

GEOTECHNICAL INVESTIGATION REPORT

Proposed School

LOT 1 IN DP527491

Magpie Hollow Road, South Bowmfels NSW 2790

13 September 2024

Prepared for Design

I. EXECUTIVE SUMMARY

Site Classification (AS2870-2011)

Site Classification - Class P

Equivalent¹ Soil Classification - Class H2

Footings Systems

- Shallow Strip/Pad Footings - Founded on stiff natural clays may be designed for a maximum allowable bearing pressure of 150 kPa
- Deep Piles - Founded on stiff natural clays with length that is at least four times greater than its diameter may be designed for a maximum allowable bearing pressure of 300 kPa

Groundwater

- Groundwater was not encountered during our limited investigation

¹ Refer to section section 3 for context and definition of "Equivalent"

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II. PROJECT VERIFICATION

Details	Draft Report	Final Report
Project Number	24524	24524
Document Reference	24524CG_R1V0	24524CG_R1V1
Related Reports	-	-
Issue Date	19 August 2024	13 September 2024
Field Engineer	Sami Azzi	Sami Azzi
Project Manager	Sami Azzi	Sami Azzi
Distribution	Sent by email	Sent by email

Report Prepared by

Sami Azzi, Principal Engineer



1. INTRODUCTION

1.1. Background

This geotechnical investigation was commissioned specifically for the site and proposed project as described in Table 1-1. The site location is shown in Figure 1-1.

We understand the project shall involve the following:

- Stripping of surface soils
- Cut and fill for site levelling
- Construction of a school building and surrounding pavements

Table 1-1 Project Summary

Project Details	Description
Site Address	Lot 1 Magpie Hollow Road, South Bowenfels NSW
Current Site Use	Vacant
Approximate Site Area	1.168 ha
Site Proposal	School Building
Excavations	Up to 1.5m for site levelling

1.2. Scope and Objectives

The aim of our investigation was to record, present and assess our site observations and subsurface findings to provide comments and recommendations on select geotechnical aspects of the proposed development. Our comments and recommendations are provided in Section 3 of this report. A geotechnical engineer was present during the fieldwork to set out testing locations, complete the boreholes, and prepare the borehole logs attached in the appendices.



Figure 1-1 Site Location

2. INVESTIGATIONS

2.1. Fieldwork Methodology

Our investigation involved a preliminary desktop study of the site, a site inspection by a geotechnical engineer, along with the drilling of five boreholes with a 4x4 mounted drilling rig in an attempt to investigate the subsurface conditions of the site.

The locations of the boreholes were determined and recorded on a site plan by our field engineers using tape measurements from existing surface features. These are shown in Figure 2-1. Table 2-1 summarises fieldwork details pertinent to the undertaken project.

Table 2-1 *Fieldwork Summary*

Project Details	Description
Date of Investigation	3 July 2024
Number of Boreholes	Five (5) machine augered boreholes
Approximate Site Area	1.168 ha
Testing Depth(s)	Up to 3.9m below existing grade
Access Limitations	None

