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Draft

Preliminary Geotechnical Investigation Proposed Battery Energy Storage System

Red Hill Road, Bororen

Prepared for

Red Hill Renewable Energy P/L

Project No. RG26-1163A

22 May 2026

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ATTACHMENTS:

Drawing No. 1.01 Locality Plan and Bore Locations

Appendix A Bore Report Sheets with Explanatory Notes
Appendix B Laboratory Test Result Report Sheets (Geotechnical)

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SECTION 1 INTRODUCTION

1.1 Project

It is understood that a battery energy storage system (BESS) is proposed for construction on a property referred to as 'Red Hill', located at 837 Red Hill Road, Bororen, approximately 55 km south of Gladstone. A preliminary geotechnical assessment was requested to gather initial information of the site to inform the upcoming planning and design process. The proposed BESS site is approximately 23.6 hectares in area that includes several unconstructed road reserves as well as Killarney Creek (which flows south to north).

Development of the site is understood to comprise a HV Switchyard, 275kV transmission line and will include other components including:

- 40m wide easement;
- 8m wide access easement;
- permanent site offices;
- bushfire and vegetation buffers;
- stormwater detention basins;
- operation and maintenance building;
- laydown and parking area;
- other applicable structures.

The location and extent of the site are shown approximately in Drawing No. 1.01, attached.

1.2 Proposed Scope of Work

The preliminary geotechnical assessment was proposed to consist of a review of all available site information to identify any information gaps, and a 'reconnaissance' visit to the site to develop an understanding of various site characteristics.

It was also proposed to undertake drilling and sampling of six bores to 3m depth at selected locations across the site to determine the most appropriate approach for additional scope of work and design requirements, including sampling for preliminary Acid Sulphate Soils (ASS) assessment taken from each bore in accordance with relevant industry guidelines.

Using the results of the site inspection and the data collected, it was further proposed that a report be produced to provide geotechnical information on each of the following topics, as appropriate:

- subsurface conditions;
- earthworks and site preparation;
- reactive soil movement and site classification;
- suitable alternative foundation types;
- soil types, distribution and characteristics;
- topography and surface conditions;
- potential geohazards;
- local surface water features;
- feasibility and ground soundness;
- anticipated footing settlements;
- anticipated construction aspects. local surface water features;
- ecology and vegetation;
- existing structures and services;
- geological features;
- sediment and erosion;

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1.3 Commission

A fee to undertake the nominated scope of investigation work was presented in a proposal on 31 March 2026. Butler Partners Pty Ltd (Butler Partners) was subsequently commissioned by Red Hill Renewable Energy P/L (RHRE) to conduct the preliminary geotechnical investigation as proposed.

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SECTION 2 THE SITE

2.1 Site Description

The solar farm site is located approximately 8.5km east of the rural town of Bororen and is bordered on the north-west side by the Red Hill Road and the eastern side by high voltage transmission line. At the time of the site visit, the proposed development area was a 'greenfield' site used for cattle grazing, with existing access tracks from the northern boundary at red hill road and across the majority of the site.

Vegetation across the site generally comprised dense and extensive grassed areas with sparse mature trees, mainly of the Eucalypt and Ironbark variety. The invasive plant species Lantana was observed at several nominated locations within the investigation area; however, additional occurrences other invasive plant species may also be present throughout the site. Eleven panoramic views of the site at the time of investigation are given in Photograph 1 to Photograph 11 and an aerial view of the site showing the location of the BESS development and photograph locations is included in Figure 1



Photograph 1: Panoramic view of the site from the Bore 1 looking north



Photograph 2: Panoramic view of the site from the Bore 2 looking east



Photograph 3: Panoramic view of the site from the Bore 3 looking north



Photograph 4: Panoramic view of the site from Bore 4 looking north



Photograph 5: Panoramic view of the site from Bore 5 looking south



Photograph 6: Panoramic view of the site from a central south position looking north-west



Photograph 7: Panoramic view of the site from the northern extent of the site looking north



Photograph 8: Panoramic view of the site from the western extent looking south



Photograph 9: Panoramic view of the site from a southern extent looking north



Photograph 10: Panoramic view of the site from a south-eastern extent looking west



Photograph 11: Panoramic view of the site from a central/northern position looking west

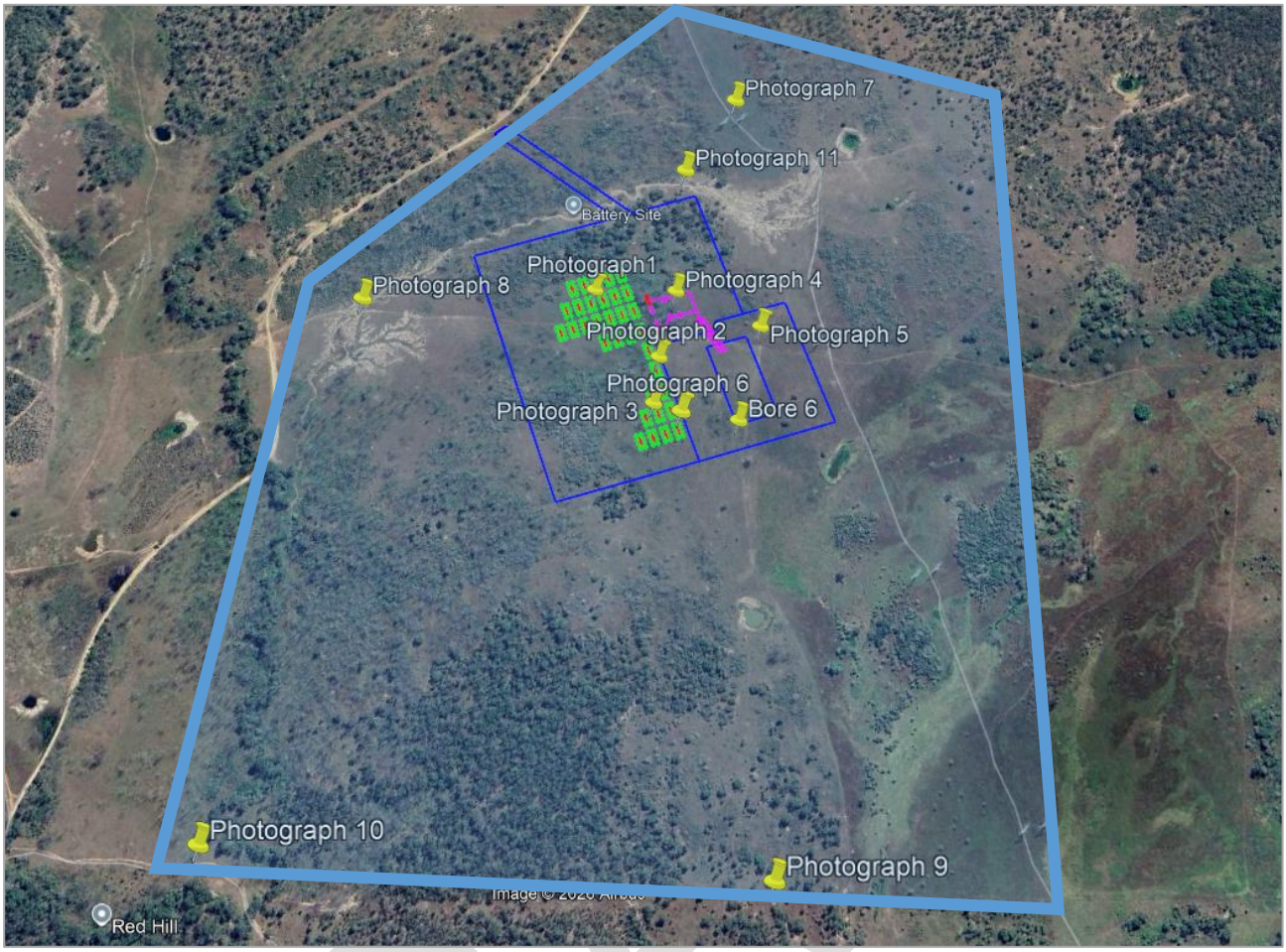


Figure 1: Aerial view of the site showing the photograph locations with reference to the proposed BESS development area (Source: Google Earth September 2023)

2.2 Geology

Reference to the Queensland Geotechnical Database indicates that the site is mapped in an area of;

- Quaternary aged (Qa)
  - Clay, silt, sand and gravel; flood-plain alluvium;
- Middle Triassic - Late Triassic aged Agnes Water Volcanics/m (Rvw/m)
  - Basaltic to andesitic lavas, thin pyroclastic deposits, volcaniclastic sandstone to boulder conglomerate;

An extract from the geological mapping from Queensland Geotechnical Database is shown in **Error! Reference source not found.** below and indicates the approximate location of the site within the regional geological setting.

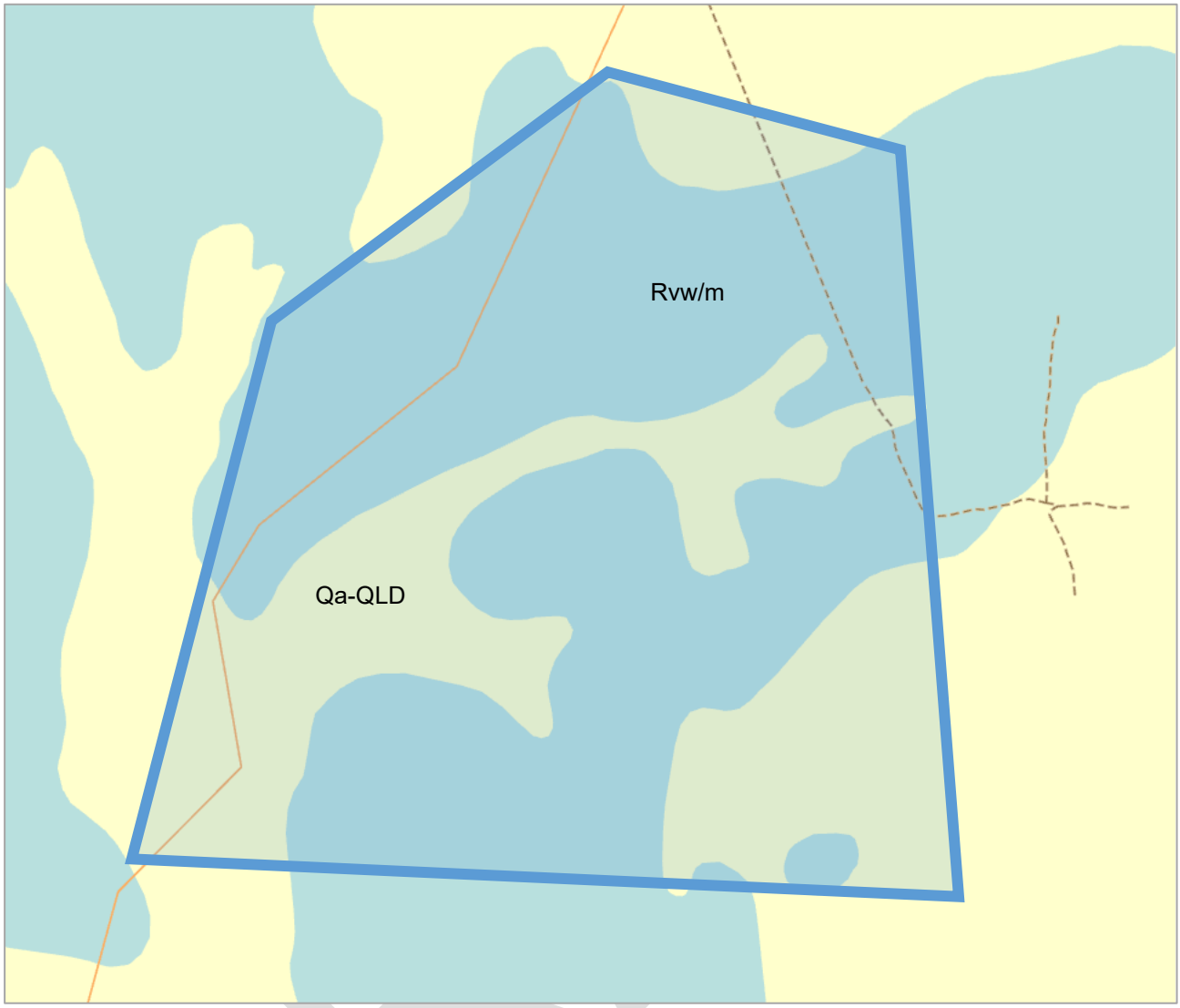


Figure 2: Site Geology (Queensland Geotechnical Database)

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SECTION 3 FIELDWORK

3.1 Drilling and Sampling Methods

The preliminary investigation included the drilling and sampling of seven bores at the locations presented in Table 1.

Table 1: Bore Location Details

Bore	Easting	Northing	Depth (m)	Approximate Ground Surface Level (RL)(m)[1]
1	355207	7319388	1.78[2]	57.5
2	355336	7319242	2.83[2]	58.5
3	355327	7319143	1.54[2]	60.0
4	355367	7319388	3.33	59.0
5	355534	7319318	1.31[2]	58.5
6	355490	7319113	2.3[2]	58.0

[1] Approximate ground surface level interpolated from survey data provided by RHRE
[2] Auger Drilling Refusal

The bores were drilled with a truck-mounted Jacro 350 drilling rig, using a solid flight auger drilling techniques. Strata identification was from the inspection of disturbed material returned to the surface by the augers, supplemented by the inspection of 'disturbed' Standard Penetration Test (SPT) samples taken at regular depths intervals. On completion of drilling, the bores were backfilled with drill spoil and surface plugged.

