-0.11	2.26
PZ-2d		1.40	0.60	0.94	
PZ-2s	April 14, 2026	0.94	1.06	0.66	0.54
PZ-2d		1.40	0.60	0.91	

Note: red – upward gradient, green – downward gradient

Vertical hydraulic gradients in Wetland 2 were generally observed to be downward throughout the monitoring program, which suggests that groundwater contributions to this feature can be considered to be negligible at this time.

Wetland 3

Well ID	Date	Well Depth (mbgs)	Stick Up (m)	Water Level (mbgs)	Vertical Hydraulic Gradient
PZ-1s	October 9, 2025	0.98	1.02	0.865	1.27
PZ-1d		1.35	0.65	1.334	
PZ-1s	December 17, 2025	0.98	1.02	-1.02	1.00
PZ-1d		1.35	0.65	-0.65	
PZ-1s	January 9, 2026	0.98	1.02	0.32	2.35
PZ-1d		1.35	0.65	1.19	
PZ-1s	February 17, 2026	0.98	1.02	0.20	2.15
PZ-1d		1.35	0.65	1.00	
PZ-1s	March 18, 2026	0.98	1.02	0.79	0.45
PZ-1d		1.35	0.65	0.96	
PZ-1s	April 14, 2026	0.98	1.02	-0.04	2.03
PZ-1d		1.35	0.65	0.71	

Note: red – upward gradient, green – downward gradient

Vertical hydraulic gradients in Wetland 3 were generally observed to be downward throughout the entirety of the monitoring program. Similarly to the other wetland features, this suggests that groundwater discharge is minimal at Wetland 3.

Piezometer station monitoring locations are shown on **Figure 10**, below:



Figure 10 – Wetland Piezometer Monitoring Map

5.3 Wetland Water Balance

A wetland water balance was completed for Wetland 1, 2 and 3. The features themselves will remain unchanged between the pre-development and post-development scenario. However, there are external catchment areas, which drain to each feature, respectively, which will change post-development. The pre-development drainage areas are presented on the attached Existing Conditions Drainage Plan (Greck, Figure 2, 2026), in **Appendix E**.

Wetland areas have been considered in their entirety, however, only a portion of each wetland is present on the Site itself, particularly Wetland 3, and may receive surface water and/or groundwater inputs from other sources off-site.

The external catchment areas are generally summarized as follows:

Feature	Piezometer Nest	Feature Size (m ²)	Catchment Area (m ²)
Wetland 1	PZ3-s/d	2,200	18,800
Wetland 2	PZ2-s/d	895	9,650
Wetland 3	PZ1-s/d	17,880	96,950

As previously discussed, based on the observations made during the wetland monitoring program, groundwater discharge to the wetland features is minimal or not occurring, which suggests that the wetlands are primarily fed by precipitation and surface water runoff.

A water balance analysis has been completed for each wetland feature to determine the pre-development runoff volumes based on existing land use conditions and the post-development runoff volumes based on the proposed land use and drainage plans.

Pre-Development Wetland Water Balances

Similar to the site-wide water balance methodology discussed in Section 4, the pre-development scenario was calculated based on existing conditions and a runoff coefficient of 0.55 was carried through the pre-development water balance for the wetland catchment areas.

The pre-development water balance calculations for the wetland features and external drainage areas are presented as follows:

Feature	Pre-Development Runoff Volume (m³/year)	Pre-Development Evapotranspiration Volume (m³/year)
Wetland 1	242	1,335
Wetland 1 Drainage Area	10,957	4,013
Wetland 2	99	543
Wetland 2 Drainage Area	5,749	1,956
Wetland 3	1,969	10,846
Wetland 3 Drainage Area	53,004	23,605

Post-Development Wetland Water Balances

The proposed development includes the introduction of paved surfaces across large portions of the existing external drainage areas to the respective wetlands, which will eliminate or significantly reduce surface water contributions from the upland area and creating a runoff deficit in these features. Based on the Proposed Conditions Drainage Plan (Greck, Figure 3, 2026), runoff coefficients between 0.55 and 0.9 were utilized in the post-development scenario. Drainage Area 204 (runoff coefficient of 0.55) was divided into three equal contributions to Wetlands 1, 2 and 3,

respectively, while the remaining post-development runoff was diverted to the proposed storm sewer network. The post-development drainage plan is included in **Appendix E**.

The wetland areas will remain the same post-development. The volume of precipitation that will runoff and be directed towards the wetlands is summarized as follows:

Land Use Area	Post-Development Runoff Volume (m ³ /year)	Post-Development Evapotranspiration Volume (m ³ /year)
Wetland 1	242	1,335
Wetland 1 Drainage Area	10,031	3,782
Wetland 2	99	543
Wetland 2 Drainage Area	9,888	2,990
Wetland 3	1,969	10,846
Wetland 3 Drainage Area	11,758	13,293

Summary and Discussion

The wetland features will remain the same between the pre-development and post-development scenario, however, the contributing catchment areas for the three (3) wetlands will see alterations in the post-development scenario. A comparison of the pre-development and post-development scenario for each feature is provided below:

Wetland 1	Runoff Volume (m ³ /year)	Evapotranspiration Volume (m ³ /year)
Wetland 1 Pre-Development Drainage Area	10,957	4,013
Wetland 1 Post-Development Drainage Area	10,031	3,782
Wetland 1 Difference (%)	-8.5%	-5.8%

Wetland 1 is expected to see minimal changes in its water balance components in the post-development scenario. No mitigation measures are required for this feature as currently proposed.

Wetland 2	Runoff Volume (m ³ /year)	Evapotranspiration Volume (m ³ /year)
Wetland 2 Pre-Development Drainage Area	5,749	1,956
Wetland 2 Post-Development Drainage Area	9,888	2,990
Wetland 2 Difference (%)	72.0%	52.9%

Wetland 2 will see a minor increase in the volume of runoff directed towards it in the post-development scenario. Although the percentage increase is moderate, the absolute volume of the increase is considered to be minor and no impacts to the hydrologic form or function of this feature are expected post-development. No mitigation measures are required for this feature as currently proposed.

Wetland 3	Runoff Volume (m ³ /year)	Evapotranspiration Volume (m ³ /year)
Wetland 3 Pre-Development Drainage Area	53,004	23,605
Wetland 3 Post-Development Drainage Area	11,758	13,293
Wetland 3 Difference (%)	-77.8%	-43.7%

Wetland 3 will see a large reduction in the volume of direct runoff towards the feature in the post-development scenario (-41,246 m³/year). This reduction in runoff will need to be mitigated in the post-development scenario and the stormwater management strategy should incorporate appropriate design and mitigation features to maintain the surface water runoff contribution to the wetland features. It is our understanding that the proposed channel realignment will be conveying much of the remaining Site stormwater runoff towards Wetland 3, which will serve to help mitigate the runoff deficit in Wetland 3. No additional mitigation measures are considered necessary at this time.

The wetland water balance assessments are presented in **Appendix F**.

Additional details on the stormwater mitigation strategy are available in the stormwater management report and comprehensive environmental, servicing and stormwater study, which are provided under separate covers.

6. IMPACT ASSESSMENT

6.1 Potential for Impact to Local Groundwater System

Any required dewatering during construction is expected to be temporary in nature and limited in extent. Active dewatering is not expected to be required and the water table is expected to return to normal shortly following the cessation of unwatering.

6.2 Potential for Impact to Surface Water Features

Potential long-term impacts to wetland features are usually related to changes in groundwater contributions to the feature and groundwater quality. As existing groundwater contributions to on-site wetland features are considered negligible, no long-term impacts to these features are expected from a quantity or quality perspective.

6.3 Potential for Impact to Water Wells

An assessment of interference of the proposed water taking to existing groundwater users is typically evaluated with respect to both quality and quantity. As discussed in **Section 3.1**, a search was completed within the Study Area for existing groundwater users.

A total of 48 well records are present within a 500 m Study Area of the Site, with upwards of 40 of these being for water supply purposes. These water supply wells are primarily installed at depths of approximately 15 mbgs to 25 mbgs or deeper, into the underlying shale bedrock aquifer. Interference with the bedrock aquifer is not expected due to the shallow nature of site alteration with the proposed development. Long-term impacts to aquifer recharge will be mitigated through stormwater design.

Impacts to water well users are not expected.

6.4 Ground Settlement

Any required dewatering during construction should be completed with passive seepage control methods. As such, groundwater will not be actively pulled from the aquifer and ground settlement is not expected to be a significant concern.

7. SUMMARY AND RECOMMENDATIONS

The key summary of the hydrogeologic study is as follows:

- (i) A total of four (4) monitoring wells were advanced across the Site as part of this hydrogeological investigation to a maximum depth of approximately 6.1 mbgs.
- (ii) Groundwater was monitored on eight occasions between July 10, 2025 and April 14, 2026. The observed high groundwater level was identified in MW-9 on April 14, 2026, at approximately 220.72 masl.
- (iii) Boreholes at the Site indicate relatively impermeable native silty clay to clayey silt material near surface in the overburden.
- (iv) A water balance assessment indicated an infiltration deficit of approximately 10,045 m³/year and increased surface runoff of approximately 54,723 m³/year with no mitigation measures. The stormwater management strategy should be designed to reduce these impacts in the post-development scenario.
- (v) A nested pair of mini-piezometers were installed within three (3) wetland features at the Site. Observations in the nested piezometers indicates a primarily downward vertical hydraulic gradient at all 3 locations. This suggests that the wetlands are primarily precipitation and surface water runoff-fed, and may serve a recharge function.
- (vi) As the wetlands are considered surface water-fed, runoff to these features should be maintained to preserve their hydrologic form and function. A wetland water balance indicates minimal increases in runoff inputs to Wetlands 1 and 2 in the post-development scenario, however, a significant runoff deficit (-78%) is calculated for Wetland 3.
- (vii) The proposed channel realignment will convey much of the post-development Site runoff towards Wetland 3, which will help mitigate the identified runoff deficit that it will experience due to the proposed development.
- (viii) Monitoring wells should be decommissioned in accordance with Ontario Regulation 903 when no longer required.

8. REFERENCES

1. Barnett, P.J., Cowan, W.R. and Henry, A.P. 1991: Quaternary Geology of Ontario, Southern Sheet; Ontario Geological Survey Map 2544, scale 1:1,000,000.
2. Conservation Halton. Interactive Mapping. Accessed November 7, 2025.

3. L.J. Chapman and D.F. Putnam. 1984: The Physiography of Southern Ontario. Second Edition.
4. PNJ Engineering Inc. Geotechnical Investigation, 8995 Boston Church Rd, Milton, ON, L9T 9C7. August 20, 2025.
5. Ontario Geological Survey 1991: Bedrock Geology of Southern Ontario, Southern Sheet; Ontario Geological Survey Map 2556, scale 1:1,000,000.
6. Ontario Ministry of the Environment, Conservation and Parks. Source Water Protection Information Atlas. Accessed November 7, 2025.
7. Ontario Ministry of the Environment. Stormwater Planning and Design Manual. 2003.

9. LIMITATIONS OF REPORT

The Limitations of Report, as quoted in Appendix 'A', are an integral part of this report.

Sincerely,

PNJ ENGINEERING INC.

Muhammad Rashid Minhas., *M.Eng., M.Phil., GIT*

Geoscientist In Training

ABID SAHI., *M.A.Sc., P.Geo., P.Eng., QP_{ESA}*

Director - Civil Infrastructure & Geo-Environmental Engineering



APPENDICES

APPENDIX A

LIMITATIONS OF THE REPORT

LIMITATIONS OF REPORT

This report is intended solely for BC5L Inc., (the Client) and their designers and is prohibited for use by others without PNJ's prior written consent. This report considers PNJ's professional work product and shall remain the sole property of PNJ. Any unauthorized reuse, redistribution of or reliance on the report shall be at the Client and recipient's sole risk, without liability to PNJ. No portion of this report may be used as a separate entity; it is to be read in its entirety and shall include all supporting drawings and appendices.

The description provided in this report are based on our present understanding of the project, the current site use, ground surface elevation and conditions, and are based on the work scope approved by the Client and described in the report. The services were performed in a manner consistent with the level of care and skill ordinarily exercised by members of geotechnical engineering professions currently practicing under similar conditions. No other representations, and no warranties or representations of any kind, either expressed or implied, are made. 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 such third parties.

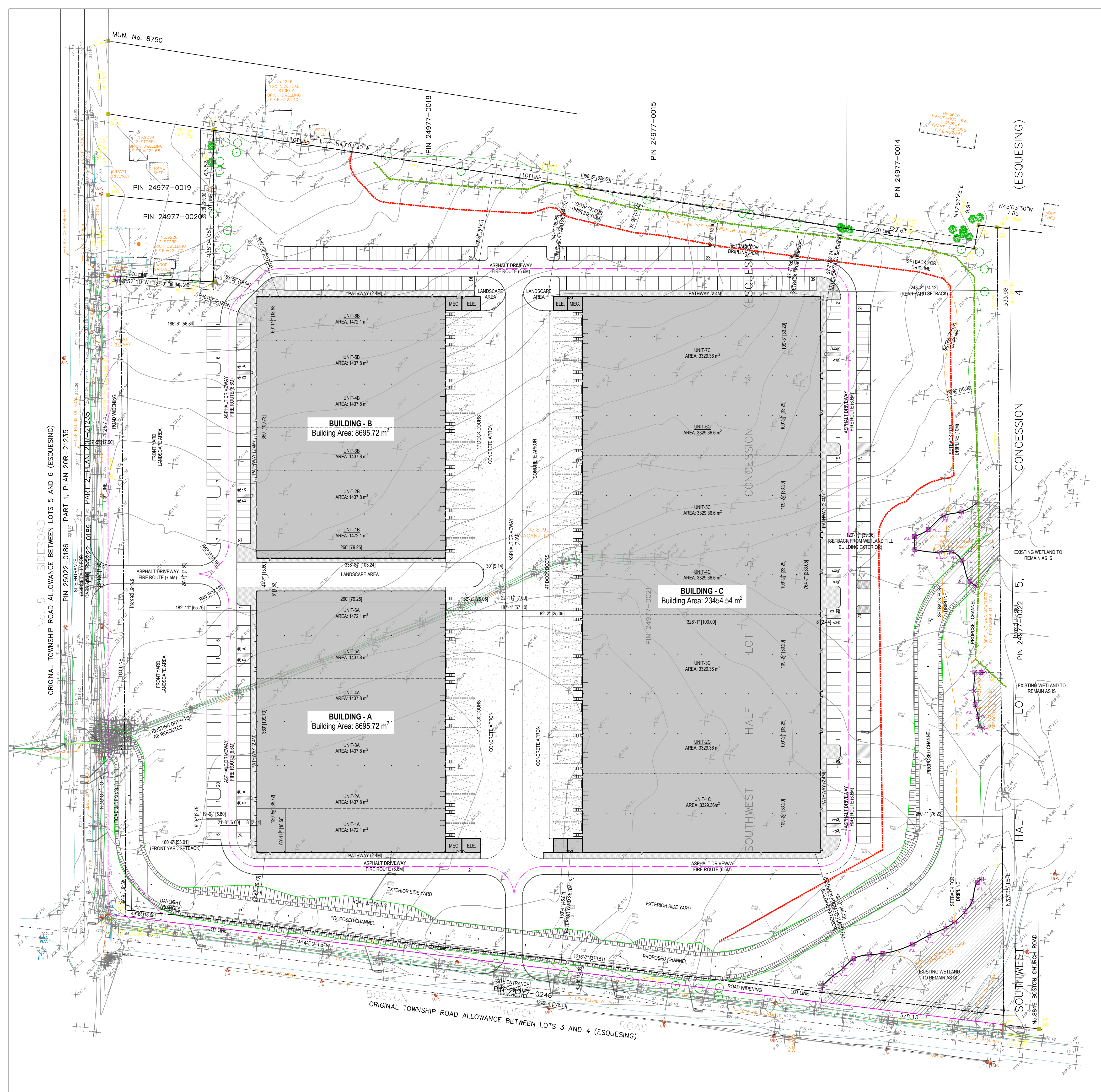
All details of design and construction are rarely known at the time of completion of geotechnical study. The recommendations and comments made in the study report are based on our completed subsurface investigation and resulting understanding of the project, as defined at the time of the study. We should be retained to review our recommendations when the drawings and specifications are complete. Without this review, PNJ will not be liable for any misunderstanding of our recommendations or their application and adaptation into the final design.

By issuing this report, PNJ is the geotechnical engineer of record. It is recommended that PNJ be retained during construction of all foundations and during earthwork operations to confirm the conditions of the subsoil are confirmed if the encountered soils are like those observed during our study. The intent of this requirement is to verify that conditions encountered during construction are consistent with the findings in the report and that inherent knowledge developed as part of our study is correctly carried forward at the construction phases.

It is important to emphasize that a soil investigation is, in fact, a random sampling of a site and the comments included in this report are based on the results obtained at the test locations only. The subsurface conditions confirmed at the test locations may vary at other locations. The subsurface conditions can also be significantly modified by the construction activities on site (e.g., excavation, dewatering and drainage, blasting, pile driving, etc.). These conditions can also be modified by exposure of soil or bedrock to humidity, dry periods, or frost. Soil and groundwater conditions between and beyond the test locations may differ both horizontally and vertically from those encountered at the test locations and conditions may become apparent during construction which could not be detected or anticipated at the time of our investigation. Should any conditions at the site be encountered which differ from those found at the test locations, we request that we be notified immediately for a reassessment of our recommendations. If changed conditions are identified during construction, no matter how minor, the recommendations in this report shall be considered invalid until sufficient review and written assessment of these conditions is completed by PNJ.

