

22 May 2019

Ref: E30910KGlet4 (ASS)

Meriden School
C/- Allen Jack and Cottier

Attention: Mr. Anthony Di Cristo

**ACID SULFATE SOIL DESKTOP SCREENING
PROPOSED LANDSCAPED PLAYGROUND – MERIDEN SCHOOL
4 VERNON STREET, STRATHFIELD, NSW 2135**

1 INTRODUCTION

Meriden School ('the client') commissioned Environmental Investigation Services (EIS)¹ to undertake an acid sulfate soil (ASS) desktop screening for the proposed landscaped playground of Meriden School located at 4 Vernon Street, Strathfield. The site is identified as part of Lot 1 in DP 1244199.

The site location and the investigation locations are shown on Drawing No. 1 extracted from a report provided by Douglas Partners (Douglas).

The investigation was undertaken generally in accordance with an EIS proposal (Ref: EP49474BG) of 9 May 2019 and written acceptance from Meriden School by of 10 May 2019.

The aims of the desktop ASS screening are to establish the likelihood that actual ASS or potential ASS (PASS) may be disturbed during the proposed development works, and to assess whether an intrusive ASS assessment and/or Acid Sulfate Soil Management Plan (ASSMP) are required.

1.1 Assessment Guidelines

The preparation of this letter report was undertaken with reference to the Acid Sulfate Soil Management Advisory Committee (ASSMAC) Acid Sulfate Soil Manual (1998)². Background information on ASS and the assessment process is provided in the appendices.

¹ Environmental consulting division of Jeffery & Katauskas Pty Ltd (J&K)

² Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). *Acid Sulfate Soils Manual* (ASS Manual 1998)

1.2 Proposed Development Details

Based on the information provided by the client, EIS understand that the proposed development includes demolition of the existing house and construction of an open play space with a shade structure (pergola), a stand for seating and a new carport. The proposed development will not involve any deep basement excavations.

2 SITE INFORMATION

2.1 Previous Investigations

EIS were provided with the following two reports prepared by Douglas in 2018:

- Preliminary Site Investigation for Contamination (Ref: Project 86568.02) dated 25 February 2019. The report concluded that the site history review and site walkover identified potential sources of contamination as imported filling or hazardous building materials. Lead and PAH contamination has been identified in filling and it is considered that remediation will be required to make the site suitable for the proposed open play space. A remedial action plan (RAP) should be prepared to document the remediation approach which is to be adopted.
- Geotechnical Investigation (Ref: Project 86568.02) dated 20 February 2019. The investigation was carried out to provide information on the subsurface conditions for design and planning purposes. The report recommended dilapidation surveys; waste classification of all material to be excavated and transported off site; footing and pile inspections during the construction and geotechnical engineer to observe proof rolling of the prepared sub-grade. The sub-surface conditions encountered by Douglas are summarised in Section 2.6.

2.2 Site Description

EIS understand that the site is located in a predominantly residential area of Strathfield. The site was located approximately 460m to the south-west of a stormwater channel that runs into Powells Creek and eventually into Homebush Bay. The site is situated within gently undulating topography on a hillside that gently slopes down to the north-east at approximately 3° to 4°. The site has a western frontage on Vernon Street.

EIS also understand that the site was occupied by a single storey free standing brick building with a tiled roof and a detached single brick garage to the east. The brick building was used as the clothing store for Meriden School. The building had previously been used as a residential dwelling and was similar in appearance to the neighbouring house. The detached garage to the east of the primary building appeared to not have been used for some time. The other areas of the site were either concrete covered or grassed covered. Vegetation, including trees and shrubs at the front and back yards were in a healthy condition.

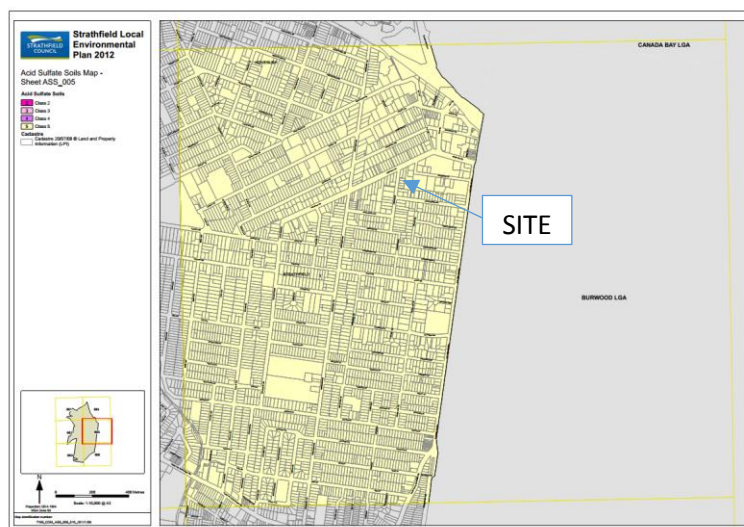
EIS have not undertaken a site inspection for the purpose of preparing this report. The site description was prepared based on the information from Douglas reports and available online information.

2.3 Regional Geology

The geological map of Sydney (1983/)³ indicates the site to be underlain by Ashfield Shale of the Wianamatta Group, which typically consists of black to dark grey shale and laminite.

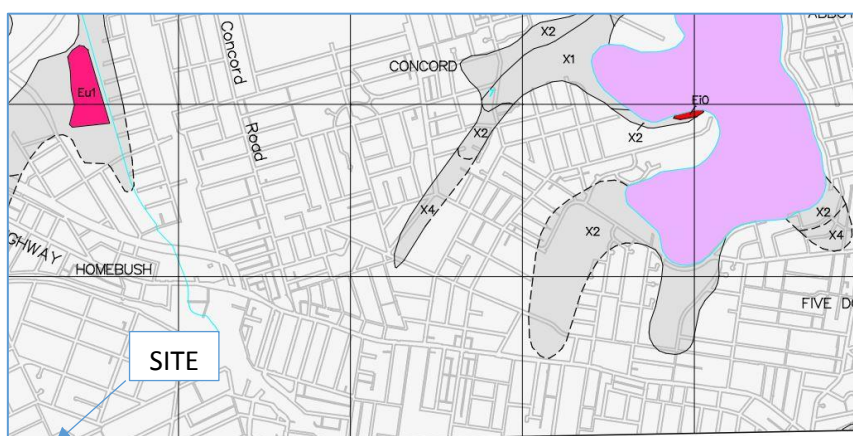
2.4 Strathfield Council Local Environmental Plan (LEP) 2012

A review of the Strathfield Council LEP indicates that the site is located in a Class 5 risk Area (refer to appendices for further details on each risk class). An extract from the Plan is reproduced below.



2.5 Acid Sulfate Soil Risk Map

A review of the ASS risk maps prepared by Department of Land and Water Conservation (1997)⁴ indicates that the site is located in an area classified as no known occurrence of acid sulfate soil. A section of the map is reproduced below.



Based on the risk maps there do not appear to be any risk areas within 500m of the site. There is a creek source (Powells Creek) approximately 460m to the north-east of the site.

³ Department of Mineral Resources, (1983). 1:100,000 Geological Map of Sydney (Series 9130)

⁴ Department of Land and Water Conservation, (1997). 1:25,000 Acid Sulfate Soil Risk Map (Series 9130N3, Ed 2).

The acid sulfate soil risk map does include a notation that river and creek sediments may contain acid sulfate soil. However EIS note that the sections of creek closest to the site are concrete lined. This area does not show up as Class 1, 2, 3, or 4 area on the Strathfield LEP 2012.