3.2 Surface Sampling

As part of the preliminary investigation, surface sampling was also undertaken at the site showing evidence of erosion and scouring, which was observed in the northern section of the site. Two surface samples were obtained as part of investigation for laboratory testing to determine likelihood for dispersion at the locations presented in Table 2.

Table 2: Surface Sampling Location Details

Sample ID	Easting	Northing
Sample 1	355551	7319584
Sample 8	354741	7319354

3.3 Test Locations and Supervision

Test locations were set out by direct measurement from existing site features in reference to the proposed development, were located in the field using hand-held GPS co-ordinates, and are shown approximately on Drawing No 1.01, attached. Ground surface levels were interpolated from survey data provided by RHRE at the completion of the investigation; however, it is suggested that the ground surface levels be confirmed by survey prior to detailed design finalisation.

An experienced geotechnical engineer logged the stratigraphy encountered in the bores, directed the in-situ sampling and testing program and supervised the fieldwork.

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SECTION 4 INVESTIGATION RESULTS

4.1 Subsurface Conditions

The subsurface conditions encountered are given on Bore Report sheets included in Appendix A, using classification and descriptive terms defined in the accompanying notes (which are generally in accordance with Australian Standard AS AS1726-1993). It should be noted that rock types indicated on the Bore Report sheets are based on visual assessment only; no petrographic analysis has been undertaken for confirmation.

For a description of the stratigraphy encountered at each bore location, the Bore Report sheets should be consulted. However, in broad summary, the subsurface conditions encountered at the bore locations generally comprised sandy silt topsoil to between 0.2m and 0.4m depth, underlain by layers of firm to hard sandy/gravelly clay to between 0.7m and 2.7m depth. The soils were underlain by very low strength gabbro (in Bores 1, 2,3 and 6 only) and layers of very dense clayey gravel was encountered in Bore 4 at 1.8m depth and very dense gravelly clayey sand was encountered in Bore 5 at 0.7m depth.

It should be carefully noted that 'strength inversions' (i.e. 'weak' material underlying 'stronger' material) were noted in Bore 6 where hard clay was underlain at 0.7m depth by stiff sandy clay.

4.2 Groundwater

Free groundwater was not encountered during auger drilling. However, groundwater levels would be expected to be affected by seasonal and prevailing weather conditions. If construction is to be undertaken at a significant time following this investigation and/or following significant wet weather, it would be prudent to confirm groundwater levels prior to construction.

4.3 Laboratory Testing

Selected samples of soil recovered from the bores were submitted to Butler Partners' NATA accredited Rockhampton geotechnical testing laboratory for assessment of erosion and sediment control parameters, particle size distribution, plasticity, shrink swell index, moisture-density relationship and California Bearing Ratio (CBR) using Australian Standards AS1289 test methods.

It should be noted that sample descriptions provided in the laboratory results summary tables (and the laboratory test result sheets) are based on the inspection of each individual laboratory test sample only. No allowance has been made in sample descriptions for sampling, sub-sampling or test methodology in determination of the mass material properties. Estimates of mass material properties are provided on each individual Bore Report sheet and as such, the laboratory test results should be read in conjunction with the relevant report sheets.

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4.3.1 *Erosion and Sediment Control Parameters*

Five selected samples of soil were tested to determine the Emerson Class Number, pH and electrical conductivity. A summary of the reported test results is presented in Table 3 and the Emerson Class Number results indicate that the samples tested had a low to high potential for dispersion, using distilled water.

Table 3: Summary of Reported Emerson Class, pH and Conductivity Test Results

Location	Depth (m)	Sample Description	Emerson Class No.	pH	Electrical Conductivity (µS/cm)
Bore 1	0.95 – 1.5	Sandy Silty Clay	4	8.0	198.6
Bore 3	0.0 – 0.3	TOPSOIL – Silty Sand	3	5.4	74.73
Bore 4	1.905 – 3.0	Clayey Gravel with Sand	2	4.6	363.2
Sample 1	0.0 – 0.1	Clay	2	8.8	1174
Sample 8	0.0 – 0.8	Clay	3	5.9	384.7

4.3.2 *Particle Size Distribution*

Five selected samples of soil were tested for measurement of particle size distribution analysis using wash sieve grading techniques, and the reported results are summarised in Table 4.

Table 4: Summary of Reported Particle Size Distribution Test Results

Location	Depth (m)	Sample Description	Sample Moisture Content (%)	Gravel Fraction[1] (%)	Sand Fraction[2] (%)	Silt and Clay Fraction[3] (%)
Bore 1	0.95 – 1.5	Sandy Clay	10.8	7	39	54
Bore 3	0.0 – 0.3	TOPSOIL – Sandy Silt	8.7	4	36	60
Bore 4	0.5 – 0.95	Clay with Sand	16.6	19	21	60
	1.905 – 3.0	Clayey Gravel with Sand	13.7	38	27	35
Bore 5	0.71 – 1.3	Gravelly Clayey Sand	7.9	30	34	36
Sample 1	0.0 – 0.1	Clay	3.0	0	13	87

[1] Particle size <60mm, >2mm; [2] Particle size (approximately) <2mm, >0.075mm; [3] Particle size (approximately) <0.075mm

4.3.3 *Plasticity*

Five sub-samples of soils tested for particle size distribution were also tested for measurement of plasticity using Atterberg limit and linear shrinkage test methods. The reported test results are summarised in Table 5 together with the sample classification and indicate that the fine-grained potion of the samples tested were of high plasticity.

Table 5: Summary of Reported Plasticity Test Results

Location	Depth (m)	Sample Description	Sample Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Classification[1]
Bore 1	0.95 – 1.5	Sandy Clay	10.8	52	19	33	13.0	CH
Bore 3	0.0 – 0.3	TOPSOIL – Sandy Silt	8.7	28	21	7	3.5	ML
Bore 4	0.5 – 0.95	Clay with Sand	16.6	60	21	39	15.0	CH
	1.905 – 3.0	Clayey Gravel with Sand	13.7	49	21	28	15.0	GC
Bore 5	0.71 – 1.3	Gravelly Clayey Sand	7.9	23	17	6	3.5	SC
Sample 1	0.0 – 0.1	Clay	3.0	86	20	66	21.0	CH

[1] Australian Standard AS1726-1993, *Geotechnical site investigations*

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4.3.4 Shrink-Swell Index

One 'undisturbed' tube samples were tested to assess shrink-swell index (I_{ss}) using the methods given in Australian Standard AS1289.7.1.1 – 1992. The reported test results are presented in Table 6, and indicate that the samples tested showed potential for high reactive ground movement, associated with moisture content/suction variation.

Table 6: Summary of Shrink-Swell Test Results

Bore	Depth (m)	Sample Description	Sample Moisture Content (%)	Shrinkage (%)	Swell (%)	I_{ss} (% per pF)
6	0.5 – 0.76	Sandy Clay	14.9	3.9	1.5	2.6

4.3.5 Chromium Suite Testing

Three samples of soil recovered from the bores, were selected for analysis using the Chromium Suite test method to provide quantitative data on ASS. Soil samples were frozen until transported to Australian Laboratory Services (ALS) under standard chain of custody protocols. ALS is registered with the National Association of Testing Authorities (NATA) for the relevant testing. A summary of results is given in Table 7 and laboratory test report sheets are included in Appendix C.

Table 7: Summary of Chromium Suite Test Results

Bore	Depth (m)	Sample Description	pH_{KCL}	Titratable Actual Acidity % Pyrite S	Chromium Reducible Sulfur – (S_{CR}) %S	Net Acidity %S (excluding ANC)	ALS Calculated Liming Rate (kg/t)*
1	0.0 – 0.5	Topsoil/Sandy Clay	5.2	**0.03**	0.007	**0.04**	**2**
5	0.5 – 1.0	Sandy Clay/Gravelly Clayey Sand	5.6	<0.02	0.005	0.02	**1**
6	1.5 – 2.0	Sandy Clay	4.4	**0.05**	0.006	**0.06**	**3**

Figures in **bold** equal or exceed the QASSIT Action Criteria for disturbance of >1000 tonnes of soil.

* Calculated by ALS on a dry weight basis assuming use of fine ag-lime (C_aCO_3) with a neutralising value of 100% and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime

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SECTION 5 ACID SULFATE SOILS DISCUSSION

5.1 Assessment Criteria for Acid Sulfate Soils

ASS in Queensland are assessed in accordance with the *Water Quality Australia's National Acid Sulfate Soils Guidance: National acid sulfate soils sampling and identification methods manual – June 2018, The Queensland Acid Sulfate Soil Technical Manual, Soil Management Guidelines (version 5.1)*. The Guidelines provide Action Criteria for assessing the results of laboratory testing quantifying the acid producing effects based on the sum of existing plus potential acidity. These action criteria are presented in Table 7.

Table 8: Action Criteria based on ASS Analysis for Three Broad Texture Categories

Type of Material		Action Criteria (1 – 1000 tonnes disturbed)		Action Criteria (> 1000 tonnes disturbed)	
		Existing + Potential Acidity		Existing + Potential Acidity	
Texture Range	Approx. Clay Content (%)	Equivalent Sulfur %S	Equivalent Acidity Mol H+/tonne	Equivalent Sulfur %S	Equivalent Acidity Mol H+/tonne
Coarse Texture Sands to loamy sands	<5	0.03	18	0.03	18
Medium Texture Sandy loams to light clays	5 – 40	0.06	36	0.03	18
Fine Texture Medium to heavy clays, silty clays	>40	0.1	62	0.03	18

It has been assumed that the volume of natural soil to be disturbed during site development works will exceed 1,000 tonnes and the *>1000 tonnes disturbed Action Criteria'* from Table 8 has therefore been used as the basis for assessment of the presence of ASS requiring treatment.

5.2 Discussion of Results – Acid Sulfate Soil Assessment and Management

Net acidity is calculated as follows:

Net Acidity = Potential Sulfidic Acidity + Actual Acidity + Retained Acidity

The results of the Chromium Suite testing undertaken from the three samples recovered from Bores 1, 5 and 6, indicate show that two of the three samples (Bore 1 at 0.0m – 0.5m depth and Bore 6 at 1.5 – 2.0m depth) reported levels of titratable actual acidity (TAA) equal to or greater than the laboratory's limit of reporting (LOR), and the Action Criteria of 0.03%S.

All three samples reported levels of chromium reducible sulfur (Scr)/potential acidity below the Action Criteria of 0.03%S. The reported Scr results range from 0.005%S to 0.007%S.

Based on the results summarised above, the soils encountered in Bores 1, 5 and 6 include zones that are acidic, however, based on the site geology, surface elevation and appearance of the soils, the soils encountered in Bores 1, 5 and 6 are **not** considered to be ASS. Whilst the net acidity in samples Bore 1 0.0-0.5m and Bore 6 1.5-2.0m did exceed the action criteria of 0.03%S, the Scr concentration in the samples were <0.03%S, indicating negligible potential for future oxidation, there were no identified underlying sulfidic materials and there were no observed jarosite mottles or coatings. Therefore, the soils represented by each of the samples are not considered to be ASS. As such, and ASSMP and treatment of soils from an ASS perspective will not be required. However, it should be noted that the results from the preliminary investigation are indicative results only, and the sampling frequency would not meet the standard guidelines for ASS investigations.

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The acidic site soils are likely to be of relatively low permeability, therefore, all cut to fill that is uniformly compacted in accordance with an appropriate engineering specification, would be essentially impermeable and 'acid leachate' would be negligible. However, if the soils in the bores highlighted above (Bores 1, 5 and 6) are placed in temporary loose stockpile and exposed to the weather, they may leach acid and may therefore require the construction of a containment bund such that run-off can be collected and tested prior to leaving site.

As the site soils are acidic, all stormwater collected during earthworks should be checked prior to off-site discharge; if the pH is outside the range of 6.5pH to 8.5pH units, it should be treated to bring it within this range in addition to checking any other discharge requirements (such as Total Suspended Solids) prior to discharge. If the soils were to be removed from site, consideration should be given to the receiving site and additional management may be required.

It is suggested that, where subsurface conditions differ from those highlighted in this report, earthworks be inspected by an experienced environmental scientist/engineer to ensure that if any (currently unidentified) zones of ASS do exist, they are identified and the materials are appropriately treated.

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SECTION 6 PRELIMINARY ASSESSMENT RESULTS

6.1 Site Inspection

Butler Partners completed a site inspection on 9 April 2026, which comprised a 'drive through' and site walkover. The areas preliminarily assessed encompassed approximately 270 ha, with subsurface investigations and surface sampling undertaken within development areas nominated by RHRE, and the relevant test locations are presented in Figure 3.