APPENDIX B

SITE PLAN



LINE LEGEND	
	PROPERTY LINE
	GREATEST LIMIT
	DRIPLINE STAKED BY TERRASTORY

SUMMARY	
ADDRESS	8995 BOSTON CHURCH RD, MILTON
ZONE	AGRICULTURE

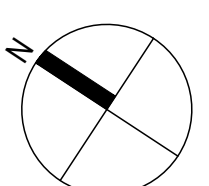
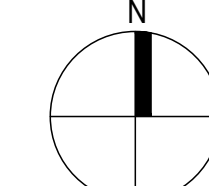
SITE STATISTICS			
ZONE VARIATION	PERMITTED	EXISTING	PROPOSED
LOT AREA (MINIMUM)		11.71 Hec. (117192.46 sq.m)	
LOT FRONTAGE (MINIMUM)		267.49m	265.30m (After Road Widening)
LOT COVERAGE (MAXIMUM)			34.8% (40845.98 m²)
FRONT YARD SETBACK (M) (MINIMUM)			55.01m
INTERIOR SIDE YARD DEPTH (M) (MINIMUM)			29.74m
EXTERIOR SIDE YARD DEPTH (M) (MINIMUM)			29.73m
REAR YARD DEPTH (M) (MINIMUM)			74.12m
HEIGHT (M) MAXIMUM			10m

VEHICULAR PARKING		
Parking is calculated for each individual Cannabis Production and Processing Facility, industrial and warehouse/distribution premises, including accessory office space, as follows:		
For the first 1000 m2, 1 parking space per 30m2 of gross floor area shall be provided.		
Any additional gross floor area shall be calculated in addition to the above provision and provided in accordance with the following rates:		
☐ For gross floor areas between 1001m2 to 5000m2 shall provide 1 parking space per 100m2 of gross floor area.		
☐ Gross floor areas greater than 5000m2 shall provide 1 parking space per 200m2 of gross floor area.		
Notwithstanding any provisions of the By-law to the contrary, accessory retail uses associated with the industrial or warehouse/distribution use shall be included within the above noted calculations provided that the retail area does not exceed the lesser of 5% or 232.2 m2 of the total gross floor		
PARKING CALCULATION		
	REQUIRED	PROVIDED
TOTAL GROSS FLOOR AREA (BUILDING A+B+C) = 33829.62 m²	1/30 m² for GFA 1000m² = 33.3	450
Parking Ratio: 1/30 m² for GFA 1000m² 1/100m² for GFA 1001m² to 5000m² 1/200m² for GFA greater than 5000m²	1/100m² for GFA 5000m² = 50	(INCLUDING 16
	1/200m² for GFA 27829.62m² = 139.14	BARRIER-FREE PARKING)
	TOTAL PARKING REQUIRED = 223	



INSPIRE ARCHITECTURAL GROUP
251520 Ontario Ltd.
218-88 Sunny Meadow Blvd, Brampton, ON L6R 0V7
+1 905-861-2032
harpree@inspireag.ca

This drawing, as an instrument of service, is provided by and is the property of Inspire Architectural Group. The contractor must verify and accept responsibility for all dimensions and conditions on site and must notify Inspire Architectural Group of any variations from the supplied information. This drawing is not to be scaled. The architect is not responsible for the accuracy of survey, structural, mechanical, electrical, etc. information shown on this drawing. Refer to the appropriate consultant's drawings before proceeding with the work. Construction must conform to all applicable codes and requirements of authorities having jurisdiction. The contractor working from drawings not specifically marked "For Construction" must assume full responsibility and bear costs for any corrections or damages resulting from his work.

R0	2025-12-10	CLIENT'S REVIEW
#	DATE	ISSUED FOR
PROJECT NAME		
PROPOSED WAREHOUSE/STORAGE DEVELOPMENT		
AT 8995 BOSTON CHURCH RD, MILTON		
DRAWING NAME		
PROPOSED SITE PLAN		
DRAWN BY	PROJECT NO.	
RB	25.020	
CHECKED BY	PROJECT DATE	
HK	2025-06-27	
Scale	Drawing no.	
1:200	A1.0	
SHEET SIZE	24"X36"	
TRUE NORTH	PROJECT NORTH	
		

APPENDIX C

BOREHOLE LOCATION PLAN

AND

BOREHOLE LOG SHEETS



LEGEND  MONITORING WELL MW-1, MW-6, MW-9, MW-11 (20 ft. / 6.09 m)  BOREHOLE BH-2, BH-3, BH-5 (15 ft. / 4.5 m) BH-7, BH-10, BH-13 (25 ft. / 7.6 m)  PIEZOMETER	
NOTES	
REFERENCES - Google Earth	
TITLE Borehole Location Plan	
PROJECT Geotechnical Investigation 8995 Boston Church Rd., Milton, ON	
CLIENT BC5L Inc.	
DRAWING NO.	1
DATE	July 28, 2025
PREPARED BY	JA
REVIEWED BY	AS
 Pavement - Materials - Geo-Environmental - Engineering 70 Galaxy Blvd Suite 100, Toronto, ON M9W 4Y6 Tel: 905.597.8383 Fax: 905.597.0825 www.pnjeng.com	
PROPOSAL NO. 25-1242-01	
REV. 0	

Notes on Borehole and Test Pit Reports

Soil description :

Each subsurface stratum is described using the following terminology. The relative density of granular soils is determined by the Standard Penetration Index ("N" value), while the consistency of clayey soils is measured by the value of undrained shear strength (Cu).

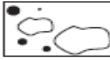
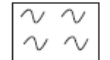
Classification (Unified system)			
Clay	< 0.002 mm		
Silt	0.002 to 0.075 mm		
Sand	0.075 to 4.75 mm	fine	0.075 to 4.25 mm
		medium	0.425 to 2.0 mm
		coarse	2.0 to 4.75 mm
Gravel	4.75 to 75 mm	fine	4.75 to 19 mm
Cobbles	75 to 300 mm	coarse	19 to 75 mm
Boulders	>300 mm		

Terminology	
"trace"	1-10%
"some"	10-20%
adjective (silty, sandy)	20-35%
"and"	35-50%

Relative density of granular soils	Standard penetration index "N" value (BLOWS/ft – 300 mm)
Very loose	0-4
Loose	4-10
Compact	10-30
Dense	30-50
Very dense	>50

Consistency of cohesive soils	Undrained shear strength (Cu)	
	(P.S.F)	(kPa)
Very soft	<250	<12
Soft	250-500	12-25
Firm	500-1000	25-50
Stiff	1000-2000	50-100
Very stiff	2000-4000	100-200
Hard	>4000	>200

Rock quality designation	
"RQD" (%) Value	Quality
<25	Very poor
25-50	Poor
50-75	Fair
75-90	Good
>90	Excellent

STRATIGRAPHIC LEGEND			
			
Sand	Gravel	Cobbles & boulders	Bedrock
			
Silt	Clay	Organic soil	Fill

Samples:

Type and Number

The type of sample recovered is shown on the log by the abbreviation listed hereafter. The numbering of samples is sequential for each type of sample.

SS: Split spoon

ST: Shelby tube

AG: Auger

SSE, GSE, AGE: Environmental sampling

PS: Piston sample (Osterberg)

RC: Rock core

GS: Grab sample

Recovery

The recovery, shown as a percentage, is the ratio of length of the sample obtained to the distance the sampler was driven/pushed into the soil

RQD

The "Rock Quality Designation" or "RQD" value, expressed as percentage, is the ratio of the total length of all core fragments of 4 inches (10 cm) or more to the total length of the run.

IN-SITU TESTS:

N: Standard penetration index

Nc: Dynamic cone penetration index

k: Permeability

R: Refusal to penetration

Cu: Undrained shear strength

ABS: Absorption (Packer test)

Pr: Pressure meter

LABORATORY TESTS:

I_p: Plasticity index

H: Hydrometer analysis

A: Atterberg limits

C: Consolidation

O.V.: Organic vapor

W_i: Liquid limit

GSA: Grain size analysis

w: Water content

CS: Swedish fall cone

W_p: Plastic limit

γ: Unit weight

CHEM: Chemical analysis

Monitoring Well: MW-1

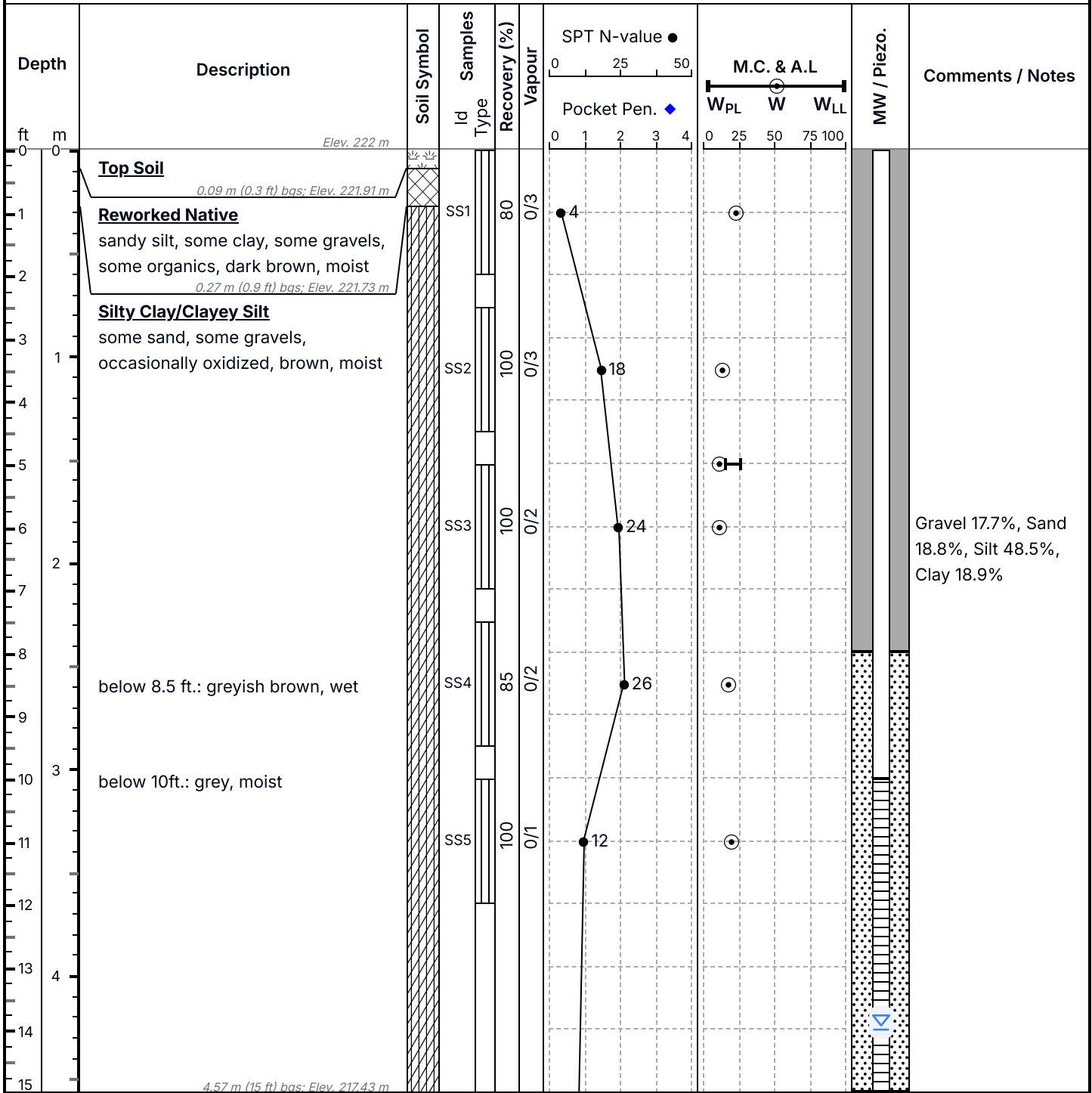
8995 Boston Church Road, Milton

Start Date: 2025-JUL-03

End Date: 2025-JUL-03

Elevation: 222 m AMSL

588240.5 E, 4822320.8 N (NAD83 - 17)



Notes: - Groundwater was measured at 4.2 mbgs immediately after the drilling.

- Borehole was open immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01
		Page 1/2

Monitoring Well: MW-1

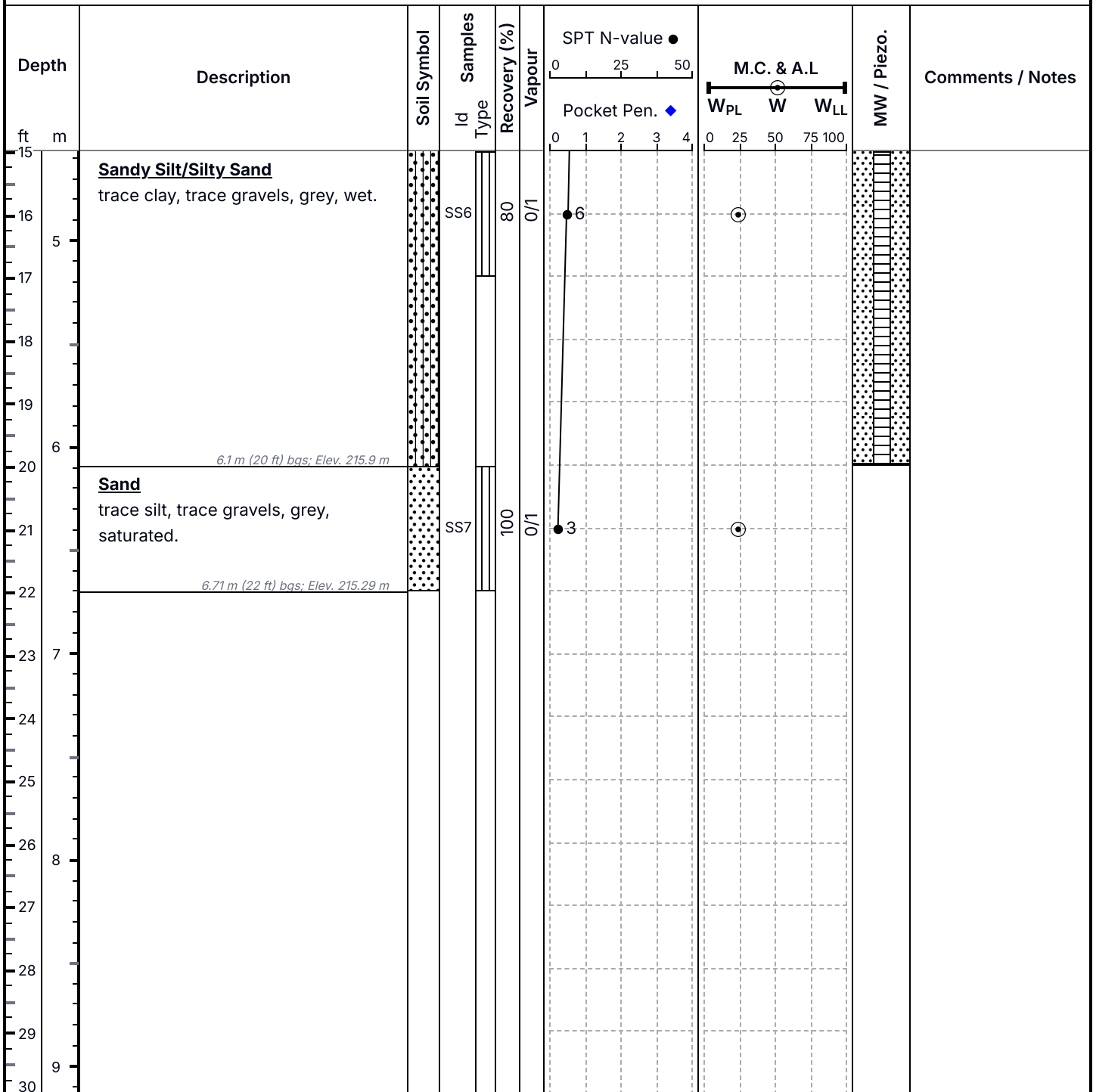
8995 Boston Church Road, Milton

Start Date: 2025-JUL-03

End Date: 2025-JUL-03

Elevation: 222 m AMSL

588240.5 E, 4822320.8 N (NAD83 - 17)



Notes: - Groundwater was measured at 4.2 mbgs immediately after the drilling.

- Borehole was open immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01
		Page 2/2

Borehole: BH-2

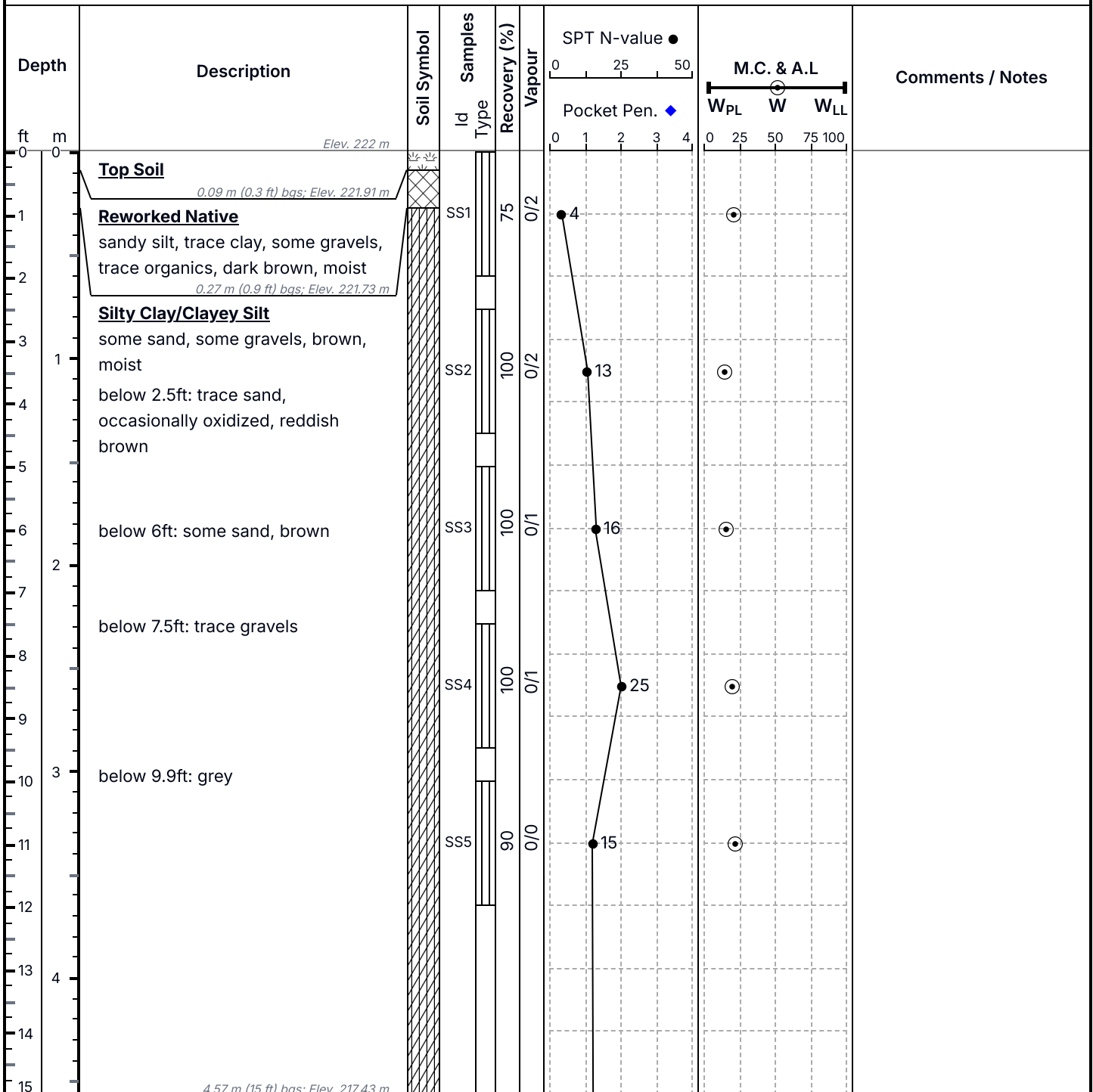
8995 Boston Church Road, Milton

Start Date: 2025-JUL-03

End Date: 2025-JUL-03

Elevation: 222 m AMSL

588315.9 E, 4822309.1 N (NAD83 - 17)



Notes: - Groundwater was measured at 3.9 mbgs immediately after drilling.

