Allam MHE Developments No.2 Pty Ltd

Acid Sulfate Soils Assessment

Proposed Manufactured Home Estate – Stage 2

82 Chapmans Road, Tuncurry

Report No. RGS03357.1-AC

13 September 2023

REGIONAL GEOTECHNICAL SOLUTIONS

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Manning-Great Lakes
Port Macquarie
Coffs Harbour

RGS03357.1-AC

13 September 2023

Allam MHE Developments No.2 Pty Ltd
PO Box 7385
BAULKHAM HILLS BC NSW 2153

Attention: Mark Cerone

Dear Mark

RE: Proposed Manufactured Home Estate – Stage 2 – 82 Chapmans Road, Tuncurry
Acid Sulfate Soils Assessment

As requested, Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken an Acid Sulfate Soils assessment for the proposed Manufactured Home Estate Stage 2 at 82 Chapmans Road, Tuncurry. This report presents the results of the assessment.

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Prepared by

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1 INTRODUCTION

As requested, Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken an Acid Sulfate Soils (ASS) assessment for the proposed Manufactured Home Estate (MHE) Stage 2 at 82 Chapmans Road, Tuncurry. The site location is shown on Figure 1 and the proposed site layout is shown on Figure 2.

The site comprises Lot 11 DP615229 and occupies approximately 16.3 hectares.

The purpose of the assessment is to identify if Actual or Potential ASS will be encountered during development of the site and if so, to develop an ASS Management Plan.

2 METHODOLOGY

The assessment of the site was undertaken on 1 and 2 August 2023 by an Engineer from RGS and involved:

- Review of previous geotechnical and geo-environmental assessment investigations undertaken within the vicinity of the site;
- Observation of site features and surrounding features relevant to the geotechnical conditions of the site;
- Logging and sampling of thirty-three test pits excavated using a track-mounted excavator; and
- Laboratory testing of representative samples.

Engineering logs of the test pits are presented in Appendix A. Laboratory test results are presented in Appendix B. Test locations are shown on Figure 3.

3 PREVIOUS INVESTIGATION

RGS has undertaken an ASS Assessment on the adjoining site to the north where the proposed MHE Stage 1 will be located. The findings of the ASS investigation are presented in report RGS03137.1-AB, dated 28 October 2022 and were reviewed as part of this assessment.

A summary of the key points and conclusions are provided below:

- Reference to the Coolongolook 1:25,000 Acid Sulfate Soil Risk Map indicates that the low-lying swampy western part of the site is situated within an area with a high probability of ASS within 1m of the ground surface;
- The ASS risk map indicates the central and eastern parts of the site to also be within an area with a high probability of ASS between 1m and 3m below the ground surface.
- Twenty-three samples obtained from the test pits were screened for the presence of actual or potential ASS using methods 23Af and 22Bf of the ASSMAC Acid Sulfate Soils Manual. The test results are attached. The results indicated:

- The samples revealed pH_f values of 5.02 to 6.78 in distilled water. In this test, pH <4 can be an indicator of Actual ASS; and
- The samples revealed pH_{FOX} values of 1.90 to 4.46 in hydrogen peroxide. Values of less than 3 can be an indicator of Potential ASS.

- Five samples were submitted for Chromium Reducible Sulphur (CRS) analysis, to differentiate between potential organic or inorganic sources of sulfur;

- Each of the samples recorded Titratable Actual Acidity (TAA) concentration below the adopted action criteria, with exception of one sample which exceeded the action criteria indicating the presence of actual acidity;

- Oxidisable sulfur concentrations exceeded the adopted action criteria in two of the samples (TP49 0.8 – 1.0m and TP51 1.7 – 1.9m indicating the presence of potential sulphuric acidity. In addition, one sample TP53 0.0 – 0.2m exceeded the action criteria for net acidity. These soils are therefore considered to be Potential ASS. As such, an ASS Management Plan is required for this part of the site;

- It is understood that excavations for the proposed stormwater basin will be to approximately 1.45m below ground surface. The remainder of the site will be filled. As such the ASS Management Plan should be implemented for excavations for the stormwater basin in the south-west corner of the site, and for other excavations into natural ground profile in the low-lying swampy area in the western part of the site, and more generally in Terrain Zone 1; and

- The ASS Management Plan requirements for excavations into the natural ground profile in Terrain Zone 1 soils in the western parts of the site indicates that lime treatment at a rate of 9kg/tonne would be required.

4 SITE CONDITIONS

4.1 Surface Conditions

The site is rectangular in shape and is bound vacant land forming proposed MHE Stage 1 to the north, a former nursery and landscape supplies yard to the north-east, undeveloped land to the east, south and south-west and by Chapmans Road and undeveloped land to the west. The Wallamba River is located approximately 380m to the west of the site.

The central and eastern parts of the site are situated on a low-lying Aeolian sandplain with the natural ground level being typically flat.

The western part of the site is situated on low-lying swampy terrain and is also generally flat. Site surface elevations vary from about RL3m to RL4m.

There was an existing shed located in the north-west corner near a site entrance gate. The shed was of masonry block construction on a concrete slab floor with a corrugated metal roof and adjoining water tank. The shed appeared to have been constructed on a fill mound which graded to the south to natural ground level at about 2° to 3°.

Two small farm dams were present in the central-west and north-east corner of the site respectively.

Drainage of the site will be primarily via infiltration into the upper sandy soils.

The site had been recently slashed prior to the field investigations. Vegetation predominantly comprised grass and weeds with remnant stands of trees including Casuarina and Eucalypts up to 15m in height. The south-west corner comprised remnant uncleared bushland.

Typical site photographs are presented below.

Looking east from the western part of the site showing the typical ground conditions at the time of the field investigations. The site had recently been slashed and was generally open with small stands of trees remaining.

Looking east showing a small farm dam located in the central-west of the site to the south of the shed.

Looking north-west from the south-eastern part of the site. The soil profile in the eastern and central parts of the comprise topsoil overlying Aeolian sands.

Looking south-west in the western part of the site. The soil profile comprised topsoil overlying Alluvial sands in this part of the site.

4.2 Subsurface Conditions

Based on the topographic conditions, the site has been divided into three terrain zones. Reference to the MinView website indicates that the underlying geology varies with each terrain as outlined below:

- Terrain Zone 1: The eastern part of the site is underlain by Holocene beach ridge and associated strandplain deposits comprising marine sand, shell and gravel;
- Terrain Zone 2: The central part, north-west corner and south-west corner of the site are underlain by Holocene tidal-delta flat deposits comprising marine sand, silt, clay, shell and gravel; and
- Terrain Zone 3: The western and south-western parts of the site are underlain by Holocene floodplain deposits comprising silt, fluvial sand and clay.

The geology of the site is presented in Plate 1 below:

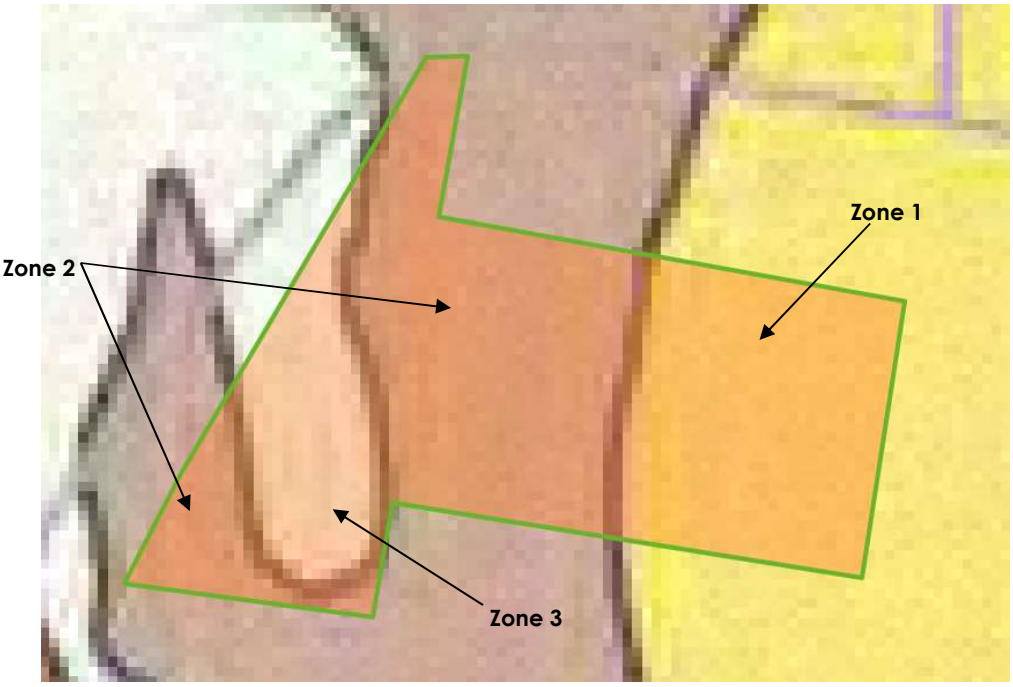


Plate 1: *Reference to the MinView website indicates that Terrain Zone 1 is underlain by Holocene beach ridge and associated strandplain deposits, Terrain Zone 2 is underlain by Holocene tidal-delta flat deposits and Terrain Zone 3 is underlain by Holocene floodplain deposits.*

The materials encountered during the investigation are summarised in Table 1 and Table 2 respectively. Further details are presented on the attached engineering logs.