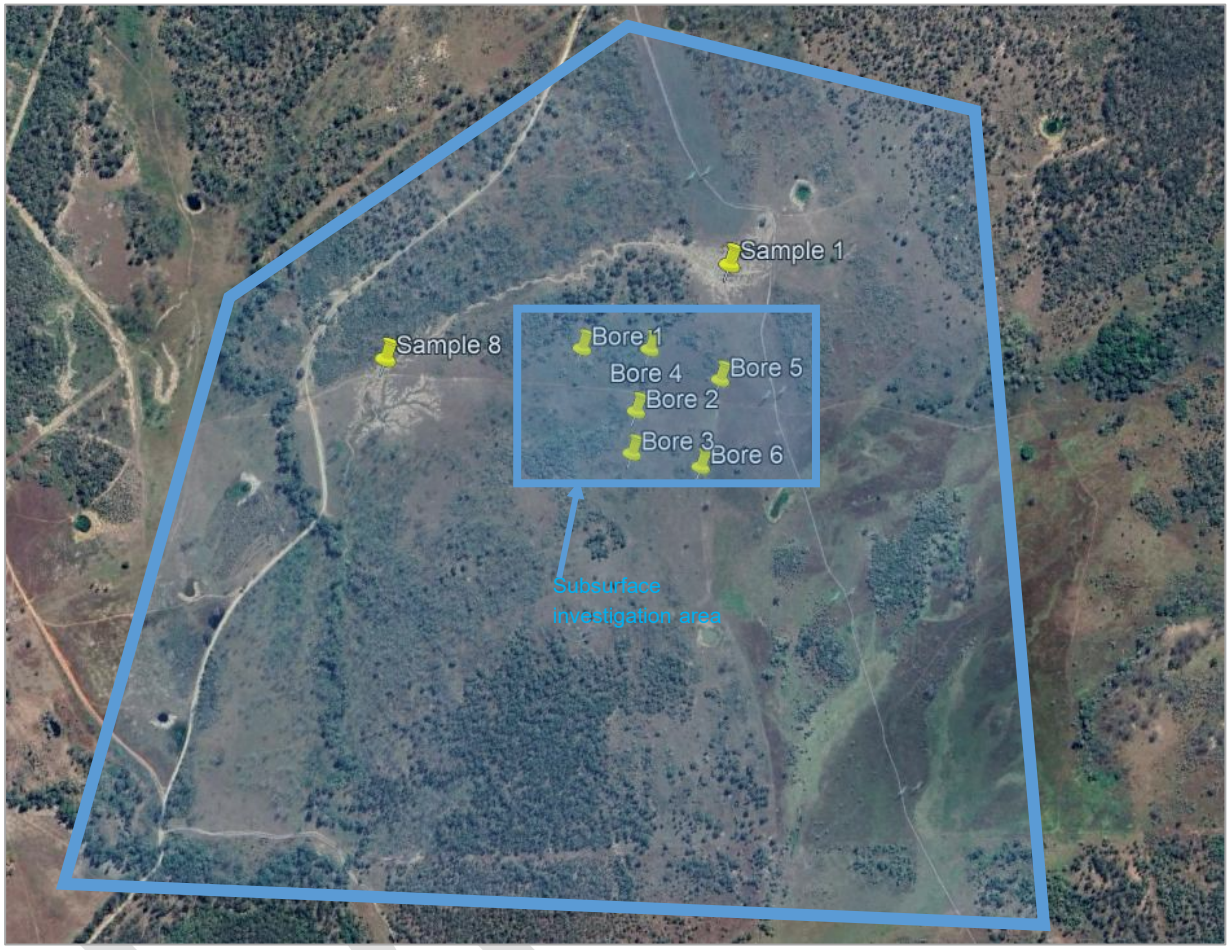


Figure 3: Area of the site inspected showing the photograph locations (Source: Google Earth September 2023)

6.2 Site Topography

Based on the observations during the site visit, the ground surface levels across the site were noted as undulating in all directions, however in general summary, the site is characterised by higher elevation areas in the south and south-eastern extents, and elevations generally decrease from the vicinity of the subsurface investigation area toward a localised low point along the western site boundary adjacent to Red Hill Road. To the north, the ground surface continues to fall toward a low point in the vicinity of an eroded area, beyond which elevations gradually rise. Toward the south-eastern extent of the site, ground elevations are relatively flat before increasing progressively to higher elevations.

6.3 Field Observation Results

For the purpose of reporting on field observation results, key features are depicted in Figure 4, with symbols representing each observed feature, and described in the following sections, however, two areas showing evidence of significant erosion (and possibly dispersion) were identified and are shown in Figure 4.

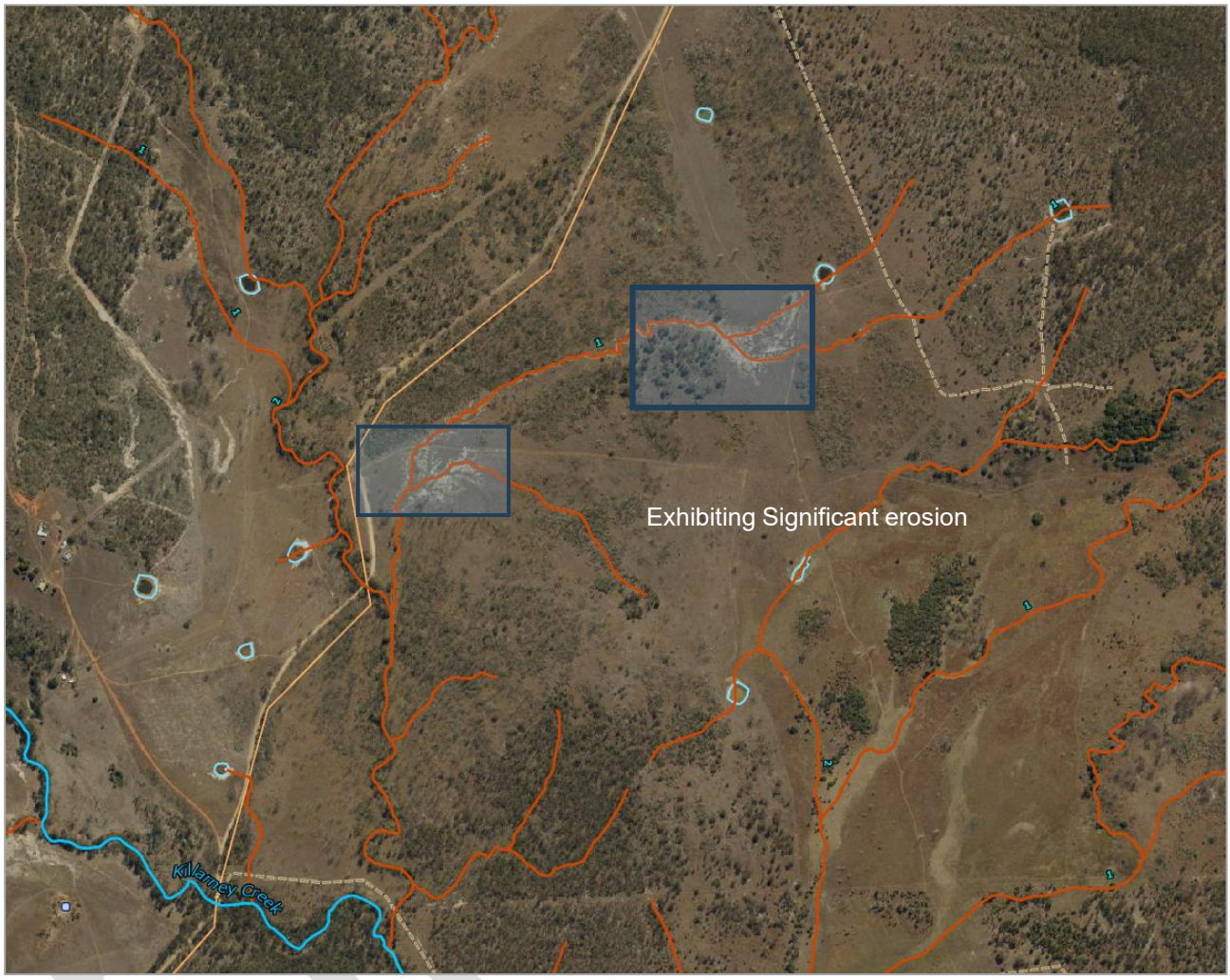


Figure 4: Aerial image showing the location of erosion areas and other features observed during the site visit.

6.3.1 Surface Soils

The site generally consisted of pale brown sandy clay soils, with the informal access tracks having a higher gravel content at the surface, which may indicate imported fill being placed to improve trafficability during 'wet' conditions (see Photograph 12). Two locations within the investigation area have been identified as exhibiting significant erosion, as shown in Figure 4. These areas coincide with the alignment of unnamed ephemeral creek (one of the branches of a Killerney Creek) that traverse the site (see Photograph 13). Evidence of minor erosion, (potentially caused by overland water flow and/or dispersive soils), was observed along Red Hill Road tracks in the south-western section of the site (see Photograph 15).

Alluvial sandy soils were observed along the waterway banks (see *Photograph 16* and Photograph 17). The identification and extent of changes in soil variety soil across the site was not possible due to the extensive grass coverage across the site, as evident in the previous photographs.



Photograph 12: Imported fill being placed to improve trafficability during 'wet' conditions



Photograph 13: General view of a location exhibiting significant erosion (and dispersion) in the central, northern extent of the site



Photograph 14: General view of a small watercourse indicating erosion within western extent of the site



Photograph 15: General view showing signs of minor erosion near the shoulder of the Red Hill Road track

6.3.2 Local surface water features

Existing creeks/watercourses were observed throughout the site, as depicted in Figure 4. The area surrounding Killarney Creek showed denser vegetation and tree coverage compared to the surrounding land, and at the time of the site inspection, some creeks contained ponded water, and some were flowing slowly due to recent wet weather events. No observable signs of erosion and instability were evident along the creek banks inspected; however exposed roots were observed at some locations.



Photograph 16: General view of a crossing location at killarney creek



Photograph 17: General view of one of the unnamed ephemeral creek (one of the branches of a Killarney Creek) crossing

Existing dams were noted and appear to coincide with natural waterways as shown in Figure 5. Access to the dams at the time of the site inspection was not possible due to the soft ground conditions, thick grasses and no visible access tracks.



Figure 5: Waterways and Dams across the site (source: Queensland Waterways)

6.3.3 Existing Structures

High voltage (HV) transmission towers were observed along the western boundary of Zone 2 as well as two towers within Potential Area 5, traversing generally north to south. Other structures or services observed on the site were a farmhouse, cattle yards and ancillary equipment and sheds (refer Figure 6).

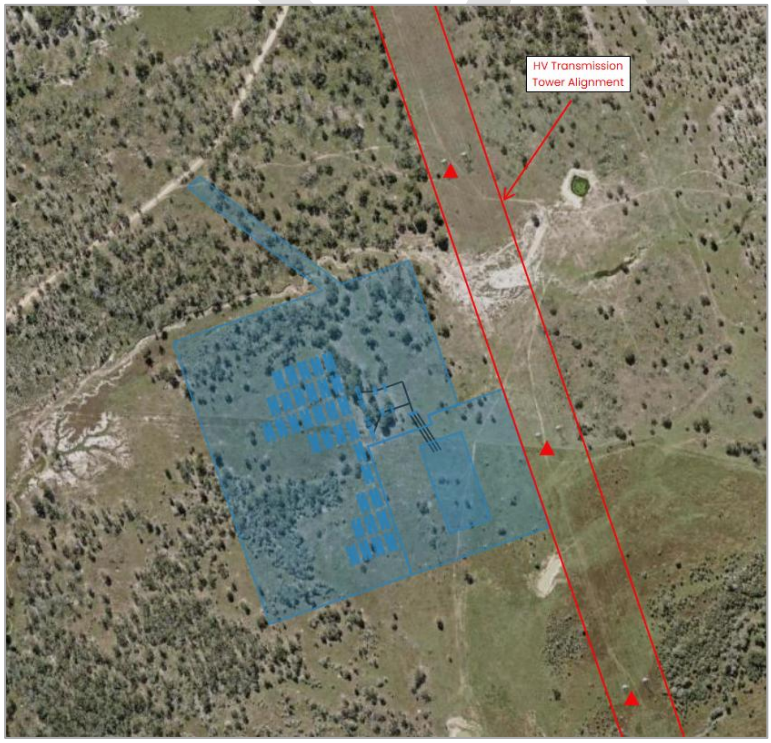


Figure 6: Existing Structures observed on the site

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SECTION 7 PRELIMINARY GEOTECHNICAL DESIGN DISCUSSION

7.1 Ground Model

The results of the investigation indicate that the site was underlain at the bore locations by surface layers of variable topsoil to between 0.2m to 0.4m depth, underlain by clay to between 0.7m to 2.7m depth. The soils were underlain by very low strength gabbro (encountered in four bores only), with the remaining two bores encountering layers of very dense clayey gravel at 1.8m depth and very dense gravelly clayey sand at 0.7m depth. Free groundwater was not encountered during auger drilling), however, groundwater levels can change over time. In these ground conditions geotechnical design will need to consider (at least) the following:

- site preparation, earthworks and excavatability;
- reactive ground movement
- trafficability after disturbance of the site;
- suitable alternate (shallow and deep) foundation types;
- foundation settlement characteristics;
- anticipated construction issues.

Discussion of geotechnical design parameters, as well as design and construction recommendations and suggestions are detailed in the following sections.