- Borehole was open immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01
		Page 1/2

Borehole: BH-2

8995 Boston Church Road, Milton

Start Date: 2025-JUL-03

End Date: 2025-JUL-03

Elevation: 222 m AMSL

588315.9 E, 4822309.1 N (NAD83 - 17)

Depth ft m	Description	Soil Symbol	Id Type	Recovery (%)	Vapour	SPT N-value ●	M.C. & A.L. W _{PL} W W _{LL}	Comments / Notes
						Pocket Pen. ◆		
15	Sandy Silt/Silty Sand some clay, trace gravels, grey, wet		SS6	95	0/0	0 25 50	0 25 50 75 100	
16						0 1 2 3 4	0 25 50 75 100	
5								
17	5.18 m (17 ft) bgs; Elev. 216.82 m							
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

Notes: - Groundwater was measured at 3.9 mbgs immediately after drilling.

- Borehole was open immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01
		Page 2/2

Borehole: BH-3

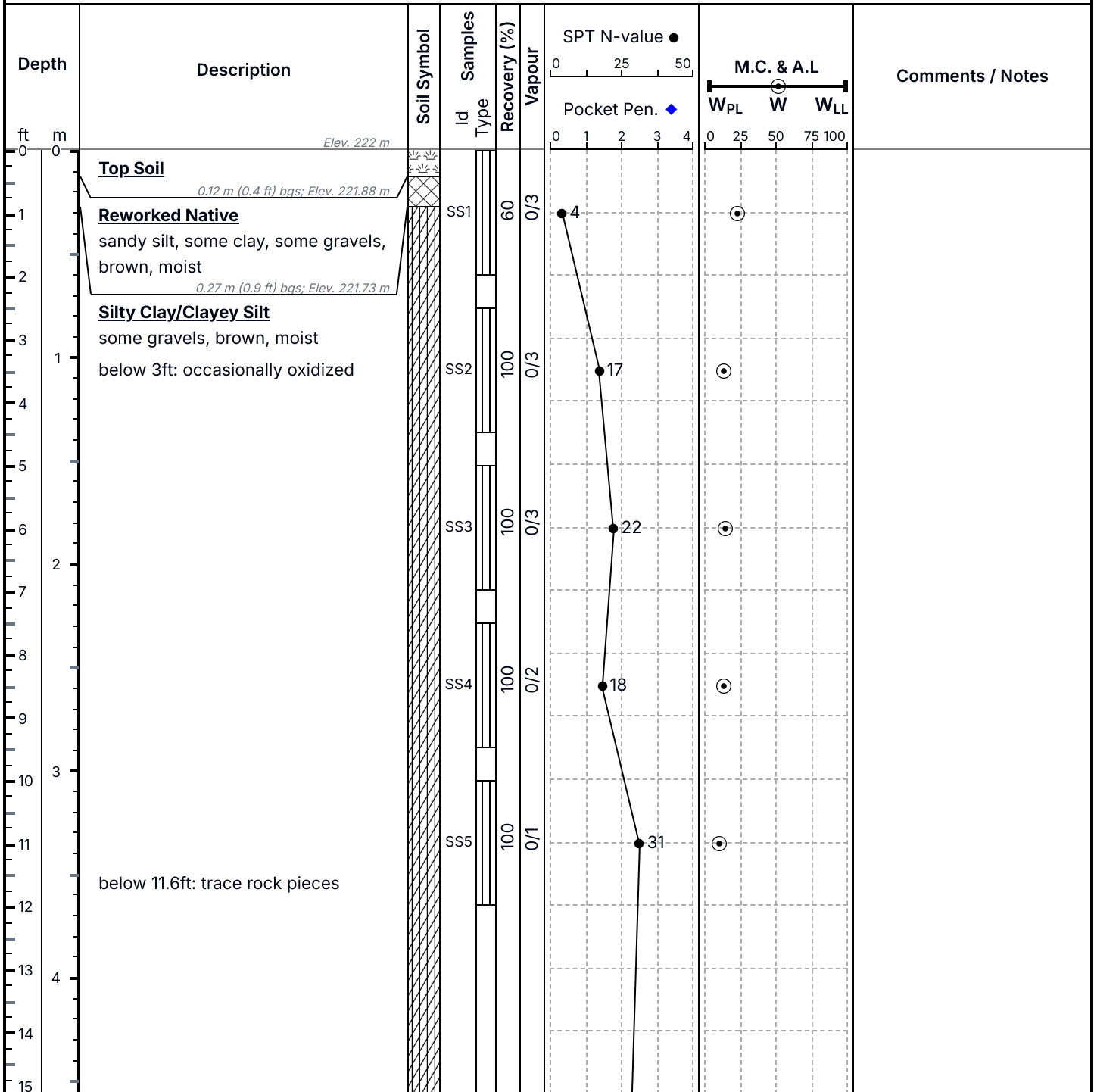
8995 Boston Church Road, Milton

Start Date: 2025-JUL-03

End Date: 2025-JUL-03

Elevation: 222 m AMSL

588122.4 E, 4822407.8 N (NAD83 - 17)



Notes: - Borehole was open and dry immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01
		Page 1/2

Borehole: BH-3

8995 Boston Church Road, Milton

Start Date: 2025-JUL-03

End Date: 2025-JUL-03

Elevation: 222 m AMSL

588122.4 E, 4822407.8 N (NAD83 - 17)

Depth ft m	Description	Soil Symbol	Samples Id Type	Recovery (%)	Vapour	SPT N-value ●	M.C. & A.L.			Comments / Notes
						Pocket Pen. ◆	W _{PL}	W	W _{LL}	
15	...continued: Silty Clay/Clayey Silt below 15ft: some sand <i>5 m (16.4 ft) bgs; Elev. 217 m</i>		SS6	100	0/1	0 25 50	0 25 50 75 100			
16						0 1 2 3 4				
5	Sandy Silt/Silty Sand trace clay, trace gravels, gray, moist to wet. <i>5.18 m (17 ft) bgs; Elev. 216.82 m</i>									
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Notes: - Borehole was open and dry immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01
		Page 2/2

Borehole: BH-5

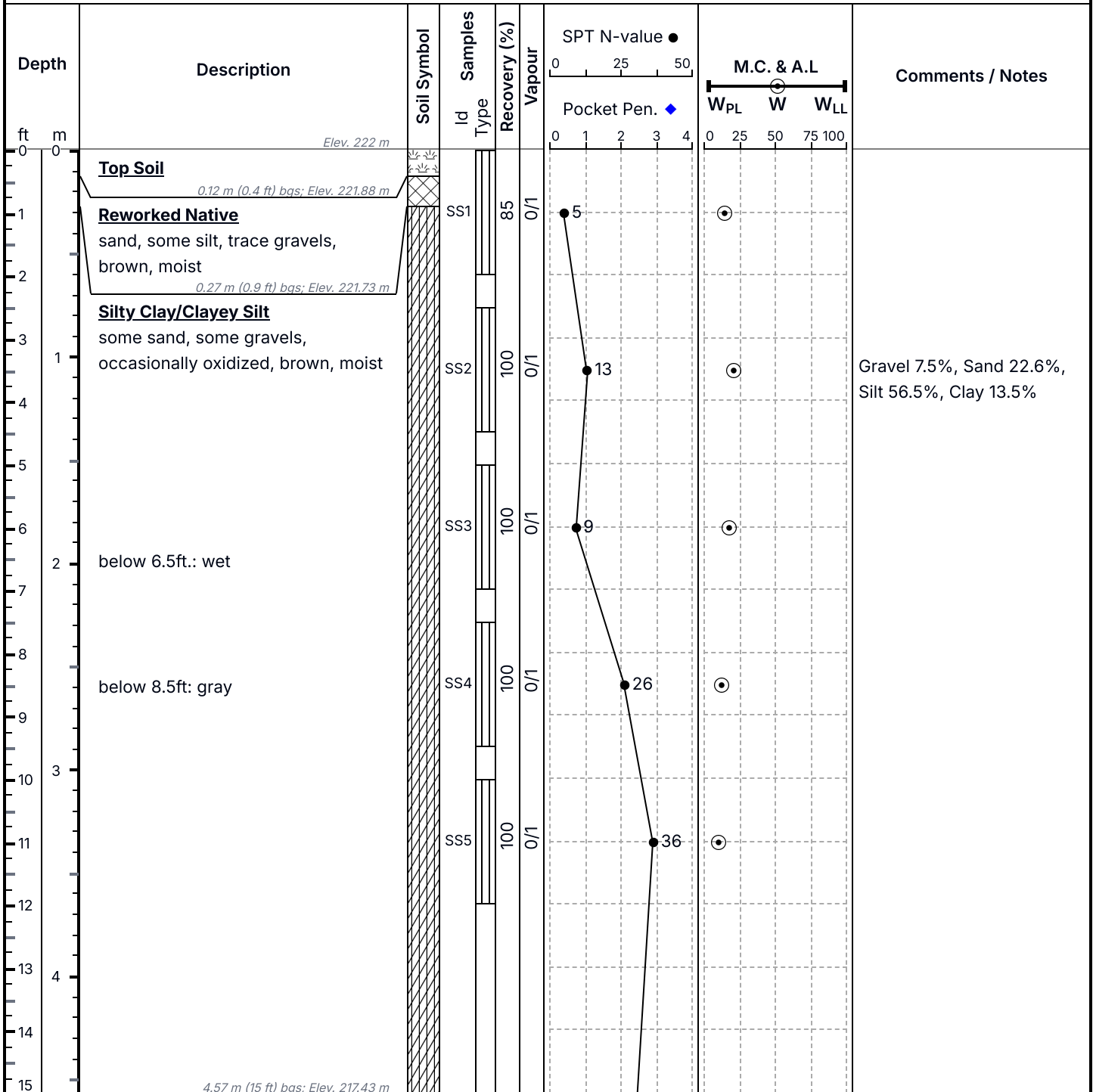
8995 Boston Church Road, Milton

Start Date: 2025-JUL-02

End Date: 2025-JUL-02

Elevation: 222 m AMSL

588396.4 E, 4822414.7 N (NAD83 - 17)



Notes: - Groundwater was measured at 2.3 mbgs immediately after drilling.

- Borehole was open immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01

Borehole: BH-5

8995 Boston Church Road, Milton

Start Date: 2025-JUL-02

End Date: 2025-JUL-02

Elevation: 222 m AMSL

588396.4 E, 4822414.7 N (NAD83 - 17)

Depth	Description	Soil Symbol	Id Type	Recovery (%)	Vapour	SPT N-value ● Pocket Pen. ◆	M.C. & A.L. W _{PL} W W _{LL}	Comments / Notes
ft m						0 25 50 0 1 2 3 4	0 25 50 75 100	
15	Sand trace silt, trace gravels, gray, wet		SS6	80	0/1	18		
16								
5								
17	5.18 m (17 ft) bgs; Elev. 216.82 m							
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

Notes: - Groundwater was measured at 2.3 mbgs immediately after drilling.

- Borehole was open immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01
		Page 2/2

Monitoring Well: MW-6

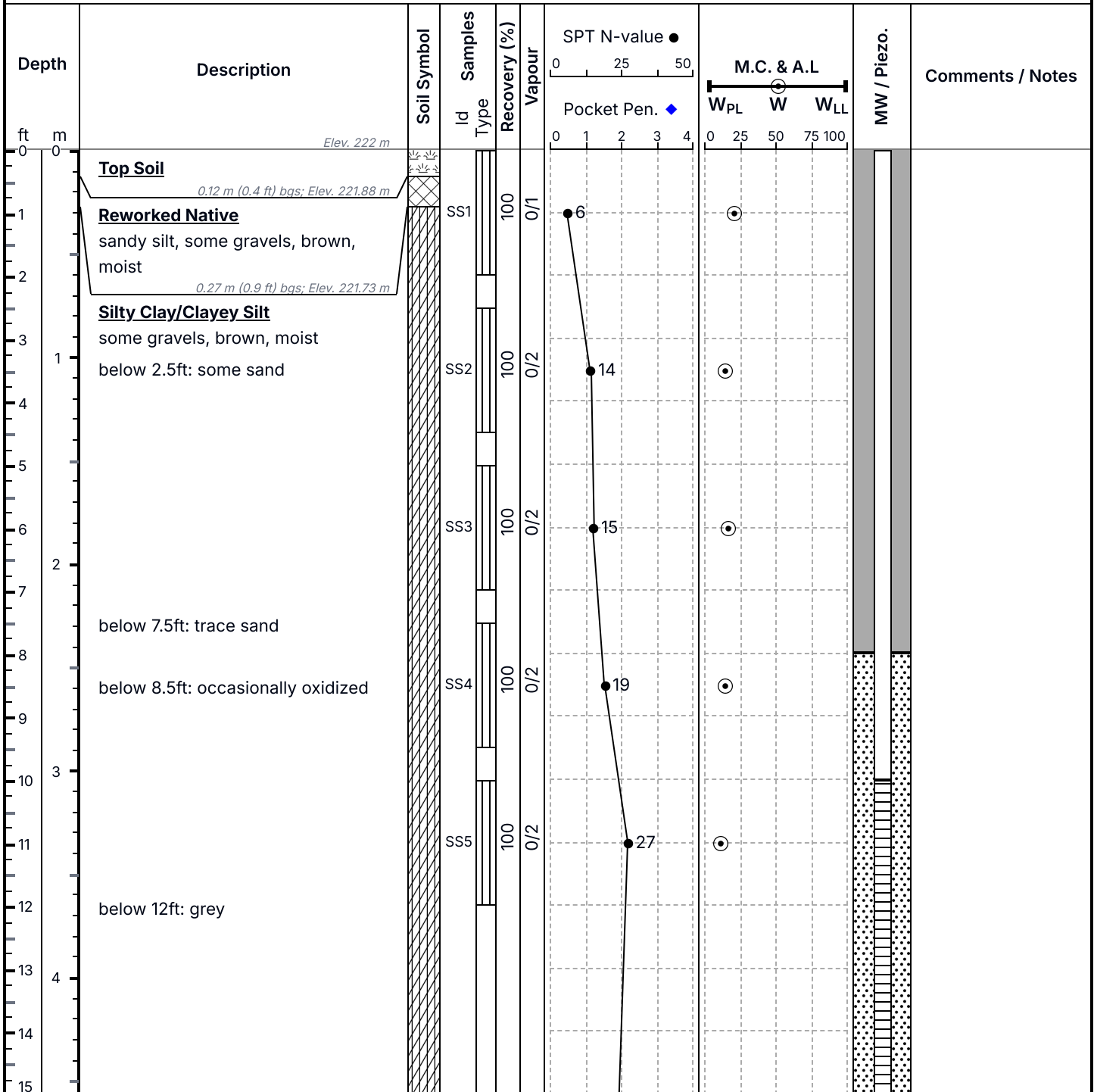
8995 Boston Church Road, Milton

Start Date: 2025-JUL-02

End Date: 2025-JUL-02

Elevation: 222 m AMSL

588384.6 E, 4822477 N (NAD83 - 17)



Notes: - Groundwater was measured at 5.9 mbgs immediately after drilling.

- Borehole was open immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01
		Page 1/2

Monitoring Well: MW-6

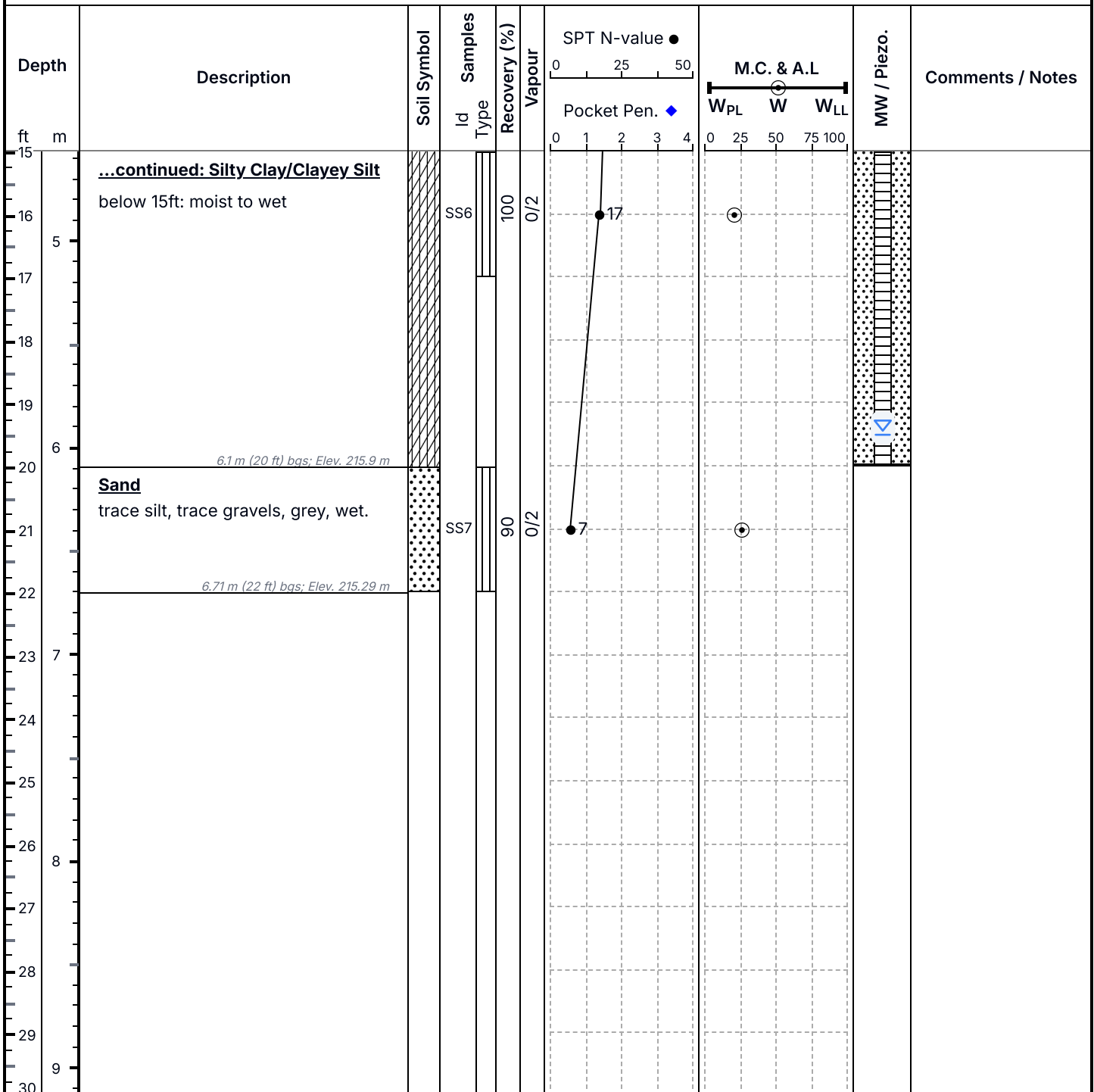
8995 Boston Church Road, Milton

Start Date: 2025-JUL-02

End Date: 2025-JUL-02

Elevation: 222 m AMSL

588384.6 E, 4822477 N (NAD83 - 17)



Notes: - Groundwater was measured at 5.9 mbgs immediately after drilling.