Table 1: Summary of Geotechnical Units

Unit	Material	Material Description
Unit 1	Topsoil	Silty SAND, fine to medium grained, some roots (central and eastern areas); or Silty CLAY, low plasticity, some sand, fine to medium grained, some roots (western area)
Unit 2	Aeolian Soil	SAND, fine to coarse grained, trace roots
Unit 3	Indurated Sand	SAND, fine to medium grained
Unit 4	Alluvial Soil	Clayey SAND, fine to coarse grained, clay, low plasticity

Table 2: Summary of Subsurface Profile

Test Pit	Depth of Material Layer (m)				
	Terrain Zone	Unit 1 Topsoil	Unit 2 Aeolian	Unit 3 Indurated Sand	Unit 4 Alluvial
TP1	1	0.0 – 0.2	0.2 - ≥2.5*	--	--
TP2	1	0.0 – 0.2	0.2 - ≥2.5*	--	--
TP3	1	--	0.5 - ≥2.5*	--	--
TP4	1	0.0 – 0.4	0.4 – 1.5	1.5 - ≥2.5*	--
TP5	1	0.0 – 0.3	0.3 - ≥2.5*	--	--
TP6	1	0.0 – 0.2	0.2 - ≥2.5*	--	--
TP7	1	0.0 – 0.2	0.2 – 1.2	1.2 - ≥2.5*	--
TP8	1	0.0 – 0.2	0.2 - ≥2.5*	--	--
TP9	1	0.0 – 0.2	0.2 - ≥2.5*	--	--
TP10	2	0.0 – 0.2	0.2 - ≥2.5*	--	--
TP11	2	0.0 – 0.2	0.2 - ≥2.5*	--	--
TP12	2	0.0 – 0.2	0.2 - ≥2.5*	--	--
TP13	2	0.0 – 0.2	0.2 - ≥2.5*	--	--
TP14	2	0.0 – 0.2	0.2 - ≥2.5*	--	--
TP15	2	0.0 – 0.2	0.2 - ≥2.5*	--	--
TP16	2	0.0 – 0.2	0.2 - ≥2.5*	--	--
TP17	2	0.0 – 0.2	0.2 - ≥2.0*	--	
TP18	2	0.0 – 0.3	0.3 - ≥2.5*	--	--
TP19	2	0.0 – 0.2	0.2 - ≥2.0*	--	--
TP20	2	0.0 – 0.2	--	--	0.2 - ≥2.0*
TP21	2	0.0 – 0.2	0.2 - ≥2.0*	--	--
TP22	2	0.0 – 0.2	--	--	0.2 - ≥2.0*

Test Pit	Depth of Material Layer (m)				
	Terrain Zone	Unit 1 Topsoil	Unit 2 Aeolian	Unit 3 Indurated Sand	Unit 4 Alluvial
TP23	2	0.0 – 0.2	--	--	0.2 - ≥2.0*
TP24	2	0.0 – 0.2	--	--	0.2 - ≥2.0*
TP25	2	0.0 – 0.2	--	--	0.2 - ≥2.0*
TP26	3	0.0 – 0.25	--	--	0.25 - ≥2.0*
TP27	3	0.0 – 0.2	--	--	0.2 - ≥2.0*
TP28	3	0.0 – 0.25	--	--	0.25 - ≥2.0*
TP29	3	0.0 – 0.25	--	--	0.25 - ≥2.0*
TP30	3	0.0 – 0.25	--	--	0.25 - ≥2.0*
TP31	3	0.0 – 0.25	--	--	0.25 - ≥2.0*
TP32	3	0.0 – 0.25	--	--	0.25 - ≥2.0*
TP33	2	0.0 – 0.25	--	--	0.25 - ≥2.0*

Note: ≥ Indicates that base of material layer was not encountered
* Indicates that the test pit was terminated due to excavation collapse
-- Indicates that the material was not encountered at the test location

Groundwater was encountered within each of the test pits at depths of between 1.0m and 1.5m below ground surface during the limited time they remained open on the days of the field investigations. It should be noted that fluctuations in groundwater levels can occur as a result of seasonal variations, temperature, rainfall, and other similar factors, the influence of which may not have been apparent at the time of the assessment.

5 ACID SULFATE SOILS

Reference to the Coolongolook 1:25,000 Acid Sulfate Soil Risk Map indicates that the low-lying swampy western part of the site is situated in an area with a high probability of ASS within 1m of the ground surface. The map indicates the central and eastern parts of the site to also be within an area with a high probability of ASS between 1m and 3m below the ground surface.

	
Approximate location of site shown in red as indicated by Google Earth image.	*Extract from the Coolongolook 1:25,000 ASS Risk Map indicates the site to be within an area with a high probability of ASS within 1m to 3m below natural ground.*

Acid Sulfate Soils (ASS) produce sulphuric acid when exposed to oxygen due to the presence of iron sulphides in the form of pyrite within the soil matrix. These soils form when iron-rich sediments are deposited in saltwater or brackish water environments. Prior to oxidation, these pyritic soils are referred to as Potential ASS. ASS that have produced acid as a result of oxidation are referred to as Actual ASS. They typically occur in natural, low-lying coastal depositional environments below approximately 5m AHD. In the field ASS are generally identified as saline sediments such as alluvial or estuarine soils or bottom sediments in creeks and estuaries.

In environments such as that which exists at the site, the pyrite and resultant acidity (if any) would exist within the fine-grained fraction of the sediment profile.

One hundred and twelve samples obtained from the test pits were screened for the presence of actual or potential ASS using methods 23Af and 22Bf of the ASSMAC Acid Sulfate Soils Manual. The test results are attached. The results indicated:

- The samples revealed pH_f values of 4.41 to 6.99 in distilled water. In this test, pH <4 can be an indicator of Actual ASS; and
- The samples revealed pH_{FOX} values of 1.27 to 4.34 in hydrogen peroxide. Values of less than 3 can be an indicator of Potential ASS.

To provide a more comprehensive assessment, fifteen samples were submitted for Chromium Reducible Sulphur (CRS) analysis, to differentiate between potential organic or inorganic sources of sulfur. A summary of the test results is presented in Table 3.

Table 3: Summary of ASS CRS Test Results

Test Pit	Depth (m)	Terrian Zone	Texture	Acid Trail (mol H+/tonne)		Sulfur Trail (mol H+/t)			Net Acidity (mol H+/tonne)	Liming Rate (kg / Tonne)
				TAA	Action Criteria	S_{KCl}	Scr	Action Criteria		
TP1	2.3 – 2.5	1	Coarse	16	18	14	**91**	18	**107**	8
TP3	2.3 – 2.5	1	Coarse	7	18	4	**33**	18	**40**	3
TP4	1.7 – 1.9	1	Coarse	16	18	12	**128**	18	**144**	11
TP7	2.3 – 2.5	1	Coarse	**21**	18	5	**50**	18	**71**	5
TP12	1.7 – 1.9	2	Coarse	6	18	7	**106**	18	**113**	8
TP15	1.2 – 1.4	2	Coarse	13	18	16	**135**	18	**148**	11
TP16	1.2 – 1.4	2	Coarse	**20**	18	**22**	**429**	18	**449**	34
TP18	0.8 – 1.0	2	Coarse	5	18	9	**92**	18	**97**	7
TP19	0.3 – 0.5	2	Coarse	5	18	8	**122**	18	**127**	10
TP20	0.8 – 1.0	2	Coarse	5	18	8	**95**	18	**100**	8
TP23	1.3 – 1.5	2	Coarse	5	18	12	**102**	18	**107**	8
TP24	0.3 – 0.5	2	Medium	5	18	9	**176**	18	**181**	14
TP25	1.8 – 2.0	2	Coarse	7	18	17	**156**	18	**163**	12
TP30	1.3 – 1.5	3	Coarse	11	18	1	3	18	14	1
TP33	0.8 – 1.0	2	Coarse	6	18	1	0	18	6	0

Note: 1. The adopted action criteria assume that >1,000 tonnes of soil is to be disturbed.

2. Values that are bold exceed the adopted action criteria.

Each of the samples recorded a Titratable Actual Acidity (TAA) concentration below the adopted action criteria, with exception of sample TP7 2.3 – 2.5m and TP16 1.2 – 1.4m which exceeded the action criteria indicating the presence of actual acidity.

Oxidisable sulfur and net acidity concentrations exceeded the adopted action criteria in each of the samples with the exception of sample TP30 1.3 – 1.5m and TP33 0.8 – 1.0m, indicating the presence of sulfuric acidity. These soils are therefore considered to be Potential ASS (PASS). In addition, extractable sulfur concentrations exceeded the adopted action criteria in two samples TP7 2.3 – 2.5m and TP16 1.2 – 1.4m indicating some of the soils in these locations are Actual ASS (AASS). As such, an ASS Management Plan is required for the site.

Details of proposed earthworks and excavation depths are unknown at this stage. However, it is likely that there will be some filling of the site. As such the ASS Management Plan should be implemented for excavations into the natural ground profile across the MHE Stage 2 development area.

The ASS Management Plan is presented in Appendix C.

6 LIMITATIONS

This report comprises the results of an investigation carried out for a specific purpose and client as defined in the document. The report should not be used by other parties or for purposes or projects other than those assumed and stated within the report, as it may not contain adequate or appropriate information for applications other than those assumed or advised at the time of its preparation. The contents of the report are for the sole use of the client and no responsibility or liability will be accepted to any third party. The report should not be reproduced either in part or in full, without the express permission of Regional Geotechnical Solutions Pty Ltd.

Geotechnical site investigation is based on data collection, judgment, experience, and opinion. By its nature, it is less exact than other engineering disciplines. The findings presented in this report and used as the basis for the recommendations presented herein were obtained using normal, industry accepted geotechnical design practises and standards. To our knowledge, they represent a reasonable interpretation of the general condition of the site. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points.

The recommended depth and properties of any soil, rock, groundwater, or other material referred to in this report is an engineering estimate based on the information available at the time of writing. The estimate is influenced and limited by the fieldwork and testing method carried out in the site investigation, and other relevant information as has been made available. In cases where information has been provided to Regional Geotechnical Solutions for the purposes of preparing this report it has been assumed that the information is accurate and appropriate for such use. No responsibility is accepted by Regional Geotechnical Solutions for inaccuracies within any data supplied by others.

If site conditions encountered during construction vary significantly from those discussed in this report, Regional Geotechnical Solutions Pty Ltd should be contacted for further advice.

This report alone should not be used by contractors as the basis for preparation of tender documents or project estimates. Contractors using this report as a basis for preparation of tender documents should avail themselves of all relevant background information regarding the site before deciding on selection of construction materials and equipment.