7.2 Earthworks

7.2.1 Site Preparation and Excavatability

Site preparation beneath settlement sensitive components is anticipated to involve stripping of topsoils, removal of any uncontrolled fill (if encountered), unsuitable materials, vegetation, etc. as far in advance of construction as possible. The extent of future earthworks at the site will be primarily dependent upon the settlement tolerance of elements to be supported 'on-ground', and the acceptable risk of future settlements occurring in areas with uncontrolled fill.

Bulk and confined excavation of soils and very low strength gabbro encountered in the bores should be readily achieved using a large hydraulic excavator, possibly supplemented with single tyne ripping to aid production.

Auger refusal on weathered gabbro (possibly of medium strength) was encountered in Bores 1, 2, 3, 5 and 6 at depths between 1.3m and 2.7m. Excavation of low strength (or stronger) rock may require use of rock breakers and lead to slow production with high 'bit' wear. It should be noted that 'harder' rock may exist close below bore termination depths and at shallower depth elsewhere on the site, intermediate to the bores.

All confined excavations should be fully supported or battered/benched to a stable angle to ensure personnel safety.

7.2.2 Erosion and Sediment Control

The results of testing on a selected samples indicate that the two samples tested had a moderate to high potential for dispersion (Emerson Class No 2), and design and construction methods will need to be adopted to ensure that these materials do not readily dispose, for example

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- treating dispersive soils to reduce the dispersiveness;
- placing dispersive materials in area that cannot be appealed by weathering/erosion (i.e. in the centre of the fill embankments etc;
- treating dispersive materials by mixing them with materials with a lower dispersibility;
- adopting suitable surface/ erosion protection measures that do not allow dispersive material to be exposed; and
- eroding that dispersive materials are properly and uniformly compacted (particularly around penetrations) and are not exposed to free water.

Additionally, the result of the testing given in Table 3 can be used, in conjunction with relevant soil classifications from the Bore Report sheets, to input to an erosion hazard assessment for the site (e.g. IECA, 2008[1]).

7.2.3 Trafficability

Trafficability for site will be adversely affected by wet weather and traffic within 'wet' subgrade during and following wet weather would be expected to potentially result in disturbance to the subgrade, with consequent loss of subgrade strength. Consideration should be given to the placement of a coarse granular working platform to those areas where trafficability is critical (e.g. internal access roads, etc.). The required layer thickness will depend on the type of plant proposed to traffic the site, however, a layer thickness of not less than 150mm is anticipated for 'light' equipment.

7.2.4 Surface Water Control

During construction, the site should be graded such that water is readily shed and does not collect and pond over the site, otherwise softening of the subgrade soils will occur, especially under construction plant traffic and heavy vehicles.

7.3 Reactive Ground Movements

The magnitude of potential reactive soil movements can be estimated using the following equation (from Australian Standard AS2870-2011 *Residential slabs and footings*) and parameters for the site selected based on recommendations in AS2870:

$$y_s = \frac{1}{100}\sum_{n=1}^{N}\left(\alpha.I_{ss}.\overline{\Delta u}.h\right)_n$$

where y_s is the characteristic surface movement, in millimetres;
α is the lateral restraint factor;
I_{ss} is the shrink-swell index (taken as 2.6% per pF to 3.0% per pF for the site clays, based on laboratory test results);
$\overline{\Delta u}$ is the soil suction change averaged over the thickness of the layer under consideration (taken as 1.2pF at the ground surface in Gladstone and reducing linearly to zero at the design depth of suction change);
h is the thickness of layer under consideration, in millimetres; and
N is the number of soil layers within the design depth of suction change (H_s), which has been taken as 2.3m in Gladstone area.

[1] IECA (2008), *Best Practice Erosion and Sediment Control, International Erosion Control Association* (Australiasia), Picton NSW – Book 4

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As a guide to the potential order of magnitude of reactive soil movement at the site, characteristic surface movement (y_s) values have been calculated for the ground conditions encountered at the site. The results indicate characteristic surface movement values 42mm to 54mm using the methods and parameters discussed above.

Notwithstanding the magnificent the magnitude of characteristic surface movement, the site would be classified as Class 'H1' (Highly Reactive), however, may vary depending on site development and final location of the BESS.

7.4 Foundations

The ground profile to be adopted for foundation design should be based on the results of the closest bore. Suitable foundations for structures will be dependent upon structural loadings, tolerance to movement (including settlements under structural loads and shrink-swell movements), type and magnitude of floor loadings, etc.

It is considered that local variations in soil/rock strength could be expected to occur over the site and it is suggested that the foundation design and construction pricing/methodology adopted for the project be such that footing sizes/founding depths can be readily adjusted if required during construction, without significant cost/time penalties being incurred.

In order to minimise potential differential foundation settlements, all footings to individual structures should be fully supported in the same quality material underlying the structure, unless each structure can be designed and detailed to be relatively flexible (e.g. footings to individual structures should not be supported in both clays/fill and rock).

7.4.1 Strip and Pad Footings

Design of strip and pad footings could be based on the maximum working bearing pressures nominated in Table 9; ultimate (failure) values can be estimated by multiplying the working stress values by 2.5.

Table 9: Maximum Working Stress Design Parameters for Strip and Pad Footings

Material	Strength[2]	Maximum Working Bearing Capacity[1] (kPa)
Level 1 Controlled Fill	-	100
Clays	stiff very stiff hard	100 150 250
Gabbro	very low low	400 700

[1] Not underlain by 'softer' material; [2] Refer to attached soil and rock classification sheets

All foundation excavations should be inspected by an experienced geotechnical engineer prior to casting, to confirm adequate bearing capacity (and final foundation dimensions/depths) and all footing excavations should be clean, dry and free of loose/softened materials immediately prior to casting. If footing excavations are to remain open for longer than ten hours prior to casting (which is not recommended) and/or wet weather is likely, it is suggested that a concrete blinding layer be cast in the base to prevent moisture ingress (and base softening).

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7.4.2 Raft Foundations

For the preliminary assessment of raft slab performance, the 'elastic' settlement modulus (E) values given in Table 10 could be used, which have been based on the results of the bores, past experience and published correlations. The modulus values given in Table 10 do not include any allowance for reactive soil movements, which must also be considered in raft design if soil/fill moisture content/suction variations are possible in reactive materials.

Table 10: Settlement Modules Values for Raft Design

Material	Strength	Young's Modulus (E') (MPa)	Poisson's Ratio
Controlled Fill (refer Section **Error! Reference source not found.**)	–	10 - 20	0.3
Clays	stiff very stiff hard	10 – 20 15 – 30 30 – 50	
Gabbro	very low low	40 – 70 60 – 120	0.2

(1) Intact – no fissures/joints

7.4.3 Bored Cast Insitu Piles

Bored pile design could be based on the maximum allowable working end bearing and shaft adhesion values nominated in *Table* 11 Ultimate stress bearing pressures can be obtained by multiplying the working stress values by 2.5. Pile design stresses (and hence, pile dimensions) should be confirmed by engineering inspection at the time of construction.

Table 11: Working Shaft/End Bearing Capacity for Bored Pile Design

Material	Strength	Shaft Adhesion (kPa)	End Bearing(1) (kPa)
Level 1 Controlled Fill	-	10	-
Clays	stiff very stiff hard	10 15 20	150 200 300
Gabbro	very low low	40 60	550 1000

(1) Minimum embedment of four times pile diameter into founding materials, no underlying 'softer' material and dry conditions

If pile foundations are adopted through reactive materials, it will be necessary to carefully assess the potential for uplift due to reactive soils/fill, where moisture content/suction change is possible, and placement of 'void former' beneath ground beams etc. may be required to minimise uplift pressure.

7.4.4 Foundation Settlement

Actual foundation settlements should be checked by detailed analysis (adopting appropriate location specific ground conditions) once footing sizes and loads are confirmed. Group effects must be considered where 'interaction' of foundations can occur.

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7.5 Pavement Subgrade Properties

Subgrade properties may vary across the site following earthworks and detailed assessment/testing will be required at the time of construction in order to confirm subgrade design values. For the purposes of initial costing and preliminary design of on-ground slabs and pavements, cast over a natural soil subgrade, could be based on the parameters presented in Table 12. The values presented in Table 12 are based on the assumption that the subgrade is prepared in accordance with Section 7.2.

Table 12: Subgrade Design Parameters

Subgrade Type	CBR (%)	Modulus of Subgrade Reaction (kPa/mm)[1]
Silty/Sandy Clay (natural on controlled fill)	2 – 5	30 – 40
Sandy/Clayey Gravel (natural on controlled fill)	10 – 15	50 – 60

[1] For transient loading only

Due to the reactive nature of the existing fill underlying the site, it is suggested that on-ground slabs are fully doweled and joints between slabs sealed to minimise potential damage from surface movements caused by subgrade moisture content variations. Allowance should be made in design for the effect of differential slab movements (due to reactive soil behaviour) if slabs are cast over different subgrade types.

Reactive subgrade materials should not be allowed to 'dry out', otherwise significant softening and soil-swell movements on 'wetting up' could potentially occur.

7.6 Additional Investigation

It is recommended that additional investigation be undertaken as part of detailed development and design of the BESS area once available. It is anticipated that additional investigation would comprise a series of additional bores beneath the footprint of structures and various infrastructure, as well as test pits positioned along proposed access roads.

It is also understood that additional slope stability analysis will be required for the earth bund proposed on the western side of the BESS development, which is anticipated to be addressed as part of detailed investigation and assessment works.

BUTLER PARTNERS PTY LTD

SUBASH RATHNAPPULIGE
Geotechnical Engineer

NICK BLOXSOM
Associate

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Important Information about Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you —* should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

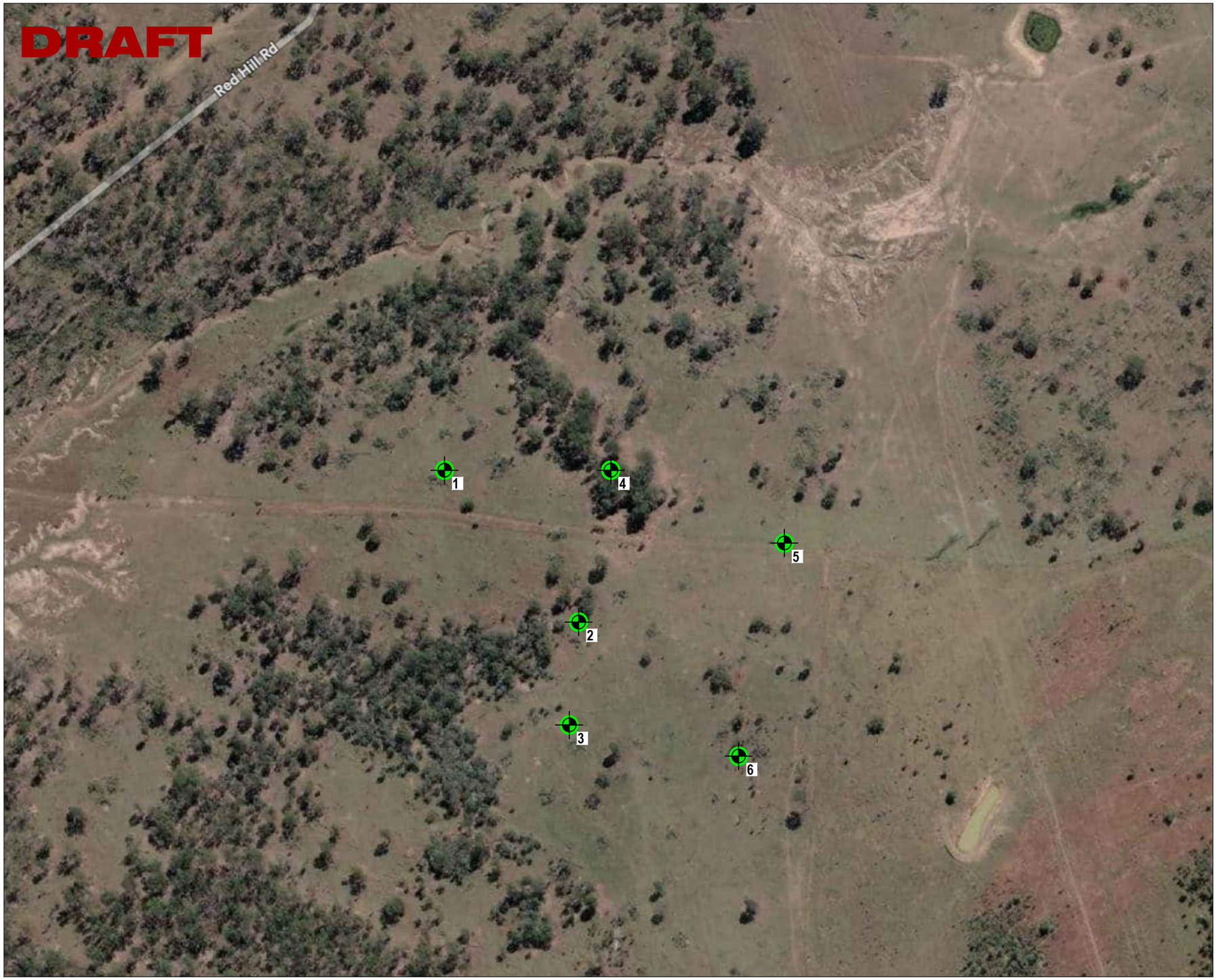
Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