- Borehole was open immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01

Borehole: BH-7

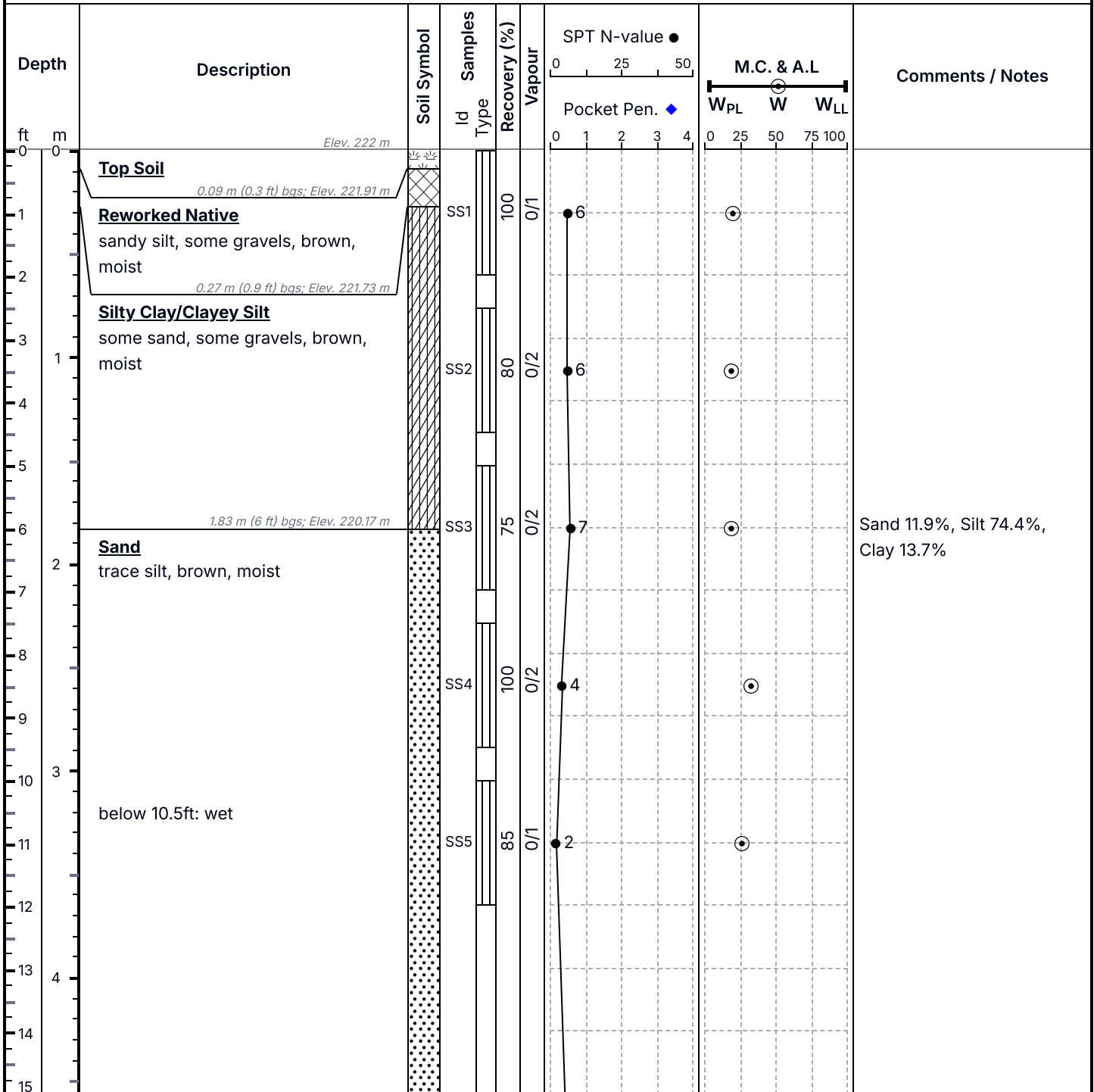
8995 Boston Church Road, Milton

Start Date: 2025-JUL-02

End Date: 2025-JUL-02

Elevation: 222 m AMSL

588291.3 E, 4822486.3 N (NAD83 - 17)



Notes: - Groundwater was measured at 5.3 mbgs immediately after drilling.

- Borehole was open immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01
		Page 1/2

Borehole: BH-7

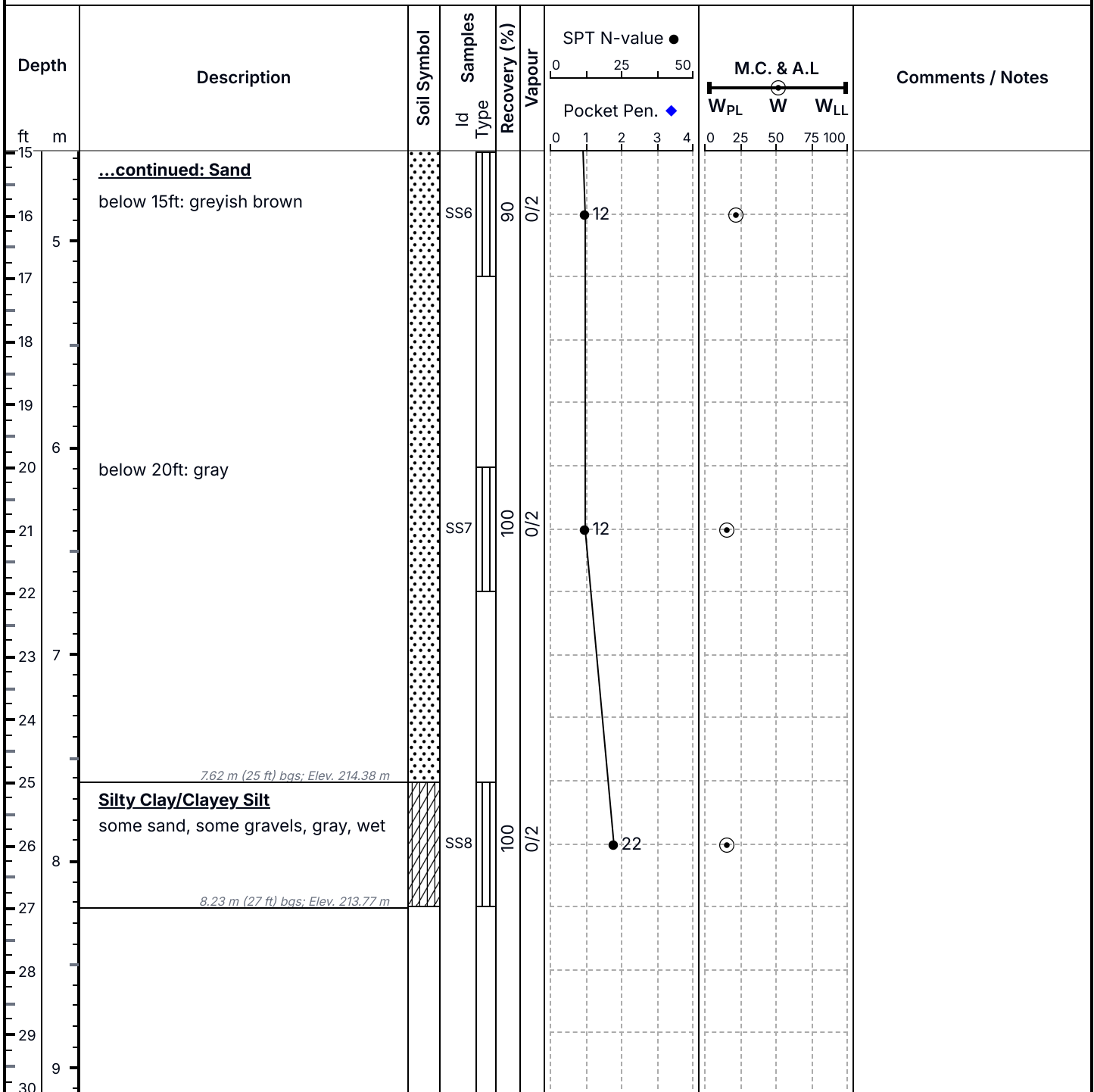
8995 Boston Church Road, Milton

Start Date: 2025-JUL-02

End Date: 2025-JUL-02

Elevation: 222 m AMSL

588291.3 E, 4822486.3 N (NAD83 - 17)



Notes: - Groundwater was measured at 5.3 mbgs immediately after drilling.

- Borehole was open immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01

Monitoring Well: MW-9

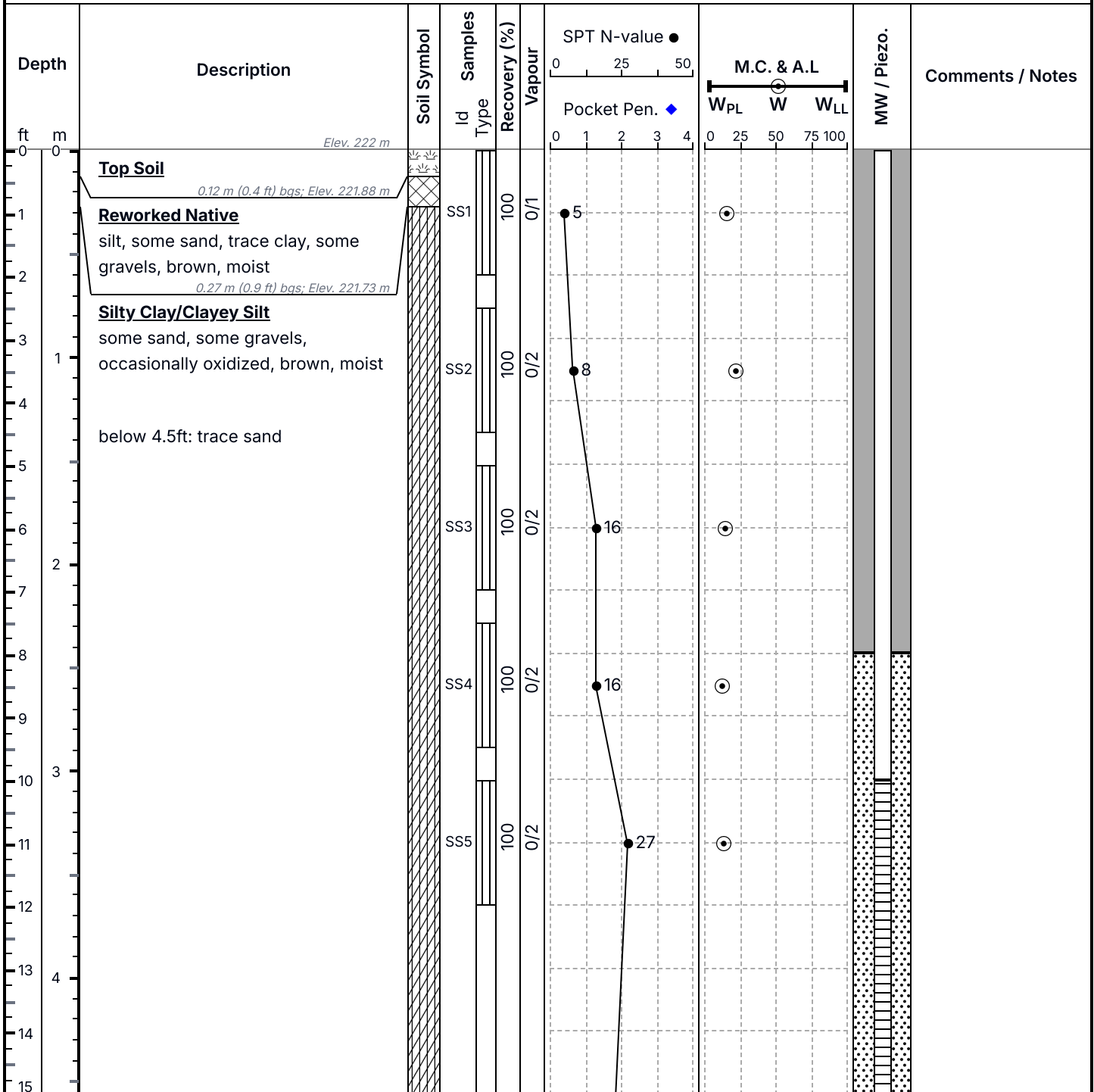
8995 Boston Church Road, Milton

Start Date: 2025-JUL-02

End Date: 2025-JUL-02

Elevation: 222 m AMSL

588184.1 E, 4822613.9 N (NAD83 - 17)



Notes: - Borehole was open and dry immediately after drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01
		Page 1/2

Monitoring Well: MW-9

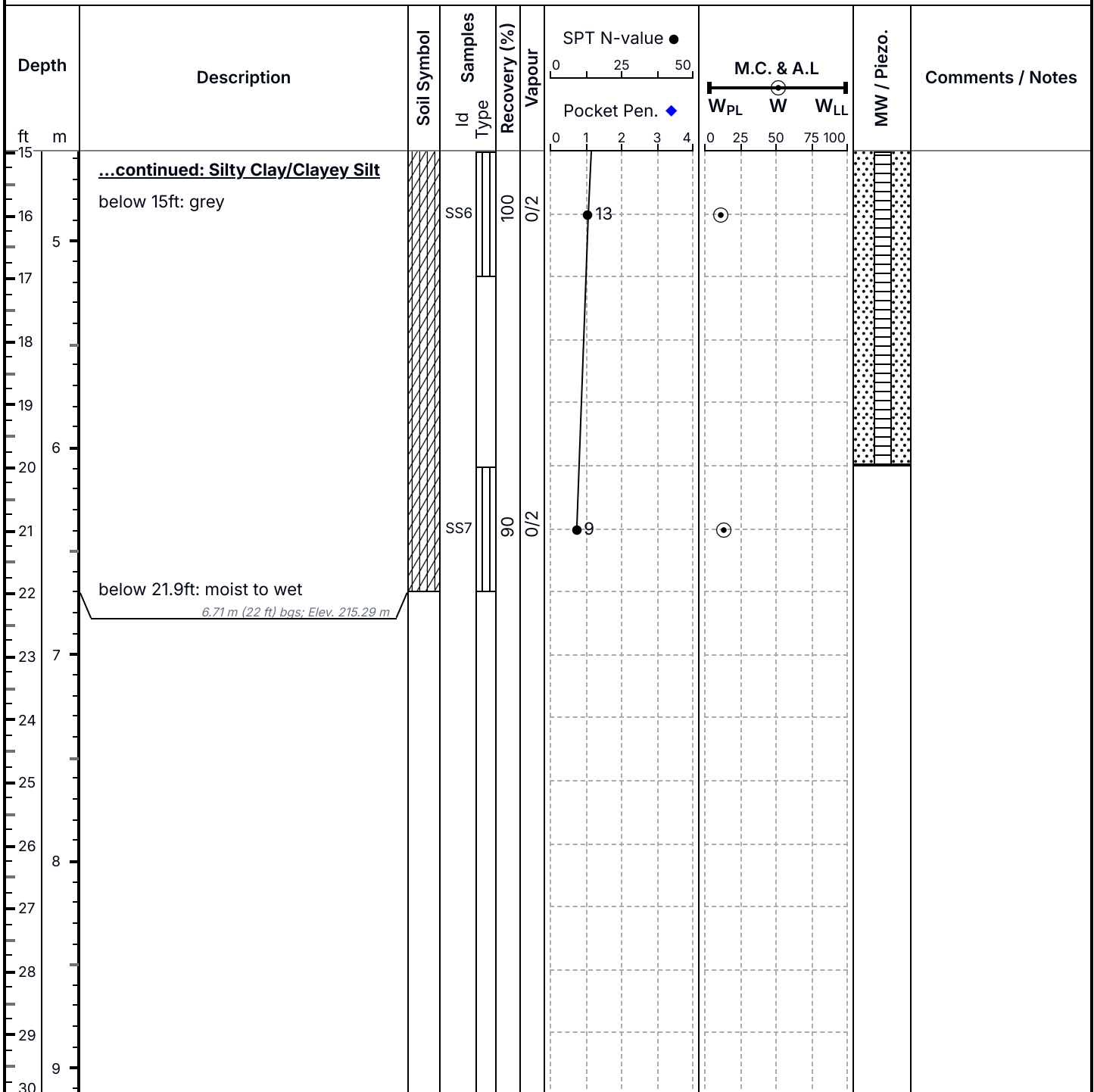
8995 Boston Church Road, Milton

Start Date: 2025-JUL-02

End Date: 2025-JUL-02

Elevation: 222 m AMSL

588184.1 E, 4822613.9 N (NAD83 - 17)



Notes: - Borehole was open and dry immediately after drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01
		Page 2/2