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Prepared by

Andrew Hills

Senior Environmental Engineer

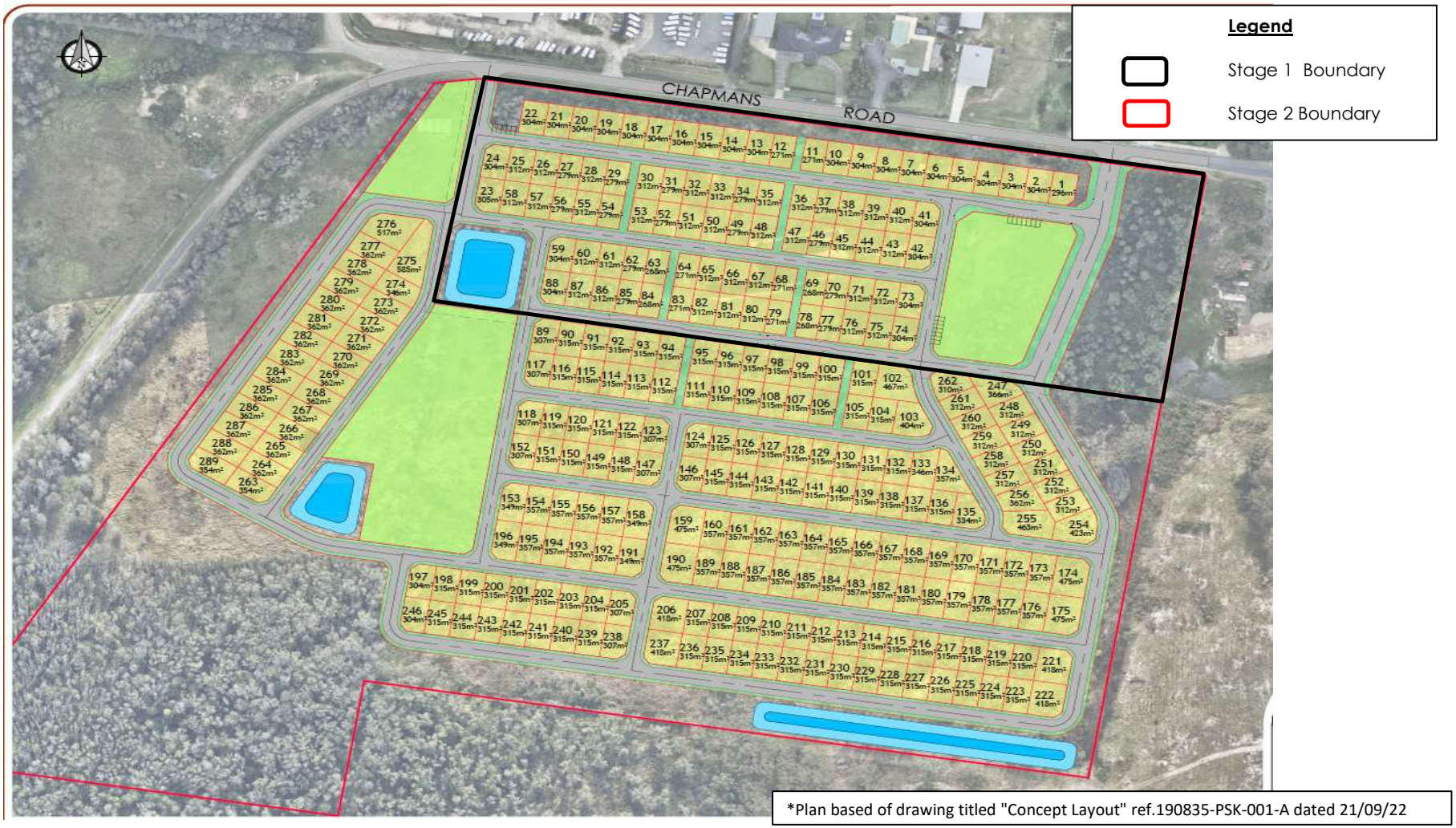
Reviewed by

Steve Morton

Principal Geotechnical Engineer

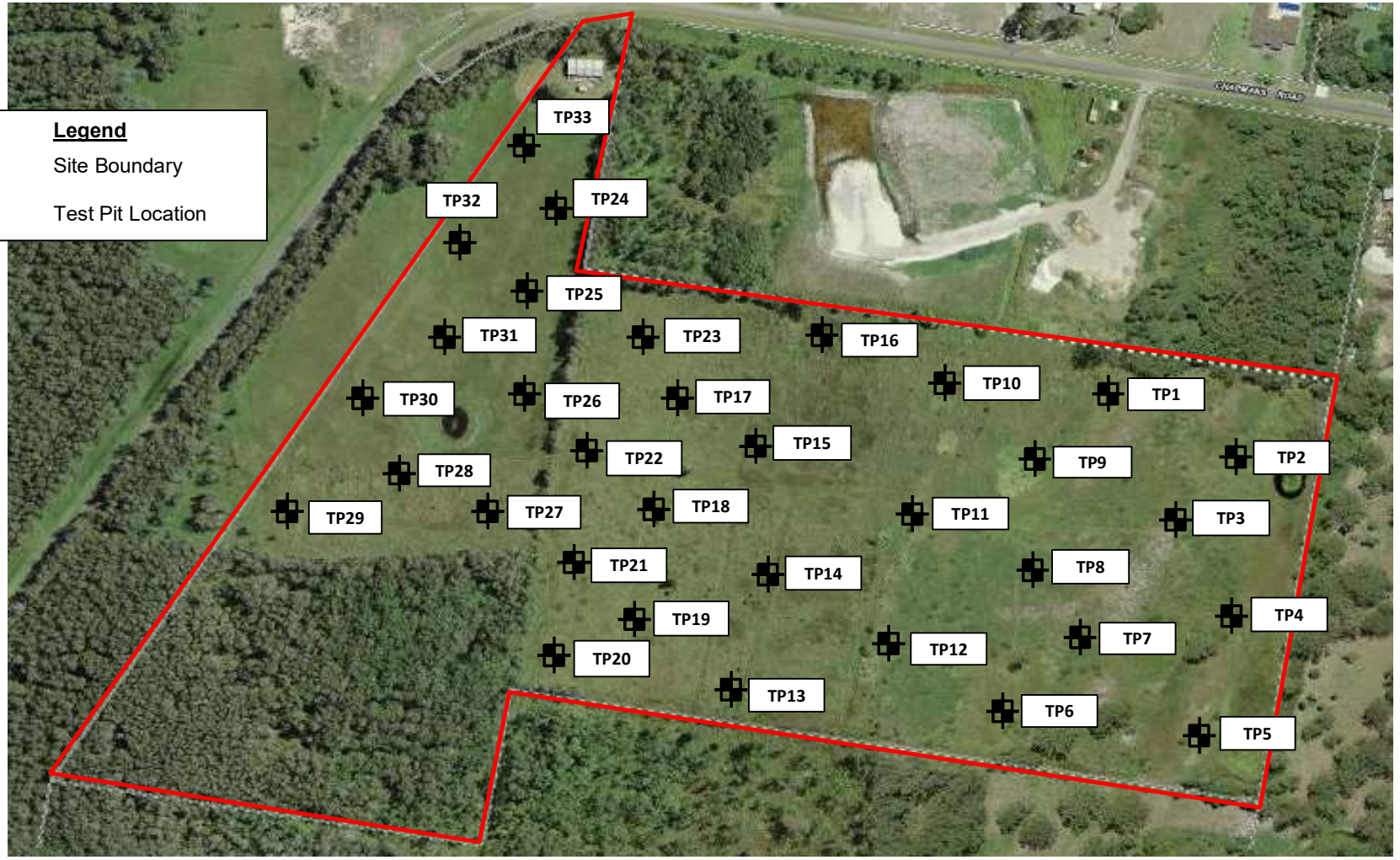
Figures

REGIONAL GEOTECHNICAL SOLUTIONS	**Client:**	Allam Property Group	Job No.	RGS03357.1
	Project:	Proposed MHE - Stage 2 82 Chapmans Road, Tuncurry	Drawn By:	APH
			Scale:	As Shown
			Date:	15-Aug-23
	Title:	Site Location Plan	Drawing No.	**Figure 1**



REGIONAL GEOTECHNICAL SOLUTIONS

Client:	Allam Property Group	Job No.	RGS03357.1
Project:	Proposed MHE - Stage 2 82 Chapmans Road, Tuncurry	Drawn By:	APH
		Scale:	As Shown
		Date:	15-Aug-23
Title:	Proposed Site Layout	Drawing No.	**Figure 2**



REGIONAL GEOTECHNICAL SOLUTIONS	**Client:**	Allam Property Group	Job No. RGS03357.1
	Project:	Proposed MHE - Stage 2 82 Chapmans Road, Tuncurry	Drawn By: APH Scale: As Shown Date: 12-Sep-23
	Title:	Test Location Plan	Drawing No. **Figure 3**

Appendix A

Results of Field Investigations

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP1

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451270 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441950 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023	1.20m		0		SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey/black, some roots	M				TOPSOIL
							0.20m					
						SP	**SAND:** Fine to medium grained, grey/pale grey					AEOLIAN
		ES 1.40m		0.5								
		1.70m		1.0								
		ES 1.90m		1.5								
		2.30m		2.0								
		ES 2.50m		2.5			2.50m					
							Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP2

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451346 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441940 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023			0		SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey/black, some roots	M				TOPSOIL
							0.20m					
						SP	**SAND:** Fine to medium grained, grey/pale grey					AEOLIAN
				0.5								
				1.0								
		1.20m										
		ES 1.40m										
				1.5			Colour change to brown/pale brown					
		1.70m										
		ES 1.90m										
				2.0								
		2.30m										
		ES 2.50m		2.5			2.50m					
							Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP3

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451298 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441866 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023	1.20m		0.5		SP	**SAND:** Fine to medium grained, pale grey/pale brown, some roots	M				AEOLIAN
		ES 1.40m				SP	**SAND:** Fine to medium grained, grey/pale grey					
		1.70m		1.0			Colour change to pale brown/brown					
		ES 1.90m		1.5								
		2.30m		2.0								
		ES 2.50m		2.5			Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP4

CLIENT: Allam Property Group | **PAGE:** 1 of 1

PROJECT NAME: Proposed MHE | **JOB NO:** RGS03357.1

SITE LOCATION: 82 Chapmans Road, Tuncurry | **LOGGED BY:** WW

TEST LOCATION: Refer to Figure 1 | **DATE:** 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket | **EASTING:** 451333 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 1.0 m | **NORTHING:** 6441828 m | **DATUM:** AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E						SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey/brown, some roots	M				TOPSOIL
							0.40m					
				0.5		SP	**SAND:** Fine to medium grained, grey/pale grey					AEOLIAN
				1.0								
	1/8/2023	1.20m ES 1.40m										
				1.5			1.50m					
		1.70m ES 1.90m				SP	**SAND:** Fine to medium grained, pale brown/brown	W				INDURATED SAND
				2.0								
		2.30m ES 2.50m		2.5			2.50m					
							Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP5

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451322 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441737 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E						SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey/black, some roots	M				TOPSOIL
							0.30m					
						SP	**SAND:** Fine to medium grained, grey/pale grey					AEOLIAN
	1/8/2023			0.5								
		1.20m		1.0								
		ES 1.40m										
				1.5								
		1.70m										
		ES 1.90m										
				2.0								
		2.30m										
		ES 2.50m		2.5			2.50m					
							Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP6