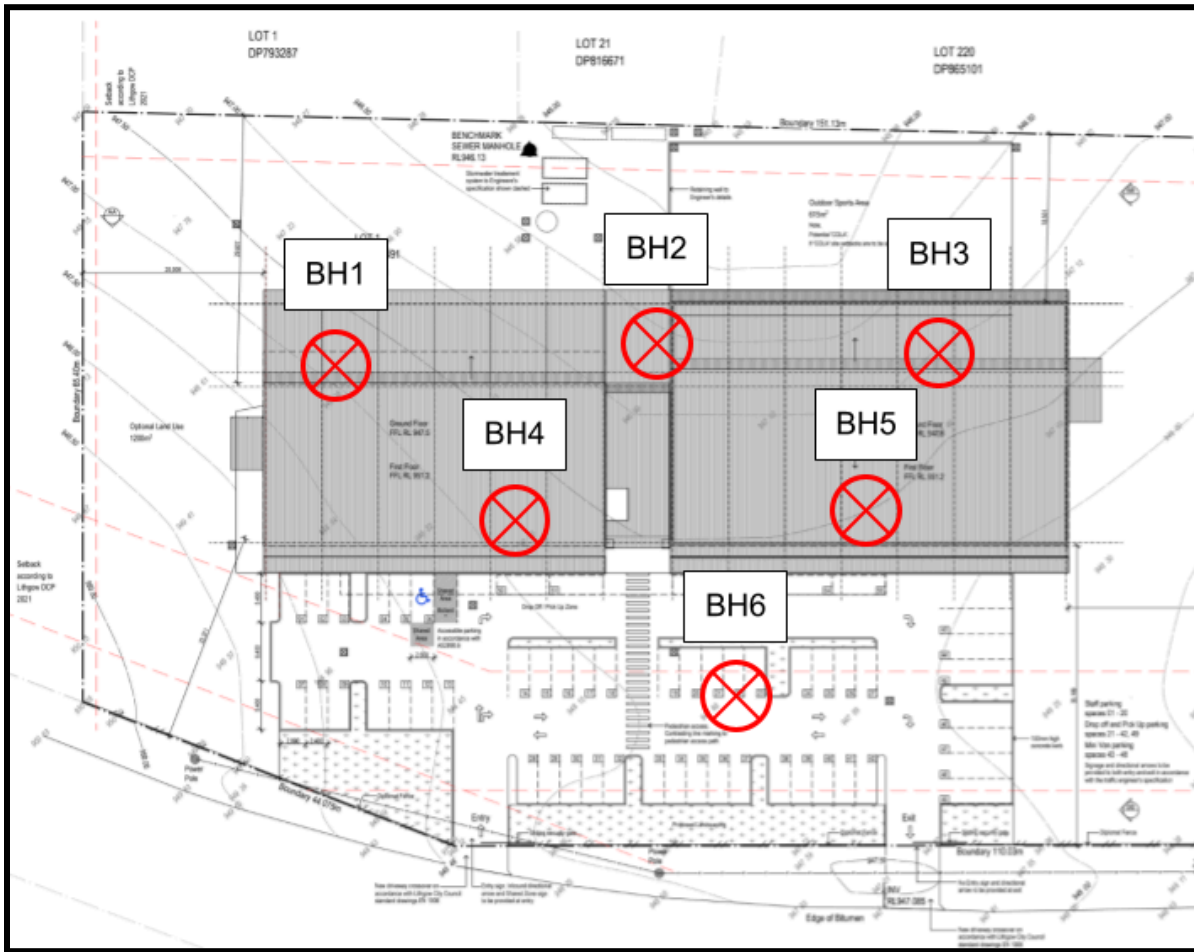


Figure 2-1 Testing Location Plan

2.2. Desktop Review of Site

Review of Satellite Imagery

According to available satellite imagery, since the year 2009, the subject site (and the general site it belongs to) and its immediate surroundings have remained more or less the same.

Geological Maps

The MinView Seamless Geology Map indicates that the site is underlain by Berry Siltstone (Pshb), described as mid to dark grey siltstone, grades up sequence to very fine-grained sandstone, highly fossiliferous, sporadic dropped pebbles.

2.3. Subsurface Conditions

Table 2-2 summarises the inferred subsurface conditions during our investigation, such as general material description, depth to colluvial soils, rock, and any initial groundwater seepage. Further detailed information is contained in the borehole logs, in Appendix B.

We note that it is often difficult to differentiate between natural soils and fill material, and that the soil rock interface is gradual in reality and is rarely a sudden change, as illustrated in our fieldwork data. As such, we require geotechnical inspections during construction to confirm our subsurface findings.