Borehole: BH-10

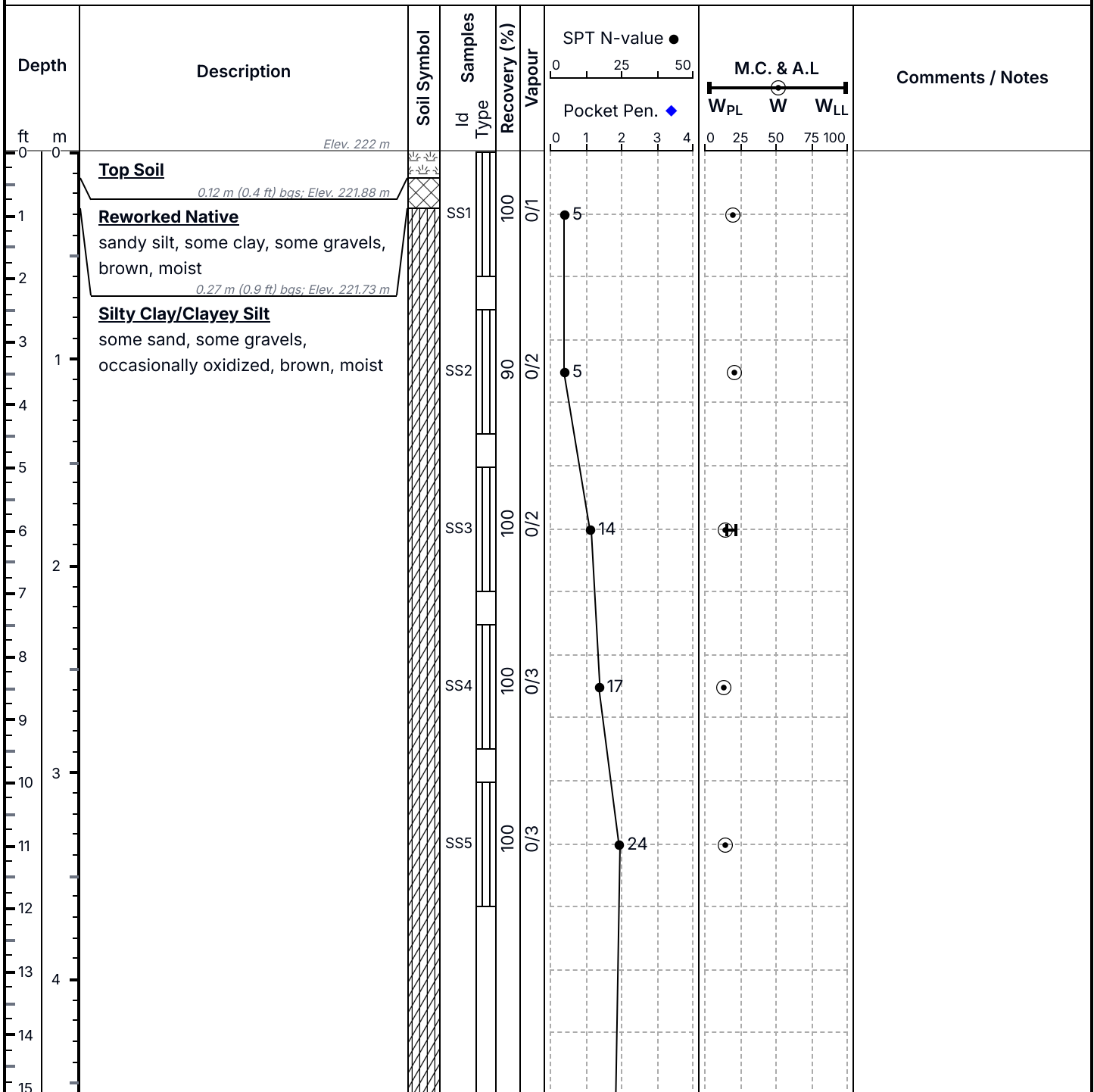
8995 Boston Church Road, Milton

Start Date: 2025-JUL-02

End Date: 2025-JUL-02

Elevation: 222 m AMSL

588196.1 E, 4822545.6 N (NAD83 - 17)



Notes: - Groundwater was measured at 6.1 mbgs immediately after drilling.

- Borehole was open immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01
		Page 1/2

Borehole: BH-10

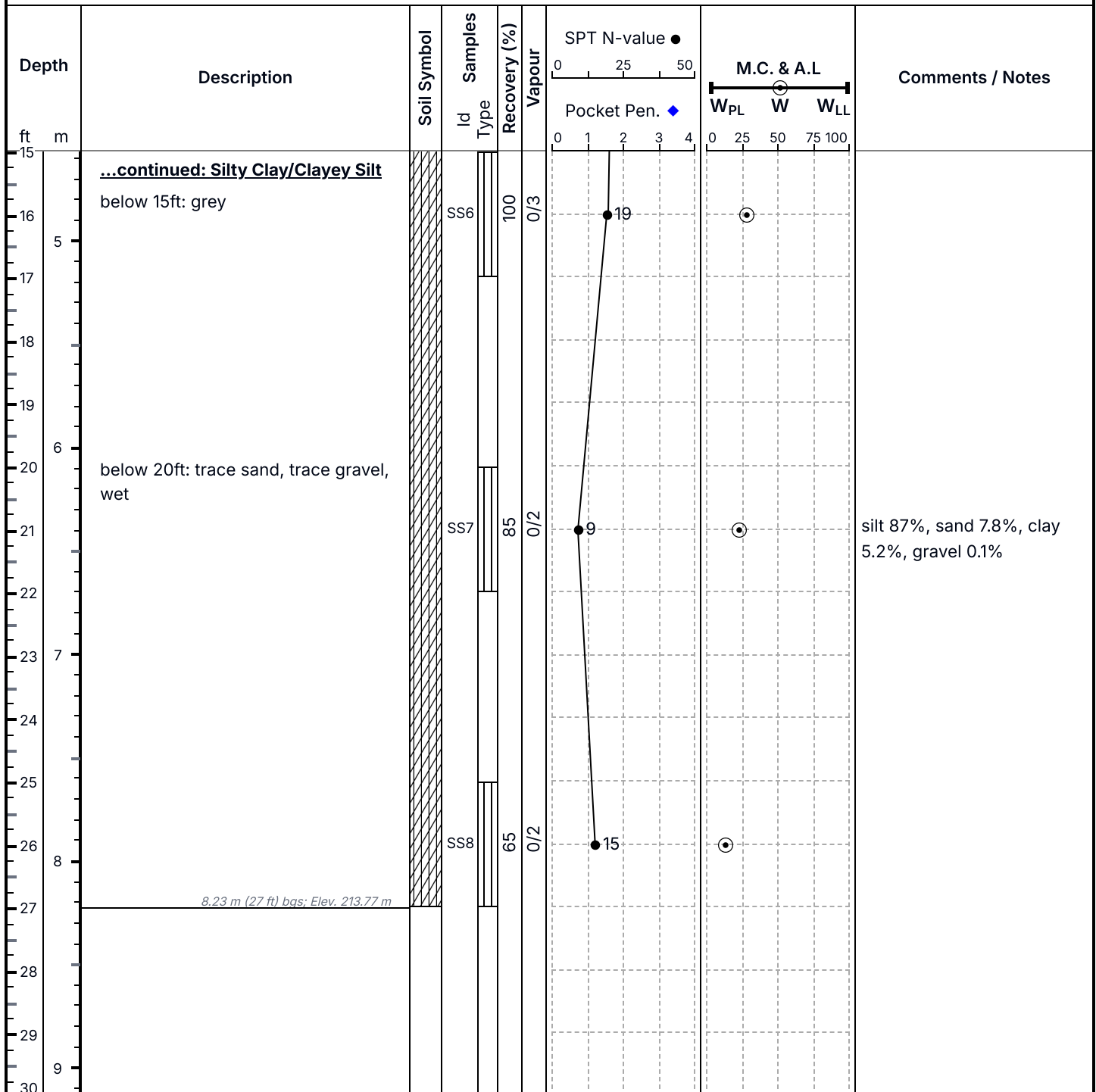
8995 Boston Church Road, Milton

Start Date: 2025-JUL-02

End Date: 2025-JUL-02

Elevation: 222 m AMSL

588196.1 E, 4822545.6 N (NAD83 - 17)



Notes: - Groundwater was measured at 6.1 mbgs immediately after drilling.

- Borehole was open immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01
		Page 2/2

Monitoring Well: MW-11

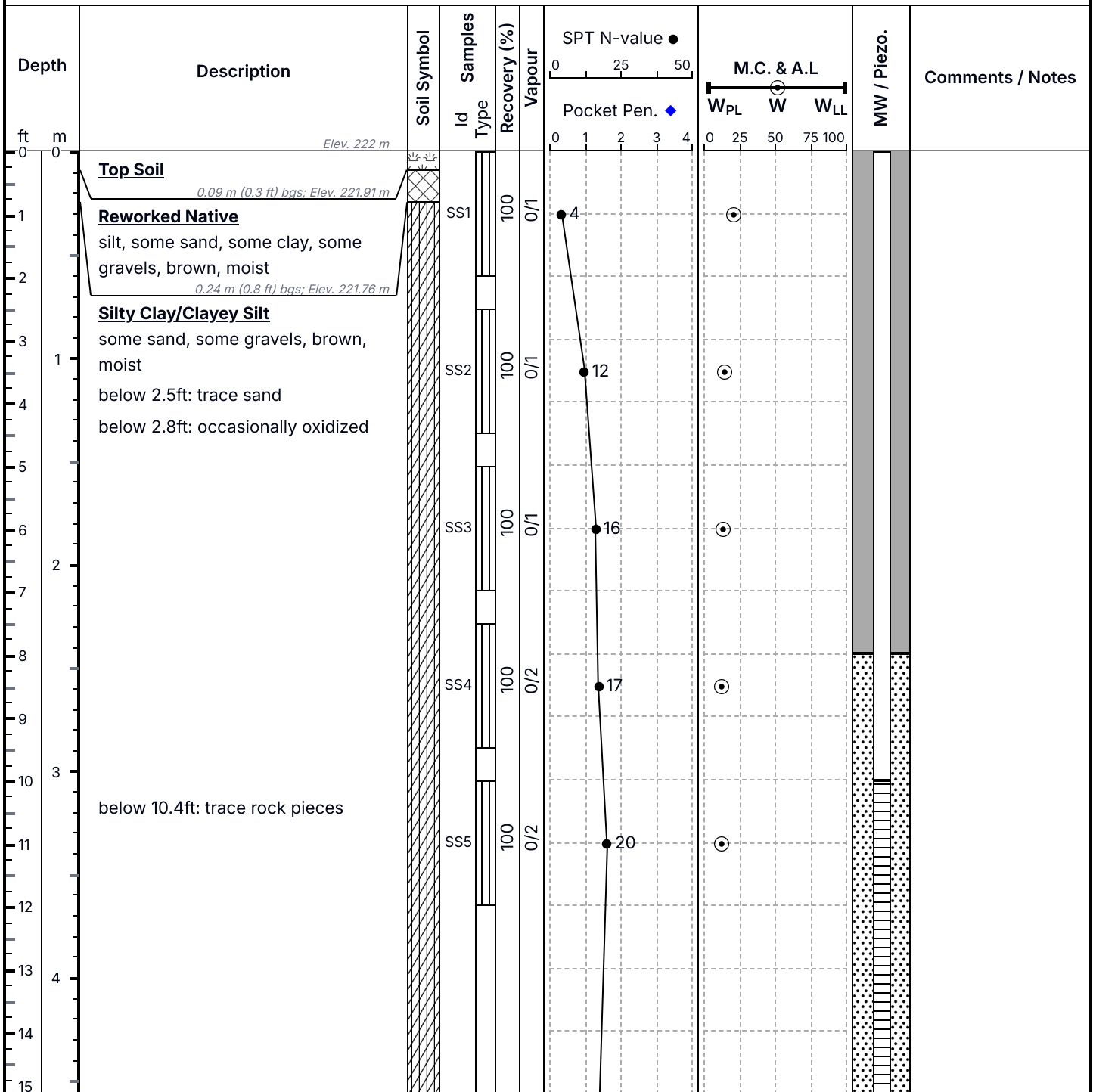
8995 Boston Church Road, Milton

Start Date: 2025-JUL-03

End Date: 2025-JUL-03

Elevation: 222 m AMSL

588128.2 E, 4822546.4 N (NAD83 - 17)



Notes: - Borehole was open and dry immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01
		Page 1/2

Monitoring Well: MW-11

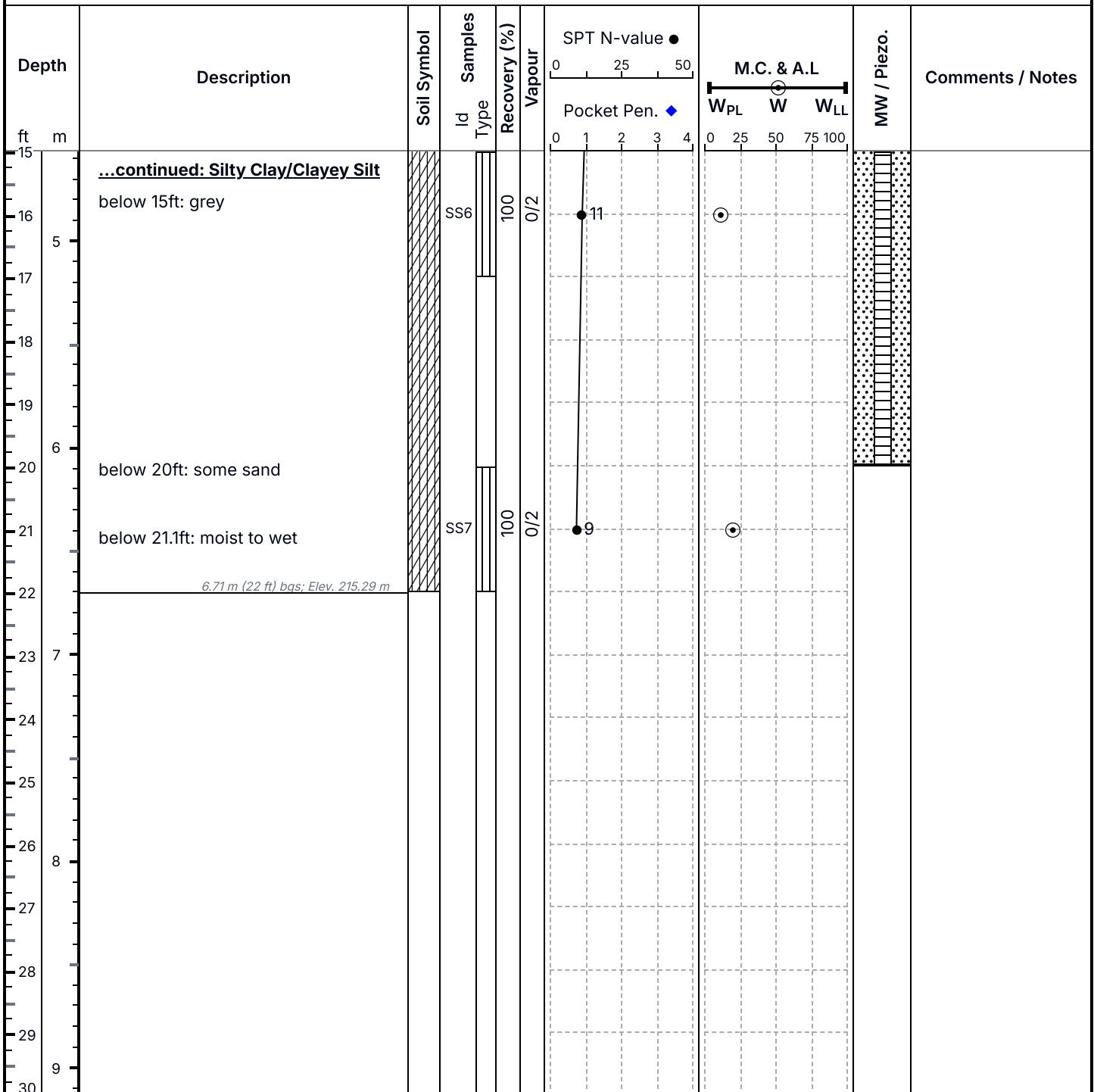
8995 Boston Church Road, Milton

Start Date: 2025-JUL-03

End Date: 2025-JUL-03

Elevation: 222 m AMSL

588128.2 E, 4822546.4 N (NAD83 - 17)



Notes: - Borehole was open and dry immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01