2.6 Subsurface Conditions

The subsurface conditions of the site were obtained from the borehole logs extracted from the Douglas reports. Four boreholes were drilled using a hand auger to a maximum depth of 1.4m. The subsurface conditions encountered generally consisted of fill material to a depth of approximately 0.2m. This was underlain by silty clay that was assessed to be residual (i.e. derived from weather bedrock). All boreholes were discontinued due to the hand auger refusal at approximately 1.0m to 1.4m below ground level.

No free groundwater was observed in the borehole during the drilling. Reference should be made to the borehole logs attached in the appendices for further details on sub-surface conditions.

EIS note that deep boreholes drilled by Douglas in another section of the school approximately 160m to the north-east of the site encountered laminite bedrock at 2.0-2.6m below ground level. This is discussed in more detail in EIS letter Ref: E30910KGlet3 dated 21 May 2019.

3 CONCLUSIONS

Based on the information reviewed for this assessment, EIS are of the opinion that there is negligible potential for ASS or PASS to be disturbed during the proposed development works described in Section 1.2 of this report. This conclusion is based on the following:

- The ASS risk map for the site indicates that the site is located within an area of no known occurrence of ASS;
- The boreholes encountered residual silty clay. Based on the deeper investigations undertaken at the other areas of the Meriden School EIS are of the opinion that shallow Laminite bedrock (sedimentary rock) is likely to be encountered beneath the natural silty clay in the site. Acid sulfate soils are usually associated with alluvial soils;
- No organic material that may be indicative of potential acid sulfate soil was encountered in the boreholes;
- The geological map for the area indicates that the site is underlain by Ashfield Shale;
- The site is located at approximately 20m Australian Heights Datum (AHD). ASS are not usually associated with soil horizons above 5m AHD;
- There are no potential acid sulfate areas with 500m of the site marked on the ASS soil risk map; and
- The proposed development will not involve deep excavations.

The risk of any site works lowering the water table on adjacent Class 1,2,3,4 land below 1m AHD is considered to be not applicable for the site for the following reasons:

- No deep excavations on site that could lower the water table;

- The Strathfield Council Local Environmental Plan (LEP) 2012 does not show any Class 1,2,3 or 4 land within 500m of the site; and
- The permeability of Ashfield shale is very low. Therefore the risk of changing water levels within the site having any impact on water levels in areas more than 500m away is considered to be very low.

Based on this information, an ASSMP is not considered necessary for the proposed development. With regard to potential acid sulfate soil the site is considered suitable for the proposed development.

4 LIMITATIONS

The report limitations are outlined below:

- EIS accepts no responsibility for any unidentified ASS or PASS issues at the site. Any unexpected problems/subsurface features that may be encountered during development works should be inspected by an environmental consultant as soon as possible;
- This report has been prepared based on the information provided to EIS and available online information; scope of work and limitation outlined in the EIS proposal; and terms of contract between EIS and the client (as applicable);
- Subsurface soil and rock conditions encountered between investigation locations (extracted from the Douglas report) may be found to be different from those expected;
- The preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards;
- Where information has been provided by third parties, EIS has not undertaken any verification process, except where specifically stated in the report;
- EIS accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site;
- EIS have not and will not make any determination regarding finances associated with the site;
- Additional investigation work may be required in the event of changes to the proposed development or land use. An environmental consultant should be contacted immediately in such circumstances;
- Material considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa;
- This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose;
- Copyright in this report is the property of EIS. EIS has used a degree of care, skill and diligence normally exercised by consulting professionals in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report;
- If the client, or any person, provides a copy of this report to any third party, such third party must not rely on this report except with the express written consent of EIS; and

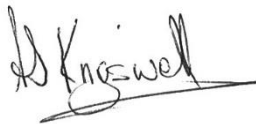
- Any third party who seeks to rely on this report without the express written consent of EIS does so entirely at their own risk and to the fullest extent permitted by law, EIS accepts no liability whatsoever, in respect of any loss or damage suffered by any such third party.

If you have any questions concerning the contents of this letter please do not hesitate to contact us.

Kind Regards,



Para Bokalawela
Senior Environmental Engineer



Adrian Kingswell
Principal Consultant

Appendices:

Appendix A: Report Figures (Douglas Partners)

Appendix B: Information on Acid Sulfate Soils

Appendix C: Borehole Logs (Douglas Partners)

Appendix A: Report Figures (Douglas Partners)

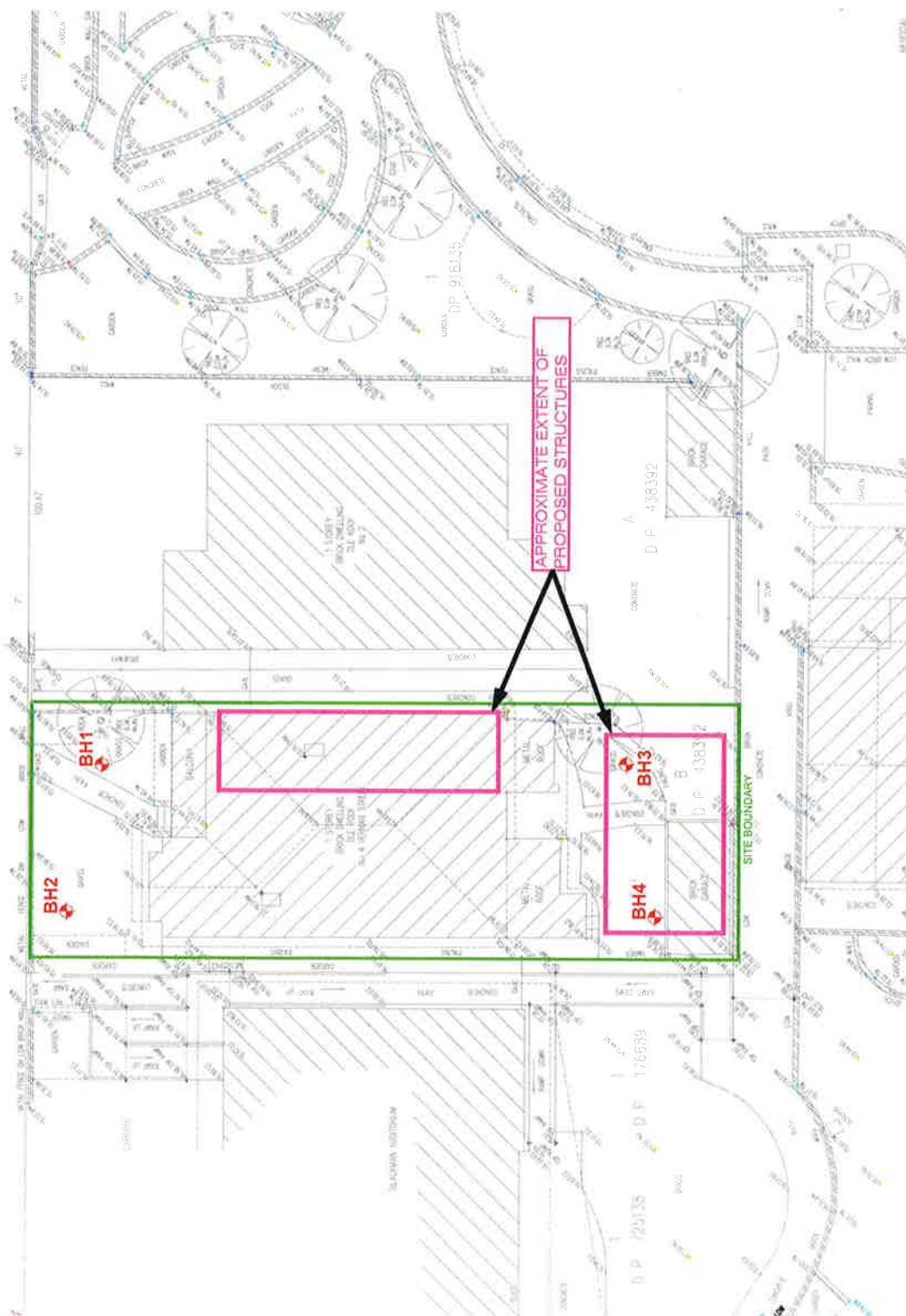


Locality Plan

VERNON STREET

VERNON STREET

VERNON STREET



NOTE:
 1: Base drawing from Linker Surveying (Ref 161014, dated 1.11.2016)
 2: Test locations are approximate only and are shown with reference to existing features.