ASFE
THE BEST PEOPLE ON EARTH

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LEGEND

1 Bore

Reference: NearMap Image

Butler Partners
geotechnical • geo-environmental • groundwater

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PROJECT
Proposed Battery Energy Storage System

PROJECT ADDRESS
Red Hill Road, Bororen

CLIENT
Red Hill Renewable Pty Ltd

SCALE
0 40 80 120 160m
1:4000

REV.	DATE	ISSUE	APP.
0	-	Initial	-

DRAWING
Test Location

REPORT
GI

PROJECT No.
RG26-1163A

DRAWING No.
1.01

File Location: p:\projects 2026\r - rockhampton\rg26-1163a - bororen, red hill road\graphics\drawings\rg26-1163a_test locations.dwg Saved on: 4/28/2026 3:29:23 PM By: sbandara

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APPENDIX A

BORE REPORT SHEETS WITH EXPLANATORY NOTES

BORE REPORT

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Client: Red Hill Renewable Energy P/L
Project: Proposed Battery Storage System
Location: Red Hill Road, Bororen
Project No: RG26-1163A

BORE 01

Page No: 1 of 1
Date: 9 April 2026
Ground Surface Level: RL 57.5m

Depth (m)	Description	RL (m)	Lithology	Sample Type	Sample Depth (m)	Test Results
0		57.5				
	TOPSOIL - sandy silt, dark grey, fine to coarse grained sand, dry				0.2	
	SANDY CLAY (CL) - very stiff, brown and dark grey, fine to coarse grained sand, w<PL	57.0		D	0.5	
				S		5,7,9 N=16
1					0.95	
				D		
		56.0			1.5	
	GABBRO (HW) - very low strength, black and brown			S		8,30/130m (HB)
2					1.78	
	End of Bore at 1.78 m (Auger refusal)					
		55.0				
3						
		54.0				
4						
		53.0				
5						

D	**Disturbed Sample**	**S**	**Standard Penetration Test (SPT)**	**E**	**Environmental Sample**	**Is(50)**	**Point Load Test Result (MPa)**
U	**Undisturbed Tube (50mm dia)**	**HB**	**SPT Hammer Bouncing**	**Up**	**Pushtube Sample**	**(d)**	**Diametral Test**
B	**Bulk Sample**	**( )**	**No Sample Recovery**	**C**	**NMLC Coring**	**(a)**	**Axial Test**
pp	**Pocket Penetrometer Test (kPa)**	**V**	**Vane Shear Strength, Uncorrected (kPa)**			**(i)**	**Lump Test**

Rig: Jacro 350
Drilling Method: Auger
Groundwater: No free groundwater encountered during auger drilling
Remarks:

Logged by: SR
Co-Ordinates E: 355207
Co-Ordinates N: 7319388

BORE REPORT

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Client: Red Hill Renewable Energy P/L
Project: Proposed Battery Storage System
Location: Red Hill Road, Bororen
Project No: RG26-1163A

BORE 02

Page No: 1 of 1
Date: 10 April 2026
Ground Surface Level: RL 58.5m

Depth (m)	Description	RL (m)	Lithology	Sample Type	Sample Depth (m)	Test Results
		58.5				
0	***TOPSOIL*** - sandy silt, dark grey, fine to coarse grained sand			D	0.0	
	SANDY CLAY (CL) - firm, red and brown and pale grey, fine to coarse grained sand, w<PL	58.0			0.4 0.5	
				S		2,3,4 N=7
1					0.95	
				D		
	- very stiff	57.0			1.5	
				S		5,8,9 N=17
2	***GRAVELLY SANDY CLAY (CH)*** - hard, pale grey and yellow, fine to coarse grained sand, fine to coarse grained sub-angular gravel, w<PL				1.95	
				D		
		56.0				
	GABBRO (HW) - very low strength, black and brown				2.7	
3				(S)	2.83	30/130m
	End of Bore at 2.83 m (Auger refusal)					
		55.0				
4						
		54.0				
5						

D	**Disturbed Sample**	**S**	**Standard Penetration Test (SPT)**	**E**	**Environmental Sample**	**Is(50)**	**Point Load Test Result (MPa)**
U	**Undisturbed Tube (50mm dia)**	**HB**	**SPT Hammer Bouncing**	**Up**	**Pushtube Sample**	**(d)**	**Diametral Test**
B	**Bulk Sample**	**( )**	**No Sample Recovery**	**C**	**NMLC Coring**	**(a)**	**Axial Test**
pp	**Pocket Penetrometer Test (kPa)**	**V**	**Vane Shear Strength, Uncorrected (kPa)**			**(i)**	**Lump Test**

Rig: Jacro 350
Drilling Method: Auger
Groundwater: No free groundwater encountered during auger drilling
Remarks:

Logged by: SR
Co-Ordinates E: 355336
Co-Ordinates N: 7319242

BORE REPORT

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Client: Red Hill Renewable Energy P/L
Project: Proposed Battery Storage System
Location: Red Hill Road, Bororen
Project No: RG26-1163A

BORE 03

Page No: 1 of 1
Date: 10 April 2026
Ground Surface Level: RL 60.0m

Depth (m)	Description	RL (m)	Lithology	Sample Type	Sample Depth (m)	Test Results
0		60.0				
	TOPSOIL - sandy silt, dark grey, fine to coarse grained sand			D	0.0	
				D	0.3	
	SANDY CLAY (CL) - stiff, dark grey, fine to coarse grained sand, w<PL			S	0.5	2,5,6 N=11
1		59.0		D	0.95	
	GABBRO (HW) - very low strength, black and brown			(S)	1.5 1.54	30/40m
	End of Bore at 1.54 m					
2		58.0				
3		57.0				
4		56.0				
5		55.0				

D	**Disturbed Sample**	**S**	**Standard Penetration Test (SPT)**	**E**	**Environmental Sample**	**Is(50)**	**Point Load Test Result (MPa)**
U	**Undisturbed Tube (50mm dia)**	**HB**	**SPT Hammer Bouncing**	**Up**	**Pushtube Sample**	**(d)**	**Diametral Test**
B	**Bulk Sample**	**( )**	**No Sample Recovery**	**C**	**NMLC Coring**	**(a)**	**Axial Test**
pp	**Pocket Penetrometer Test (kPa)**	**V**	**Vane Shear Strength, Uncorrected (kPa)**			**(i)**	**Lump Test**

Rig: Jacro 350
Drilling Method: Auger
Groundwater: No free groundwater encountered during auger drilling
Remarks:

Logged by: SR
Co-Ordinates E: 355327
Co-Ordinates N: 7319143

BORE REPORT

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Client: Red Hill Renewable Energy P/L
Project: Proposed Battery Storage System
Location: Red Hill Road, Bororen
Project No: RG26-1163A

BORE 04

Page No: 1 of 1
Date: 9 April 2026
Ground Surface Level: RL 59.0m

Depth (m)	Description	RL (m)	Lithology	Sample Type	Sample Depth (m)	Test Results
		59.0				
0	***TOPSOIL*** - sandy silt, dark grey, fine to coarse grained sand, dry			D	0.0	
				D	0.2	
	CLAY (CH) - very stiff, brown and dark grey, with fine to coarse grained sand, w<PL			S	0.5	5,8,12 N=20
1	***SILTY SANDY CLAY (CL)*** - very stiff, dark grey, fine to coarse grained sand, w<PL	58.0		D	0.95	
				S	1.5	10,18,30/105m
2	***CLAYEY GRAVEL (GC)*** - very dense, dark grey and black and white, fine to coarse grained sub-angular gravel, with fine to coarse grained sand, dry	57.0		D	1.905	
3		56.0		S	3.0	28,20,30/30m (HB)
	End of Bore at 3.33 m				3.33	
4		55.0				
5		54.0				

D	**Disturbed Sample**	**S**	**Standard Penetration Test (SPT)**	**E**	**Environmental Sample**	**Is(50)**	**Point Load Test Result (MPa)**
U	**Undisturbed Tube (50mm dia)**	**HB**	**SPT Hammer Bouncing**	**Up**	**Pushtube Sample**	**(d)**	**Diametral Test**
B	**Bulk Sample**	**( )**	**No Sample Recovery**	**C**	**NMLC Coring**	**(a)**	**Axial Test**
pp	**Pocket Penetrometer Test (kPa)**	**V**	**Vane Shear Strength, Uncorrected (kPa)**			**(i)**	**Lump Test**

Rig: Jacro 350
Drilling Method: Auger
Groundwater: No free groundwater encountered during auger drilling
Remarks:

Logged by: SR
Co-Ordinates E: 355367
Co-Ordinates N: 7319388

BORE REPORT

Butler Partners
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Client: Red Hill Renewable Energy P/L
Project: Proposed Battery Storage System
Location: Red Hill Road, Bororen
Project No: RG26-1163A

BORE 05

Page No: 1 of 1
Date: 9 April 2026
Ground Surface Level: RL 58.5m

Depth (m)	Description	RL (m)	Lithology	Sample Type	Sample Depth (m)	Test Results
0		58.5				
	TOPSOIL - sandy silt, dark grey, fine to coarse grained sand			D	0.0	
					0.25	
	SANDY CLAY (CH) - hard, brown and dark grey, fine to coarse grained sand, w<PL			D		
		58.0			0.5	4,30/60m (HB)
				S		
	GRAVELLY CLAYEY SAND (SC) - very dense, pale grey and bown, fine to coarse grained sub-angular gravel, fine to coarse grained sand, dry				0.71	
1				D		
				(S)	1.3	30/10m
	End of Bore at 1.31 m (Auger refusal)				1.31	
		57.0				
2						
		56.0				
3						
		55.0				
4						
		54.0				
5						

D	**Disturbed Sample**	**S**	**Standard Penetration Test (SPT)**	**E**	**Environmental Sample**	**Is(50)**	**Point Load Test Result (MPa)**
U	**Undisturbed Tube (50mm dia)**	**HB**	**SPT Hammer Bouncing**	**Up**	**Pushtube Sample**	**(d)**	**Diametral Test**
B	**Bulk Sample**	**( )**	**No Sample Recovery**	**C**	**NMLC Coring**	**(a)**	**Axial Test**
pp	**Pocket Penetrometer Test (kPa)**	**V**	**Vane Shear Strength, Uncorrected (kPa)**			**(i)**	**Lump Test**

Rig: Jacro 350
Drilling Method: Auger
Groundwater: No free groundwater encountered during auger drilling
Remarks:

Logged by: SR
Co-Ordinates E: 355534
Co-Ordinates N: 7319318

BORE REPORT

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Client: Red Hill Renewable Energy P/L
Project: Proposed Battery Storage System
Location: Red Hill Road, Bororen
Project No: RG26-1163A

BORE 06

Page No: 1 of 1
Date: 10 April 2026
Ground Surface Level: RL 58.0m

Depth (m)	Description	RL (m)	Lithology	Sample Type	Sample Depth (m)	Test Results
0		58.0				
	TOPSOIL - sandy silt, dark grey, fine to coarse grained sand, dry			D	0.0	
					0.2	
	SANDY CLAY (CH) - hard, yellowish grey, fine to coarse grained sand, w<PL			D		
					0.5	
				U50		p>600
	- stiff, redish brown and pale grey				0.76	
1		57.0		D		
					1.5	
				S		5,6,8 N=14
2		56.0			1.95	
				D		
	GABBRO (HW) - very low strength, dark grey and black				2.3	
	End of Bore at 2.3 m (Auger refusal)					
3		55.0				
4		54.0				
5		53.0				

D	**Disturbed Sample**	**S**	**Standard Penetration Test (SPT)**	**E**	**Environmental Sample**	**Is(50)**	**Point Load Test Result (MPa)**
U	**Undisturbed Tube (50mm dia)**	**HB**	**SPT Hammer Bouncing**	**Up**	**Pushtube Sample**	**(d)**	**Diametral Test**
B	**Bulk Sample**	**( )**	**No Sample Recovery**	**C**	**NMLC Coring**	**(a)**	**Axial Test**
pp	**Pocket Penetrometer Test (kPa)**	**V**	**Vane Shear Strength, Uncorrected (kPa)**			**(i)**	**Lump Test**

Rig: Jacro 350
Drilling Method: Auger
Groundwater: No free groundwater encountered during auger drilling
Remarks:

Logged by: SR
Co-Ordinates E: 355490
Co-Ordinates N: 7319113

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Notes on Description and Classification of Soil

The methods of description and classification of soils used in this report are generally based on Australian Standard AS1726-1993 Geotechnical Site Investigations.

Soil description is based on an assessment of disturbed samples, as recovered from bores and excavations, or from undisturbed materials as seen in excavations and exposures or in undisturbed samples. Descriptions given on report sheets are an interpretation of the conditions encountered at the time of investigation.

In the case of cone or piezocone penetrometer tests, actual soil samples are not recovered and soil description is inferred based on published correlations, past experience and comparison with bore and/or test pit data (if available).

Soil classification is based on the particle size distribution of the soil and the plasticity of the portion of the material finer than 0.425mm. The description of particle size distribution and plasticity is based on the results of visual field estimation, laboratory testing or both. When assessed in the field, the properties of the soil are estimated; precise description will always require laboratory testing to define soil properties.