Borehole: BH-13

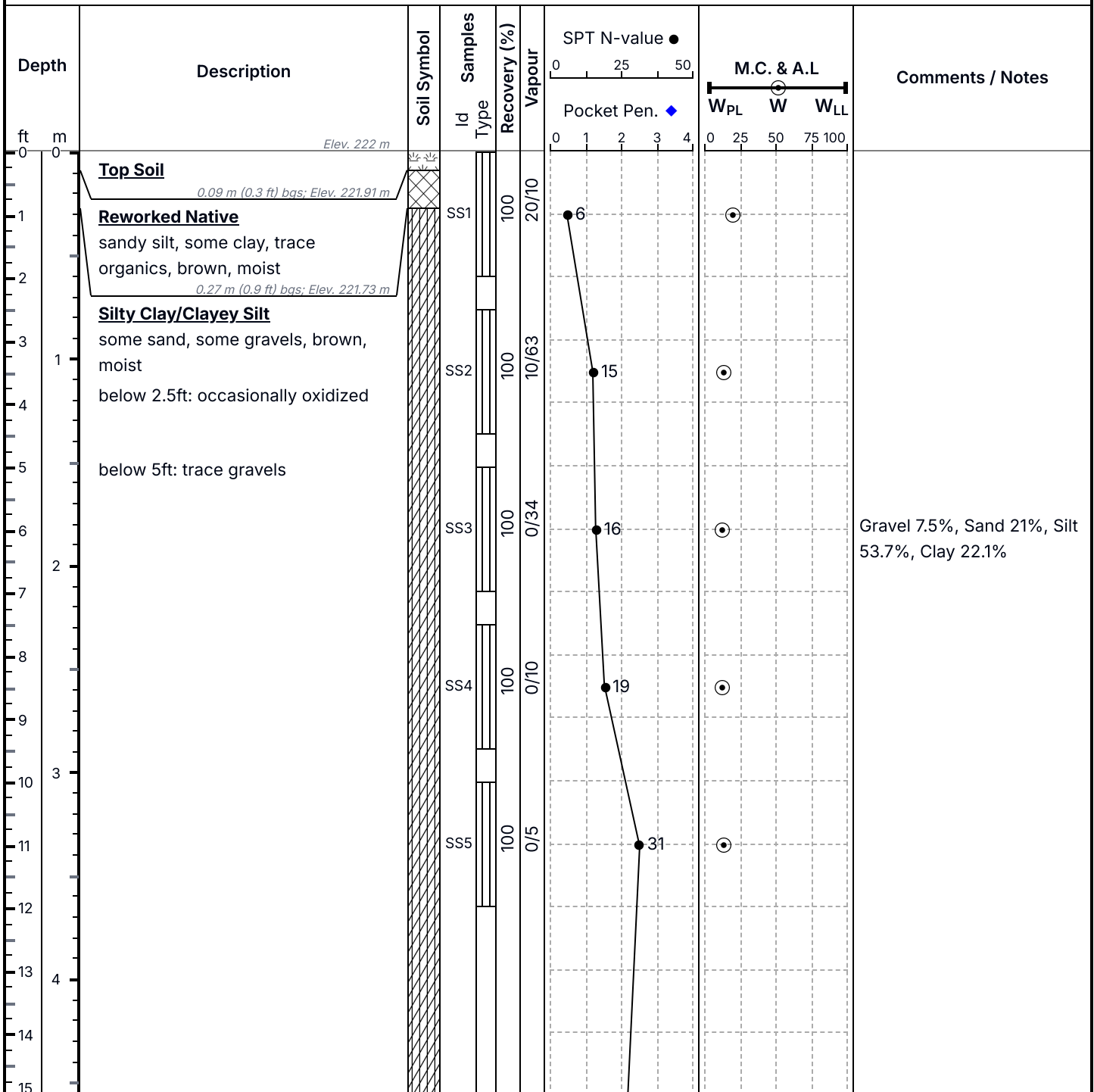
8995 Boston Church Road, Milton

Start Date: 2025-JUL-03

End Date: 2025-JUL-03

Elevation: 222 m AMSL

588070.7 E, 4822474 N (NAD83 - 17)



Notes: Borehole was open and dry immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01

Borehole: BH-13

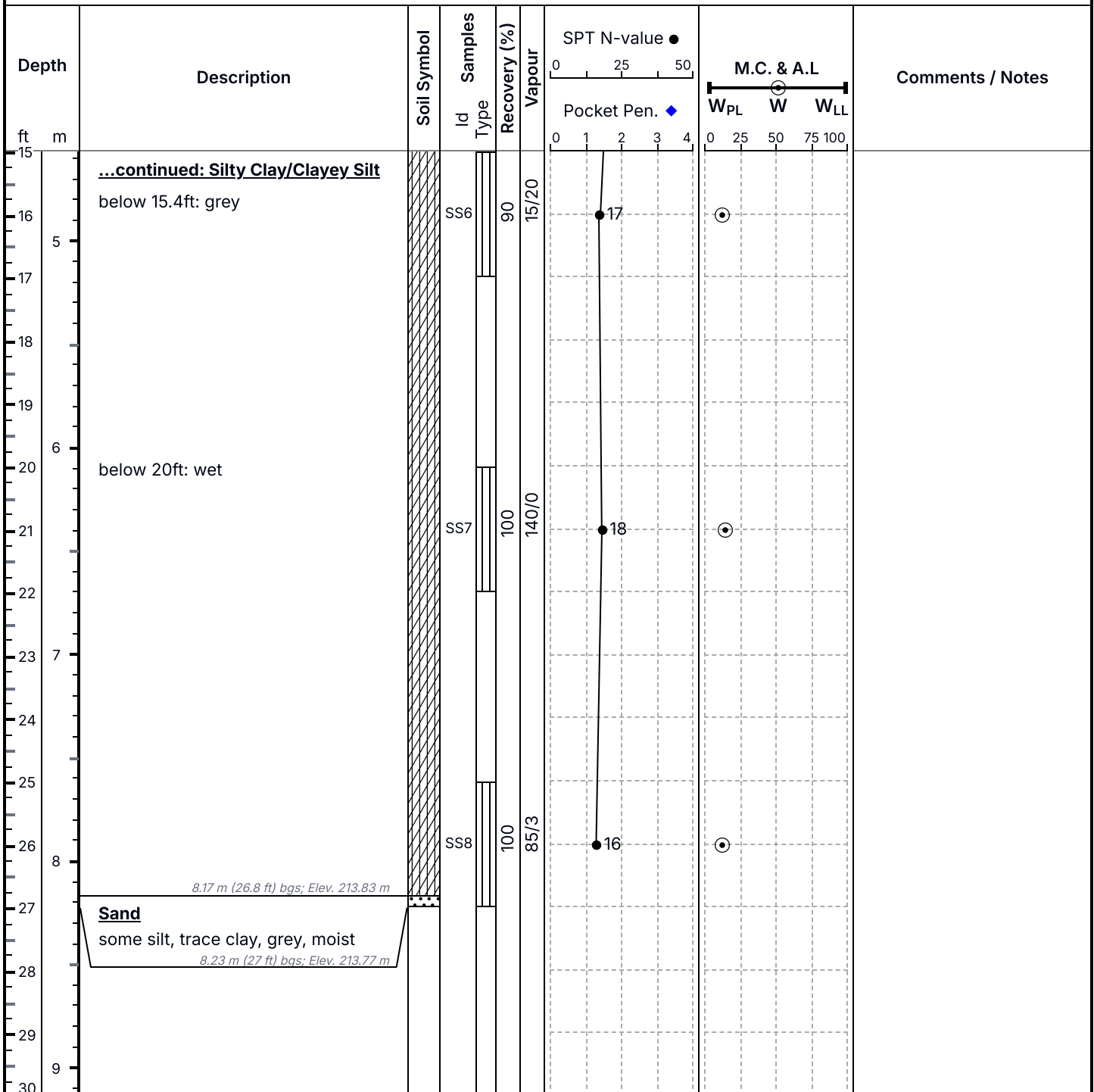
8995 Boston Church Road, Milton

Start Date: 2025-JUL-03

End Date: 2025-JUL-03

Elevation: 222 m AMSL

588070.7 E, 4822474 N (NAD83 - 17)



Notes: Borehole was open and dry immediately after the drilling.



Logged By: MUH	Contractor: DrillTech Drilling Ltd.	Client: BC5L Inc.
Approved By: AS	Drilling Details: Solid Stem	Project Title: 8995 Boston Church Road, Milton
Project Eng.: Abid Sahi., P.Eng.		Project No.: 25-1242-01
		Page 2/2

APPENDIX D

SITE WATER BALANCE ASSESSMENT

WATER BUDGET - PRE-DEVELOPMENT
WATER BALANCE ASSESSMENT

Catchment Designation	Site
Area (m ²)	120297
Pervious Area (m ²)	120297
Impervious Area (m ²)	0
Infiltration Factors	
Topography Infiltration Factor	0.3
Soil Infiltration Factor	0.1
Land Cover Infiltration Factor	0.1
MOE Infiltration Factor	0.5
Run-Off Coefficient	0.5
Runoff from Impervious Surfaces*	0.8
Inputs (per Unit Area)	
Precipitation (mm/yr)	807
Run-On (mm/yr)	0
Other Inputs (mm/yr)	0
Total Inputs (mm/yr)	807
Outputs (per Unit Area)	
Precipitation Surplus (mm/yr)	200
Net Surplus (mm/yr)	200
Evapotranspiration (mm/yr)	607
Infiltration (mm/yr)	100
Rooftop Infiltration (mm/yr)**	0
Total Infiltration (mm/yr)	100
Runoff Pervious Areas	100
Runoff Impervious Areas	0
Total Runoff (mm/yr)	100
Total Outputs (mm/yr)	807
Difference (Inputs - Outputs)	0
Inputs (Volumes)	
Precipitation (m ³ /yr)	97055
Run-On (m ³ /yr)	0
Other Inputs (m ³ /yr)	0
Total Inputs (m³/yr)	97055
Outputs (Volumes)	
Precipitation Surplus (m ³ /yr)	24084
Net Surplus (m ³ /yr)	24084
Evapotranspiration (m ³ /yr)	72972
Infiltration (m ³ /yr)	12042
Rooftop Infiltration (m ³ /yr)	0
Total Infiltration (m ³ /yr)	12042
Runoff Pervious Areas	12042
Runoff Impervious Areas	0
Total Runoff (m³/yr)	12042
Total Outputs (m³/yr)	97055
Difference (Inputs - Outputs)	0

*Evaporation from impervious areas was assumed to be 20% of precipitation

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo-transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196
Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.						
* This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.						
<u>Topography</u>	Flat Land, average slope < 0.6 m/km				0.3	
	Rolling Land, average slope 2.8 m to 3.8 m/km				0.2	
	Hilly Land, average slope 28 m to 47 m/km				0.1	
<u>Soils</u>	Tight impervious clay				0.1	
	Medium combinations of clay and loam				0.2	
	Open Sandy loam				0.4	
<u>Cover</u>	Cultivated Land				0.1	
	Woodland				0.2	

WATER BUDGET, POST-DEVELOPMENT
WATER BALANCE ASSESSMENT

Catchment Designation	Site
Area (m ²)	120297
Pervious Area (m ²)	19950
Impervious Area (m ²)	100347
New Rooftop Area (m ²)	45571
Infiltration Factors	
Topography Infiltration Factor	0.3
Soil Infiltration Factor	0.1
Land Cover Infiltration Factor	0.1
MOE Infiltration Factor	0.5
Run-Off Coefficient	0.5
Runoff from Impervious Surfaces*	0.8
Inputs (per Unit Area)	
Precipitation (mm/yr)	807
Run-On (mm/yr)	0
Other Inputs (mm/yr)	0
Total Inputs (mm/yr)	807
Outputs (per Unit Area)	
Precipitation Surplus (mm/yr)	572
Net Surplus (mm/yr)	572
Evapotranspiration (mm/yr)	235
Infiltration (mm/yr)	17
Rooftop Infiltration (mm/yr)	0
Total Infiltration (mm/yr)	17
Runoff Pervious Areas	17
Runoff Impervious Areas	538
Total Runoff (mm/yr)	555
Total Outputs (mm/yr)	807
Difference (Inputs - Outputs)	0
Inputs (Volumes)	
Precipitation (m ³ /yr)	97055
Run-On (m ³ /yr)	0
Other Inputs (m ³ /yr)	0
Total Inputs (m³/yr)	97055
Outputs (Volumes)	
Precipitation Surplus (m ³ /yr)	68762
Net Surplus (m ³ /yr)	68762
Evapotranspiration (m ³ /yr)	28294
Infiltration (m ³ /yr)	1997
Rooftop Infiltration (m ³ /yr)	0
Total Infiltration (m ³ /yr)	1997
Runoff Pervious Areas	1997
Runoff Impervious Areas	64768
Total Runoff (m ³ /yr)	66765
Total Outputs (m³/yr)	97055
Difference (Inputs - Outputs)	0

*Evaporation from impervious areas was assumed to be

20% of precipitation

Table 3.1: Hydrologic Cycle Component Values

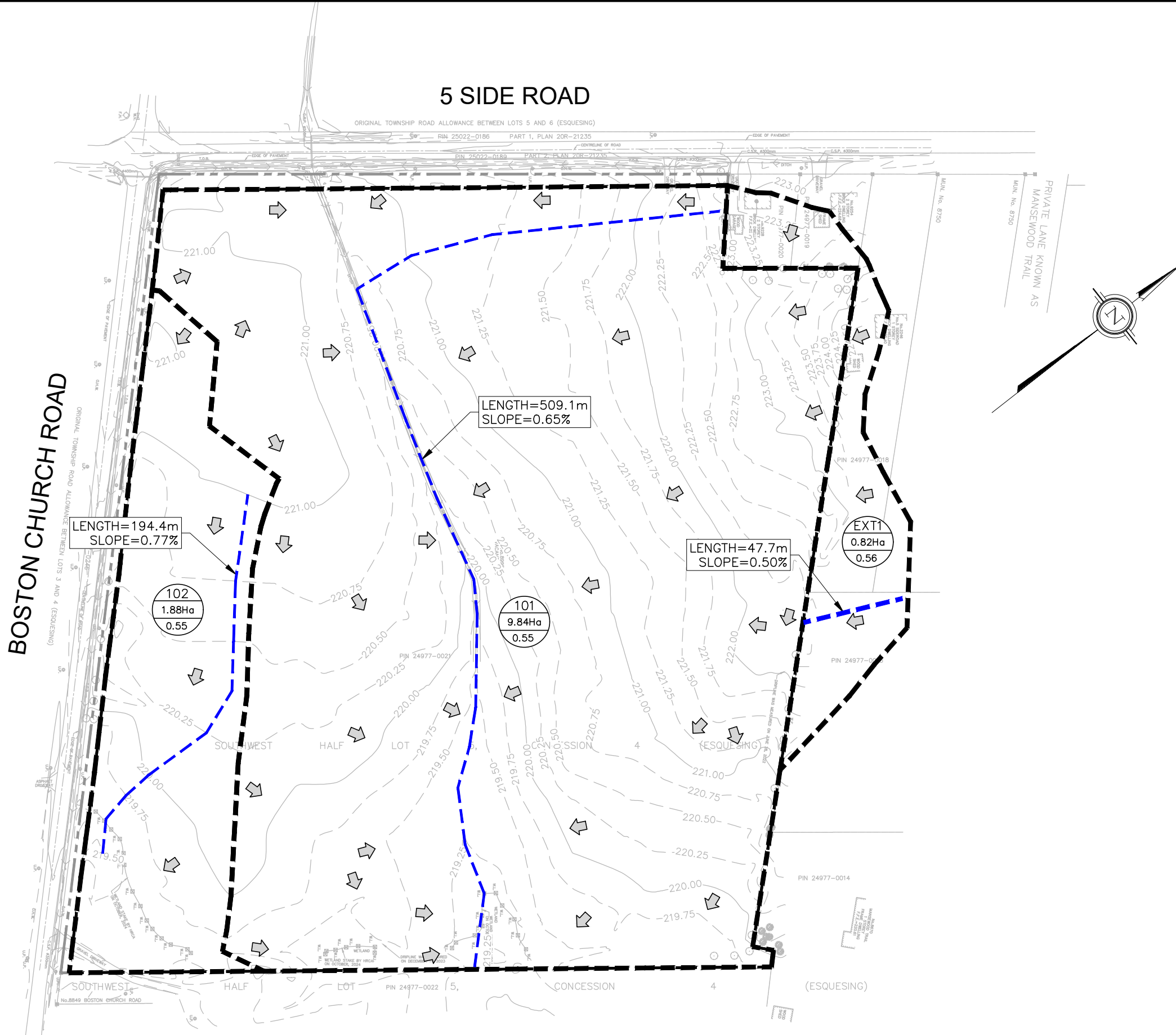
	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo-transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196
Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.						
* This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.						
<u>Topography</u>	Flat Land, average slope < 0.6 m/km				0.3	
	Rolling Land, average slope 2.8 m to 3.8 m/km				0.2	
	Hilly Land, average slope 28 m to 47 m/km				0.1	
<u>Soils</u>	Tight impervious clay				0.1	
	Medium combinations of clay and loam				0.2	
	Open Sandy loam				0.4	
<u>Cover</u>	Cultivated Land				0.1	
	Woodland				0.2	

WATER BUDGET SUMMARY
WATER BALANCE ASSESSMENT

Characteristic	Site		
	Pre-Development	Post-Development	Change (Pre- to Post-)
Inputs (Volumes)			
Precipitation (m ³ /yr)	97055	97055	0.0%
Run-On (m ³ /yr)	0	0	0.0%
Other Inputs (m ³ /yr)	0	0	0.0%
Total Inputs (m³/yr)	97055	97055	0.0%
Outputs (Volumes)			
Precipitation Surplus (m ³ /yr)	24084	68762	185.5%
Net Surplus (m ³ /yr)	24084	68762	185.5%
Evapotranspiration (m ³ /yr)	72972	28294	-61.2%
Infiltration (m ³ /yr)	12042	1997	-83.4%
Rooftop Infiltration (m ³ /yr)	0	0	0.0%
Total Infiltration (m ³ /yr)	12042	1997	-83.4%
Runoff Pervious Areas	12042	1997	-83.4%
Runoff Impervious Areas	0	64768	-
Total Runoff (m ³ /yr)	12042	66765	454.4%
Total Outputs (m³/yr)	97055	97055	0.0%

APPENDIX E

PRE AND POST DEVELOPMENT DRAINAGE PLANS



KEY PLAN	
N.T.S.	
LEGEND	
EXISTING	PROPOSED
MH1	MH1
CB	CB
DCB	DCB
FD	FD
	STORM MANHOLE
	SINGLE CATCHBASIN
	DOUBLE CATCHBASIN
	SINGLE FLOOR DRAIN
	STORM SEWER
	LIMIT OF SUBJECT PROPERTY
	EASEMENT
	RIGHT OF WAY
	LOT LINE
	FENCE LINE
	CURB/SIDEWALK
	BUILDING
	RETAINING WALL
	MAJOR CONTOUR LABEL
	MINOR CONTOUR LABEL
	ELEVATION
	DRIVEWAY
	SWALE
	OVERLAND FLOW
	TREE
	STORM DRAINAGE BOUNDARY
	LONGEST TRAVEL PATH
	DENOTES AREA NUMBER
	DENOTES AREA IN HECTARES
	DENOTES RUNOFF COEFFICIENT

COORDINATE NOTES
SPECIFIED CONTROL POINTS, UTM ZONE 17, NAD83 (CSRS)
POINT A: NORTHING=4822453.512, EASTING=588001.572
POINT B: NORTHING=4822450.007, EASTING=588472.139

BENCHMARK NOTES
ELEVATIONS SHOWN HEREON ARE GEODETIC, VERTICAL DATUM HTv2.0,
ARE DERIVED FROM SOKKIA POWERNET NETWORK
COMPLETED BY:
MANDARIN SURVEYORS LTD.
2400 MIDLAND AVE, #121, SCARBOROUGH, ONTARIO, M1S 5C1
(647) 430-1336 COMPLETED ON: OCTOBER 25, 2024