Table 2-2 Summary of Inferred Subsurface Conditions

Geological Unit	Depth to Top of Geological Unit (m, Below Existing Levels)	Description
Fill	0.0	Composed of silty gravelly clays
Natural Soils	0 - 0.2m BEL	Composed of residual silty clays of high plasticity with coarse sized gravels
Inferred Siltstone	~ 3.2 - 3.7m BEL	Berry Siltstone. Inferred only
Groundwater	Not Encountered	Boreholes 'dry' on completion of drilling

2.4. Site Observations

The subject site is located within slightly undulating topography, and is rectangular in plan. The site is bound by Magpie Hollow Road to the south, a rural property to the west, low density residential dwellings to the north, and a service station to the east. In the vicinity of the site, the ground levels generally fall to the north. The provided survey plan shows a maximum elevation relief of approximately 4.59m across the site, with ground levels varying from approximately RL950.18m AHD at the south western end and RL945.59m AHD at the north end.

The subject site was vacant at the time of the investigation. The site was covered by a grassed lawn with no structures of significance.

The northern neighbouring properties were various low density residential dwellings. In the vicinity of the common boundary were their rear yards where ground levels were similar to those of the subject site in those areas. Some neighbouring properties had sheds or trees that were offset from the common boundary by approximately 1m.

The western neighbouring property appeared to be a rural property with no structures of significance in the vicinity of the common boundary. Ground levels were similar to those of the subject site in the vicinity of the common boundary.

The eastern neighbouring property comprised a service station with a car wash. Ground levels were similar to those of the subject site in the vicinity of the common boundary.

Site observations have been made based on a cursory inspection of the subject site and its surroundings, together with a review of satellite imagery and available information provided by the client. These observations during our fieldwork were limited to accessible areas and so some features may not have been omitted due to a limited field of view. Other parts of the site or its surrounds may have been partially obstructed and so we note that observations may be subject to a degree of error. If actual conditions differ to our documented observations or have changed since our investigation, AGS should be immediately informed and this report revised if necessary.

3. GEOTECHNICAL CONSIDERATIONS

3.1. Engineered Fill

All topsoil is to be stripped and disposed of or reused in landscaping only. Topsoil cannot be used for engineered fill. The site requires site levelling. Clayey site won fill can be used to level the site, provided that it is compacted as engineered fill as per level 1 compaction conditions. All clayey fill should be compacted in maximum 200mm loose layers to a density ratio between 90% and 102% of SMDD and within 2% of SOMC. Insitu density tests are to be carried out for general engineered fill. These should be carried out at a rate of at least one test per later per 300m² and at least three tests per 200mm layer. Testing is to be as per AS3978-2007.

3.2. Equivalent Site Classification

In accordance with AS 2870-2011 'Residential Slabs and Footings,' the site is classified as 'Class P' due to abnormal moisture conditions, and due to the presence of buildings, pavements, and trees. For design considerations, footings may be subject to shrink swell movements by the site soils equivalent to that of a 'Class H2' site. We note that AS2970 is mostly aimed at residential developments, however the site classification can be considered as a guideline for commercial developments.

3.3. Footings

We recommend that all footings for the proposed structures should be founded on the same substratum, of at least natural clays of very stiff strength. Shallow strip/pad footings founded on clays of at least stiff strength may be designed for a maximum allowable bearing pressure of 150kPa. Alternatively, piled footings (whose length is at least four times greater than their diameter) founded in residual clays of at least stiff strength may be designed for a maximum allowable bearing pressure of 300kPa.

We note that siltstone bedrock was unable to be confirmed (only inferred by the refusal depths of the drilling rig) due to the limitations of our equipment and so we recommend a secondary investigation with NMLC coring capability is carried out at a later date. For preliminary considerations, piled footings socketed in siltstone bedrock of at least low strength may be designed for a allowable bearing pressure of 600kPa.

Skin friction of 60kPa in compression and 30kPa in tension may also be adopted. We note that a higher allowable bearing pressure can be achieved with the additional recommended investigation.

A geotechnical engineer should be engaged to inspect at least the initial stages of footing excavations to confirm assumptions, identify variations to initially observed subsurface conditions and to ensure that the desired founding material has been reached. All footings should be poured as soon as possible after excavation, are to be dry and free of loose or water softened material, and are to be clean and inspected prior to pouring concrete.

3.4. Earthworks and Engineered Fill

All works relating to excavation should be completed with reference to Safe Work Australia's 'Excavation Work - Code of Practice' October 2018. Care should be taken during site cut and fill excavations to not undermine or remove support from the site boundaries.