LEGEND
 Borehole location

		PROJECT No: 86568.02
CLIENT: Meriden School		DRAWING No: 1
OFFICE: Sydney		REVISION: 0
SCALE: 1:200 @ A3		
DRAWN BY: PSCH		
DATE: 17.1.2019		
TITLE: Site Plan Site 2 - Proposed Open Play Space 4 Vernon Street, STRATHFIELD		

Appendix B: Information on Acid Sulfate Soils

A. Background

Acid Sulfate Soil (ASS) is formed from iron rich alluvial sediments and sulfate (found in seawater) in the presence of sulfate reducing bacteria and plentiful organic matter. These conditions are generally found in mangroves, salt marsh vegetation or tidal areas and at the bottom of coastal rivers and lakes. These soils include those that are producing acid (termed actual ASS) and those that can become acid producing (termed potential ASS or 'PASS'). PASS are naturally occurring soils and sediment that contain iron sulfides (pyrite) which, when exposed to oxygen generate sulfuric acid.

B. The ASS Management Advisory Committee (ASSMAC)

The NSW government in 1994 formed the ASSMAC to coordinate a response to ASS issues. In 1998 this group released the Acid Sulfate Soil Manual⁵ providing best practice advice for planning, assessment, management, laboratory methods, drainage, groundwater and the preparation of ASS management plans (ASSMP).

In 1997 the Department of Land and Soil Conservation (now part of the Office of Environment and Heritage⁶) developed two series of maps with respect to ASS for use by council and technical staff implementing the ASS Manual 1998:

- ASS Planning Maps – issued to councils and government units; and
- ASS Risk Maps – issued to interested parties.

C. The ASS Planning Maps

The ASS planning maps provide an indication of the relative potential for disturbance of ASS to occur at locations within the council area. These maps do not provide an indication of the actual occurrence of ASS at a site or the likely severity of the conditions.

The maps are divided into five classes dependent upon the type of activities/works that if undertaken, may represent an environmental risk through the development of acidic conditions associated with ASS:

Table 1: Risk Classes

Risk Class	Description
Class 1	All works.
Class 2	All works below existing ground level and works by which the water table is likely to be lowered.
Class 3	Works at depths beyond 1m below existing ground level or works by which the water table is likely to be lowered beyond 1m below existing ground level.
Class 4	Works at depths beyond 2m below existing ground level or works by which the water table is likely to be lowered beyond 2m below existing ground level.
Class 5	Works within 500m of adjacent Class 1,2,3,4 land which are likely to lower the water table below 1m AHD on the adjacent land.

⁵ Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). *Acid Sulfate Soils Manual* (ASS Manual 1998)

⁶ <http://www.environment.nsw.gov.au/acidsulfatesoil/index.htm>

D. The ASS Risk Maps

The ASS risk maps provide an indication of the probability of occurrence of PASS at a particular location based on interpretation from geological and soil landscape maps. The maps provide classes based on high probability, low probability, no known occurrence and areas of disturbed terrain (site specific assessment necessary) and the likely depth at which ASS are likely to be encountered.

E. Investigation and Laboratory Testing for ASS

The ASS Manual 1998 includes information on assessment of the likelihood of PASS, the need for an ASSMP, and the development of mitigation measures for a proposed development located in PASS risk areas.

The ASS Manual 1998 recommends a minimum of four sampling locations for a site with an area up to 1ha. For sites greater than 4ha, the manual recommends the use of a reduced density of two locations per hectare subject to the proposed development. For lineal investigations, the manual recommends sampling every 50-100m.

The sampling locations should include all areas where significant disturbance of soils will occur and/or areas with a high environmental sensitivity. In some instances a varied sampling plan may be more suitable, particularly for sites less than 1,000m² in area.

The depth of investigation should extend to at least 1m beyond the depth of proposed excavation/disturbance or estimated drop in water table height, or to a minimum of 2m below existing ground level, whichever is greatest.

Standard methods for the laboratory analysis of samples are presented in the Australian Standard AS4969-2008/09⁷ (part 1 to 14). The principal analytical method is suspension Peroxide Oxidation Combined Acidity and Sulfur (sPOCAS).

The sPOCAS method specified in AS4969-2008/09 supersedes the POCAS method specified in the ASS Manual 1998. When S_{POS} (peroxide oxidisable sulfur) values are close to the action criteria confirmation of the result can be undertaken by the chromium reducible sulfur (S_{CR}) method.

The endpoint for the pH titration in AS4969-2008/09 is pH6.5 as opposed to pH5.5 adopted in the ASS Manual. Therefore the values for Total Actual Acidity (TAA), Total Sulfide Acidity (TSA) and Total Potential Acidity (TPA) will more conservative when analysed using the sPOCAS method specified in AS4969-2008/09.

⁷ Standards Australia, (2008/2009). *Analysis of acid sulfate soil – Dried samples – Methods of test, Parts 1 to 14.* (AS4969-2008/09)

Appendix C: Borehole Logs (Douglas Partners)

BOREHOLE LOG

CLIENT: Meriden School
PROJECT: Site 2 - Proposed Open Play Space
LOCATION: 4 Vernon Street, Strathfield

SURFACE LEVEL: 15.8 AHD
EASTING: 323302
NORTHING: 6250096
DIP/AZIMUTH: 90°/-

BORE No: BH1
PROJECT No: 86568.02
DATE: 17-1-2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		FILLING (Topsoil): dark grey, sandy silt topsoil with trace of rootlets and gravels			0.1							
	0.2	CLAY: firm, red brown to brown clay with trace of silt, damp		A/E	0.2							
					0.4							
				A/E	0.5							
	0.8	CLAY: stiff, pale grey and pale brown clay with trace of ironstone bands, moist			0.9							
				A/E	1.0							
	1.4	below 1.35 m: becoming hard Bore discontinued at 1.4m Hand auger refusal on ironstone bands										

RIG: Hand Tools

DRILLER: AT

LOGGED: AT

CASING: Uncased

TYPE OF BORING: Hand auger to 1.5m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Borehole backfilled with drilling spoil

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
D Disturbed sample	W Water seep	S Standard penetration test
E Environmental sample	W Water level	V Shear vane (kPa)



Douglas Partners
 Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Meriden School
PROJECT: Site 2 - Proposed Open Play Space
LOCATION: 4 Vernon Street, Strathfield

SURFACE LEVEL: 15.9 AHD
EASTING: 323300
NORTHING: 6250089
DIP/AZIMUTH: 90°/-

BORE No: BH2
PROJECT No: 86568.02
DATE: 17-1-2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		FILLING (Topsoil): dark grey, sandy silt topsoil with trace of rootlets and gravels			0.1							
	0.2	CLAY: stiff, red brown to brown clay with trace of silt, damp		A/E	0.2							
					0.4							
				A/E*	0.5							
		below 0.6 m: becoming very stiff										
	0.7	CLAY: stiff to very stiff, pale grey and pale brown clay with trace of ironstone bands, moist										
					0.9							
				A/E	1.0							
	1.2	Bore discontinued at 1.2m Hand auger refusal on ironstone bands										

RIG: Hand Tools

DRILLER: AT

LOGGED: AT

CASING: Uncased

TYPE OF BORING: Hand auger to 1.2m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: *BD1/170119, Borehole backfilled with drilling spoil