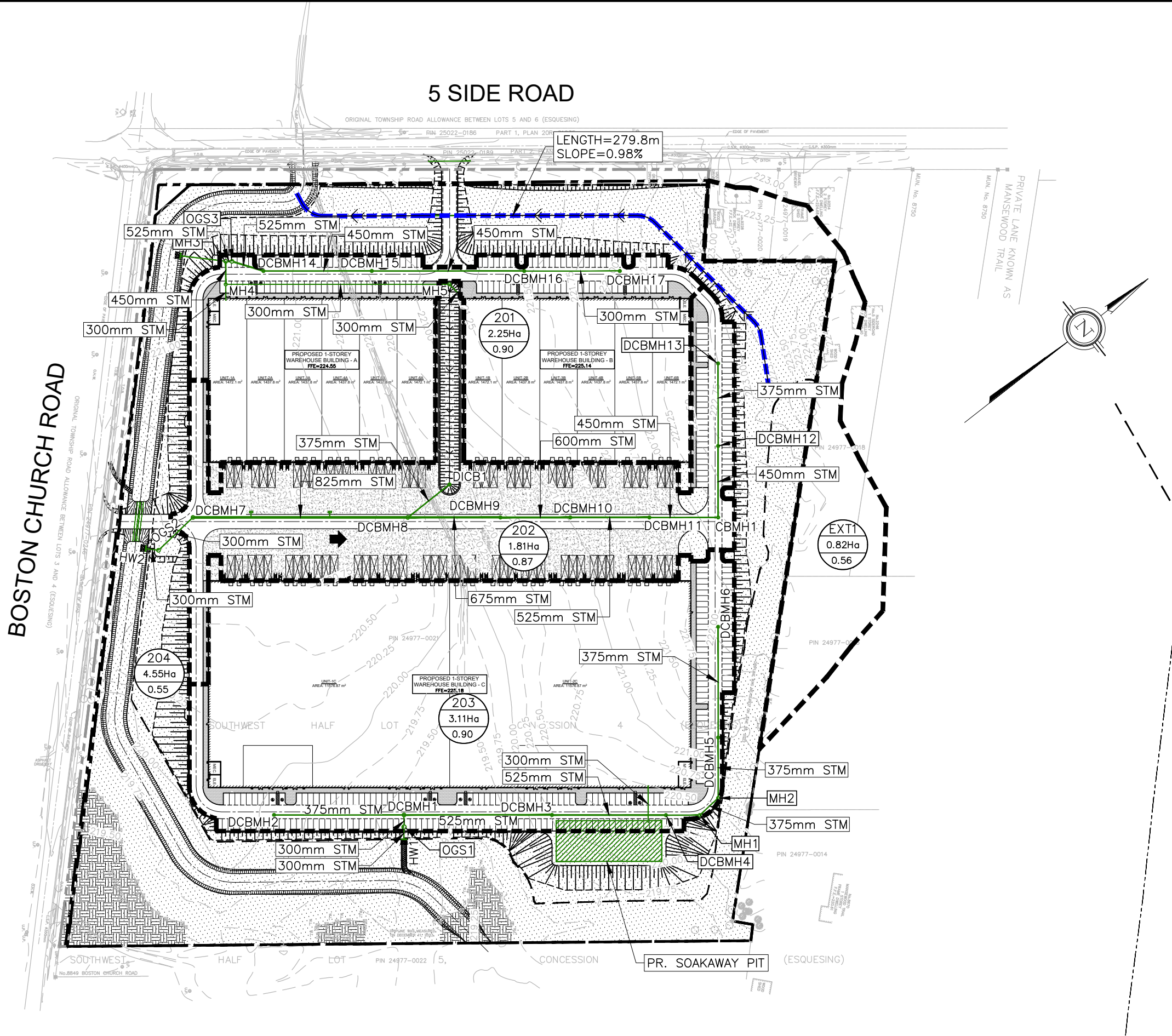


CLIENT NAME:
BCSL INC.
10 ARBORVIEW CRESCENT
ETOBICOKE, ONTARIO
M9W 7B4

PROJECT NAME:
PROPOSED INDUSTRIAL SITE PLAN
8995 BOSTON CHURCH ROAD
TOWN OF MILTON, ONTARIO

DRAINAGE PLAN
EXISTING CONDITIONS

DESIGNED BY:	S.G.	SCALES:	PROJECT No. 23-1033
CHECKED BY:	E.P.	HORIZONTAL: 1:2000	DRAWING No. FIG.2
DRAWN BY:	S.G.	VERTICAL: N/A	SHEET No.
DATE:	APR. 1, 2026	SHEET SIZE: 11"x17"	



KEY PLAN
N.T.S.

LEGEND

EXISTING

MH1

CB

DCB

FD

265.22EX

265.22

3

0.023Ha

0.40

PROPOSED

MH1

CB

DCB

FD

265.22

3

0.023Ha

0.40

STORM MANHOLE

SINGLE CATCHBASIN

DOUBLE CATCHBASIN

SINGLE FLOOR DRAIN

STORM SEWER

LIMIT OF SUBJECT PROPERTY

EASEMENT

RIGHT OF WAY

LOT LINE

FENCE LINE

CURB/SIDEWALK

BUILDING

RETAINING WALL

MAJOR CONTOUR LABEL

MINOR CONTOUR LABEL

ELEVATION

DRIVEWAY

SWALE

OVERLAND FLOW

TREE

STORM DRAINAGE BOUNDARY

LONGEST TRAVEL PATH

3

0.023Ha

0.40

0.023Ha

0.40

0.023Ha

0.40

COORDINATE NOTES
SPECIFIED CONTROL POINTS, UTM ZONE 17, NAD83 (CSRS)
POINT A: NORTHING=4822453.512, EASTING=588001.572
POINT B: NORTHING=4822450.007, EASTING=588472.139

BENCHMARK NOTES
ELEVATIONS SHOWN HEREON ARE GEODETIC, VERTICAL DATUM HTv2.0,
ARE DERIVED FROM SOKKIA POWERNET NETWORK
COMPLETED BY:
MANDARIN SURVEYORS LTD.
2400 MIDLAND AVE, #121, SCARBOROUGH, ONTARIO, M1S 5C1
(647) 430-1336 COMPLETED ON: OCTOBER 25, 2024



CLIENT NAME:
BCSL INC.
10 ARBORVIEW CRESCENT
ETOBICOKE, ONTARIO
M9W 7B4

PROJECT NAME:
PROPOSED INDUSTRIAL SITE PLAN
8995 BOSTON CHURCH ROAD
TOWN OF MILTON, ONTARIO

DRAINAGE PLAN
PROPOSED CONDITIONS

DESIGNED BY:	S.G.	SCALES:	1:2000	PROJECT No.	23-1033
CHECKED BY:	E.P.	HORIZONTAL:		DRAWING No.	FIG.3
DRAWN BY:	S.G.	VERTICAL:	N/A	SHEET No.	
DATE:	APR. 2, 2026	SHEET SIZE:	11"x17"		

APPENDIX F

WETLAND WATER BALANCE ASSESSMENT

WETLAND 1 WATER BUDGET - PRE-DEVELOPMENT
WATER BALANCE ASSESSMENT

Catchment Designation	Site
Area (m ²)	2200
Pervious Area (m ²)	2200
Impervious Area (m ²)	0
Infiltration Factors	
Topography Infiltration Factor	0.25
Soil Infiltration Factor	0.1
Land Cover Infiltration Factor	0.1
MOE Infiltration Factor	0.45
Run-Off Coefficient	0.55
Runoff from Impervious Surfaces*	0.8
Inputs (per Unit Area)	
Precipitation (mm/yr)	807
Run-On (mm/yr)	570
Other Inputs (mm/yr)	0
Total Inputs (mm/yr)	1377
Outputs (per Unit Area)	
Precipitation Surplus (mm/yr)	200
Net Surplus (mm/yr)	200
Evapotranspiration (mm/yr)	607
Infiltration (mm/yr)	90
Rooftop Infiltration (mm/yr)**	0
Total Infiltration (mm/yr)	90
Runoff Pervious Areas	110
Runoff Impervious Areas	0
Total Runoff (mm/yr)	110
Total Outputs (mm/yr)	807
Difference (Inputs - Outputs)	570
Inputs (Volumes)	
Precipitation (m ³ /yr)	1775
Run-On (m ³ /yr)	1254
Other Inputs (m ³ /yr)	0
Total Inputs (m³/yr)	3029
Outputs (Volumes)	
Precipitation Surplus (m ³ /yr)	440
Net Surplus (m ³ /yr)	440
Evapotranspiration (m ³ /yr)	1335
Infiltration (m ³ /yr)	198
Rooftop Infiltration (m ³ /yr)	0
Total Infiltration (m ³ /yr)	198
Runoff Pervious Areas	242
Runoff Impervious Areas	0
Total Runoff (m ³ /yr)	242
Total Outputs (m³/yr)	1775
Difference (Inputs - Outputs)	1254

*Evaporation from impervious areas was assumed to be 20% of precipitation

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo-transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196
Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.						
* This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.						
<u>Topography</u>	Flat Land, average slope < 0.6 m/km				0.3	
	Rolling Land, average slope 2.8 m to 3.8 m/km				0.2	
	Hilly Land, average slope 28 m to 47 m/km				0.1	
<u>Soils</u>	Tight impervious clay				0.1	
	Medium combinations of clay and loam				0.2	
	Open Sandy loam				0.4	
<u>Cover</u>	Cultivated Land				0.1	
	Woodland				0.2	

WETLAND 1 CATCHMENT AREA WATER BUDGET - PRE-DEVELOPMENT
WATER BALANCE ASSESSMENT

Catchment Designation	Site
Area (m ²)	18800
Pervious Area (m ²)	2200
Impervious Area (m ²)	16600
Infiltration Factors	
Topography Infiltration Factor	0.25
Soil Infiltration Factor	0.1
Land Cover Infiltration Factor	0.1
MOE Infiltration Factor	0.45
Run-Off Coefficient	0.55
Runoff from Impervious Surfaces*	0.8
Inputs (per Unit Area)	
Precipitation (mm/yr)	807
Run-On (mm/yr)	0
Other Inputs (mm/yr)	0
Total Inputs (mm/yr)	807
Outputs (per Unit Area)	
Precipitation Surplus (mm/yr)	593
Net Surplus (mm/yr)	593
Evapotranspiration (mm/yr)	213
Infiltration (mm/yr)	11
Rooftop Infiltration (mm/yr)**	0
Total Infiltration (mm/yr)	11
Runoff Pervious Areas	13
Runoff Impervious Areas	570
Total Runoff (mm/yr)	583
Total Outputs (mm/yr)	807
Difference (Inputs - Outputs)	0
Inputs (Volumes)	
Precipitation (m ³ /yr)	15168
Run-On (m ³ /yr)	0
Other Inputs (m ³ /yr)	0
Total Inputs (m³/yr)	15168
Outputs (Volumes)	
Precipitation Surplus (m ³ /yr)	11155
Net Surplus (m ³ /yr)	11155
Evapotranspiration (m ³ /yr)	4013
Infiltration (m ³ /yr)	198
Rooftop Infiltration (m ³ /yr)	0
Total Infiltration (m ³ /yr)	198
Runoff Pervious Areas	242
Runoff Impervious Areas	10714
Total Runoff (m³/yr)	10957
Total Outputs (m³/yr)	15168
Difference (Inputs - Outputs)	0

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo-transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196
Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.						
* This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.						
<u>Topography</u>	Flat Land, average slope < 0.6 m/km				0.3	
	Rolling Land, average slope 2.8 m to 3.8 m/km				0.2	
	Hilly Land, average slope 28 m to 47 m/km				0.1	
<u>Soils</u>	Tight impervious clay				0.1	
	Medium combinations of clay and loam				0.2	
	Open Sandy loam				0.4	
<u>Cover</u>	Cultivated Land				0.1	
	Woodland				0.2	

*Evaporation from impervious areas was assumed to be 20% of precipitation

WETLAND 1 WATER BUDGET, POST-DEVELOPMENT
WATER BALANCE ASSESSMENT

Catchment Designation	Site
Area (m ²)	2200
Pervious Area (m ²)	2200
Impervious Area (m ²)	0
New Rooftop Area (m ²)	0
Infiltration Factors	
Topography Infiltration Factor	0.25
Soil Infiltration Factor	0.1
Land Cover Infiltration Factor	0.1
MOE Infiltration Factor	0.45
Run-Off Coefficient	0.55
Runoff from Impervious Surfaces*	0.8
Inputs (per Unit Area)	
Precipitation (mm/yr)	807
Run-On (mm/yr)	578
Other Inputs (mm/yr)	0
Total Inputs (mm/yr)	1385
Outputs (per Unit Area)	
Precipitation Surplus (mm/yr)	200
Net Surplus (mm/yr)	200
Evapotranspiration (mm/yr)	607
Infiltration (mm/yr)	90
Rooftop Infiltration (mm/yr)	0
Total Infiltration (mm/yr)	90
Runoff Pervious Areas	110
Runoff Impervious Areas	0
Total Runoff (mm/yr)	110
Total Outputs (mm/yr)	807
Difference (Inputs - Outputs)	578
Inputs (Volumes)	
Precipitation (m ³ /yr)	1775
Run-On (m ³ /yr)	1272
Other Inputs (m ³ /yr)	0
Total Inputs (m³/yr)	3047
Outputs (Volumes)	
Precipitation Surplus (m ³ /yr)	440
Net Surplus (m ³ /yr)	440
Evapotranspiration (m ³ /yr)	1335
Infiltration (m ³ /yr)	198
Rooftop Infiltration (m ³ /yr)	0
Total Infiltration (m ³ /yr)	198
Runoff Pervious Areas	242
Runoff Impervious Areas	0
Total Runoff (m ³ /yr)	242
Total Outputs (m³/yr)	1775
Difference (Inputs - Outputs)	1272

*Evaporation from impervious areas was assumed to be

20% of precipitation

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo- transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196
Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.						
* This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.						
Topography	Flat Land, average slope < 0.6 m/km				0.3	
	Rolling Land, average slope 2.8 m to 3.8 m/km				0.2	
	Hilly Land, average slope 28 m to 47 m/km				0.1	
Soils	Tight impervious clay				0.1	
	Medium combinations of clay and loam				0.2	
	Open Sandy loam				0.4	
Cover	Cultivated Land				0.1	
	Woodland				0.2	

WETLAND 1 CATCHMENT AREA WATER BUDGET, POST-DEVELOPMENT
WATER BALANCE ASSESSMENT

Catchment Designation	Site
Area (m ²)	17367
Pervious Area (m ²)	2200
Impervious Area (m ²)	15167
New Rooftop Area (m ²)	0
Infiltration Factors	
Topography Infiltration Factor	0.25
Soil Infiltration Factor	0.1
Land Cover Infiltration Factor	0.1
MOE Infiltration Factor	0.45
Run-Off Coefficient	0.55
Runoff from Impervious Surfaces*	0.8
Inputs (per Unit Area)	
Precipitation (mm/yr)	807
Run-On (mm/yr)	0
Other Inputs (mm/yr)	0
Total Inputs (mm/yr)	807
Outputs (per Unit Area)	
Precipitation Surplus (mm/yr)	589
Net Surplus (mm/yr)	589
Evapotranspiration (mm/yr)	218
Infiltration (mm/yr)	11
Rooftop Infiltration (mm/yr)	0
Total Infiltration (mm/yr)	11
Runoff Pervious Areas	14
Runoff Impervious Areas	564
Total Runoff (mm/yr)	578
Total Outputs (mm/yr)	807
Difference (Inputs - Outputs)	0
Inputs (Volumes)	
Precipitation (m ³ /yr)	14011
Run-On (m ³ /yr)	0
Other Inputs (m ³ /yr)	0
Total Inputs (m³/yr)	14011
Outputs (Volumes)	
Precipitation Surplus (m ³ /yr)	10230
Net Surplus (m ³ /yr)	10230
Evapotranspiration (m ³ /yr)	3782
Infiltration (m ³ /yr)	198
Rooftop Infiltration (m ³ /yr)	0
Total Infiltration (m ³ /yr)	198
Runoff Pervious Areas	242
Runoff Impervious Areas	9789
Total Runoff (m ³ /yr)	10031
Total Outputs (m³/yr)	14011
Difference (Inputs - Outputs)	0

*Evaporation from impervious areas was assumed to be

20% of precipitation

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo-transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196
Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.						
* This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.						
<u>Topography</u>	Flat Land, average slope < 0.6 m/km				0.3	
	Rolling Land, average slope 2.8 m to 3.8 m/km				0.2	
	Hilly Land, average slope 28 m to 47 m/km				0.1	
<u>Soils</u>	Tight impervious clay				0.1	
	Medium combinations of clay and loam				0.2	
	Open Sandy loam				0.4	
<u>Cover</u>	Cultivated Land				0.1	
	Woodland				0.2	

WETLAND 2 WATER BUDGET - PRE-DEVELOPMENT
WATER BALANCE ASSESSMENT

Catchment Designation	Site
Area (m ²)	895
Pervious Area (m ²)	895
Impervious Area (m ²)	0
Infiltration Factors	
Topography Infiltration Factor	0.25
Soil Infiltration Factor	0.1
Land Cover Infiltration Factor	0.1
MOE Infiltration Factor	0.45
Run-Off Coefficient	0.55
Runoff from Impervious Surfaces*	0.8
Inputs (per Unit Area)	
Precipitation (mm/yr)	807
Run-On (mm/yr)	596
Other Inputs (mm/yr)	0
Total Inputs (mm/yr)	1403
Outputs (per Unit Area)	
Precipitation Surplus (mm/yr)	200
Net Surplus (mm/yr)	200
Evapotranspiration (mm/yr)	607
Infiltration (mm/yr)	90
Rooftop Infiltration (mm/yr)**	0
Total Infiltration (mm/yr)	90
Runoff Pervious Areas	110
Runoff Impervious Areas	0
Total Runoff (mm/yr)	110
Total Outputs (mm/yr)	807
Difference (Inputs - Outputs)	596
Inputs (Volumes)	
Precipitation (m ³ /yr)	722
Run-On (m ³ /yr)	533
Other Inputs (m ³ /yr)	0
Total Inputs (m³/yr)	1256
Outputs (Volumes)	
Precipitation Surplus (m ³ /yr)	179
Net Surplus (m ³ /yr)	179
Evapotranspiration (m ³ /yr)	543
Infiltration (m ³ /yr)	81
Rooftop Infiltration (m ³ /yr)	0
Total Infiltration (m ³ /yr)	81
Runoff Pervious Areas	99
Runoff Impervious Areas	0
Total Runoff (m ³ /yr)	99
Total Outputs (m³/yr)	722
Difference (Inputs - Outputs)	533