Where soil can be clearly identified as FILL this will be noted as the main soil type followed by a description of the composition of the fill (e.g. FILL – yellow-brown, fine to coarse grained gravelly clay fill with concrete rubble). If the soil is assessed as possibly being fill this will be noted as an additional observation.

Soils are generally described using the following sequence of terms. In certain instances, not all of the terms will be included in the soil description.

MAIN SOIL TYPE (CLASSIFICATION GROUP SYMBOL)
- strength/density, colour, structure/grain size, secondary and minor components, additional observations

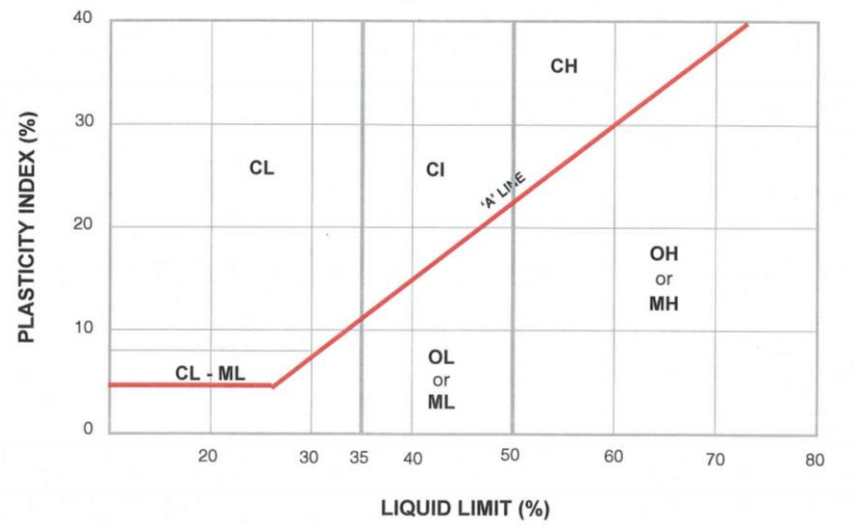
Information on the definition of descriptive and classification terms follows.

SOIL TYPE and CLASSIFICATION GROUP SYMBOLS

	Major Divisions	Particle Size	Classification Group Symbol	Typical Names
COARSE GRAINED SOILS (more than half of material is larger than 0.075mm)	BOULDERS	>200mm		
	COBBLES	63 – 200mm		
	GRAVELS (more than half of coarse fraction is larger than 2.36mm)	Coarse: 20 – 63mm Medium: 6 – 20mm Fine: 2.36 – 6mm	GW	Well graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines, uniform gravels.
			GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (more than half of coarse fraction is smaller than 2.36mm)	Coarse: 0.6 – 2.36mm Medium: 0.2 – 0.6mm Fine: 0.075 – 0.2mm	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands and gravelly sands; little or no fines, uniform sands.
			SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS (more than half of material is smaller than 0.075mm)	SILTS & CLAYS (liquid limit <50%)		ML	Inorganic silts and very fine sands, silty/clayey fine sands or clayey silts with low plasticity.
			CL and CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS & CLAYS (liquid limit >50%)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils.
			CH	Inorganic clays of high plasticity.
			OH	Organic clays of medium to high plasticity, organic silts.
	HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils.

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PLASTICITY CHART FOR CLASSIFICATION OF FINE GRAINED SOILS



(Reference: Australian Standard AS1726-1993 Geotechnical site investigations)

DESCRIPTIVE TERMS FOR MATERIAL PROPORTIONS

Coarse Grained Soils		Fine Grained Soils	
% Fines	Modifier	% Coarse	Modifier
<5	Omit, or use 'trace'	<15	Omit, or use trace.
5 – 12	Describe as 'with clay/silt' as applicable.	15 – 30	Describe as 'with sand/gravel' as applicable.
>12	Prefix soil as 'silty/clayey' as applicable	>30	Prefix soil as 'sandy/gravelly' as applicable.

STRENGTH TERMS – COHESIVE SOILS

Strength Term	Undrained Shear Strength	Field Guide to Strength
Very soft	<12kPa	Exudes between the fingers when squeezed in hand.
Soft	12 – 25kPa	Can be moulded by light finger pressure.
Firm	25 – 50kPa	Can be moulded by strong finger pressure.
Stiff	50 – 100kPa	Cannot be moulded by fingers, can be indented by thumb.
Very stiff	100 – 200kPa	Can be indented by thumb nail.
Hard	>200kPa	Can be indented with difficulty by thumb nail.

DENSITY TERMS – NON COHESIVE SOILS

Density Term	Density Index	SPT "N"	CPT Cone Resistance
Very loose	<15%	0 – 5	0 – 2MPa
Loose	15 – 35%	5 – 10	2 – 5MPa
Medium dense	35 – 65%	10 – 30	5 – 15MPa
Dense	65 – 85%	30 – 50	15 – 25MPa
Very dense	>85%	>50	>25MPa

COLOUR

The colour of a soil will generally be described in a 'moist' condition using simple colour terms (e.g. black, grey, red, brown etc.) modified as necessary by "pale", "dark", "light" or "mottled". Borderline colours will be described as a combination of colours (e.g. grey-brown).

EXAMPLE

e.g. CLAYEY SAND (SC) – medium dense, grey-brown, fine to medium grained with silt.

Indicates a medium dense, grey-brown, fine to medium grained clayey sand with silt.

Notes on Description and Classification of Rock

The methods of description and classification of rock used in this report are generally based on Australian Standard AS1726-1993 *Geotechnical site investigations*.

Rock description is based on an assessment of disturbed samples, as recovered from bores and excavations, or from undisturbed materials as seen in excavations and exposures, or in core samples. Descriptions given on report sheets are an interpretation of the conditions encountered at the time of investigation.

Notes outlining the method and terminology adopted for the description of rock defects are given below, however, detailed information on defects can generally only be determined where rock core is taken, or excavations or exposures allow detailed observation and measurement.

Rocks are generally described using the following sequence of terms. In certain instances not all of the terms will be included in the rock description.

ROCK TYPE (WEATHERING SYMBOL), strength, colour, grain size, defect frequency

Information on the definition of descriptive and classification terms follows.

ROCK TYPE

In general, simple rock names are used rather than precise geological classifications.

ROCK MATERIALS WEATHERING CLASSIFICATION

Term	Weathering Symbol	Definition
Residual soil	RS	Soil developed from extremely weathered rock; the mass structure and substance fabrics are no longer evident; there is a large change in volume but the soil has not been significantly transported.
Extremely weathered	XW	Rock is weathered to such an extent that it has 'soil' properties, i.e. it either disintegrates or can be remoulded in water.
Distinctly weathered *	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by ironstaining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
- Highly weathered	HW	Rock substance affected by weathering to the extent that limonite staining or bleaching affects the whole of the rock substance and other signs of chemical or physical decomposition are evident. Porosity and strength may be increased or decreased compared to the fresh rock, usually as a result of iron leaching or deposition. The colour and strength of the original fresh rock substance is no longer recognisable.
- Moderately weathered	MW	Rock substance affected by weathering to the extent that staining extends throughout the whole of the rock substance and the original colour of the fresh rock may be no longer recognisable.
Slightly weathered	SW	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh	FR	Rock shows no sign of decomposition or staining.

** Subdivision of this weathering grade into highly and moderately may be used where applicable.*

STRENGTH OF ROCK MATERIAL

Term	Symbol	Point Load Index I_s (50)	Field Guide To Strength
Extremely low	EL	<0.03MPa	Easily remoulded by hand to a material with soil properties.
Very low	VL	0.03 – 0.1MPa	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.
Low	L	0.1 – 0.3MPa	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium	M	0.3 – 1.0MPa	Readily scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High	H	1.0 – 3.0MPa	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very high	VH	3.0 – 10.0MPa	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely high	EH	>10MPa	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

Notes:
1. *These terms refer to the strength of the rock material and not to the strength of the rock mass which may be considerably weaker due to the effect of rock defects.*
2. *The field guide visual assessment for rock strength may be used for preliminary assessment or when point load testing is not available.*
3. *Anisotropy of rock may affect the field assessment of strength.*

COLOUR

The colour of a rock will generally be described in a 'moist' condition using simple colour terms (e.g. black, grey, red, brown, etc) modified as necessary by 'pale', 'dark', 'light' or 'mottled'. Borderline colours will be described as a combination of colours (e.g. grey-brown).

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GRAIN SIZE

Descriptive Term	Particle Size Range
Coarse grained	0.6 – 2.0mm
Medium grained	0.2 – 0.6mm
Fine grained	0.06 – 0.2mm

DEFECT FREQUENCY

Where appropriate, a defect frequency may be recorded as part of the rock description and will be expressed as the number of natural (or interpreted natural) defects present in an equivalent one metre length of core; by use of the following defect frequency descriptive terms; or both. The descriptive terms refer to the spacing of all types of natural defects along which the rock is discontinuous and include, bedding plane partings, joints and other rock defects, but excludes known artificial fractures such as drilling breaks.

Defect Frequency	Description
Fragmented	Rock core is comprised primarily of fragments of length less than 20mm, and mostly of width less than the core diameter.
Highly Fractured	Core lengths are generally less than 20mm to 40mm with occasional fragments.
Fractured	Core lengths are mainly 30mm to 100mm with occasional shorter and longer sections.
Fractured to Slightly Fractured	Core lengths are mainly 100mm to 300mm with occasional shorter to longer sections.
Slightly Fractured	Core lengths are generally 300mm to 1,000mm with occasional longer sections and occasional sections of 100mm to 300mm.
Unbroken	The core does not contain any fractures.

EXAMPLE

e.g. SANDSTONE (XW) – low strength, pale brown, fine to coarse grained, slightly fractured.

ROCK DEFECT LOGGING

Defects are discontinuities in the rock mass and include joints, sheared zones, cleavages and bedding partings. The ability to observe and log defects will depend on the investigation methodology. Defects logged in core are described using the abbreviations noted in the following tables.

The *depth* noted in the description is measured in metres from the ground surface, the *defect angle* is measured in degrees from horizontal, and the defect *thickness* is measured normal to the plane of the defect and is in millimetres (unless otherwise noted).

Defects are generally described using the following sequence of terms:

Depth, Defect Type, Defect Angle (dip), Surface Roughness, Infill, Thickness

DEFECT TYPE

B	– Bedding
J	– Joint
S	– Shear Zone
C	– Crushed Zone

SURFACE ROUGHNESS

i	- rough or irregular, stepped
ii	- smooth, stepped
iii	- slickensided, stepped
iv	- rough or irregular, undulating
v	- smooth, undulating
vi	- slickensided, undulating
vii	- rough or irregular, planar
viii	- smooth planar
ix	- slickensided, planar

INFILL

Infill refers to secondary minerals or other materials formed on the surface of the defect and some common descriptions are given in the following table together with their abbreviations.

Ls	- limonite staining
Fe	- iron staining
Cl	- clay
Mn	- manganese staining
Qtz	- quartz
Ca	- calcite
Clean	- no visible infill

EXAMPLE

3.59m, J, 90, vii, Ls, 1mm

indicates a joint at 3.59m depth that is at 90° to horizontal (i.e. vertical), is rough or irregular and planar, limonite stained and 1mm thick.

APPENDIX B

LABORATORY TEST RESULT REPORT SHEETS (GEOTECHNICAL)

DRAFT

Material Test Report

Report Number: **RG26-1163A-1C**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479A
Date Sampled: 09/04/2026
Dates Tested: 17/04/2026 - 11/05/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Bore 1, Depth: 0.95 - 1.5**

Emerson Class Number of a Soil (AS 1289.3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Sandy Clay		
Nature of Water	Distilled		
* Mineral Present	Carbonate		

pH Value of Soil (AS 1289 4.3.1)		Min	Max
Soil-suspension Temperature (^{o}C)	23		
Distilled Water pH	6.8		
Depth			
Material Description			
Moisture Condition	Air-dried		
pH	8.0		
Electrical Conductivity (µS/cm)	198.6		
Soil to Water Ratio	1:2.5		
For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm			
Electrical Conductivity not covered by accreditation.			

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WORLD RECOGNISED ACCREDITATION

Approved Signatory: Allister Naismith
Assistant Laboratory Manager

Laboratory Number: 19529

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Material Test Report

Report Number: **RG26-1163A-1C**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479B
Date Sampled: 10/04/2026
Dates Tested: 17/04/2026 - 11/05/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Bore 3, Depth: 0.0 - 0.3**

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Assistant Laboratory Manager

Laboratory Number: 19529

Emerson Class Number of a Soil (AS 1289.3.8.1)		Min	Max
Emerson Class	**3**		
Soil Description	Topsoil		
Nature of Water	Distilled		

pH Value of Soil (AS 1289 4.3.1)		Min	Max
Soil-suspension Temperature (^{o}C)	23		
Distilled Water pH	6.8		
Depth			
Material Description			
Moisture Condition	Air-dried		
pH	5.4		
Electrical Conductivity (µS/cm)	74.73		
Soil to Water Ratio	1:2.5		
For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm			
Electrical Conductivity not covered by accreditation.			