Excavations are expected to encounter fill material and residual clayey soils. The fill, and natural soils can be readily completed with the bucket of an excavator.

3.5. Slabs on Grade

For lightly trafficked slabs such as the proposed pavements, the subgrade should be stripped of any topsoil, root affected soil or deleterious material and the underlying soil should be compacted. Unsuitable fill should be replaced by granular material that has been compacted to at least 98% Standard Maximum Dry Density (SMDD). The subbase layer of any slabs should include at least 100mm of good quality fine grained crushed rock compacted to at least 100% of Standard Maximum Dry Density. Adequately spaced slab joints should also be incorporated.

We recommend that California Bearing Ratio (CBR) tests are carried out on the pavement slab prior to final slab design.

3.6. Batter Slopes

Temporary battery slopes through the soil profile can be cut no steeper than 1 vertical (V) in 1 horizontal (H).

3.7. Groundwater

No groundwater was encountered during our investigation. Regardless, seepage from rainwater and/or perched water (if present during excavation/piling) is expected to be manageable by sumps and pumps during temporary dewatering. These conditions, however, must be confirmed during excavation.

3.8. Retaining Walls

Cantilevered retaining walls appear to be appropriate for the site, provided that the appropriate batter slopes in section 3.6 can be adhered to.

Surcharge loads are additional to these earth pressure recommendations and must be taken into account for the design if present. Compaction of backfill material will impose additional stresses on retaining walls and so these must be considered for retaining wall design. Retaining walls structures should be designed to withstand the lateral earth pressure imposed by surcharge loads in their zone of influence, including but not limited to neighbouring structures. Retention systems must be stiff enough to reduce settlements and lateral movements of nearby structures.

For the design of cantilever retaining walls, we recommend a triangular lateral earth pressure with an active earth pressure coefficient K_a of 0.3 for soil and backfill materials where there is a horizontal retained surface. Where the retained surface is up to 5 degrees, K_a is to be increased to 0.35. An at rest earth pressure coefficient K_0 of 0.5 may also be considered for horizontal retained surfaces and 0.55 for retained surfaces up to 5 degrees. A unit weight of 20kN/m² should be adopted for soil and backfill material.

3.9. Soil Aggression

Although soil aggression testing did not form part of the scope of works, we recommend adopting a preliminary exposure classification of “moderate” to concrete piles, based on our experience with nearby projects in lithgow. We recommend this is confirmed with laboratory testing in future.

3.10. Site Drainage

It is crucial to ensure adequate drainage during construction and in the long term. The site soils are likely to undergo substantial loss in strength when wet. Good surface and subsurface drainage will also increase the performance of the structure in its operational.

The soils developed on the Berry Siltstone are commonly acidic and surface runoff from these soils may influence the quality of the groundwater within the adjacent alluvial aquifer.

GENERAL COMMENTS AND LIMITATIONS

Australian Ground Sciences (AGS) has based its geotechnical assessment on information gathered from its fieldwork. The recommendations and observations provided in this report are limited to the information gathered from test and inspection areas and are presented to address specific issues during construction. In the event that our recommendations are not implemented in full, AGS does not accept responsibility for the performance of any structures.

The accuracy of our recommendations and factual information may be limited by undetected variations (or misinterpretations) in subsurface conditions between test and inspection locations. Subsurface conditions may change after field testing and/or inspections. For any reason, should any changes to the site surface, subsurface, or geotechnical and groundwater conditions be observed during or before construction, it is recommended that AGS be contacted immediately. Further recommendations may be required at an additional cost. AGS does not accept responsibility for any variations in subsurface conditions that were not observed or accessible during our fieldwork.

This report and any associated information has been prepared solely for the addressed client and for the proposed works mentioned in the provided documentation. Any misinterpretation or reliance by third parties shall be at their own risk. Designers and consultants should satisfy themselves that this report has been understood thoroughly. This report should be read in full. Please contact AGS to clarify any concerns or misunderstandings related to this report or if ground conditions have been found to differ to those presented.