*Evaporation from impervious areas was assumed to be 20% of precipitation

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo-transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196
Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.						
* This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.						
<u>Topography</u>	Flat Land, average slope < 0.6 m/km				0.3	
	Rolling Land, average slope 2.8 m to 3.8 m/km				0.2	
	Hilly Land, average slope 28 m to 47 m/km				0.1	
<u>Soils</u>	Tight impervious clay				0.1	
	Medium combinations of clay and loam				0.2	
	Open Sandy loam				0.4	
<u>Cover</u>	Cultivated Land				0.1	
	Woodland				0.2	

WETLAND 2 CATCHMENT AREA WATER BUDGET - PRE-DEVELOPMENT
WATER BALANCE ASSESSMENT

Catchment Designation	Site
Area (m ²)	9650
Pervious Area (m ²)	895
Impervious Area (m ²)	8755
Infiltration Factors	
Topography Infiltration Factor	0.25
Soil Infiltration Factor	0.1
Land Cover Infiltration Factor	0.1
MOE Infiltration Factor	0.45
Run-Off Coefficient	0.55
Runoff from Impervious Surfaces*	0.8
Inputs (per Unit Area)	
Precipitation (mm/yr)	807
Run-On (mm/yr)	0
Other Inputs (mm/yr)	0
Total Inputs (mm/yr)	807
Outputs (per Unit Area)	
Precipitation Surplus (mm/yr)	604
Net Surplus (mm/yr)	604
Evapotranspiration (mm/yr)	203
Infiltration (mm/yr)	8
Rooftop Infiltration (mm/yr)**	0
Total Infiltration (mm/yr)	8
Runoff Pervious Areas	10
Runoff Impervious Areas	586
Total Runoff (mm/yr)	596
Total Outputs (mm/yr)	807
Difference (Inputs - Outputs)	0
Inputs (Volumes)	
Precipitation (m ³ /yr)	7786
Run-On (m ³ /yr)	0
Other Inputs (m ³ /yr)	0
Total Inputs (m³/yr)	7786
Outputs (Volumes)	
Precipitation Surplus (m ³ /yr)	5830
Net Surplus (m ³ /yr)	5830
Evapotranspiration (m ³ /yr)	1956
Infiltration (m ³ /yr)	81
Rooftop Infiltration (m ³ /yr)	0
Total Infiltration (m ³ /yr)	81
Runoff Pervious Areas	99
Runoff Impervious Areas	5651
Total Runoff (m³/yr)	5749
Total Outputs (m³/yr)	7786
Difference (Inputs - Outputs)	0

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo-transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196
Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.						
* This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.						
<u>Topography</u>	Flat Land, average slope < 0.6 m/km				0.3	
	Rolling Land, average slope 2.8 m to 3.8 m/km				0.2	
	Hilly Land, average slope 28 m to 47 m/km				0.1	
<u>Soils</u>	Tight impervious clay				0.1	
	Medium combinations of clay and loam				0.2	
	Open Sandy loam				0.4	
<u>Cover</u>	Cultivated Land				0.1	
	Woodland				0.2	

*Evaporation from impervious areas was assumed to be 20% of precipitation

WETLAND 2 WATER BUDGET, POST-DEVELOPMENT
WATER BALANCE ASSESSMENT

Catchment Designation	Site
Area (m ²)	895
Pervious Area (m ²)	895
Impervious Area (m ²)	0
New Rooftop Area (m ²)	0
Infiltration Factors	
Topography Infiltration Factor	0.25
Soil Infiltration Factor	0.1
Land Cover Infiltration Factor	0.1
MOE Infiltration Factor	0.45
Run-Off Coefficient	0.55
Runoff from Impervious Surfaces*	0.8
Inputs (per Unit Area)	
Precipitation (mm/yr)	807
Run-On (mm/yr)	607
Other Inputs (mm/yr)	0
Total Inputs (mm/yr)	1414
Outputs (per Unit Area)	
Precipitation Surplus (mm/yr)	200
Net Surplus (mm/yr)	200
Evapotranspiration (mm/yr)	607
Infiltration (mm/yr)	90
Rooftop Infiltration (mm/yr)	0
Total Infiltration (mm/yr)	90
Runoff Pervious Areas	110
Runoff Impervious Areas	0
Total Runoff (mm/yr)	110
Total Outputs (mm/yr)	807
Difference (Inputs - Outputs)	607
Inputs (Volumes)	
Precipitation (m ³ /yr)	722
Run-On (m ³ /yr)	543
Other Inputs (m ³ /yr)	0
Total Inputs (m³/yr)	1265
Outputs (Volumes)	
Precipitation Surplus (m ³ /yr)	179
Net Surplus (m ³ /yr)	179
Evapotranspiration (m ³ /yr)	543
Infiltration (m ³ /yr)	81
Rooftop Infiltration (m ³ /yr)	0
Total Infiltration (m ³ /yr)	81
Runoff Pervious Areas	99
Runoff Impervious Areas	0
Total Runoff (m ³ /yr)	99
Total Outputs (m³/yr)	722
Difference (Inputs - Outputs)	543

*Evaporation from impervious areas was assumed to be

20% of precipitation

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo-transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
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Silt Loam	125	C	940	536	222	182
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Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
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Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196
Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.						
* This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.						
Topography	Flat Land, average slope < 0.6 m/km				0.3	
	Rolling Land, average slope 2.8 m to 3.8 m/km				0.2	
	Hilly Land, average slope 28 m to 47 m/km				0.1	
Soils	Tight impervious clay				0.1	
	Medium combinations of clay and loam				0.2	
	Open Sandy loam				0.4	
Cover	Cultivated Land				0.1	
	Woodland				0.2	

WETLAND 2 CATCHMENT AREA WATER BUDGET, POST-DEVELOPMENT
WATER BALANCE ASSESSMENT

Catchment Designation	Site
Area (m ²)	16062
Pervious Area (m ²)	895
Impervious Area (m ²)	15167
New Rooftop Area (m ²)	0
Infiltration Factors	
Topography Infiltration Factor	0.25
Soil Infiltration Factor	0.1
Land Cover Infiltration Factor	0.1
MOE Infiltration Factor	0.45
Run-Off Coefficient	0.55
Runoff from Impervious Surfaces*	0.8
Inputs (per Unit Area)	
Precipitation (mm/yr)	807
Run-On (mm/yr)	0
Other Inputs (mm/yr)	0
Total Inputs (mm/yr)	807
Outputs (per Unit Area)	
Precipitation Surplus (mm/yr)	621
Net Surplus (mm/yr)	621
Evapotranspiration (mm/yr)	186
Infiltration (mm/yr)	5
Rooftop Infiltration (mm/yr)	0
Total Infiltration (mm/yr)	5
Runoff Pervious Areas	6
Runoff Impervious Areas	609
Total Runoff (mm/yr)	616
Total Outputs (mm/yr)	807
Difference (Inputs - Outputs)	0
Inputs (Volumes)	
Precipitation (m ³ /yr)	12959
Run-On (m ³ /yr)	0
Other Inputs (m ³ /yr)	0
Total Inputs (m³/yr)	12959
Outputs (Volumes)	
Precipitation Surplus (m ³ /yr)	9968
Net Surplus (m ³ /yr)	9968
Evapotranspiration (m ³ /yr)	2990
Infiltration (m ³ /yr)	81
Rooftop Infiltration (m ³ /yr)	0
Total Infiltration (m ³ /yr)	81
Runoff Pervious Areas	99
Runoff Impervious Areas	9789
Total Runoff (m³/yr)	9888
Total Outputs (m³/yr)	12959
Difference (Inputs - Outputs)	0

*Evaporation from impervious areas was assumed to be 20% of precipitation

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo- transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196
Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.						
* This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.						
Topography	Flat Land, average slope < 0.6 m/km				0.3	
	Rolling Land, average slope 2.8 m to 3.8 m/km				0.2	
	Hilly Land, average slope 28 m to 47 m/km				0.1	
Soils	Tight impervious clay				0.1	
	Medium combinations of clay and loam				0.2	
	Open Sandy loam				0.4	
Cover	Cultivated Land				0.1	
	Woodland				0.2	

WETLAND 3 WATER BUDGET - PRE-DEVELOPMENT
WATER BALANCE ASSESSMENT

Catchment Designation	Site
Area (m ²)	17880
Pervious Area (m ²)	17880
Impervious Area (m ²)	0
Infiltration Factors	
Topography Infiltration Factor	0.25
Soil Infiltration Factor	0.1
Land Cover Infiltration Factor	0.1
MOE Infiltration Factor	0.45
Run-Off Coefficient	0.55
Runoff from Impervious Surfaces*	0.8
Inputs (per Unit Area)	
Precipitation (mm/yr)	807
Run-On (mm/yr)	502
Other Inputs (mm/yr)	0
Total Inputs (mm/yr)	1309
Outputs (per Unit Area)	
Precipitation Surplus (mm/yr)	200
Net Surplus (mm/yr)	200
Evapotranspiration (mm/yr)	607
Infiltration (mm/yr)	90
Rooftop Infiltration (mm/yr)**	0
Total Infiltration (mm/yr)	90
Runoff Pervious Areas	110
Runoff Impervious Areas	0
Total Runoff (mm/yr)	110
Total Outputs (mm/yr)	807
Difference (Inputs - Outputs)	502
Inputs (Volumes)	
Precipitation (m ³ /yr)	14426
Run-On (m ³ /yr)	8976
Other Inputs (m ³ /yr)	0
Total Inputs (m³/yr)	23401
Outputs (Volumes)	
Precipitation Surplus (m ³ /yr)	3580
Net Surplus (m ³ /yr)	3580
Evapotranspiration (m ³ /yr)	10846
Infiltration (m ³ /yr)	1611
Rooftop Infiltration (m ³ /yr)	0
Total Infiltration (m ³ /yr)	1611
Runoff Pervious Areas	1969
Runoff Impervious Areas	0
Total Runoff (m ³ /yr)	1969
Total Outputs (m³/yr)	14426
Difference (Inputs - Outputs)	8976

*Evaporation from impervious areas was assumed to be 20% of precipitation

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo-transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196
Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.						
* This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.						
<u>Topography</u>	Flat Land, average slope < 0.6 m/km				0.3	
	Rolling Land, average slope 2.8 m to 3.8 m/km				0.2	
	Hilly Land, average slope 28 m to 47 m/km				0.1	
<u>Soils</u>	Tight impervious clay				0.1	
	Medium combinations of clay and loam				0.2	
	Open Sandy loam				0.4	
<u>Cover</u>	Cultivated Land				0.1	
	Woodland				0.2	

WETLAND 3 CATCHMENT AREA WATER BUDGET - PRE-DEVELOPMENT
WATER BALANCE ASSESSMENT

Catchment Designation	Site
Area (m ²)	96950
Pervious Area (m ²)	17880
Impervious Area (m ²)	79070
Infiltration Factors	
Topography Infiltration Factor	0.25
Soil Infiltration Factor	0.1
Land Cover Infiltration Factor	0.1
MOE Infiltration Factor	0.45
Run-Off Coefficient	0.55
Runoff from Impervious Surfaces*	0.8
Inputs (per Unit Area)	
Precipitation (mm/yr)	807
Run-On (mm/yr)	0
Other Inputs (mm/yr)	0
Total Inputs (mm/yr)	807
Outputs (per Unit Area)	
Precipitation Surplus (mm/yr)	563
Net Surplus (mm/yr)	563
Evapotranspiration (mm/yr)	243
Infiltration (mm/yr)	17
Rooftop Infiltration (mm/yr)**	0
Total Infiltration (mm/yr)	17
Runoff Pervious Areas	20
Runoff Impervious Areas	526
Total Runoff (mm/yr)	547
Total Outputs (mm/yr)	807
Difference (Inputs - Outputs)	0
Inputs (Volumes)	
Precipitation (m ³ /yr)	78219
Run-On (m ³ /yr)	0
Other Inputs (m ³ /yr)	0
Total Inputs (m³/yr)	78219
Outputs (Volumes)	
Precipitation Surplus (m ³ /yr)	54615
Net Surplus (m ³ /yr)	54615
Evapotranspiration (m ³ /yr)	23605
Infiltration (m ³ /yr)	1611
Rooftop Infiltration (m ³ /yr)	0
Total Infiltration (m ³ /yr)	1611
Runoff Pervious Areas	1969
Runoff Impervious Areas	51035
Total Runoff (m³/yr)	53004
Total Outputs (m³/yr)	78219
Difference (Inputs - Outputs)	0

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo-transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196
Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.						
* This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.						
<u>Topography</u>	Flat Land, average slope < 0.6 m/km				0.3	
	Rolling Land, average slope 2.8 m to 3.8 m/km				0.2	
	Hilly Land, average slope 28 m to 47 m/km				0.1	
<u>Soils</u>	Tight impervious clay				0.1	
	Medium combinations of clay and loam				0.2	
	Open Sandy loam				0.4	
<u>Cover</u>	Cultivated Land				0.1	
	Woodland				0.2	

*Evaporation from impervious areas was assumed to be 20% of precipitation

WETLAND 3 WATER BUDGET, POST-DEVELOPMENT
WATER BALANCE ASSESSMENT

Catchment Designation	Site
Area (m ²)	17880
Pervious Area (m ²)	17880
Impervious Area (m ²)	0
New Rooftop Area (m ²)	0
Infiltration Factors	
Topography Infiltration Factor	0.25
Soil Infiltration Factor	0.1
Land Cover Infiltration Factor	0.1
MOE Infiltration Factor	0.45
Run-Off Coefficient	0.55
Runoff from Impervious Surfaces*	0.8
Inputs (per Unit Area)	
Precipitation (mm/yr)	807
Run-On (mm/yr)	356
Other Inputs (mm/yr)	0
Total Inputs (mm/yr)	1163
Outputs (per Unit Area)	
Precipitation Surplus (mm/yr)	200
Net Surplus (mm/yr)	200
Evapotranspiration (mm/yr)	607
Infiltration (mm/yr)	90
Rooftop Infiltration (mm/yr)	0
Total Infiltration (mm/yr)	90
Runoff Pervious Areas	110
Runoff Impervious Areas	0
Total Runoff (mm/yr)	110
Total Outputs (mm/yr)	807
Difference (Inputs - Outputs)	356
Inputs (Volumes)	
Precipitation (m ³ /yr)	14426
Run-On (m ³ /yr)	6365
Other Inputs (m ³ /yr)	0
Total Inputs (m³/yr)	20791
Outputs (Volumes)	
Precipitation Surplus (m ³ /yr)	3580
Net Surplus (m ³ /yr)	3580
Evapotranspiration (m ³ /yr)	10846
Infiltration (m ³ /yr)	1611
Rooftop Infiltration (m ³ /yr)	0
Total Infiltration (m ³ /yr)	1611
Runoff Pervious Areas	1969
Runoff Impervious Areas	0
Total Runoff (m ³ /yr)	1969
Total Outputs (m³/yr)	14426
Difference (Inputs - Outputs)	6365

*Evaporation from impervious areas was assumed to be

20% of precipitation

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo- transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196
Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.						
* This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.						
Topography	Flat Land, average slope < 0.6 m/km					0.3
	Rolling Land, average slope 2.8 m to 3.8 m/km					0.2
	Hilly Land, average slope 28 m to 47 m/km					0.1
Soils	Tight impervious clay					0.1
	Medium combinations of clay and loam					0.2
	Open Sandy loam					0.4
Cover	Cultivated Land					0.1
	Woodland					0.2

WETLAND 3 CATCHMENT AREA WATER BUDGET, POST-DEVELOPMENT
WATER BALANCE ASSESSMENT

Catchment Designation	Site
Area (m ²)	33047
Pervious Area (m ²)	17880
Impervious Area (m ²)	15167
New Rooftop Area (m ²)	0
Infiltration Factors	
Topography Infiltration Factor	0.25
Soil Infiltration Factor	0.1
Land Cover Infiltration Factor	0.1
MOE Infiltration Factor	0.45
Run-Off Coefficient	0.55
Runoff from Impervious Surfaces*	0.8
Inputs (per Unit Area)	
Precipitation (mm/yr)	807
Run-On (mm/yr)	0
Other Inputs (mm/yr)	0
Total Inputs (mm/yr)	807
Outputs (per Unit Area)	
Precipitation Surplus (mm/yr)	405
Net Surplus (mm/yr)	405
Evapotranspiration (mm/yr)	402
Infiltration (mm/yr)	49
Rooftop Infiltration (mm/yr)	0
Total Infiltration (mm/yr)	49
Runoff Pervious Areas	60
Runoff Impervious Areas	296
Total Runoff (mm/yr)	356
Total Outputs (mm/yr)	807
Difference (Inputs - Outputs)	0
Inputs (Volumes)	
Precipitation (m ³ /yr)	26662
Run-On (m ³ /yr)	0
Other Inputs (m ³ /yr)	0
Total Inputs (m³/yr)	26662
Outputs (Volumes)	
Precipitation Surplus (m ³ /yr)	13369
Net Surplus (m ³ /yr)	13369
Evapotranspiration (m ³ /yr)	13293
Infiltration (m ³ /yr)	1611
Rooftop Infiltration (m ³ /yr)	0
Total Infiltration (m ³ /yr)	1611
Runoff Pervious Areas	1969
Runoff Impervious Areas	9789
Total Runoff (m ³ /yr)	11758
Total Outputs (m³/yr)	26662
Difference (Inputs - Outputs)	0

*Evaporation from impervious areas was assumed to be 20% of precipitation

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo-transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196
Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.						
<i>* This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.</i>						
<u>Topography</u>	Flat Land, average slope < 0.6 m/km				0.3	
	Rolling Land, average slope 2.8 m to 3.8 m/km				0.2	
	Hilly Land, average slope 28 m to 47 m/km				0.1	
<u>Soils</u>	Tight impervious clay				0.1	
	Medium combinations of clay and loam				0.2	
	Open Sandy loam				0.4	
<u>Cover</u>	Cultivated Land				0.1	
	Woodland				0.2	

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