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test ts(50) (MPa)
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test ts(50) (MPa)
C Core drilling	W Water sample	ppp Pocket penetrometer (kPa)
D Disturbed sample	W Water seep	SP Standard penetration test
E Environmental sample	W Water level	V Shear vane (kPa)

Douglas Partners
 Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Meriden School
PROJECT: Site 2 - Proposed Open Play Space
LOCATION: 4 Vernon Street, Strathfield

SURFACE LEVEL: 16.7 AHD
EASTING: 323326
NORTHING: 6250091
DIP/AZIMUTH: 90°/--

BORE No: BH3
PROJECT No: 86568.02
DATE: 17-1-2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		FILLING (Topsoil): dark grey, sandy silt topsoil with trace of rootlets and gravels			0.1							
	0.2	CLAY: firm, red brown to brown clay with trace of silt, damp		A/E	0.2							
		below 0.45 m: becoming soft		A/E*	0.4							
					0.5							
	0.6	CLAY: stiff, pale grey and pale brown clay with trace of ironstone bands, moist										
					0.9							
				A/E	1.0							
		below: 1.05 m: becoming hard										
	1.1	Bore discontinued at 1.1m Hand auger refusal on ironstone bands										

RIG: Hand Tools

DRILLER: AT

LOGGED: AT

CASING: Uncased

TYPE OF BORING: Hand auger to 1.1m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: *BD2/170119, Borehole backfilled with drilling spoil

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)
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C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
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E Environmental sample	W Water level	V Shear vane (kPa)

Douglas Partners
 Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Meriden School
PROJECT: Site 2 - Proposed Open Play Space
LOCATION: 4 Vernon Street, Strathfield

SURFACE LEVEL: 16.8 AHD
EASTING: 323326
NORTHING: 6250085
DIP/AZIMUTH: 90°/-

BORE No: BH4
PROJECT No: 86568.02
DATE: 17-1-2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		FILLING (Topsoil): dark grey, sandy silt topsoil with trace of rootlets, gravels and possible ash		A/E	0.1							
	0.2	CLAY: firm to stiff, red brown to brown clay with trace of silt, damp		A/E	0.2							
				A/E	0.4							
				A/E	0.5							
	0.7	CLAY: stiff to very stiff, pale grey and pale brown clay with trace of ironstone bands, moist		A/E	0.9							
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RIG: Hand Tools

DRILLER: AT

LOGGED: AT

CASING: Uncased

TYPE OF BORING: Hand auger to 1.0m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Borehole backfilled with drilling spoil

☐ Sand Penetrometer AS1289.6.3.3
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SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
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C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	W ₂ Water seep	S Standard penetration test	
E Environmental sample	W ₃ Water level	V Shear vane (kPa)	

22 May 2019
Ref: E30910KGlet3 (ASS)

Meriden School
C/- Allen Jack and Cottier

Attention: Mr. Anthony Di Cristo

**ACID SULFATE SOIL DESKTOP SCREENING
PROPOSED CENTRE FOR MUSIC AND DRAMA – MERIDEN SCHOOL
13 MARGARET STREET, STRATHFIELD, NSW 2135**

1 INTRODUCTION

Meriden School ('the client') commissioned Environmental Investigation Services (EIS)¹ to undertake an acid sulfate soil (ASS) desktop screening for the proposed Centre for Music and Drama of Meriden School located at 13 Margaret Street, Strathfield. The site is identified as part of Lot 101 in DP 862040.

The site location and the investigation locations are shown on Drawing No. 1 extracted from a report provided by Douglas Partners (Douglas).

The investigation was undertaken generally in accordance with an EIS proposal (Ref: EP49473BG) of 9 May 2019 and written acceptance from Meriden School by of 10 May 2019.

The aims of the desktop ASS screening are to establish the likelihood that actual ASS or potential ASS (PASS) may be disturbed during the proposed development works, and to assess whether an intrusive ASS assessment and/or Acid Sulfate Soil Management Plan (ASSMP) are required.

1.1 Assessment Guidelines

The preparation of this letter report was undertaken with reference to the Acid Sulfate Soil Management Advisory Committee (ASSMAC) Acid Sulfate Soil Manual (1998)². Background information on ASS and the assessment process is provided in the appendices.

1.2 Proposed Development Details

Based on the information provided by the client, EIS understand that the proposed development includes demolition of a number of existing buildings and construction of a new building for the centre for music and drama. The proposed development includes an approximately 6.2m deep basement excavation.

¹ Environmental consulting division of Jeffery & Katauskas Pty Ltd (J&K)

² Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). *Acid Sulfate Soils Manual* (ASS Manual 1998)

2 SITE INFORMATION

2.1 Previous Investigations

EIS were provided with the following two reports prepared by Douglas in 2018:

- Preliminary Site Investigation for Contamination (Ref: Project 86568.01) dated 13 November 2018. The report concluded the following:
 - Soil sampling from boreholes and test pits and laboratory analysis for common contaminants has indicated an absence of soil contamination. On this basis it was considered that the site is suitable for the proposed development from a contamination perspective;
 - Testing for waste classification purposes indicated that the filling has a preliminary classification of General Solid Waste (non-putrescible) and the underlying natural soil/rock is preliminarily classified as VENM. Further testing would need to be undertaken (post-demolition) to confirm these classifications for soil and rock that will be excavated for the proposed basement and disposed (or re-used) off-site; and
 - A hazardous building materials survey should be undertaken (if not already completed) for demolition of the existing building.
- Geotechnical Investigation (Ref: Project 86568.00) dated 16 November 2018. The investigation was carried out to provide information on the subsurface conditions for design and planning purposes. The report recommended dilapidation surveys; waste classification of all material to be excavated and transported off site; monitoring of groundwater levels; shoring pile inspections and anchor installation; and footing and pile inspections during construction. The sub-surface conditions encountered by Douglas are summarised in Section 2.6.

2.2 Site Description

Based on the information provided in the Douglas reports EIS understand that the site is located in a predominantly residential area of Strathfield. The site is located approximately 370m to the south of a stormwater channel that runs into Powells Creek and eventually into Homebush Bay. The site is situated within gently undulating topography on a hillside that gently slopes down to the north-east at approximately 3° to 4°. The site has a southern frontage on Margaret Street.

EIS also understand that the site was occupied by a one-story brick building which contained classrooms used for music and drama at the school. The immediate surrounds of the building included landscaped gardens, paved walkways and an asphalt driveway.

EIS have not undertaken a site inspection for the purpose of preparing this report. The site description was prepared based on the information from Douglas report and available online information.

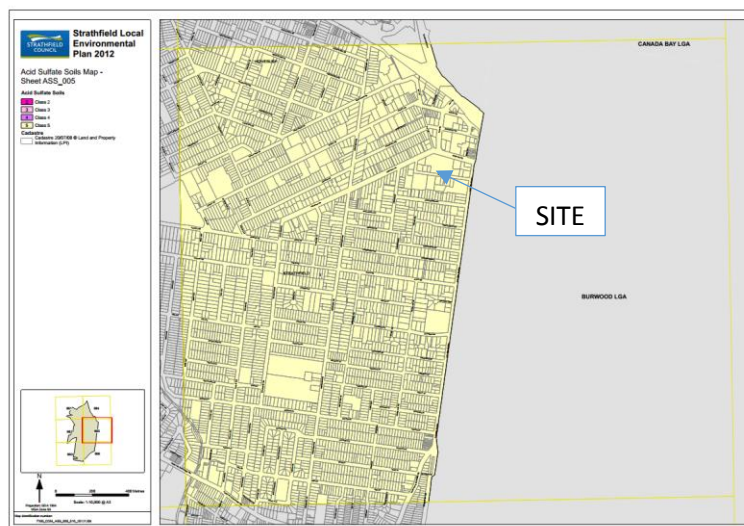
2.3 Regional Geology

The geological map of Sydney (1983/)³ indicates the site to be underlain by Ashfield Shale of the Wianamatta Group, which typically consists of black to dark grey shale and laminite.