A waste classification is required for any soil excavated from the site prior to offsite disposal.

This report may only be reproduced in full. This report is only valid once the client has paid the full agreed cost.

4. REPORT EXPLANATION NOTES

Introduction

The following notes are brief explanations and summaries of practices by Australian Ground Sciences. It outlines the company's standard procedures and practices for reference in the report.

Description and Classification Methods

Soil and rock descriptions and classifications are based on Australian Standard 1726:2017. Identification of soil and rock requires judgement and AGS infers accuracy only to the extent that is common in geotechnical practice.

Sampling

Sampling of soil is carried out during drilling to allow examination. Samples are used to provide information about plasticity, colour, moisture content, grain size, minor constituents, and occasionally, strength and structure.

Investigation Methods

- **Auger Drilling:** A borehole with a diameter of approximately 100mm advanced by battery or hand operated equipment. Refusal of the auger does not necessarily indicate rock level and can occur on many materials such as fill, tree

roots, hard clay, gravel or ironstone, or even cobbles and boulders.

- **Continuous Spiral Flight Augers:** A borehole with a diameter between 100mm and 150mm is advanced by a drill rig. Samples collected from using this method can be very disturbed and layers may become mixed. Samples are of limited reliability due to mixing or softening of samples by groundwater or uncertainties.

- **Rock Augering:** Using a Tungsten Carbide (TC) drill bit, the drill rig may advance into rock. This method is fast and inexpensive in comparison to continuous core drilling but only provides an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths have a significant impact, further investigations by core drilling may be recommended.

- **Continuous Core Drilling:** Using a diamond tipped core barrel, the drill rig may obtain a continuous core sample. This technique provides a reliable but relatively expensive method of investigation.

- **Dynamic Cone Penetrometer (DCP):** A 9kg hammer is dropped down 510mm

onto an anvil that drives a 16mm may not be shown in the short time the diameter rod with a 20mm diameter cone borehole is observed, especially in low tip into the soil. The DCP test results are permeability soils. On the other hand, a used to assess the compaction of fill, local perched water table may strength of cohesive soils, and the misleadingly represent a true water table. relative density of granular soil.

Refusal of the dynamic cone penetrometer (DCP) does not necessarily indicate rock level and can occur on many materials such as fill, tree roots, hard clay, gravel or ironstone, and cobbles and boulders.

Logs

The attached borehole log presents our geological interpretation of subsurface conditions. Boreholes represent a very small sample of the total subsurface conditions and therefore cannot capture all subsurface features of a site. The reliability of the results rely on the method of drilling and the frequency of sampling. One of the most reliable assessments of soil is the use of continuous undisturbed sampling or core drilling, though this is not always practical.

Groundwater

Groundwater is measured during, on completion of, and sometimes a short time after drilling. It is possible that although groundwater may be present, it

Water tables often vary over time with seasons or with recent rain and may change by the time construction begins. The installation and use of standpipes may be more reliable to read groundwater levels as the groundwater may stabilise after several days or weeks.

Fill

The distinction of fill from natural material can often be determined only by foreign inclusions (such as brick, concrete, plastic, etc.). Therefore, it is often difficult to distinguish fill from natural material if the fill material is similar to the natural material present on site. The presence of fill should be noted because there is much more potential for fill to vary over a site than for natural material. There is an increased risk, therefore, of loading on fill due to its unpredictable nature.

Laboratory Testing

Australian Ground Services does not conduct the laboratory testing. Where testing is necessary, collected samples

are sent to NATA accredited geotechnical testing labs. Laboratory testing is carried out to Australian Standard 1289 or NSW Government Roads & Maritime Services test methods.

Engineering Report

This report has been prepared by a qualified engineer and is based on the interpretation of factual information obtained from the site. If a report has been prepared for a specific project, the information and interpretation may not be relevant if the structure is changed. Therefore, it is imperative that Australian Ground Sciences is informed of any changes so that it may adjust the advice given or engage in further investigation. Additional fees may apply.