CLIENT: Allam Property Group | **PAGE:** 1 of 1

PROJECT NAME: Proposed MHE | **JOB NO:** RGS03357.1

SITE LOCATION: 82 Chapmans Road, Tuncurry | **LOGGED BY:** WW

TEST LOCATION: Refer to Figure 1 | **DATE:** 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket | **EASTING:** 451216 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 1.0 m | **NORTHING:** 6441786 m | **DATUM:** AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023			0		SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey/black, some roots	M				TOPSOIL
							0.20m					
						SP	**SAND:** Fine to medium grained, grey/pale grey					AEOLIAN
				0.5								
				1.0								
		1.20m										
		ES										
		1.40m										
				1.5								
		1.70m										
		ES										
		1.90m										
				2.0								
		2.30m										
		ES										
		2.50m		2.5			2.50m					
							Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP7

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451253 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441829 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023					SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey/black, some roots	M				TOPSOIL
							0.20m					
						SP	**SAND:** Fine to medium grained, grey/pale grey					AEOLIAN
				0.5								
				1.0								
		1.20m					1.20m					
						SP	**SAND:** Fine to medium grained, brown/dark brown	W				INDURATED SAND
		ES 1.40m										
				1.5								
		1.70m										
		ES 1.90m										
				2.0								
		2.30m										
		ES 2.50m		2.5			2.50m					
							Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP8

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451247 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441885 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023	1.20m				SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey/black, some roots	M				TOPSOIL
							0.20m					
						SP	**SAND:** Fine to medium grained, grey/pale grey					AEOLIAN
		ES 1.40m		0.5								
				1.0								
		1.70m										
		ES 1.90m		1.5								
				2.0								
		2.30m										
		ES 2.50m		2.5			2.50m					
							Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP9

CLIENT: Allam Property Group | **PAGE:** 1 of 1

PROJECT NAME: Proposed MHE | **JOB NO:** RGS03357.1

SITE LOCATION: 82 Chapmans Road, Tuncurry | **LOGGED BY:** WW

TEST LOCATION: Refer to Figure 1 | **DATE:** 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket | **EASTING:** 451244 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 1.0 m | **NORTHING:** 6441925 m | **DATUM:** AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023	1.20m		0		SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey/black, some roots	M				TOPSOIL
							0.20m					
						SP	**SAND:** Fine to medium grained, grey/pale grey					AEOLIAN
		ES 1.40m		0.5								
				1.0								
		1.70m										
		ES 1.90m		1.5								
				2.0								
		2.30m										
		ES 2.50m		2.5			2.50m					
							Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

ENGINEERING LOG - TEST PIT

REGIONAL GEOTECHNICAL SOLUTIONS

TEST PIT NO: TP10

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451187 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441952 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023					SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey/black, some roots	M				TOPSOIL
							0.20m					
						SP	**SAND:** Fine to medium grained, pale grey/pale brown					AEOLIAN
				0.5								
				1.0								
		1.20m										
		ES 1.40m										
				1.5			Colour change to pale grey/grey					
		1.70m										
		ES 1.90m										
				2.0								
		2.30m										
		ES 2.50m		2.5			2.50m					
							Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP11

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451156 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441899 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023	1.20m		0		SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey/black, some roots	M				TOPSOIL
							0.20m					
						SP	**SAND:** Fine to medium grained, grey/pale grey					AEOLIAN
		ES 1.40m		0.5								
		1.70m		1.0								
		ES 1.90m		1.5								
		2.30m		2.0								
		ES 2.50m		2.5			2.50m					
							Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP12

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451126 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441818 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023	1.20m		0		SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey/black, some roots	M				TOPSOIL
							0.20m					
						SP	**SAND:** Fine to coarse grained, grey/pale grey					AEOLIAN
		ES 1.40m		0.5								
		1.70m		1.0								
		ES 1.90m		1.5								
		2.30m		2.0								
		ES 2.50m		2.5			2.50m					
							Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP13

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451074 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441801 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023	1.20m				SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey/black, some roots	M				TOPSOIL
							0.20m					
						SP	**SAND:** Fine to medium grained, pale grey/grey					AEOLIAN
		ES 1.40m		0.5								
				1.0								
		1.70m										
		ES 1.90m		1.5								
				2.0								
		2.30m										
		ES 2.50m		2.5			2.50m					
							Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP14

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451074 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441890 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023					SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey/black, some roots	M				TOPSOIL
							0.20m					
						SP	**SAND:** Fine to medium grained, pale grey/grey					AEOLIAN
				0.5								
				1.0								
		1.20m										
		ES 1.40m										
				1.5								
		1.70m										
		ES 1.90m										
				2.0								
		2.30m										
		ES 2.50m		2.5			2.50m					
							Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP15

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451076 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441935 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023	1.20m		0		SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey/black, some roots	M				TOPSOIL
							0.20m					
						SP	**SAND:** Fine to medium grained, pale grey/grey					AEOLIAN
		ES 1.40m		0.5								
				1.0								
		1.70m										
		ES 1.90m		1.5								
				2.0								
		2.30m										
		ES 2.50m		2.5			2.50m					
							Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP16

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451120 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441981 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023	1.20m		0		SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey/black, some roots	M				TOPSOIL
							0.20m					
						SP	**SAND:** Fine to medium grained, pale grey/grey					AEOLIAN
		ES 1.40m		0.5								
		1.70m		1.0								
		ES 1.90m		1.5								
		2.30m		2.0								
		ES 2.50m		2.5			2.50m					
							Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP17

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451050 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441945 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E						SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey/black, some roots	W				TOPSOIL
							0.20m					
						SP	**SAND:** Fine to medium grained, pale grey/grey					AEOLIAN
		0.30m										
		ES										
		0.50m		0.5								
		0.80m										
		ES										
	1/8/2023	1.00m		1.0								
				1.5								
		1.80m										
		ES										
		2.00m		2.0			2.00m					
							Hole Terminated at 2.00 m due to collapse					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP18

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451037 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441901 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023	0.30m				SC	**TOPSOIL:** Clayey SAND, fine to medium grained, dark grey/black, clay, low plasticity, some roots	M				TOPSOIL
		ES 0.50m		0.5		SP	0.20m **SAND:** Fine to medium grained, grey/pale grey					AEOLIAN
		0.80m										
		ES 1.00m		1.0								
		1.30m										
		ES 1.50m		1.5								
		1.80m										
		ES 2.00m		2.0								
		2.30m										
		ES 2.50m		2.5			2.50m					
							Hole Terminated at 2.50 m due to collapse					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP19

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451017 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441826 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023	0.30m ES 0.50m 0.80m ES 1.00m 1.30m ES 1.50m 1.80m ES 2.00m		0.5 1.0 1.5 2.0 2.5		SC 0.20m SP 2.00m	**TOPSOIL:** Clayey SAND, fine to medium grained, dark grey/black, some roots **SAND:** Fine to medium grained, pale grey/grey Hole Terminated at 2.00 m due to collapse	W				TOPSOIL AEOLIAN

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP20

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 450978 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441801 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E						SC	**TOPSOIL:** Clayey SAND, fine to medium grained, dark grey/black, clay, low plasticity, some roots	W				TOPSOIL
							0.20m					
		0.30m				SC	**Clayey SAND:** Fine to medium grained, low plasticity, pale grey/grey					ALLUVIUM
		ES										
		0.50m		0.5								
							0.60m					
						SP	**SAND:** Fine to medium grained, pale grey/grey					
		0.80m										
	1/8/2023	ES										
	▽	1.00m		1.0								
		1.30m										
		ES										
		1.50m		1.5								
		1.80m										
		ES										
		2.00m		2.0			2.00m					
							Hole Terminated at 2.00 m due to collapse					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP21

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451017 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441826 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023	0.30m ES 0.50m		0.5		SC	**TOPSOIL:** Clayey SAND, fine to medium grained, dark grey/black, clay, low plasticity, some roots	W				TOPSOIL
							0.20m					
						SP	**SAND:** Fine to medium grained, grey/pale grey, moderate sulfur smell					AEOLIAN
		0.80m ES 1.00m		1.0								
		1.30m ES 1.50m		1.5								
		1.80m ES 2.00m		2.0			2.00m					
				2.5			Hole Terminated at 2.00 m due to collapse					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density		
V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition	
D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP22

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 450996 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441927 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E						CL	**TOPSOIL:** Silty CLAY, low plasticity, dark grey/black, clay, some roots	M				TOPSOIL
							0.20m					
		0.30m				SC	**Clayey SAND:** Fine to coarse grained, grey/brown-grey, clay, low plasticity, moderate sulfur smell					ALLUVIUM
		ES 0.50m		0.5								
							0.70m					
		0.80m				SP	**SAND:** Fine to medium grained, pale grey/grey					
		ES 1.00m		1.0								
	1/8/2023											
		1.30m										
		ES 1.50m		1.5								
		1.80m										
		ES 2.00m		2.0			2.00m					
							Hole Terminated at 2.00 m due to collapse					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP23

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 451008 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441998 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023	0.30m				CL	**TOPSOIL:** Silty CLAY, low plasticity, some sand, fine to medium grained, dark grey/black, some roots	M				TOPSOIL
		ES 0.50m		0.5		0.20m SC	**Clayey SAND:** Fine to coarse grained, grey/pale brown, clay, low plasticity					ALLUVIUM
		0.80m				0.80m SP	**SAND:** Fine to coarse grained, pale grey/grey					
		ES 1.00m		1.0								
		1.30m										
		ES 1.50m		1.5								
		1.80m										
		ES 2.00m		2.0		2.20m						
							Hole Terminated at 2.20 m due to collapse					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP24

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 450989 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6442077 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E						CL	**TOPSOIL:** Silty CLAY, low plasticity, dark grey/brown, some sand, fine to medium grained, some roots	M				TOPSOIL
							0.20m					
		0.30m				SC	**Clayey SAND:** Low plasticity, pale grey/pale brown					ALLUVIAL
		ES 0.50m		0.5								
							0.60m					
						SP	**SAND:** Fine to medium grained, pale grey/grey					
		0.80m										
		ES 1.00m		1.0								
	1/8/2023											
		1.30m										
		ES 1.50m		1.5								
		1.80m										
		ES 2.00m		2.0			2.00m					
							Hole Terminated at 2.00 m due to collapse					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP25

CLIENT: Allam Property Group | **PAGE:** 1 of 1

PROJECT NAME: Proposed MHE | **JOB NO:** RGS03357.1

SITE LOCATION: 82 Chapmans Road, Tuncurry | **LOGGED BY:** WW

TEST LOCATION: Refer to Figure 1 | **DATE:** 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket | **EASTING:** 450973 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 1.0 m | **NORTHING:** 6442019 m | **DATUM:** AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E						CL	**TOPSOIL:** Silty CLAY, low plasticity, dark grey/black, some sand, fine to medium grained, some roots	M				TOPSOIL
							0.20m					
		0.30m				SC	**Clayey SAND:** Fine to coarse grained, pale grey/pale brown, clay, low plasticity					ALLUVIAL
		ES 0.50m		0.5								
						SP	**SAND:** Fine to coarse grained, pale grey/grey					
		0.80m					0.80m					
	1/8/2023	ES 1.00m		1.0								
		1.30m										
		ES 1.50m		1.5								
		1.80m										
		ES 2.00m		2.0			2.00m					
							Hole Terminated at 2.00 m due to collapse					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