³ Department of Mineral Resources, (1983). *1:100,000 Geological Map of Sydney (Series 9130)*

2.4 Strathfield Council Local Environmental Plan (LEP) 2012

A review of the Strathfield Council LEP indicates that the site is located in a Class 5 risk Area (refer to appendices for further details on each risk class). An extract from the Plan is reproduced below.



2.5 Acid Sulfate Soil Risk Map

A review of the ASS risk maps prepared by Department of Land and Water Conservation (1997)⁴ indicates that the site is located in an area classified as no known occurrence of acid sulfate soil. A section of the map is reproduced below.



Based on the risk maps there do not appear to be any risk areas within 500m of the site. There is a creek source (Powells Creek) approximately 550m to the north of the site.

The acid sulfate soil risk map does include a notation that river and creek sediments may contain acid sulfate soil. However EIS note that the sections of creek closest to the site are concrete lined. This area does not show up as Class 1, 2, 3, or 4 area on the Strathfield LEP 2012.

⁴ Department of Land and Water Conservation, (1997). 1:25,000 Acid Sulfate Soil Risk Map (Series 9130N3, Ed 2).

2.6 Subsurface Conditions

The subsurface conditions of the site were obtained from the borehole logs extracted from the Douglas reports. The subsurface conditions encountered generally consisted of fill material to a depth of approximately 1.2m. This was underlain by silty clay that was assessed to be residual (i.e. derived from weather bedrock). Laminite (sedimentary rock) was encountered at approximately 2.0m to 2.6m below ground level.

Groundwater was encountered in a well installed in a borehole at a depth of 3.36m, measured five days after the installation. No free groundwater was observed in the borehole during the drilling. Reference should be made to the borehole logs attached in the appendices for further details on sub-surface conditions.

3 CONCLUSIONS

Based on the information reviewed for this assessment, EIS are of the opinion that there is negligible potential for ASS or PASS to be disturbed during the proposed development works described in Section 1.2 of this report. This conclusion is based on the following:

- The ASS risk map for the site indicates that the site is located within an area of no known occurrence of ASS;
- The boreholes encountered residual silty clay over shallow Laminite bedrock (sedimentary rock). Acid sulfate soils are usually associated with alluvial soils;
- No organic material (e.g. bands of peat) that may be indicative of potential acid sulfate soil was encountered;
- The geological map for the area indicates that the site is underlain by Ashfield Shale. This was confirmed by the boreholes;
- The site is located at approximately 19m Australian Heights Datum (AHD). ASS are not usually associated with soil horizons above 5m AHD; and
- There are no potential acid sulfate areas within 500m of the site marked on the ASS soil risk map.

The risk of any site works lowering the water table on adjacent Class 1,2,3,4 land below 1m AHD is considered to be negligible for the following reasons:

- The Strathfield Council Local Environmental Plan (LEP) 2012 does not show any Class 1,2,3 or 4 land within 500m of the site; and
- The permeability of Ashfield shale is very low. Therefore the risk of changing water levels within the site having any impact on water levels in areas more than 500m away is considered to be very low.

Based on this information, an ASSMP is not considered necessary for the proposed development. With regard to potential acid sulfate soil the site is considered suitable for the proposed development.

4 LIMITATIONS

The report limitations are outlined below:

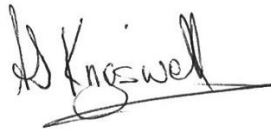
- EIS accepts no responsibility for any unidentified ASS or PASS issues at the site. Any unexpected problems/subsurface features that may be encountered during development works should be inspected by an environmental consultant as soon as possible;
- This report has been prepared based on the information provided to EIS and available online information; scope of work and limitation outlined in the EIS proposal; and terms of contract between EIS and the client (as applicable);
- Subsurface soil and rock conditions encountered between investigation locations (extracted from the Douglas report) may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes;
- The preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards;
- Where information has been provided by third parties, EIS has not undertaken any verification process, except where specifically stated in the report;
- EIS accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site;
- EIS have not and will not make any determination regarding finances associated with the site;
- Additional investigation work may be required in the event of changes to the proposed development or land use. An environmental consultant should be contacted immediately in such circumstances;
- Material considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa;
- This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose;
- Copyright in this report is the property of EIS. EIS has used a degree of care, skill and diligence normally exercised by consulting professionals in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report;
- If the client, or any person, provides a copy of this report to any third party, such third party must not rely on this report except with the express written consent of EIS; and
- Any third party who seeks to rely on this report without the express written consent of EIS does so entirely at their own risk and to the fullest extent permitted by law, EIS accepts no liability whatsoever, in respect of any loss or damage suffered by any such third party.

If you have any questions concerning the contents of this letter please do not hesitate to contact us.

Kind Regards,



Para Bokalawela
Senior Environmental Engineer



Adrian Kingswell
Principal Consultant

Appendices:

Appendix A: Report Figures (Douglas Partners)

Appendix B: Information on Acid Sulfate Soils

Appendix C: Borehole Logs (Douglas Partners)

Appendix A: Report Figures (Douglas Partners)



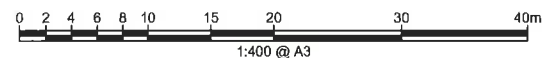
Locality Plan

LEGEND

- + Test pit location
- x Borehole location
- W Groundwater well

NOTE:

- 1: Base image from Nearmap.com
(Dated 23.10.2018)
- 2: Test locations are approximate only and
are shown with reference to existing features.



Appendix B: Information on Acid Sulfate Soils

A. Background

Acid Sulfate Soil (ASS) is formed from iron rich alluvial sediments and sulfate (found in seawater) in the presence of sulfate reducing bacteria and plentiful organic matter. These conditions are generally found in mangroves, salt marsh vegetation or tidal areas and at the bottom of coastal rivers and lakes. These soils include those that are producing acid (termed actual ASS) and those that can become acid producing (termed potential ASS or 'PASS'). PASS are naturally occurring soils and sediment that contain iron sulfides (pyrite) which, when exposed to oxygen generate sulfuric acid.

B. The ASS Management Advisory Committee (ASSMAC)

The NSW government in 1994 formed the ASSMAC to coordinate a response to ASS issues. In 1998 this group released the Acid Sulfate Soil Manual⁵ providing best practice advice for planning, assessment, management, laboratory methods, drainage, groundwater and the preparation of ASS management plans (ASSMP).

In 1997 the Department of Land and Soil Conservation (now part of the Office of Environment and Heritage⁶) developed two series of maps with respect to ASS for use by council and technical staff implementing the ASS Manual 1998:

- ASS Planning Maps – issued to councils and government units; and
- ASS Risk Maps – issued to interested parties.

C. The ASS Planning Maps

The ASS planning maps provide an indication of the relative potential for disturbance of ASS to occur at locations within the council area. These maps do not provide an indication of the actual occurrence of ASS at a site or the likely severity of the conditions.

The maps are divided into five classes dependent upon the type of activities/works that if undertaken, may represent an environmental risk through the development of acidic conditions associated with ASS:

Table 1: Risk Classes

Risk Class	Description
Class 1	All works.
Class 2	All works below existing ground level and works by which the water table is likely to be lowered.
Class 3	Works at depths beyond 1m below existing ground level or works by which the water table is likely to be lowered beyond 1m below existing ground level.
Class 4	Works at depths beyond 2m below existing ground level or works by which the water table is likely to be lowered beyond 2m below existing ground level.
Class 5	Works within 500m of adjacent Class 1,2,3,4 land which are likely to lower the water table below 1m AHD on the adjacent land.