Site Anomalies

If subsurface or site conditions differ to those expected from the information gathered from our investigation, it is crucial that AGS is notified immediately. It

is much easier to resolve issues once subsurface conditions have been exposed and before structures have been constructed.

Review of Design

It is recommended that a joint design review is undertaken with an experienced geotechnical engineer or engineering geologist, especially where investigation is limited.

Site Inspection

It is recommended that AGS is contacted to perform inspections. Site visits may be required to confirm expected conditions as well as assist contractors in identifying soil/rock and appropriate footing/pile depths and conditions.

Classifications

PARTICLE SIZE DEFINITIONS

Fraction	Components	Subdivision	Size* mm
Oversize	BOULDERS		>200
	COBBLES		63–200
Coarse grained soil	GRAVEL	Coarse	19–63
		Medium	6.7–19
		Fine	2.36–6.7
	SAND	Coarse	0.6–2.36
		Medium	0.21–0.6
		Fine	0.075–0.21
Fine grained soil	SILT		0.002–0.075
	CLAY		<0.002

* These sizes correspond approximately to standard sieve sizes.

RELATIVE DENSITY OF NON-COHESIVE SOILS

Term	Density index %
Very Loose (VL)	≤15
Loose (L)	>15 and ≤35
Medium Dense (MD)	>35 and ≤65
Dense (D)	>65 and ≤85
Very Dense (VD)	>85

NOTE: The moisture content may influence the inferred relative density.

CONSISTENCY TERMS FOR COHESIVE SOILS

Consistency	Field guide to consistency	Indicative undrained shear strength kPa
Very Soft (VS)	Exudes between the fingers when squeezed in hand	≤12
Soft (S)	Can be moulded by light finger pressure	>12 and ≤25
Firm (F)	Can be moulded by strong finger pressure	>25 and ≤50
Stiff (St)	Cannot be moulded by fingers	>50 and ≤100
Very Stiff (VSt)	Can be indented by thumb nail	>100 and ≤200
Hard (H)	Can be indented with difficulty by thumb nail	>200
Friable (Fr)	Can be easily crumbled or broken into small pieces by hand	—

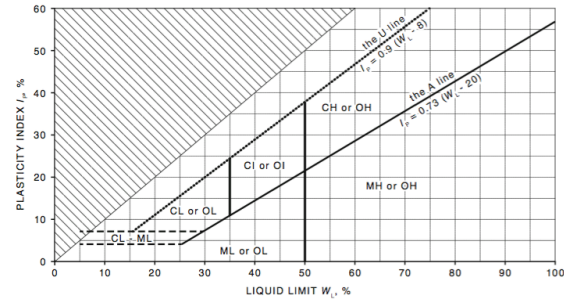
NOTE: Consistency is affected by the moisture content of the soil at the time of measurement.

DESCRIPTIVE TERMS FOR ACCESSORY (SECONDARY AND MINOR) SOIL COMPONENTS

Designation of components	In coarse grained soils				In fine grained soils	
	% Fines	Terminology	% Accessory coarse fraction	Terminology	% Sand/gravel	Terminology
Minor	≤5	Add 'trace clay/silt' to description, as applicable	≤15	Add 'trace sand/gravel' to description, as applicable	≤15	Use 'trace'
	>5, ≤12	Add 'with clay/silt' to description, as applicable	>15, ≤30	Add 'with sand/gravel' to description, as applicable	>15, ≤30	Add 'with sand/gravel' to description, as applicable
Secondary	>12	Prefix soil name as 'silty' or 'clayey', as applicable	>30	Prefix soil name with 'sandy' or 'gravelly', as applicable	>30	Prefix soil name with 'sandy' or 'gravelly', as applicable

DESCRIPTIVE TERMS FOR PLASTICITY

Descriptive term	Range of liquid limit for silt	Range of liquid limit for clay
Non-plastic	Not applicable	Not applicable
Low plasticity	≤50	≤35
Medium plasticity	Not applicable	>35 and ≤50
High plasticity	>50	>50



NOTE: The U line is an approximate upper bound for most natural soils. Data which plot above the U line may represent unusual/problem soil behaviour, or unreliable data and should be considered carefully.