ENGINEERING LOG - TEST PIT

REGIONAL GEOTECHNICAL SOLUTIONS

CLIENT:	Allam Property Group	**TEST PIT NO:**	**TP26**
PROJECT NAME:	Proposed MHE	**PAGE:**	1 of 1
SITE LOCATION:	82 Chapmans Road, Tuncurry	**JOB NO:**	RGS03357.1
TEST LOCATION:	Refer to Figure 1	**LOGGED BY:**	WW
		DATE:	1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket **EASTING:** 450956 m **SURFACE RL:**

TEST PIT LENGTH: 2.0 m **WIDTH:** 1.0 m **NORTHING:** 6441954 m **DATUM:** AHD

Excavation and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
E	1/8/2023	0.30m ES 0.50m		0.5		CL	**TOPSOIL:** Silty CLAY, low plasticity, dark grey/black, some sand, fine to medium grained, some roots	W				TOPSOIL
		0.80m ES 1.00m		1.0		SC	0.25m **Clayey SAND:** Fine to coarse grained, pale grey/pale brown, clay, low plasticity					ALLUVIAL
		1.30m ES 1.50m		1.5		SP	1.00m **SAND:** Fine to coarse grained, pale grey/grey					
		1.80m ES 2.00m		2.0			2.00m					
				2.5			Hole Terminated at 2.00 m due to collapse					

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP27

CLIENT: Allam Property Group | **PAGE:** 1 of 1

PROJECT NAME: Proposed MHE | **JOB NO:** RGS03357.1

SITE LOCATION: 82 Chapmans Road, Tuncurry | **LOGGED BY:** WW

TEST LOCATION: Refer to Figure 1 | **DATE:** 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket | **EASTING:** 450951 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 1.0 m | **NORTHING:** 6441884 m | **DATUM:** AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E						CL	**TOPSOIL:** Silty CLAY, low plasticity, dark grey/black, some sand, fine to medium grained, some roots	W				TOPSOIL
							0.20m					
		0.30m				SC	**Clayey SAND:** Fine to coarse grained, pale grey/pale brown, clay, low plasticity					ALLUVIAL
		ES 0.50m		0.5								
		0.80m					0.80m					
		ES 1.00m		1.0		SP	**SAND:** Fine to coarse grained, pale grey/grey					
	1/8/2023	1.30m										
		ES 1.50m		1.5								
		1.80m										
		ES 2.00m		2.0			2.00m					
							Hole Terminated at 2.00 m due to collapse					
				2.5								

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP28

CLIENT: Allam Property Group | **PAGE:** 1 of 1

PROJECT NAME: Proposed MHE | **JOB NO:** RGS03357.1

SITE LOCATION: 82 Chapmans Road, Tuncurry | **LOGGED BY:** WW

TEST LOCATION: Refer to Figure 1 | **DATE:** 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket | **EASTING:** 450913 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 1.0 m | **NORTHING:** 6441915 m | **DATUM:** AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E	1/8/2023	0.30m				CL	**TOPSOIL:** Silty CLAY, low plasticity, dark grey/black, some sand, fine to medium grained, some roots	W				TOPSOIL
		ES 0.50m		0.5		SC	0.25m **Clayey SAND:** Fine to coarse grained, pale grey/pale brown, clay, low plasticity					ALLUVIAL
		0.80m				SP	0.80m **SAND:** Fine to coarse grained, pale grey/grey					
		ES 1.00m		1.0								
		1.30m										
		ES 1.50m		1.5								
		1.80m										
		ES 2.00m		2.0			2.00m Hole Terminated at 2.00 m due to collapse					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP29

CLIENT: Allam Property Group | **PAGE:** 1 of 1

PROJECT NAME: Proposed MHE | **JOB NO:** RGS03357.1

SITE LOCATION: 82 Chapmans Road, Tuncurry | **LOGGED BY:** WW

TEST LOCATION: Refer to Figure 1 | **DATE:** 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket | **EASTING:** 450860 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 1.0 m | **NORTHING:** 6441886 m | **DATUM:** AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E		0.30m				CL	**TOPSOIL:** Silty CLAY, low plasticity, dark grey/black, some sand, fine to medium grained, some roots	W				TOPSOIL
		ES 0.50m		0.5		SC	0.25m **Clayey SAND:** Fine to medium grained, pale grey/pale brown, clay, low plasticity					ALLUVIUM
	1/8/2023	0.80m				SP	0.80m **SAND:** Fine to medium grained, pale grey/grey					
		ES 1.00m		1.0								
		1.30m										
		ES 1.50m		1.5								
		1.80m										
		ES 2.00m		2.0			2.00m					
							Hole Terminated at 2.00 m due to collapse					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP30

CLIENT: Allam Property Group | **PAGE:** 1 of 1

PROJECT NAME: Proposed MHE | **JOB NO:** RGS03357.1

SITE LOCATION: 82 Chapmans Road, Tuncurry | **LOGGED BY:** WW

TEST LOCATION: Refer to Figure 1 | **DATE:** 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket | **EASTING:** 450890 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 1.0 m | **NORTHING:** 6441953 m | **DATUM:** AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E						CL	**TOPSOIL:** Silty CLAY, low plasticity, dark grey/black, some sand, fine to medium grained, some roots	W				TOPSOIL
		0.30m					0.25m					
		ES				SC	**Clayey SAND:** Fine to medium grained, grey/pale brown, clay, low plasticity					ALLUVIUM
		0.50m		0.5								
		0.80m					0.80m					
		ES				SP	**SAND:** Fine to medium grained, pale grey/grey					
	1/8/2023	1.00m		1.0								
		1.30m										
		ES										
		1.50m		1.5								
		1.80m										
		ES										
		2.00m		2.0			2.00m					
							Hole Terminated at 2.00 m due to collapse					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP31

CLIENT: Allam Property Group
PAGE: 1 of 1
PROJECT NAME: Proposed MHE
JOB NO: RGS03357.1
SITE LOCATION: 82 Chapmans Road, Tuncurry
LOGGED BY: WW
TEST LOCATION: Refer to Figure 1
DATE: 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket
EASTING: 450933 m
SURFACE RL:
TEST PIT LENGTH: 2.0 m
WIDTH: 1.0 m
NORTHING: 6441995 m
DATUM: AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E						CL	**TOPSOIL:** Silty CLAY, low plasticity, dark grey/black, some sand, fine to medium grained, some roots	W				TOPSOIL
		0.30m					0.25m					
		ES				SC	**Clayey SAND:** Fine to medium grained, pale grey/pale brown, clay, low plasticity					ALLUVIUM
		0.50m		0.5								
		0.80m					0.80m					
		ES				SP	**SAND:** Fine to medium grained, pale grey/grey					
	1/8/2023	1.00m		1.0								
		1.30m										
		ES										
		1.50m		1.5								
		1.80m										
		ES										
		2.00m		2.0			2.00m					
							Hole Terminated at 2.00 m due to collapse					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP32

CLIENT: Allam Property Group | **PAGE:** 1 of 1

PROJECT NAME: Proposed MHE | **JOB NO:** RGS03357.1

SITE LOCATION: 82 Chapmans Road, Tuncurry | **LOGGED BY:** WW

TEST LOCATION: Refer to Figure 1 | **DATE:** 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket | **EASTING:** 450938 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 1.0 m | **NORTHING:** 6442043 m | **DATUM:** AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E						CL	**TOPSOIL:** Silty CLAY, low plasticity, dark grey/black, some sand, fine to medium grained, some roots	W				TOPSOIL
		0.30m					0.25m					
		ES				SC	**Clayey SAND:** Fine to medium grained, pale grey/pale brown, clay, low plasticity					ALLUVIUM
		0.50m		0.5			0.60m					
						SP	**SAND:** Fine to medium grained, pale brown/pale grey					
		0.80m					Colour change to grey/pale grey					
		ES										
		1.00m		1.0								
	1/8/2023											
		1.30m										
		ES										
		1.50m		1.5								
		1.80m										
		ES										
		2.00m		2.0			2.00m					
							Hole Terminated at 2.00 m due to collapse					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

REGIONAL GEOTECHNICAL SOLUTIONS

ENGINEERING LOG - TEST PIT

TEST PIT NO: TP33

CLIENT: Allam Property Group | **PAGE:** 1 of 1

PROJECT NAME: Proposed MHE | **JOB NO:** RGS03357.1

SITE LOCATION: 82 Chapmans Road, Tuncurry | **LOGGED BY:** WW

TEST LOCATION: Refer to Figure 1 | **DATE:** 1/8/23

EQUIPMENT TYPE: 6T Excavator - 600mm Toothed Bucket | **EASTING:** 450975 m | **SURFACE RL:**

TEST PIT LENGTH: 2.0 m | **WIDTH:** 1.0 m | **NORTHING:** 6442102 m | **DATUM:** AHD

Excavation and Sampling					Material description and profile information					Field Test		
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
E						CL	**TOPSOIL:** Silty CLAY, low plasticity, dark grey/black, some sand, fine to medium grained, some roots	W				TOPSOIL
		0.30m					0.25m					
		ES				SC	**Clayey SAND:** Fine to medium grained, pale grey/pale brown, clay, low plasticity					ALLUVIUM
		0.50m		0.5								
		0.80m					0.80m					
		ES				SP	**SAND:** Fine to medium grained, pale grey/grey					
		1.00m		1.0								
	1/8/2023	1.30m										
		ES										
		1.50m		1.5								
		1.80m										
		ES										
		2.00m		2.0			2.00m					
							Hole Terminated at 2.00 m due to collapse					
				2.5								

LEGEND:

Water
- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes
- Gradational or transitional strata
- Definitive or distict strata change

Notes, Samples and Tests

U_{50}	50mm Diameter tube sample
CBR	Bulk sample for CBR testing
E	Environmental sample
ASS	Acid Sulfate Soil Sample
B	Bulk Sample

Field Tests

PID	Photoionisation detector reading (ppm)
DCP(x-y)	Dynamic penetrometer test (test depth interval shown)
HP	Hand Penetrometer test (UCS kPa)

Consistency

		UCS (kPa)
VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

Moisture Condition

D	Dry
M	Moist
W	Wet
W_p	Plastic Limit
W_L	Liquid Limit

Appendix B

Laboratory Test Result Sheets

RESULTS OF ACID SULFATE SOIL ANALYSIS

112 samples supplied by Regional Geotechnical Solutions Pty Ltd on 8/08/2023. Lab Job No. P3902.
Analysis requested by Andrew Hills. Your Job: RGS03357.1, Allam Property Group.