⁵ Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). *Acid Sulfate Soils Manual* (ASS Manual 1998)

⁶ <http://www.environment.nsw.gov.au/acidsulfatesoil/index.htm>

D. The ASS Risk Maps

The ASS risk maps provide an indication of the probability of occurrence of PASS at a particular location based on interpretation from geological and soil landscape maps. The maps provide classes based on high probability, low probability, no known occurrence and areas of disturbed terrain (site specific assessment necessary) and the likely depth at which ASS are likely to be encountered.

E. Investigation and Laboratory Testing for ASS

The ASS Manual 1998 includes information on assessment of the likelihood of PASS, the need for an ASSMP, and the development of mitigation measures for a proposed development located in PASS risk areas.

The ASS Manual 1998 recommends a minimum of four sampling locations for a site with an area up to 1ha. For sites greater than 4ha, the manual recommends the use of a reduced density of two locations per hectare subject to the proposed development. For lineal investigations, the manual recommends sampling every 50-100m.

The sampling locations should include all areas where significant disturbance of soils will occur and/or areas with a high environmental sensitivity. In some instances a varied sampling plan may be more suitable, particularly for sites less than 1,000m² in area.

The depth of investigation should extend to at least 1m beyond the depth of proposed excavation/disturbance or estimated drop in water table height, or to a minimum of 2m below existing ground level, whichever is greatest.

Standard methods for the laboratory analysis of samples are presented in the Australian Standard AS4969-2008/09⁷ (part 1 to 14). The principal analytical method is suspension Peroxide Oxidation Combined Acidity and Sulfur (sPOCAS).

The sPOCAS method specified in AS4969-2008/09 supersedes the POCAS method specified in the ASS Manual 1998. When S_{POS} (peroxide oxidisable sulfur) values are close to the action criteria confirmation of the result can be undertaken by the chromium reducible sulfur (S_{CR}) method.

The endpoint for the pH titration in AS4969-2008/09 is pH6.5 as opposed to pH5.5 adopted in the ASS Manual. Therefore the values for Total Actual Acidity (TAA), Total Sulfide Acidity (TSA) and Total Potential Acidity (TPA) will more conservative when analysed using the sPOCAS method specified in AS4969-2008/09.

⁷ Standards Australia, (2008/2009). *Analysis of acid sulfate soil – Dried samples – Methods of test, Parts 1 to 14*. (AS4969-2008/09)

Appendix C: Borehole Logs (Douglas Partners)

BOREHOLE LOG

CLIENT: Meriden School
PROJECT: Meriden Centre of Music and Drama
LOCATION: Margaret Street, Strathfield

SURFACE LEVEL: 17.0 AHD
EASTING: 323488
NORTHING: 6250175
DIP/AZIMUTH: 90°/-

BORE No: 101
PROJECT No: 86568.00
DATE: 4/10/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering	Graphic Log	Rock Strength	Fracture Spacing (m)	Discontinuities	Sampling & In Situ Testing			
								Type	Core Rec. %	RQD %	Test Results & Comments
	0.3	FILLING: dark grey, fine to coarse sand filling (topsoil) with some silt and roadbase gravel, moist.						A/E			
	1	FILLING: apparently compacted, light yellow-brown, fine to medium sand filling, moist						A/E*			
	1.2	0.6m: geofabric inclusion						A/E			
	1.2	0.7m: slightly silty with some roadbase gravel, ironstone flakes and ceramic inclusions, moist						S			3,5,7 N = 12
	2	SILTY CLAY: stiff, light grey mottled red-brown silty clay, with some ironstone inclusions (10-30mm) MC>PL, damp to moist					Unless otherwise stated rock is fractured along rough planar bedding with clay 1-5mm and iron dipping 0°-5°	A/E			
	2.6	LAMINITE: very low strength, light grey-brown laminite					2.78-2.80m: Cs, 20mm	S			8,15/70 refusal PL(A) = 0.4
	2.81	LAMINITE: medium strength, moderately then slightly fractured, grey-brown laminite with approximately 25% fine sandstone laminations and some clay bands					3.18m: J 85°&70°, st, ro, cly 1mm 3.23-3.25m: Cs 20mm 3.25m: J 45°, un, ro, cly 3.4m: J 70°&80°, st, ro, fe 3.77-3.80m: Cs 30mm 3.8m: J 70°, un, ro, cly	C	100	75	PL(A) = 0.4
	4										PL(A) = 0.4
	4.9	LAMINITE: medium strength, fresh, unbroken, pale grey and grey laminite with approximately 20% fine sandstone laminations						C	100	97	PL(A) = 0.6
	5										PL(A) = 0.7
	6							C	100	100	PL(A) = 0.6
	7										
	7.9	Bore discontinued at 7.9m									
	8										
	9										

RIG: Bobcat

DRILLER: JE

LOGGED: LS/SI

CASING: HW to 2.7m

TYPE OF BORING: Solid flight auger (TC-bit) to 2.68m, NMLC-coring to 7.9m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Backfilled with drilling spoil; *BD3/041018

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ts(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ts(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



Douglas Partners
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BOREHOLE LOG

CLIENT: Meriden School
PROJECT: Meriden Centre of Music and Drama
LOCATION: Margaret Street, Strathfield

SURFACE LEVEL: 17.1 AHD
EASTING: 323505
NORTHING: 6250175
DIP/AZIMUTH: 90°/--

BORE No: 102
PROJECT No: 86568.00
DATE: 3/10/2018
SHEET 1 OF 1

[illegible]

RIG: Bobcat

DRILLER: JE

LOGGED: LS/SI

CASING: HW to 2.4m

TYPE OF BORING: Solid flight auger (TC-bit) to 2.5m, NMLC-coring to 8.05m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Backfilled with drilling spoil: *BD2/031018

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	T	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	WS	Water seep
E	Environmental sample	WL	Water level
		PI(D)	Photo ionisation detector (ppm)
		P(LA)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		gp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Meriden School
PROJECT: Mediden Centre of Music and Drama
LOCATION: Margaret Street, Strathfield

SURFACE LEVEL: 18.1 AHD
EASTING: 323494
NORTHING: 6250151
DIP/AZIMUTH: 90°/-

BORE No: 103
PROJECT No: 86568.00
DATE: 3/10/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength						Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium	High			Very High	Ex High	B - Bedding	J - Joint	Type	Core Rec. %
18	0.3	FILLING: dark grey, fine to coarse sand filling (topsoil)																A/E			1,4,6 N = 10	
	0.6	FILLING: dark grey, silty, fine sand filling, slightly clayey with some rootlets and fine to medium igneous gravel.																A/E				
17	1.0	CLAY: orange-brown, clay with traces of ironstone gravel																A/E				
		SILTY CLAY: stiff, light grey-brown silty clay with dark gray carbonaceous material																S/E				
		1.5m: with medium to coarse ironstone gravel																A/E*				
16	2.0	SHALY CLAY: pale grey, shaly clay with traces of bark and some fine to coarse ironstone gravels																A			10,25/130 refusal Bouncing	
	2.5	LAMINITE: extremely low to very low strength, pale grey shale with some ironstone bands																S				
15	2.8	LAMINITE: low to medium strength, highly weathered, fractured to slightly fractured brown and grey laminite with 10-20% sandstone laminations and some extremely low strength bands																				
14	4.0	LAMINITE: medium strength, slightly weathered then fresh, slightly fractured to unbroken dark grey-brown then dark grey laminite with approximately 30% sandstone laminations																			PL(A) = 0.4	
13	5.0																					
12	6.0																				PL(A) = 0.5	
11	7.0																					
10	8.03	Bore discontinued at 8.03m																			PL(A) = 0.6	
9																						
9																					PL(A) = 0.6	
																					PL(A) = 0.9	

RIG: Bobcat

DRILLER: JE

LOGGED: JDB

CASING: HW to 2.5m

TYPE OF BORING: Solid flight auger (TC-Bit) to 2.5m, Rotary washbore (Blade bit) to 2.8m, NMLC-coring to 8.03m.