ROCK MATERIAL STRENGTH CLASSIFICATION

Term	Abbreviation	Uniaxial compressive strength (see Note 1 and Note 2) MPa	Point load strength index I_{cs} (see Note 3) MPa	Guide to strength
				Field assessment
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30 mm thick can be broken by finger pressure.
Low Strength	L	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium Strength	M	6 to 20	0.3 to 1	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
High Strength	H	20 to 60	1 to 3	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High Strength	EH	more than 200	more than 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

NOTES:

- Material with strength less than 'Very Low' shall be described using soil characteristics. The presence of an original rock structure, fabric or texture should be noted, if relevant.
- The method for measuring the uniaxial compressive strength shall be in accordance with AS 4133.4.2.1.
- The method for measuring the point load strength index shall be in accordance with AS 4133.4.1.

CLASSIFICATION OF MATERIAL WEATHERING

Term	Abbreviation	Definition
Residual Soil (Note 1)	RS	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered (Note 1)	XW	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly Weathered (Note 2)	HW Distinctly Weathered (Note 2) DW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately Weathered (Note 2)	MW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable, but shows little or no change of strength from fresh rock.
Slightly Weathered	SW	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh	FR	Rock shows no sign of decomposition of individual minerals or colour changes.

NOTES:

- The term 'Extremely Weathered rock' is misleading as the material has soil properties. The word 'rock' should be replaced with the name of the original rock in lower case or the word 'material', e.g. Extremely Weathered granite or Extremely Weathered material. Residual Soil and Extremely Weathered material should be described using soil descriptive terms.
- Where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock the term 'Distinctly Weathered' may be used. 'Distinctly Weathered' is defined as follows: 'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores'. There is some change in rock strength.

Symbols

SOILS	ROCKS		
	SEDIMENTARY	METAMORPHIC	IGNEOUS
 Boulders and cobbles	 Limestone	 Coarse grained	 Coarse grained
 Gravel	 Conglomerate	 Medium grained	 Medium grained
 Sand	 Breccia	 Fine grained	 Fine grained
 Silt	 Sandstone		
 Clay	 Siltstone		
 Peat	 Mudstone		
NOTE: Composite soil types may be signified by combined symbols, e.g.	 Coal		
	 Tuff		
 Silty sand	 Gypsum, Rocksalt etc.		
			WEATHERED PROFILES AND DURICRUSTS
			 Weathered profile
			 Duricrust
			FILL
			 Fill

5. APPENDICES

Enclosed in Appendices A and B are the DCP test results and borehole logs, respectively.

Borehole Log	BH1
Job No.	24524
Address	Magpie Hollow Road, South Bownfels NSW 2790

Drilling Date: 3 July 2024
Drilling Method: Auger Drilling
Drilling Rig: 4x4 Mounted Rig
Groundwater Seepage: Dry on completion

Approximate RL: -
Well details: N/A
Logged by: Sami Azzi
Reviewed by: Sami Azzi

Elevation (mAHD)	Depth (m)	Profile Start Depth (m)	Strata Description	USCS	Moisture Content / Weathering	Strength / Relative Density	Samples	Tests (SPT, DCP, etc)	Comments (ORIGIN IN BRACKETS)
	0 0.1 0.2	0.0	FILL: TOPSOIL silty clay, medium plasticity, dark grey brown	-	M	-	-		Grass covered.
	0.3 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1 3.2 3.3	0.3	Silty CLAY:high plasticity, orange brown, trace gravel	CH	w>PL				(Residual)
	3.4 3.5		SILTSTONE	-	(D W)	(L)			Inferred Berry Siltstone

Drill Rig Refusal at 3.6m on inferred bedrock.