44 Bent Street WINGHAM NSW 2429

Sample Identification	EAL Lab Code	Texture	Moisture Content		pH_F and pH_{FOX}				KCl-extractable sulfur		Potential Sulfidic Acidity (Chromium Reducible Sulfur - CRS)			Actual Acidity (Titratable Actual Acidity - TAA)	Retained Acidity		Non-treated soil: Acid Neutralising Capacity (ANC_{BT})		Non-treated soil: Net Acidity	Non-treated soil: Lime Calculation
			(% moisture of total wet weight)	(g moisture / g of oven dry soil)	pH_F	pH_{FOX}	pH change	Reaction	(% S_{KCl})	(equiv. mol H^+/t)	(% S_{cr})	(mol H^+/t)	pH_{KCl}	(mol H^+/t)	(%S_{NAS})	(mol H^+/t)	(% $CaCO_3$)	(mol H^+/t)	(mol H^+/t)	(kg $CaCO_3$/t DW)
Method Info.		**	**		*(In-house method S21)*				**		*(In-house method S20)*		*(In-house method 16b)*		**		*(In-house method S14)*		**	**
TP 1 1.2-1.4m	*P3902/1*	Coarse	19.1	0.24	5.60	4.12	-1.48	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 1 1.7-1.9m	*P3902/2*	Coarse	24.2	0.32	5.22	3.50	-1.72	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 1 2.3-2.5m	*P3902/3*	Coarse	17.3	0.21	4.41	2.21	-2.20	Volcanic	0.022	14	0.146	91	4.99	16	..	..	..	..	107	8
TP 2 1.2-1.4m	*P3902/4*	Coarse	17.8	0.22	5.64	3.15	-2.49	Medium	..	..	..	..	..	..	..	..	..	..	..	..
TP 2 1.7-1.9m	*P3902/5*	Coarse	21.0	0.27	4.97	3.50	-1.47	Medium	..	..	..	..	..	..	..	..	..	..	..	..
TP 2 2.3-2.5m	*P3902/6*	Coarse	17.4	0.21	4.63	2.48	-2.15	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 3 1.2-1.4m	*P3902/7*	Coarse	16.7	0.20	5.07	3.24	-1.83	Medium	..	..	..	..	..	..	..	..	..	..	..	..
TP 3 1.7-1.9m	*P3902/8*	Coarse	19.1	0.24	5.76	1.59	-4.17	High	..	..	..	..	..	..	..	..	..	..	..	..
TP 3 2.3-2.5m	*P3902/9*	Coarse	17.6	0.21	5.24	1.68	-3.56	Low	0.007	4	0.053	33	5.27	7	..	..	..	..	40	3
TP 4 1.2-1.4m	*P3902/10*	Coarse	20.1	0.25	5.92	3.28	-2.64	Medium	..	..	..	..	..	..	..	..	..	..	..	..
TP 4 1.7-1.9m	*P3902/11*	Coarse	17.8	0.22	5.00	2.22	-2.78	Volcanic	0.020	12	0.205	128	4.91	16	..	..	..	..	144	11
TP 4 2.3-2.5m	*P3902/12*	Coarse	18.6	0.23	5.22	1.27	-3.95	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 5 1.2-1.4m	*P3902/13*	Coarse	20.3	0.25	6.03	4.27	-1.76	Medium	..	..	..	..	..	..	..	..	..	..	..	..
TP 5 1.7-1.9m	*P3902/14*	Coarse	20.2	0.25	6.14	4.27	-1.87	Medium	..	..	..	..	..	..	..	..	..	..	..	..
TP 5 2.3-2.5m	*P3902/15*	Coarse	16.5	0.20	5.73	2.13	-3.60	Volcanic	..	..	..	..	..	..	..	..	..	..	..	..
TP 6 1.2-1.4m	*P3902/16*	Coarse	23.8	0.31	6.10	3.97	-2.13	Medium	..	..	..	..	..	..	..	..	..	..	..	..
TP 6 1.7-1.9m	*P3902/17*	Coarse	15.8	0.19	5.12	2.14	-2.98	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 6 2.3-2.5m	*P3902/18*	Coarse	16.5	0.20	5.73	2.17	-3.56	Volcanic	..	..	..	..	..	..	..	..	..	..	..	..
TP 7 1.2-1.4m	*P3902/19*	Coarse	15.1	0.18	6.18	3.24	-2.94	Medium	..	..	..	..	..	..	..	..	..	..	..	..
TP 7 1.7-1.9m	*P3902/20*	Coarse	18.4	0.23	5.74	3.00	-2.74	Medium	..	..	..	..	..	..	..	..	..	..	..	..
TP 7 2.3-2.5m	*P3902/21*	Coarse	19.3	0.24	5.75	1.37	-4.38	High	0.009	5	0.080	50	5.11	21	..	..	..	..	71	5
TP 8 1.2-1.4m	*P3902/22*	Coarse	23.4	0.31	6.39	3.89	-2.50	Medium	..	..	..	..	..	..	..	..	..	..	..	..
TP 8 1.7-1.9m	*P3902/23*	Coarse	19.1	0.24	6.35	1.55	-4.80	High	..	..	..	..	..	..	..	..	..	..	..	..
TP 8 2.3-2.5m	*P3902/24*	Coarse	17.9	0.22	5.50	2.18	-3.32	Volcanic	..	..	..	..	..	..	..	..	..	..	..	..
TP 9 1.2-1.4m	*P3902/25*	Coarse	24.8	0.33	6.26	3.72	-2.54	Medium	..	..	..	..	..	..	..	..	..	..	..	..
TP 9 1.7-1.9m	*P3902/26*	Coarse	16.4	0.20	4.50	2.06	-2.44	Volcanic	..	..	..	..	..	..	..	..	..	..	..	..
TP 9 2.3-2.5m	*P3902/27*	Coarse	16.8	0.20	4.69	2.30	-2.39	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 10 1.2-1.4m	*P3902/28*	Coarse	21.2	0.27	6.08	2.56	-3.52	Medium	..	..	..	..	..	..	..	..	..	..	..	..
TP 10 1.7-1.9m	*P3902/29*	Coarse	16.9	0.20	4.59	2.16	-2.43	Volcanic	..	..	..	..	..	..	..	..	..	..	..	..
TP 10 2.3-2.5m	*P3902/30*	Coarse	16.7	0.20	4.59	2.08	-2.51	Volcanic	..	..	..	..	..	..	..	..	..	..	..	..
TP 11 1.2-1.4m	*P3902/31*	Coarse	20.5	0.26	6.19	3.30	-2.89	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 11 1.7-1.9m	*P3902/32*	Coarse	16.6	0.20	5.23	2.32	-2.91	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 11 2.3-2.5m	*P3902/33*	Coarse	16.9	0.20	5.14	2.34	-2.80	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 12 1.2-1.4m	*P3902/34*	Coarse	23.9	0.31	6.22	1.80	-4.42	Medium	..	..	..	..	..	..	..	..	..	..	..	..
TP 12 1.7-1.9m	*P3902/35*	Coarse	16.1	0.19	4.74	2.17	-2.57	Volcanic	0.012	7	0.171	106	5.53	6	..	..	..	..	113	8
TP 12 2.3-2.5m	*P3902/36*	Coarse	15.7	0.19	4.66	2.16	-2.51	Volcanic	..	..	..	..	..	..	..	..	..	..	..	..
TP 13 1.2-1.4m	*P3902/37*	Coarse	20.0	0.25	5.50	2.22	-3.28	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 13 1.7-1.9m	*P3902/38*	Coarse	16.8	0.20	4.83	2.32	-2.51	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 13 2.3-2.5m	*P3902/39*	Coarse	17.0	0.21	5.18	2.32	-2.86	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 14 1.2-1.4m	*P3902/40*	Coarse	17.0	0.21	6.22	3.92	-2.30	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 14 1.7-1.9m	*P3902/41*	Coarse	18.6	0.23	5.17	2.28	-2.89	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 14 2.3-2.5m	*P3902/42*	Coarse	17.8	0.22	5.06	2.21	-2.85	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 15 1.2-1.4m	*P3902/43*	Coarse	18.2	0.22	5.38	2.14	-3.24	Volcanic	0.026	16	0.216	135	5.17	13	..	..	..	..	148	11
TP 15 1.7-1.9m	*P3902/44*	Coarse	18.7	0.23	5.03	2.21	-2.82	Volcanic	..	..	..	..	..	..	..	..	..	..	..	..
TP 15 2.3-2.5m	*P3902/45*	Coarse	18.3	0.22	5.99	3.70	-2.29	Low	..	..	..	..	..	..	..	..	..	..	..	..

Environmental Analysis Laboratory, Southern Cross University,
Tel. 02 6620 3678, website: scu.edu.au/eal

checked: .....
Graham Lancaster
Laboratory Manager

RESULTS OF ACID SULFATE SOIL ANALYSIS

112 samples supplied by Regional Geotechnical Solutions Pty Ltd on 8/08/2023. Lab Job No. P3902.
Analysis requested by Andrew Hills. Your Job: RGS03357.1, Allam Property Group.