WATER OBSERVATIONS: No free groundwater observed whilst augering. Dipped at 11:00 am 8/10/2018, water level at 3.36m.

REMARKS: *BD1/031018

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test (50) (MPa)
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (50) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
D Disturbed sample	W Water seep	S Standard penetration test
E Environmental sample	W Water level	V Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Meriden School
PROJECT: Meriden Centre of Music and Drama
LOCATION: Margaret Street, Strathfield

SURFACE LEVEL: 18.1 AHD
EASTING: 323494
NORTHING: 6250151
DIP/AZIMUTH: 90°/-

BORE No: 103
PROJECT No: 86568.00
DATE: 3/10/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Well Construction Details
				Type	Depth	Sample	Results & Comments		
18	0.3	FILLING: dark grey, fine to coarse sand filling (topsoil)		A/E	0.1				Gatic Cover
	0.6	FILLING: dark grey, silty, fine sand filling, slightly clayey with some rootlets and fine to medium igneous gravel.		A/E	0.2				
	1.0	CLAY: orange-brown, clay with traces of ironstone gravel		A/E	0.5				
	1.5	SILTY CLAY: stiff, light grey-brown silty clay with dark gray carbonaceous material		S/E	0.6				
	2.0	1.5m: with medium to coarse ironstone gravel		A/E*	0.9		1,4,6 N = 10		1 Filling (0.0-2.1m)
	2.5	SHALY CLAY: pale grey, shaly clay with traces of bark and some fine to coarse ironstone gravels		A	1.0				Blank PVC Casing (0.05-2.85m)
	2.8	LAMINITE: extremely low to very low strength, pale grey shale with some ironstone bands		S	1.45		10,25/130 refusal Bouncing		Bentonite Plug (2.0-2.75m)
	3.0	LAMINITE: low to medium strength, highly weathered, fractured to slightly fractured brown and grey laminite with 10-20% sandstone laminations and some extremely low strength bands		C	1.5				
	4.0	LAMINITE: medium strength, slightly weathered then fresh, slightly fractured to unbroken dark grey-brown then dark grey laminite with approximately 30% sandstone laminations		C	1.6		PL(A) = 0.4	08-10-18	Slotted PVC Casing (2.85-7.85m)
	5.0			C	1.8		PL(A) = 0.5		
	6.0			C	2.0		PL(A) = 0.6		Gravel (2.75-7.85m)
	7.0			C	2.5		PL(A) = 0.6		
	8.03	Bore discontinued at 8.03m		C	2.78		PL(A) = 0.9		End Cap Hole Collapse

RIG: Bobcat

DRILLER: JE

LOGGED: JDB

CASING: HW to 2.5m

TYPE OF BORING: Solid flight auger (TC-Bit) to 2.5m, Rotary washbore (Blade bit) to 2.8m, NMLC-coring to 8.03m.

WATER OBSERVATIONS: No free groundwater observed whilst augering. Dipped at 11:00 am 8/10/2018, water level at 3.36m.

REMARKS: *BD1/031018

SAMPLING & IN SITU TESTING LEGEND

A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)
BLK Block sample	U ₂ Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
D Disturbed sample	W ₂ Water seep	S Standard penetration test
E Environmental sample	W ₃ Water level	V Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Meriden School
PROJECT: Meriden Centre of Music and Drama
LOCATION: Margaret Street, Strathfield

SURFACE LEVEL: 18.7 AHD
EASTING: 323503
NORTHING: 6250136
DIP/AZIMUTH: 90°/-

BORE No: 104
PROJECT No: 86568.00
DATE: 5/10/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering EW HW MW SW FS FR	Graphic Log	Rock Strength Ex Low Very Low Low Medium High Very High Ex High	Water	Fracture Spacing (m) 0.01 0.05 0.10 0.50 1.00	Discontinuities B - Bedding J - Joint S - Shear F - Fault	Sampling & In Situ Testing			
									Type	Core Rec. %	RQD %	Test Results & Comments
	0.01	FILLING: dark grey, fine to medium sand filling with some silt (topsoil), saturated							A/E			
	0.25	FILLING: dark grey slightly silty sand filling, saturated							A/E*			
	1	SILTY CLAY: stiff, light grey mottled red-brown silty clay, with some ironstone inclusions (5-10mm), MC>PL, moist							A/E			
	2.2	LAMINITE: very low strength, highly weathered, pale grey-brown laminite						Unless otherwise stated rock is fractured along rough planar bedding with clay 1-3mm and iron, dipping 0°-5°	S			4,6,8 N = 14
	2.55	LAMINITE: medium strength, moderately then slightly weathered, fractured and slightly fractured, grey-brown laminite with approximately 20% fine sandstone laminations and some clay bands										16/30 refusal
	3							2.56m: B 0°, cly 10mm 2.78m: B 0°, cly 10mm 2.78-2.80m: Ds 20mm 2.83-2.86m: Cs 30mm 3.14-3.86m: Cs 20mm 3.21-3.23m: Cs 20mm 3.23m: J 40°, pl, cly 1mm 3.51-3.53m: Cs 20mm 3.82m: J 45°, pl, ro, cln 3.92m: B 0°, cly 20mm 4.1m: J 5°&20°, st, ro, cly vn 4.12-4.20m: J 70°, pl, ro, cly vn 4.2m: J 85°, un, ro, cly vn 4.32-4.34m: Ds 10mm 4.43-4.50m: Ds 20mm 4.68m: B 0°, pl, ro, cly 10mm	C	100	66	Bouncing, no recovery PL(A) = 0.6 PL(A) = 0.5
	5.0	LAMINITE: high strength, slightly weathered then fresh, slightly fractured and unbroken grey laminite with approximately 20% fine sandstone laminations							C	100	63	PL(A) = 0.8 PL(A) = 1.1
	6											
	7							6.33m: J 30°, un, ro, fe	C	100	100	PL(A) = 1.1 PL(A) = 1.5
	8.08	Bore discontinued at 8.08m										PL(A) = 1.1

RIG: Bobcat **DRILLER:** JE **LOGGED:** LS/SI **CASING:** HW to 2.5m
TYPE OF BORING: Solid flight auger (TC-Bit) to 2.5m, Rotary washbore (Blade bit) to 2.53m, NMLC-coring to 8.08m.
WATER OBSERVATIONS: No free groundwater observed whilst augering
REMARKS: Backfilled with drilling spoil; *BD6/051018

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	W Water seep	S Standard penetration test	
E Environmental sample	W Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Meriden School
PROJECT: Meriden Centre of Music and Drama
LOCATION: Margaret Street, Strathfield

SURFACE LEVEL: 18.3 AHD
EASTING: 323475
NORTHING: 6250140
DIP/AZIMUTH: 90°/-

BORE No: 105
PROJECT No: 86568.00
DATE: 5/10/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding	J - Joint	Type
18	0.25	TOPSOIL: dark grey, silty, fine sand topsoil with some clay and rootlets, moist.																A/E			Bulk sample taken from 0.4-0.8m pp = 200-180 3,4,7 N = 11
	0.8	CLAY: apparently stiff, light brown clay with trace fine ironstone gravel and rootlets, damp.																A/E B			
1		SILTY CLAY: stiff, grey mottled red-brown, silty clay with some fine to medium ironstone gravel, trace rootlets and carbonaceous material, humid.																A/E*			
																		S/E			
	2.0	LAMINITE: extremely low strength, light brown shale with some fine to coarse ironstone gravel.																A/E			pp >600 25/140 refusal Bouncing
	2.64	2.50m: becomes brown, very low strength																S/E			
3		LAMINITE: medium strength with some extremely low strength bands, highly weathered, fractured to slightly fractured, brown and dark brown shale with some ironstaining and some sandstone laminations.																C	100	75	PL(A) = 0.4
4																					PL(A) = 0.7
4.22		LAMINITE: medium then medium to high strength, fresh, slightly fractured to unbroken, dark grey laminite with approximately 80% siltstone interbedded with 20% fine grained sandstone.																C	100	94	
5																					
6																					PL(A) = 0.9
7																		C	100	95	PL(A) = 1
8																					PL(A) = 1
8	8.0	Bore discontinued at 8.0m																			
9																					
9																					

RIG: Bobcat

DRILLER: JE

LOGGED: JDB

CASING: HW to 2.5m

TYPE OF BORING: Solid flight auger (TC-Bit) to 2.5m, Rotary washbore (Blade bit) to 2.64m, NMLC-coring to 8.00m.