Borehole Log	BH2
Job No.	24524
Address	Magpie Hollow Road, South Bowmfels NSW 2790

Drilling Date: 3 July 2024
Drilling Method: Auger Drilling
Drilling Rig: 4x4 Mounted Rig
Groundwater Seepage: Dry on completion

Approximate RL: -
Well details: N/A
Logged by: Sami Azzi
Reviewed by: Sami Azzi

Elevation (mAHD)	Depth (m)	Profile Start Depth (m)	Strata Description	USCS	Moisture Content / Weathering	Strength / Relative Density	Samples	Tests (SPT, DCP, etc)	Comments (ORIGIN IN BRACKETS)
	0 0.1 0.2	0.0	FILL: TOPSOIL silty clay, medium plasticity, dark grey brown	-	M	-	-		Grass covered.
	0.3 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1	0.3	Silty CLAY:high plasticity, orange brown, trace gravel	CH	w>PL				(Residual)
	3.2 3.3 3.4		SILTSTONE	-	(D W)	(L)			Inferred Berry Siltstone

Drill Rig Refusal at 3.5m on inferred bedrock.

Borehole Log	BH1
Job No.	24524
Address	Magpie Hollow Road, South Bownfels NSW 2790

Drilling Date: 3 July 2024
Drilling Method: Auger Drilling
Drilling Rig: 4x4 Mounted Rig
Groundwater Seepage: Dry on completion

Approximate RL: -
Well details: N/A
Logged by: Sami Azzi
Reviewed by: Sami Azzi

Elevation (mAHD)	Depth (m)	Profile Start Depth (m)	Strata Description	USCS	Moisture Content / Weathering	Strength / Relative Density	Samples	Tests (SPT, DCP, etc)	Comments (ORIGIN IN BRACKETS)
	0 0.1 0.3 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1 3.2 3.3	0	Silty CLAY:high plasticity, orange brown, trace gravel	CH	w> PL	St			(Residual)
	3.4 3.5		SILTSTONE	-	(D W)	(L)			Inferred Berry Siltstone

Drill Rig Refusal at 3.6m on inferred bedrock.

Borehole Log	BH4
Job No.	24524
Address	Magpie Hollow Road, South Bownfels NSW 2790

Drilling Date: 3 July 2024
Drilling Method: Auger Drilling
Drilling Rig: 4x4 Mounted Rig
Groundwater Seepage: Dry on completion

Approximate RL: -
Well details: N/A
Logged by: Sami Azzi
Reviewed by: Sami Azzi

Elevation (mAHD)	Depth (m)	Profile Start Depth (m)	Strata Description	USCS	Moisture Content / Weathering	Strength / Relative Density	Samples	Tests (SPT, DCP, etc)	Comments (ORIGIN IN BRACKETS)
	0 0.1	0.0	FILL: TOPSOIL silty clay, medium plasticity, dark grey brown	-	M	-	-		Grass covered.
	0.2 0.3 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1 3.2 3.3 3.4 3.5 3.6	0.2	Silty CLAY:high plasticity, orange brown, trace gravel	CH	w> PL	St			(Residual)
	3.7 3.8		SILTSTONE	-	(D W)	(L)			Inferred Berry Siltstone

Drill Rig Refusal at 3.9m on inferred bedrock.

Borehole Log	BH4
Job No.	24524
Address	Magpie Hollow Road, South Bowmfels NSW 2790

Drilling Date: 3 July 2024
Drilling Method: Auger Drilling
Drilling Rig: 4x4 Mounted Rig
Groundwater Seepage: Dry on completion

Approximate RL: -
Well details: N/A
Logged by: Sami Azzi
Reviewed by: Sami Azzi

Elevation (mAHD)	Depth (m)	Profile Start Depth (m)	Strata Description	USCS	Moisture Content / Weathering	Strength / Relative Density	Samples	Tests (SPT, DCP, etc)	Comments (ORIGIN IN BRACKETS)
	0 0.1	0.0	FILL: TOPSOIL silty clay, medium plasticity, dark grey brown	-	M	-	-		Grass covered.
	0.2 0.3 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1 3.2 3.3 3.4 3.5	0.2	Silty CLAY:high plasticity, orange brown, trace gravel	CH	w> PL	St			(Residual)
	3.6 3.7	3.6	SILTSTONE	-	(D W)	(L)			Inferred Berry Siltstone

Drill Rig Refusal at 3.8m on inferred bedrock.