44 Bent Street WINGHAM NSW 2429

Sample Identification	EAL Lab Code	Texture	Moisture Content		pH_F and pH_{FOX}				KCl-extractable sulfur (S_{KCl})		Potential Sulfidic Acidity (Chromium Reducible Sulfur - CRS)		Actual Acidity (Titratable Actual Acidity - TAA)		Retained Acidity		Non-treated soil: Acid Neutralising Capacity (ANC_{BT})		Non-treated soil: Net Acidity	Non-treated soil: Lime Calculation
			(% moisture of total wet weight)	(g moisture / g of oven dry soil)	pH_F	pH_{FOX}	pH change	Reaction	(% S_{KCl})	(equiv. mol H^+/t)	(% S_{cr})	(mol H^+/t)	pH_{KCl}	(mol H^+/t)	(%S_{NAS})	(mol H^+/t)	(% $CaCO_3$)	(mol H^+/t)	(mol H^+/t)	(kg $CaCO_3$/t DW)
Method Info.		**	**		*(In-house method S21)*				**		*(In-house method S20)*		*(In-house method 16b)*		**		*(In-house method S14)*		**	**
TP 16 1.2-1.4m	*P3902/46*	Coarse	22.1	0.28	6.04	1.69	-4.35	Volcanic	0.035	22	0.688	429	5.10	20	..	..	..	..	449	34
TP 16 1.7-1.9m	*P3902/47*	Coarse	20.1	0.25	5.04	2.28	-2.76	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 16 2.3-2.5m	*P3902/48*	Coarse	18.9	0.23	5.37	2.27	-3.10	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 17 0.8-1.0m	*P3902/49*	Coarse	17.2	0.21	6.16	4.02	-2.14	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 17 1.3-1.5m	*P3902/50*	Coarse	17.2	0.21	5.09	2.24	-2.85	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 17 1.8-2.0m	*P3902/51*	Coarse	17.7	0.22	5.44	2.35	-3.09	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 18 0.8-1.0m	*P3902/52*	Coarse	16.7	0.20	4.98	2.13	-2.85	Extreme	0.014	9	0.148	92	5.37	5	..	..	..	..	97	7
TP 18 1.3-1.5m	*P3902/53*	Coarse	16.8	0.20	5.36	2.26	-3.10	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 18 1.8-2.0m	*P3902/54*	Coarse	17.2	0.21	5.23	2.27	-2.96	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 18 2.3-2.5m	*P3902/55*	Coarse	18.2	0.22	5.21	2.23	-2.98	Very High	..	..	..	..	..	..	..	..	..	..	..	..
TP 19 0.8-1.0m	*P3902/56*	Coarse	18.1	0.22	5.07	2.30	-2.77	Very High	..	..	..	..	..	..	..	..	..	..	..	..
TP 19 1.3-1.5m	*P3902/57*	Coarse	18.0	0.22	5.54	2.30	-3.24	Very High	..	..	..	..	..	..	..	..	..	..	..	..
TP 19 1.8-2.0m	*P3902/58*	Coarse	17.7	0.22	5.40	2.26	-3.14	Very High	..	..	..	..	..	..	..	..	..	..	..	..
TP 20 0.8-1.0m	*P3902/59*	Coarse	17.9	0.22	5.12	2.14	-2.98	Volcanic	0.014	8	0.196	122	5.38	5	..	..	..	..	127	10
TP 20 1.3-1.5m	*P3902/60*	Coarse	18.2	0.22	5.25	2.17	-3.08	Volcanic	..	..	..	..	..	..	..	..	..	..	..	..
TP 20 1.8-2.0m	*P3902/61*	Coarse	16.6	0.20	6.04	2.29	-3.75	Very High	..	..	..	..	..	..	..	..	..	..	..	..
TP 21 0.8-1.0m	*P3902/62*	Coarse	20.1	0.25	5.22	2.12	-3.10	Volcanic	..	..	..	..	..	..	..	..	..	..	..	..
TP 21 1.3-1.5m	*P3902/63*	Coarse	18.4	0.23	5.38	2.22	-3.16	Volcanic	..	..	..	..	..	..	..	..	..	..	..	..
TP 21 1.8-2.0m	*P3902/64*	Coarse	19.8	0.25	5.21	2.21	-3.00	Very High	..	..	..	..	..	..	..	..	..	..	..	..
TP 22 0.3-0.5m	*P3902/65*	Coarse	17.5	0.21	6.38	3.73	-2.65	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 22 0.8-1.0m	*P3902/66*	Coarse	17.5	0.21	5.45	2.23	-3.22	Very High	..	..	..	..	..	..	..	..	..	..	..	..
TP 22 1.3-1.5m	*P3902/67*	Coarse	18.1	0.22	5.36	2.20	-3.16	Very High	..	..	..	..	..	..	..	..	..	..	..	..
TP 22 1.8-2.0m	*P3902/68*	Medium	16.5	0.20	5.60	2.20	-3.40	Very High	..	..	..	..	..	..	..	..	..	..	..	..
TP 23 0.3-0.5m	*P3902/69*	Coarse	19.6	0.24	6.18	4.22	-1.96	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 23 0.8-1.0m	*P3902/70*	Coarse	18.8	0.23	5.25	2.28	-2.97	Volcanic	..	..	..	..	..	..	..	..	..	..	..	..
TP 23 1.3-1.5m	*P3902/71*	Coarse	17.6	0.21	5.47	2.22	-3.25	Volcanic	0.012	8	0.152	95	5.57	5	..	..	..	..	100	8
TP 23 1.8-2.0m	*P3902/72*	Coarse	17.2	0.21	5.95	2.23	-3.72	Very High	..	..	..	..	..	..	..	..	..	..	..	..
TP 24 0.8-1.0m	*P3902/73*	Coarse	16.2	0.19	5.89	2.28	-3.61	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 24 1.3-1.5m	*P3902/74*	Coarse	21.6	0.27	5.85	2.27	-3.58	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 24 1.8-2.0m	*P3902/75*	Coarse	17.9	0.22	6.48	2.23	-4.25	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 25 0.8-1.0m	*P3902/76*	Coarse	18.1	0.22	6.62	2.16	-4.46	Volcanic	..	..	..	..	..	..	..	..	..	..	..	..
TP 25 1.3-1.5m	*P3902/77*	Coarse	18.2	0.22	6.31	2.28	-4.03	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 25 1.8-2.0m	*P3902/78*	Coarse	16.6	0.20	6.41	2.23	-4.18	Extreme	0.019	12	0.164	102	5.41	5	..	..	..	..	107	8
TP 26 0.3-0.5m	*P3902/79*	Coarse	18.8	0.23	6.65	4.02	-2.63	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 26 0.8-1.0m	*P3902/80*	Coarse	20.1	0.25	6.43	3.01	-3.42	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 26 1.3-1.5m	*P3902/81*	Coarse	20.0	0.25	5.41	2.25	-3.16	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 26 1.8-2.0m	*P3902/82*	Coarse	18.8	0.23	5.84	2.24	-3.60	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 27 0.8-1.0m	*P3902/83*	Coarse	19.2	0.24	5.63	2.34	-3.29	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 27 1.3-1.5m	*P3902/84*	Coarse	18.2	0.22	6.08	2.32	-3.76	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 27 1.8-2.0m	*P3902/85*	Coarse	17.7	0.22	5.92	2.25	-3.67	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 28 0.8-1.0m	*P3902/86*	Coarse	17.8	0.22	6.29	2.23	-4.06	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 28 1.3-1.5m	*P3902/87*	Coarse	17.3	0.21	5.18	2.26	-2.92	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 28 1.8-2.0m	*P3902/88*	Medium	18.1	0.22	6.26	2.20	-4.06	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 29 0.3-0.5m	*P3902/89*	Coarse	18.9	0.23	6.41	3.06	-3.35	Medium	..	..	..	..	..	..	..	..	..	..	..	..
TP 29 0.8-1.0m	*P3902/90*	Coarse	18.5	0.23	6.55	2.78	-3.77	Low	..	..	..	..	..	..	..	..	..	..	..	..

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Graham Lancaster
Laboratory Manager

RESULTS OF ACID SULFATE SOIL ANALYSIS

112 samples supplied by Regional Geotechnical Solutions Pty Ltd on 8/08/2023. Lab Job No. P3902.
Analysis requested by Andrew Hills. Your Job: RGS03357.1, Allam Property Group.

44 Bent Street WINGHAM NSW 2429

																	Non-treated soil		Non-treated soil	
Sample Identification	EAL Lab Code	Texture	Moisture Content		pH_F and pH_{FOX}				KCl-extractable sulfur (S_{KCl})		Potential Sulfidic Acidity (Chromium Reducible Sulfur - CRS)			Actual Acidity (Titratable Actual Acidity - TAA)	Retained Acidity		Acid Neutralising Capacity (ANC_{BT})		Net Acidity	Lime Calculation
			(% moisture of total wet weight)	(g moisture / g of oven dry soil)	pH_F	pH_{FOX}	pH change	Reaction	(% S_{KCl})	(equiv. mol H^+/t)	(% S_{cr})	(mol H^+/t)	pH_{KCl}	(mol H^+/t)	(%S_{NAS})	(mol H^+/t)	(% $CaCO_3$)	(mol H^+/t)	(mol H^+/t)	(kg $CaCO_3$/t DW)
Method Info.		**	**		*(In-house method S21)*				**		*(In-house method S20)*		*(In-house method 16b)*		**		*(In-house method S14)*		**	**
TP 29 1.3-1.5m	*P3902/91*	Coarse	18.9	0.23	5.94	2.23	-3.71	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 29 1.8-2.0m	*P3902/92*	Medium	20.4	0.26	6.22	2.35	-3.87	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 30 0.3-0.5m	*P3902/93*	Coarse	18.5	0.23	6.50	3.42	-3.08	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 30 0.8-1.0m	*P3902/94*	Coarse	17.6	0.21	6.63	2.81	-3.82	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 30 1.3-1.5m	*P3902/95*	Coarse	17.4	0.21	5.40	2.10	-3.30	Volcanic	0.015	9	0.281	176	5.45	5	..	..	..	..	181	14
TP 30 1.8-2.0m	*P3902/96*	Coarse	20.9	0.26	6.50	2.28	-4.22	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 31 0.8-1.0m	*P3902/97*	Coarse	19.2	0.24	6.64	2.55	-4.09	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 31 1.3-1.5m	*P3902/98*	Coarse	22.2	0.29	6.36	2.22	-4.14	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 31 1.8-2.0m	*P3902/99*	Coarse	19.1	0.24	6.56	2.28	-4.29	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 32 0.8-1.0m	*P3902/100*	Coarse	18.0	0.22	6.87	2.99	-3.88	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 32 1.3-1.5m	*P3902/101*	Coarse	16.4	0.20	6.21	2.18	-4.03	Volcanic	..	..	..	..	..	..	..	..	..	..	..	..
TP 32 1.8-2.0m	*P3902/102*	Medium	17.0	0.21	6.74	2.19	-4.55	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 33 0.3-0.5m	*P3902/103*	Coarse	18.4	0.23	6.39	3.81	-2.58	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 33 0.8-1.0m	*P3902/104*	Coarse	17.2	0.21	5.93	2.15	-3.78	Volcanic	0.027	17	0.251	156	5.10	7	..	..	..	..	163	12
TP 33 1.3-1.5m	*P3902/105*	Coarse	18.2	0.22	6.40	2.27	-4.13	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 33 1.8-2.0m	*P3902/106*	Coarse	16.7	0.20	6.60	2.38	-4.22	Extreme	..	..	..	..	..	..	..	..	..	..	..	..
TP 32 0.3-0.5m	*P3902/107*	Coarse	20.0	0.25	6.91	3.92	-2.99	Low	..	..	..	..	..	..	..	..	..	..	..	..
TP 22 0.3-0.5m	*P3902/108*	Coarse	16.6	0.20	6.49	2.76	-3.74	Medium	..	..	..	..	..	..	..	..	..	..	..	..
TP 24 0.3-0.5m	*P3902/109*	Medium	17.9	0.22	6.33	3.17	-3.16	Medium	0.002	1	0.005	3	5.67	11	..	..	..	..	14	1
TP 27 0.3-0.5m	*P3902/110*	Coarse	18.8	0.23	6.71	3.74	-2.97	Medium	..	..	..	..	..	..	..	..	..	..	..	..
TP 19 0.3-0.5m	*P3902/111*	Coarse	16.4	0.20	6.86	3.81	-3.05	Medium	0.001	1	<0.005	0	5.82	6	..	..	..	..	6	0
TP 25 0.3-0.5m	*P3902/112*	Medium	16.8	0.20	6.99	4.34	-2.65	Medium	..	..	..	..	..	..	..	..	..	..	..	..