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Backfilled with drilling spoil; *BD8/20181005 taken from 0.9-1.0m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



Douglas Partners
 Geotechnics | Environment | Groundwater

TEST PIT LOG

CLIENT: Meriden School
PROJECT: Meriden Centre of Music and Drama
LOCATION: Margaret Street, Strathfield

SURFACE LEVEL: 17.2 AHD
EASTING: 323493
NORTHING: 6250178

PIT No: TP106
PROJECT No: 86568.00
DATE: 5/10/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
17	0.05	FILLING: brown, bark filling with some topsoil, moist.		D/E								
		FILLING: dark grey-brown, silty, fine to medium sand filling with some rootlets and trace brick fragments and rootlets, wet.										
	0.25	FILLING: dark grey-brown, clay filling with some fine igneous gravel, trace brick and concrete fragments, wet.										
	0.35	FILLING: pale grey, slightly clayey, fine to medium sand filling with some brick and concrete fragments, wet.										
		0.50m: yellow danger tape										
16	0.66	CLAY: very stiff to hard, grey mottled orange-brown, slightly silty clay with some fine to medium ironstone gravel, medium plasticity, wet.		D/E								
	0.85	Pit discontinued at 0.85m										
1				U ₅₀								
					1.11							

RIG: Hand tools

LOGGED: JDB/SI

SURVEY DATUM: MGA94

WATER OBSERVATIONS: Water seepage from 0.1m

REMARKS: Backfilled with excavated spoil

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	WL	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Meriden School
PROJECT: Meriden Centre of Music and Drama
LOCATION: Margaret Street, Strathfield

SURFACE LEVEL: 17.2 AHD
EASTING: 323511
NORTHING: 6250172

PIT No: TP107
PROJECT No: 86568.00
DATE: 4/10/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
17	0.05	BRICK PAVERS		D/E	0.1							
	0.1	FILLING: light grey-brown, fine to medium sand filling, humid.										
	0.2	FILLING: dark grey-brown, slightly clayey, fine to medium sand filling with some fine igneous gravel and trace brick fragments, moist.										
	0.3	CLAY: stiff, orange-brown clay with trace fine to medium ironstone gravel, moist.										
	0.4											
16	0.5				0.5							
	0.6	SILTY CLAY: very stiff to hard, orange-brown mottled grey, silty clay with some fine to medium ironstone gravel and trace of carbonaceous material, moist.			0.6							
	0.7				0.7							
1	0.91	Pit discontinued at 0.91m										

RIG: Hand tools

LOGGED: JDB/SI

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Backfilled with excavated spoil; *BD5/20181004 taken from 0.6-0.7m

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	SP	Standard penetration test
E	Environmental sample	WL	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Meriden School
PROJECT: Meriden Centre of Music and Drama
LOCATION: Margaret Street, Strathfield

SURFACE LEVEL: 18.0 AHD
EASTING: 323513
NORTHING: 6250162

PIT No: TP108A
PROJECT No: 86568.00
DATE: 4/10/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
	0.05	BRICK PAVERS										
	0.1	FILLING: light yellow-brown, medium sand filling.		D/E	0.05							
	0.18	ROADBASE: apparently compacted, light grey-green, igneous gravel (3-25mm), angular to sub-angular, well graded with some fine to coarse sand, moist.		E	0.1							
	0.2	ASPHALTIC CONCRETE		D/E	0.18							
		FILLING: brown and orange-brown, silty clay filling with some coarse sand, sandstone gravel (4-10mm) with trace ceramic fragments and slag (5-25mm), moist.			0.2							
		0.40m: becomes grey with some fine gravels, low plasticity, MC ~ PL										
	0.57	SILTY CLAY: stiff, red-brown, silty clay with trace ironstone gravel, medium to high plasticity, MC ~ PL.		D/E	0.59							
	0.9	Pit discontinued at 0.9m										

RIG: Hand tools

LOGGED: RB

SURVEY DATUM: MGA94

WATER OBSERVATIONS: Free groundwater observed at 0.79m

REMARKS: Backfilled with excavated spoil

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Meriden School
PROJECT: Mediden Centre of Music and Drama
LOCATION: Margaret Street, Strathfield

SURFACE LEVEL: 18.0 AHD
EASTING: 323512
NORTHING: 6250163

PIT No: TP108B
PROJECT No: 86568.00
DATE: 4/10/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
	0.05	BRICK PAVERS										
	0.06	FILLING: light yellow-brown, fine to medium sand filling, moist.										
	0.11	ASPHALTIC CONCRETE		D	0.11							
	0.13				0.13							
	0.2	ROADBASE: grey, gravelly sand with clay.										
	0.25	FILLING: brown and grey, gravelly silty clay filling, medium plasticity, MC ~ PL.		D/E	0.25							
	0.26	FILLING: grey, gravelly sand filling with some clay and silt, moist.			0.26							
	0.47	SILTY CLAY: firm to stiff, grey and brown, silty clay with a trace of ironstone gravel, medium to high plasticity, MC ~ PL.		D/E	0.5							
					0.6							
		0.70m; becomes red-brown, MC > PL										
		0.75m: stiff to very stiff										
				E	0.8							
					0.9		pp = 220					
	0.95	Pit discontinued at 0.95m										

RIG: Hand tools

LOGGED: RB

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Backfilled with excavated spoil

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND


A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)
D Disturbed sample	W Water seep	SP Standard penetration test
E Environmental sample	W Water level	V Shear vane (kPa)

TEST PIT LOG

CLIENT: Meriden School
PROJECT: Meriden Centre of Music and Drama
LOCATION: Margaret Street, Strathfield

SURFACE LEVEL: 18.7 AHD
EASTING: 323514
NORTHING: 6250138

PIT No: TP109
PROJECT No: 86568.00
DATE: 4/10/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
18	0.05	FILLING: bark and wood chips (garden bed)		D/E	0.1							
		FILLING: dark grey, silty, fine sand filling with some organic matter, moist.			0.2							
	0.3	FILLING: light grey, fine to medium sand filling with a trace of ripped sandstone boulder and brick fragments, moist.		D/E*	0.5							
		0.42m: concrete fragment, 60mm thick			0.6							
	0.55	FILLING: pale grey, ripped sandstone and cobble filling, sub-rounded to sub-angular, with some fine sand and trace slate fragments, moist.		D/E	0.8							
	0.64	CLAY: very stiff to hard, brown mottled light grey clay, moist.			1.0							
	1.0	Pit discontinued at 1.0m		U ₉₀	1.33							

RIG: Hand tools

LOGGED: JDB/SI

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Backfilled with excavated spoil; *BD4/20181004 taken from 0.5-0.6m

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	SP	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)