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Material Test Report

Report Number: **RG26-1163A-1C**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479C
Date Sampled: 09/04/2026
Dates Tested: 17/04/2026 - 11/05/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Bore 4, Depth: 1.905 - 3.0**

Emerson Class Number of a Soil (AS 1289.3.8.1)		Min	Max
Emerson Class	**2**		
Soil Description	Clay		
Nature of Water	Distilled		

pH Value of Soil (AS 1289 4.3.1)		Min	Max
Soil-suspension Temperature (^{o}C)	23		
Distilled Water pH	6.8		
Depth			
Material Description			
Moisture Condition	Air-dried		
pH	4.6		
Electrical Conductivity (µS/cm)	363.2		
Soil to Water Ratio	1:2.5		
For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm			
Electrical Conductivity not covered by accreditation.			

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Material Test Report

Report Number: **RG26-1163A-1C**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479G
Date Sampled: 09/04/2026
Dates Tested: 17/04/2026 - 11/05/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Sample 1, Depth: 0.0 - 0.1**

Emerson Class Number of a Soil (AS 1289.3.8.1)		Min	Max
Emerson Class	**2**		
Soil Description			
Nature of Water	Distilled		

pH Value of Soil (AS 1289 4.3.1)		Min	Max
Soil-suspension Temperature (^{o}C)	23		
Distilled Water pH	6.8		
Depth			
Material Description			
Moisture Condition	Air-dried		
pH	8.8		
Electrical Conductivity (µS/cm)	1174		
Soil to Water Ratio	1:2.5		
For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm			
Electrical Conductivity not covered by accreditation.			

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Material Test Report

Report Number: **RG26-1163A-1C**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479H
Date Sampled: 09/04/2026
Dates Tested: 17/04/2026 - 11/05/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Sample 8, Depth: 0.0 - 0.8**

Emerson Class Number of a Soil (AS 1289.3.8.1)		Min	Max
Emerson Class	**3**		
Soil Description			
Nature of Water	Distilled		

pH Value of Soil (AS 1289 4.3.1)		Min	Max
Soil-suspension Temperature (^{o}C)	23		
Distilled Water pH	6.8		
Depth			
Material Description			
Moisture Condition	Air-dried		
pH	5.9		
Electrical Conductivity (µS/cm)	384.7		
Soil to Water Ratio	1:2.5		
For Conductivity - 1 dS/m = 1 mS/cm = 1000 µS/cm			
Electrical Conductivity not covered by accreditation.			

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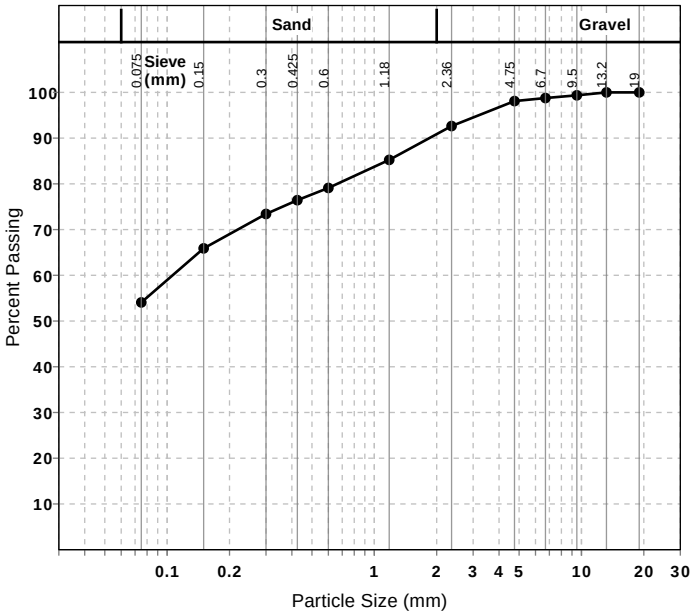
Report Number: **RG26-1163A-1A**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479A
Date Sampled: 09/04/2026
Dates Tested: 17/04/2026 - 05/05/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Bore 1, Depth: 0.95 - 1.5**

Particle Size Distribution (AS1289 3.6.1 & 2.1.1 & Q253)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
13.2 mm	**100**		
9.5 mm	**99**		
6.7 mm	**99**		
4.75 mm	**98**		
2.36 mm	**93**		
1.18 mm	**85**		
0.6 mm	**79**		
0.425 mm	**76**		
0.3 mm	**73**		
0.15 mm	**66**		
0.075 mm	**54**		

Particle size and shape properties of a soil (Q253)		Min	Max
Coefficient of Uniformity (D_{60}/D_{10})	18.8		
Fines Ratio	0.71		
Fines to Sand Ratio	0.58		
% < 0.075 mm / % < 0.300 mm Ratio	0.74		
Coefficient of Curvature	0.56		
Grading Coefficient			

Moisture Content (AS 1289 2.1.1)		Min	Max
Moisture Content (%)	10.8		

Particle Size Distribution



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Material Test Report

Report Number: **RG26-1163A-1A**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479B
Date Sampled: 10/04/2026
Dates Tested: 17/04/2026 - 01/05/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Bore 3, Depth: 0.0 - 0.3**

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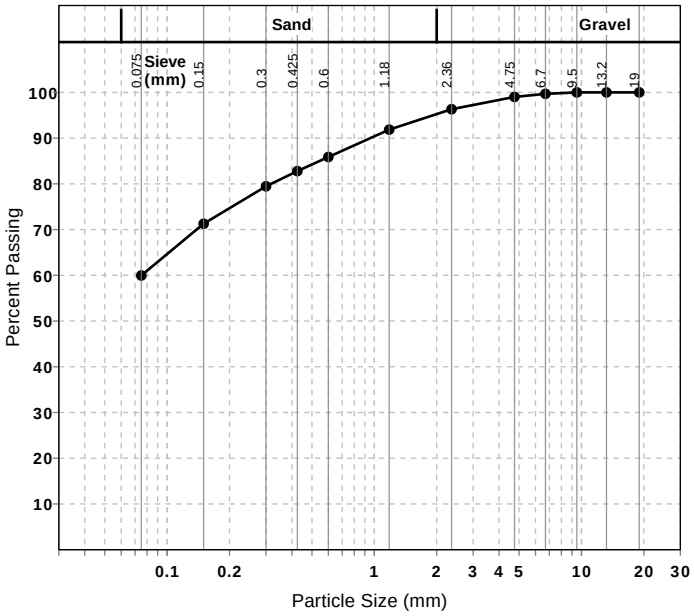
Approved Signatory: Allister Naismith
Assistant Laboratory Manager
Laboratory Number: 19529

Particle Size Distribution (AS1289 3.6.1 & 2.1.1 & Q253)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
13.2 mm	**100**		
9.5 mm	**100**		
6.7 mm	**100**		
4.75 mm	**99**		
2.36 mm	**96**		
1.18 mm	**92**		
0.6 mm	**86**		
0.425 mm	**83**		
0.3 mm	**79**		
0.15 mm	**71**		
0.075 mm	**60**		

Particle size and shape properties of a soil (Q253)		Min	Max
Coefficient of Uniformity (D_{60}/D_{10})	21.4		
Fines Ratio	0.72		
Fines to Sand Ratio	0.62		
% < 0.075 mm / % < 0.300 mm Ratio	0.75		
Coefficient of Curvature	0.54		
Grading Coefficient			

Moisture Content (AS 1289 2.1.1)		Min	Max
Moisture Content (%)	8.7		

Particle Size Distribution



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Assistant Laboratory Manager

Laboratory Number: 19529

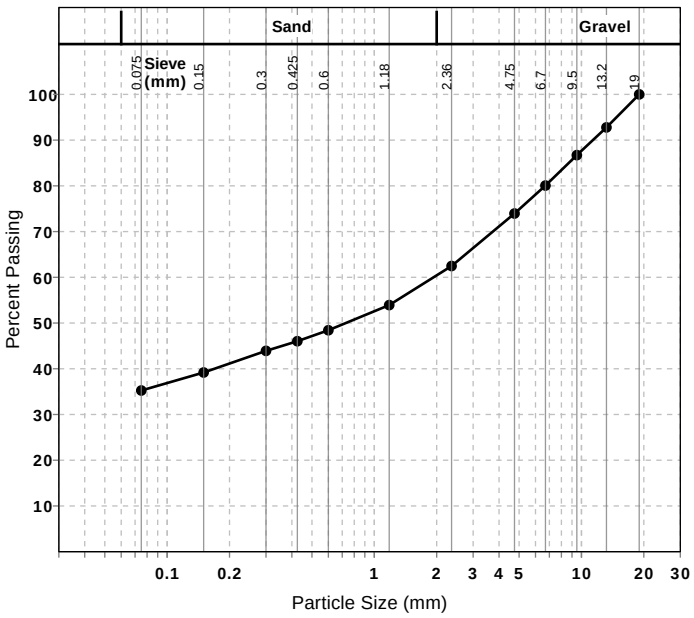
Report Number: **RG26-1163A-1A**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479C
Date Sampled: 09/04/2026
Dates Tested: 17/04/2026 - 30/04/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Bore 4, Depth: 1.905 - 3.0**

Particle Size Distribution (AS1289 3.6.1 & 2.1.1 & Q253)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
13.2 mm	**93**		
9.5 mm	**87**		
6.7 mm	**80**		
4.75 mm	**74**		
2.36 mm	**62**		
1.18 mm	**54**		
0.6 mm	**48**		
0.425 mm	**46**		
0.3 mm	**44**		
0.15 mm	**39**		
0.075 mm	**35**		

Particle size and shape properties of a soil (Q253)		Min	Max
Coefficient of Uniformity (D_{60}/D_{10})	2195.2		
Fines Ratio	0.77		
Fines to Sand Ratio	0.56		
% < 0.075 mm / % < 0.300 mm Ratio	0.80		
Coefficient of Curvature	0.52		
Grading Coefficient			

Moisture Content (AS 1289 2.1.1)		Min	Max
Moisture Content (%)	13.7		

Particle Size Distribution



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Laboratory Number: 19529

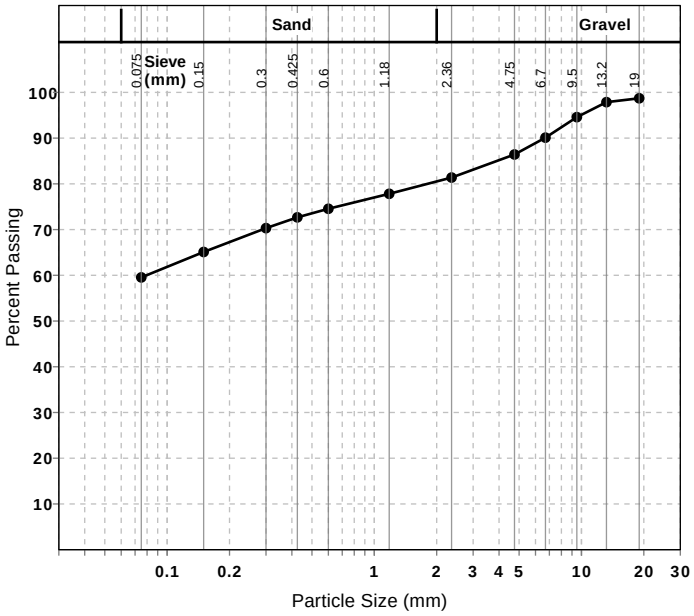
Report Number: **RG26-1163A-1A**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479D
Date Sampled: 09/04/2026
Dates Tested: 17/04/2026 - 05/05/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Bore 4, Depth: 0.5 - 0.95**

Particle Size Distribution (AS1289 3.6.1 & 2.1.1 & Q253)			
Sieve	Passed %	Passing Limits	
19 mm	**99**		
13.2 mm	**98**		
9.5 mm	**95**		
6.7 mm	**90**		
4.75 mm	**86**		
2.36 mm	**81**		
1.18 mm	**78**		
0.6 mm	**75**		
0.425 mm	**73**		
0.3 mm	**70**		
0.15 mm	**65**		
0.075 mm	**60**		

Particle size and shape properties of a soil (Q253)		Min	Max
Coefficient of Uniformity (D_{60}/D_{10})	496.4		
Fines Ratio	0.82		
Fines to Sand Ratio	0.73		
% < 0.075 mm / % < 0.300 mm Ratio	0.85		
Coefficient of Curvature	0.28		
Grading Coefficient			

Moisture Content (AS 1289 2.1.1)		Min	Max
Moisture Content (%)	16.6		

Particle Size Distribution



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Material Test Report

Report Number: **RG26-1163A-1A**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479E
Date Sampled: 09/04/2026
Dates Tested: 17/04/2026 - 01/05/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Bore 5, Depth: 0.71 - 1.3**