NOTES:

1. All analysis is reported on a dry weight (DW) basis, unless wet weight (WW) is specified.
2. Samples are dried and ground immediately upon arrival (unless supplied dried and ground).
3. Analytical procedures are sourced from Sullivan L, Ward N, Toppler N and Lancaster G. 2018. National acid sulfate soils guidance: national acid sulfate soils identification and laboratory methods manual, Department of Agriculture and Water Resources, Canberra, ACT. CC BY 4.0.
4. The Acid Base Accounting Equation, where Acid Neutralising Capacity has not been corroborated by other data, is Net Acidity = Potential Acidity + Actual Acidity + Retained Acidity (Eq. 3.2; Sullivan et al. 2018 - full reference above).
5. The Acid Base Accounting Equation for post-limed soil materials is Net Acidity = Potential Acidity + Actual Acidity + Retained Acidity - (post treatment Acid Neutralising Capacity - initial Acid Neutralising Capacity) (Eq. 3.3; Sullivan et al. 2018 - full reference above).
   While the Acid Neutralising Capacity of a soil material may not be included in the Net Acidity calculation (Note 4), it must be measured to give an Initial Acid Neutralising Capacity if verification testing is planned post-liming.
   The Inital Acid Neutralising Capacity must be provided by the client to enable EAL to produce Verification Net Acidity and Liming calculations for post-limed soil materials.
6. The Acid Base Accounting Equation, where Acid Neutralising Capacity has been corroborated by other data, is Net Acidity = Potential Acidity + Actual Acidity + Retained Acidity - Acid Neutralising Capacity (Eq. 3.1; Sullivan et al. 2018 - full reference above).
7. The lime calculation includes a Safety Factor of 1.5 as a safety margin for acid neutralisation (Sullivan et al. 2018). This is only applied to positive values. An increased Safety Factor may be required in some cases.
8. Retained Acidity is required when the pHKCl < 4.5 or where jarosite has been visually observed.
9. A negative Net Acidity result indicates an excess acid neutralising capacity.
10. If insufficient mixing occurs during intial sampling, or during post-liming, or both: the Potential Sulfidic Acidity may be greater in the post-limed sample than in the intial sample; the post-liming Acid Neutralising Capacity may be lower in the post-limed sample than in the intial sample.
11. **An acid sulfate soil management plan is triggered by Net Acidity results greater than the texture dependent criterion: coarse texture ⩾ 0.03% S or 18 mol H+/t; medium texture ⩾ 0.06% S or 36 mol H+/t; fine texture ⩾ 0.1% S or 62 mol H+/t) (Table 1.1; Sullivan et al. 2018 - full refere**
12. For projects that disturb > 1000 t of soil material, the coarse trigger of ≥ 0.03% S or ≥ 18 mol H+/t must be applied in accordance with Sullivan et al. (2018) (full reference above).
13. Acid sulfate soil texture triggers can be related to NCST (2009) textures: coarse and peats = sands to loamy sands; medium = clayey sand to light clays; fine = light medium to heavy clays (Sullivan et al. 2018 - full reference above).
14. Bulk density is required to convert liming rates to soil volume based results. Field bulk density rings can be submitted to EAL for bulk density determination.

checked: .....
Graham Lancaster
Laboratory Manager

RESULTS OF ACID SULFATE SOIL ANALYSIS

112 samples supplied by Regional Geotechnical Solutions Pty Ltd on 8/08/2023. Lab Job No. P3902.
Analysis requested by Andrew Hills. Your Job: RGS03357.1, Allam Property Group.

44 Bent Street WINGHAM NSW 2429

Sample Identification	EAL Lab Code	Texture	Moisture Content		pH_F and pH_{FOX}				KCl-extractable sulfur (S_{KCl})		Potential Sulfidic Acidity (Chromium Reducible Sulfur - CRS)		pH_{KCl}	Actual Acidity (Titratable Actual Acidity - TAA)	Retained Acidity		Non-treated soil: Acid Neutralising Capacity (ANC_{BT})		Non-treated soil: Net Acidity	Non-treated soil: Lime Calculation
			(% moisture of total wet weight)	(g moisture / g of oven dry soil)	pH_F	pH_{FOX}	pH change	Reaction	(% S_{KCl})	(equiv. mol H^+/t)	(% S_{cr})	(mol H^+/t)		(mol H^+/t)	(%S_{NAS})	(mol H^+/t)	(% $CaCO_3$)	(mol H^+/t)	(mol H^+/t)	(kg $CaCO_3$/t DW)
Method Info.		**	**		*(In-house method S21)*				**		*(In-house method S20)*		*(In-house method 16b)*		**		*(In-house method S14)*		**	**

15. A negative Net Acidity result indicates an excess acid neutralising capacity.
16. '..' is reported where a test is either not requested or not required. Where pHKCl is < 4.5 or > 6.5, zero is reported for SNAS and ANC in Net Acidity calculations, respectively.
17. Results refer to samples as received at the laboratory. This report is not to be reproduced except in full.
18. ** NATA accreditation does not cover the performance of this service.
19. Analysis conducted between sample arrival date and reporting date.
20. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions (refer SCU.edu.au/eal/t&cs or on request).
21. Results relate to the samples tested.
22. This report was updated on 28/08/2023 and replaces the report issued on 17/08/2023. Net Acidity and KCl extractable Sulfur results are now included.

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Appendix C

Acid Sulfate Soils Management Plan

ACID SULFATE SOIL MANAGEMENT PLAN

1 INTRODUCTION

The Acid Sulfate Soil Management Plan (ASSMP) outlined below shall be adopted for all works associated with the excavation of natural soils during the construction of the proposed MHE Stage 2 at 82 Chapmans Road, Tuncurry. The site is identified as Lot 11 DP615229.

This ASSMP is aimed at remediating or controlling the generation of sulphuric acidity during the excavation of actual and potential Acid Sulfate Soils (ASS) where excavations will be undertaken into the natural ground profile.

Attention is drawn to the fact that verification testing of the treated ASS generally takes between 5 and 10 working days and therefore time should be allowed in the earthworks management plan for the site for this process to occur.

2 RESPONSIBILITIES

The project superintendent is responsible for implementing the ASS management protocols detailed within this ASSMP. Only a suitably experienced ASS consultant may vary the procedures detailed herein.

The superintendent shall:

- Record a daily log showing the volume of material that has been excavated and treated;
- Ensure that verification testing is undertaken by an independent monitoring consultant on a regular basis.

The requirements of the ASSMP are in addition to, but do not override any other standard procedures such as safety considerations. Where conflict results, or may result from, the implementation of the ASS management as against other performance criteria, the project superintendent shall obtain directives from the project manager or the ASS consultant as appropriate.

3 NEUTRALISING MATERIALS

Fine Agricultural Lime (aglime) will be used for lining of processing or stockpile areas and for blending within excavated materials. Dolomatic aglime, or magnesium blend aglime, should not be used. The aglime shall have:

- At least 85% by weight passing 1mm, and 100% passing 2.5mm. In general a finer grind is better; and
- Aglime shall have a Neutralising Value (NV) of 90% or better (i.e. NV>90).

4 MANAGEMENT AND PROCESSING OF ASS

4.1 Treatment Area

ASS shall be placed in a prepared treatment area on site or within the road corridor at an approved location. To prevent runoff to other areas of the site the treatment area shall be ringed by a bund wall that has a height of at least 0.5m that comprises soils that are not ASS or are treated ASS. The treatment area should be of sufficient size to treat the excavated materials at the proposed excavation rate and to store material for the period required to undertake the verification testing.

The base of the treatment area and bund wall batters shall be limed at a rate of $34kg_{lime}/tonne_{soil}$.

4.2 Treatment

The ASS shall be placed in the treatment area and spread in layers of not more than 300mm thick with lime being applied across the treatment area at a rate of 34kg/tonne. The lime shall be evenly mixed and be applied within 8 hours of excavation.

4.3 Verification Testing

Verification testing shall be undertaken by an independent ASS consultant. The number of samples to be tested shall be based on the volume of the stockpile or treated soil within the treatment area as outlined in Table C1.

Table C1. Number of verification samples required based on treated soil/stockpile volume

Volume (m^3)	Number of samples
<250	2
251 - 500	3
501 – 1,000	4
>1,000	4 plus one per additional $500m^3$

The samples shall be submitted for testing by the Chromium Reducible Sulfur suite and the Verification Net Acidity compared to ASSMAC Action Criteria. The Verification Net Acidity shall be determined from the test results as outlined below:

> *Verification net acidity = Potential Sulfidic Acidity + Actual Acidity + Retained Acidity – (Post treatment Acid Neutralising Capacity – Initial Acid Neutralising Capacity)*

If testing indicates verification net acidity values that exceed ASSMAC Action Criteria in the processed material, reprocess (potentially requiring variation in the processing methodology) and re-sample to verify that acceptable values have been obtained.

All records applicable to acid sulfate testing and treatment shall be collated to substantiate treatment.

4.4 Water Quality Monitoring

Waters collected in the treatment area (if any) shall be tested for pH on a daily basis during the works. If the recorded pH of any sample is less than 6, it shall be immediately retested. If the pH is again below 6, the pH shall be adjusted by the application of hydrated lime until it is in the range 6 to 8.

Where the pH is less than 4.0, the ASS Consultant shall be engaged within 6 hours to review the site practices and monitoring results and to recommend remedial measures.

Complete records of all monitoring results shall be maintained by the Contractor.

4.5 Post Treatment

Once the ASS materials have been treated in accordance with this ASSMP, the materials may be reused on site, or disposed of at a licensed waste landfill. In accordance with a directive from the EPA, unless a specific order, exemption, or approval is granted from the EPA the treated material may not be reused on another site.