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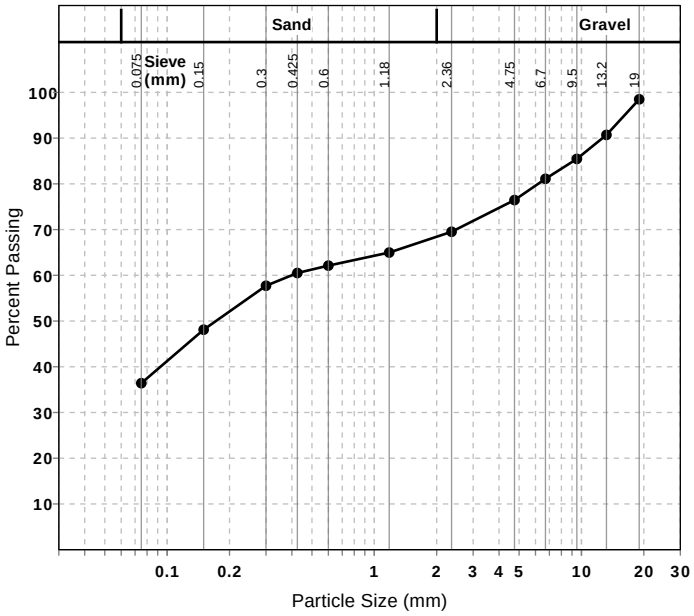
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Assistant Laboratory Manager
Laboratory Number: 19529

Particle Size Distribution (AS1289 3.6.1 & 2.1.1 & Q253)			
Sieve	Passed %	Passing Limits	
19 mm	**98**		
13.2 mm	**91**		
9.5 mm	**85**		
6.7 mm	**81**		
4.75 mm	**76**		
2.36 mm	**70**		
1.18 mm	**65**		
0.6 mm	**62**		
0.425 mm	**61**		
0.3 mm	**58**		
0.15 mm	**48**		
0.075 mm	**36**		

Particle size and shape properties of a soil (Q253)		Min	Max
Coefficient of Uniformity (D_{60}/D_{10})	25.4		
Fines Ratio	0.60		
Fines to Sand Ratio	0.52		
% < 0.075 mm / % < 0.300 mm Ratio	0.63		
Coefficient of Curvature	0.42		
Grading Coefficient			

Moisture Content (AS 1289 2.1.1)		Min	Max
Moisture Content (%)	7.9		

Particle Size Distribution



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Material Test Report

Report Number: **RG26-1163A-1A**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479G
Date Sampled: 09/04/2026
Dates Tested: 17/04/2026 - 06/05/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Sample 1, Depth: 0.0 - 0.1**

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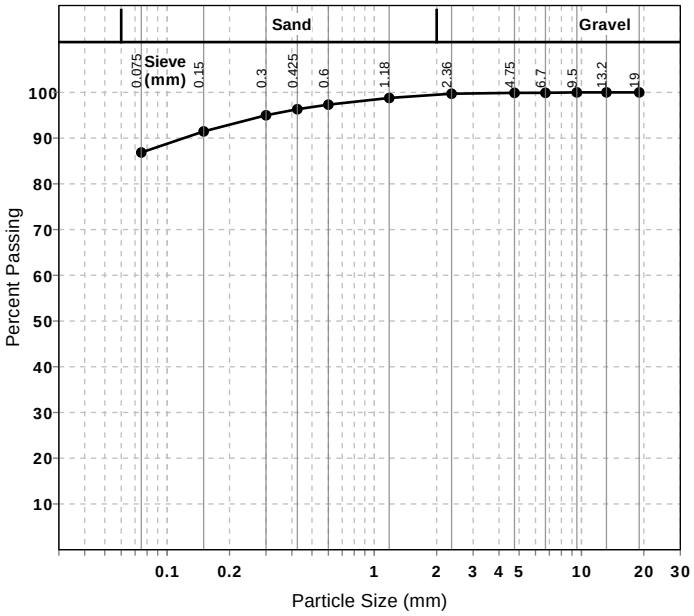
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Particle Size Distribution (AS1289 3.6.1 & 2.1.1 & Q253)			
Sieve	Passed %	Passing Limits	
19 mm	**100**		
13.2 mm	**100**		
9.5 mm	**100**		
6.7 mm	**100**		
4.75 mm	**100**		
2.36 mm	**100**		
1.18 mm	**99**		
0.6 mm	**97**		
0.425 mm	**96**		
0.3 mm	**95**		
0.15 mm	**91**		
0.075 mm	**87**		

Particle size and shape properties of a soil (Q253)		Min	Max
Coefficient of Uniformity (D_{60}/D_{10})			
Fines Ratio	0.90		
Fines to Sand Ratio	0.87		
% < 0.075 mm / % < 0.300 mm Ratio	0.91		
Coefficient of Curvature			
Grading Coefficient			

Moisture Content (AS 1289 2.1.1)		Min	Max
Moisture Content (%)	3.0		

Particle Size Distribution



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Material Test Report

Report Number: **RG26-1163A-1B**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479A
Date Sampled: 09/04/2026
Dates Tested: 17/04/2026 - 07/05/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Bore 1, Depth: 0.95 - 1.5**

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1 & Q252)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	76		
Liquid Limit (%)	52		
Plastic Limit (%)	19		
Plasticity Index (%)	**33**		
Weighted Plasticity Index (%)	2522		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**13.0**		
Cracking Crumbling Curling	None		

Moisture Content (AS 1289 2.1.1)		Min	Max
Moisture Content (%)	10.8		

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Assistant Laboratory Manager

Laboratory Number: 19529

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Material Test Report

Report Number: **RG26-1163A-1B**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479B
Date Sampled: 10/04/2026
Dates Tested: 17/04/2026 - 07/05/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Bore 3, Depth: 0.0 - 0.3**

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1 & Q252)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	83		
Liquid Limit (%)	28		
Plastic Limit (%)	21		
Plasticity Index (%)	**7**		
Weighted Plasticity Index (%)	580		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**3.5**		
Cracking Crumbling Curling	None		

Moisture Content (AS 1289 2.1.1)		Min	Max
Moisture Content (%)	8.7		

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Material Test Report

Report Number: **RG26-1163A-1B**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479C
Date Sampled: 09/04/2026
Dates Tested: 17/04/2026 - 07/05/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Bore 4, Depth: 1.905 - 3.0**

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1 & Q252)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	46		
Liquid Limit (%)	49		
Plastic Limit (%)	21		
Plasticity Index (%)	**28**		
Weighted Plasticity Index (%)	1289		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**15.0**		
Cracking Crumbling Curling	Curling		

Moisture Content (AS 1289 2.1.1)		Min	Max
Moisture Content (%)	13.7		

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Material Test Report

Report Number: **RG26-1163A-1B**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479D
Date Sampled: 09/04/2026
Dates Tested: 17/04/2026 - 11/05/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Bore 4, Depth: 0.5 - 0.95**

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1 & Q252)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	73		
Liquid Limit (%)	60		
Plastic Limit (%)	21		
Plasticity Index (%)	**39**		
Weighted Plasticity Index (%)	2834		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**15.0**		
Weighted Linear Shrinkage (%)	1098		
Cracking Crumbling Curling			

Moisture Content (AS 1289 2.1.1)		Min	Max
Moisture Content (%)	16.6		

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Report Number: **RG26-1163A-1B**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479E
Date Sampled: 09/04/2026
Dates Tested: 17/04/2026 - 07/05/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Bore 5, Depth: 0.71 - 1.3**

Atterberg Limit (AS1289 3.9.2 & 3.2.1 & 3.3.2 & Q252)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	60		
Retained 0.425 (%)	2		
Liquid Limit (%)	23		
Plastic Limit (%)	17		
Plasticity Index (%)	**6**		
Weighted Plasticity Index (%)	363		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**3.5**		
Weighted Linear Shrinkage (%)	206		
Cracking Crumbling Curling	Cracking		

Moisture Content (AS 1289 2.1.1)		Min	Max
Moisture Content (%)	7.9		

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Assistant Laboratory Manager

Laboratory Number: 19529

Report Number: **RG26-1163A-1B**
Issue Number: 1
Date Issued: 13/05/2026
Client: Red Hill Renewable Energy P/L
29 Gilmore Street, Tarragindi QLD 4121
Contact: James Basham
Project Number: RG26-1163A
Project Name: Proposed Battery Energy Storage System
Project Location: Red Hill Road, Bororen
Work Request: 28479
Sample Number: R26-28479G
Date Sampled: 09/04/2026
Dates Tested: 17/04/2026 - 11/05/2026
Sampling Method: AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method: In accordance with the test method
Site Selection: Selected by Client
Sample Location: **Sample 1, Depth: 0.0 - 0.1**

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1 & Q252)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Passing 0.425 (%)	96		
Liquid Limit (%)	86		
Plastic Limit (%)	20		
Plasticity Index (%)	**66**		
Weighted Plasticity Index (%)	6357		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	**21.0**		
Weighted Linear Shrinkage (%)			
Cracking Crumbling Curling			

Moisture Content (AS 1289 2.1.1)		Min	Max
Moisture Content (%)	3.0		

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Material Test Report

Report Number:	**RG26-1163A-1D**
Issue Number:	1
Date Issued:	13/05/2026
Client:	Red Hill Renewable Energy P/L 29 Gilmore Street, Tarragindi QLD 4121
Contact:	James Basham
Project Number:	RG26-1163A
Project Name:	Proposed Battery Energy Storage System
Project Location:	Red Hill Road, Bororen
Work Request:	28479
Sample Number:	R26-28479F
Date Sampled:	09/04/2026
Dates Tested:	17/04/2026 - 02/05/2026
Sampling Method:	AS 1289.1.2.1 6.5.3 - Power auger drilling
Preparation Method:	In accordance with the test method
Site Selection:	Selected by Client
Sample Location:	**Bore 6, Depth: 0.5 - 0.76**

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Accredited for compliance with ISO/IEC 17025 - Testing

NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory: Allister Naismith
Assistant Laboratory Manager

Laboratory Number: 19529

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	**2.6**
Visual Description	
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	**3.9**
Estimated % by volume of significant inert inclusions	15
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	16.0

Swell Test	
Initial Pocket Penetrometer (kPa)	
Final Pocket Penetrometer (kPa)	
Initial Moisture Content (%)	14.9
Final Moisture Content (%)	17.1
Swell (%)	**1.5**
* scope of accreditation does not cover the performance of pocket penetrometer readings.	

Moisture Content (AS 1289 2.1.1)		Min	Max
Moisture Content (%)	14.9		

This document shall not be reproduced except in full without approval of the laboratory.
Results relate only to the items tested/sampled.

APPENDIX C

LABORATORY TEST RESULT REPORT SHEETS (ASS)

DRAFT

CERTIFICATE OF ANALYSIS

Work Order	: **EB2614466**	Page	: 1 of 3
Client	: **BUTLER PARTNERS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MR ANDREW DOAK	Contact	: Nathan King
Address	: 246 KENT STREET ROCKHAMPTON QLD 4700	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: ----	Telephone	: +61-7-3552-8685
Project	: RG26-1163A	Date Samples Received	: 23-Apr-2026 11:36
Order number	: GEOTECHROK-3128	Date Analysis Commenced	: 27-Apr-2026
C-O-C number	: 1	Issue Date	: 28-Apr-2026 14:50
Sampler	: SUBASH RATHNAPPULIGE		
Site	: Red Hill Road, Bororen		
Quote number	: EN/000 (Planned event Tables)		
No. of samples received	: 3		
No. of samples analysed	: 3		

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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ASS: EA033 (CRS Suite): Analysis is performed as per the Acid Sulfate Soils Laboratory Methods Guidelines (2004) and the updated National Acid Sulfate Soils Guidance: National acid sulfate soils identification and laboratory methods manual, Department of Agriculture and Water Resources, Canberra, ACT (2018)
- ASS: EA033 (CRS Suite): ANC not required because pH KCl less than 6.5
- ASS: EA033 (CRS Suite): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m3'.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	Bore 1 0.0 - 0.5	Bore 5 0.5 - 1.0	Bore 6 1.5 - 2.0	----	----
			Sampling date / time	09-Apr-2026 00:00	09-Apr-2026 00:00	09-Apr-2026 00:00	----	----
Compound	CAS Number	LOR	Unit	EB2614466-001	EB2614466-002	EB2614466-003	--------	--------
				Result	Result	Result	----	----
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	**5.2**	**5.6**	**4.4**	**----**	**----**
Titratable Actual Acidity (23F)	----	2	mole H+ / t	**21**	**11**	**33**	**----**	**----**
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	**0.03**	<0.02	**0.05**	**----**	**----**
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	**0.007**	**0.005**	**0.006**	**----**	**----**
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	<10	**----**	**----**
EA033-D: Retained Acidity								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	**----**	**----**	<0.02	**----**	**----**
HCl Extractable Sulfur (20Be)	----	0.02	% S	**----**	**----**	<0.02	**----**	**----**
Net Acid Soluble Sulfur (20Je)	----	0.02	% S	**----**	**----**	<0.02	**----**	**----**
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	**----**	**----**	<10	**----**	**----**
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	**----**	**----**	<0.02	**----**	**----**
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	**1.5**	**----**	**----**
Net Acidity (sulfur units)	----	0.02	% S	**0.04**	**0.02**	**0.06**	**----**	**----**
Net Acidity (acidity units)	----	10	mole H+ / t	**25**	**14**	**37**	**----**	**----**
Liming Rate	----	1	kg CaCO3/t	**2**	**1**	**3**	**----**	**----**
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	**0.04**	**0.02**	**0.06**	**----**	**----**
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	**25**	**14**	**37**	**----**	**----**
Liming Rate excluding ANC	----	1	kg CaCO3/t	**2**	**1**	**3**	**----**	**----**