Proposed Wind Farm in Scott River

Preliminary Acid Sulfate Soils and Dewatering Management Plan

Synergy Renewable Energy Diversion

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Acronyms and Abbreviations

Abbreviations	Full Name
~	Approximately
>	Greater than
<	Less than
%	Per cent
%S	Percentage sulfur
µS/cm	Micro Siemens per centimetre
AASS	Actual acid sulfate soils
AHD	Australian Height Datum
ANC	Acid neutralising capacity
ANZECC	Australian and New Zealand Environment and Conservation Council
ANZG	Australian and New Zealand Guideline
AS/NZS	Australian Standard/New Zealand Standard
ASS	Acid sulfate soils
ASSDMP	Acid Sulfate Soils and Dewatering Management Plan
ASLP	Australian Standard Leaching Procedure
ATT	Attention
BSR	Basic summary of records
$CaCO_3$	Calcium carbonate
CF	Conversion Factor
Cl^-	Chloride
cm	Centimetre
CO_3^{2-}	Carbonate
DBCA	Department of Biodiversity, Conservation and Attractions
DO	Dissolved oxygen
DoH	Department of Health
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
EC	Electrical conductivity
EIL	Ecological Investigation Level
ENV	Effective neutralising value
EPBC Act	*Environmental Protection, Biodiversity and Conservation Act 1999*
FWG	Freshwater Guidelines
GDA	Geocentric Datum of Australia
GDE	Groundwater Dependent Ecosystem
H^+/tonne	Hydrogen per tonne

Abbreviations	Full Name
HCO_3^-	Bicarbonate
HIL-A	Health Investigation Levels for residential
kL	Kilolitres
km	Kilometres
km^2	Square kilometres
L/s	Litres per second
LDWG	Livestock Drinking Water Guidelines
LIWG	Long-term Irrigation Water Guidelines
LOR	Limit of reporting
m	Metres
m^3	Cubic metres
m/d	Metres per day
m^3/d	Cubic metres per day
mbgl	Metres below ground level
mg/L	Milligrams per litre
MGA	Map Grid of Australia
mm	Millimetres
mol H^+/tonne	Moles of hydrogen per tonne
MW	MegaWatt
NASS	Non-acid Sulfate Soils
NATA	National Associated of Testing Authorities
NO_X-N	Nitrates and nitrites as nitrogen
NPUG	Non-potable Drinking Water Guidelines
PASS	Potential Acid Sulfate Soils
pH_F	Field pH
pH_{FOX}	Field peroxide pH
pH_{KCl}	Potassium chloride pH
pH_{OX}	Peroxide oxidised pH
PTG	PTG Consulting Pty Ltd
Pty Ltd	Proprietary Limited
PVC	Polyvinyl chloride
QAQC	Quality Assurance and Quality Control
Redox	Oxidation and reduction potential
RP	Reactive phosphorus
RPD	Relative percentage difference
SF	Safety factor
S_{NAS}	Sulfur – Net Acid Soluble

Abbreviations	Full Name
SO_4^{2-}	Sulfate
SPOS	Sulfur – Peroxide Oxidisable Sulfur
SynergyRED	Synergy Renewable Energy Developments Pty Ltd
TA	Total alkalinity
TAA	Titratable actual acidity
TDS	total dissolved solids
TEC	Threatened Ecological Community
TKN	Total Kjeldahl nitrogen
TP	Total phosphorus
TSS	Total suspended solids
tonne/m^3	Tonne per cubic metre
the project	Proposed wind farm in Scott River
the site	Project area for the proposed wind farm in Scott River
TPA	Titratable peroxide acidity
TTA	Titratable total acidity
USEPA	United States Environmental Protection Agency
V	Volts
VEPA	Victorian Environmental Protection Agency

EXECUTIVE SUMMARY

Introduction

Synergy Renewable Energy Developments Pty Ltd (SynergyRED) engaged PTG Consulting Pty Ltd (PTG) to support environmental approvals and management, with respect to Acid Sulfate Soils (ASS), for the proposed 100 MW wind farm (the "project") on the Scott River Plain, ~15 km northeast of Augusta, Western Australia (Figure 1, Appendix A).

The project site (Figure 1, Appendix A) occupies an area of ~3,596.8 hectares (ha) and comprises agricultural properties bound by Dennis Road to the east and Scott River Road to the west. The northern end is bordered by a fence line approximately 1.5 km south of the Brockman Highway, and the southern boundary extends approximately 1.5 km south of Governor Broome Road (the 'site').

The infrastructure for the project has not been finalised however the proposed works for the project are anticipated to include excavation of soil and potentially dewatering for the following:

- Construction of up to 20 wind turbine generators, up to 250 m in height, with two primary foundations being explored:
  - primary concrete foundations up to 0.8-1.2 metres below ground level (mbgl), supported by a series of concrete piles.
  - primary concrete foundations at the surface, supported by a series of concrete piles.
  - traditional below ground foundations up to 6 mbgl, whilst considered unlikely, may be considered where no dewatering is required and the ASS risk is considered low.
- Construction of a network of access roads for required infrastructure.
- Construction/installation of associated infrastructure including:
  - Electrical substation(s) and switchyard.
  - Operations and maintenance building and workshop.
  - Meteorological mast(s) and transmission poles and or towers and connecting power lines on foundations installed to depths ranging from 0.25-1.5 mbgl.
  - Buried electrical cabling connecting the turbines to substation(s).
- Construction of gravel borrow pits and extraction of associated material.

Proposed locations for the various project infrastructure are presented on Figure 1, Appendix A.

The site is mapped by the Department of Water and Environmental Regulation (DWER) as having a "high to moderate risk of ASS occurring within 3 m of natural soil surface" (NationalMap, 2025a). The site is mapped as being underlaid by alluvium (Qpd), a known ASS and reflected in the ASS risk mapping for the site. Preliminary investigations have identified alluvium across the site throughout the investigated soil profile, with a maximum net acidity of 2.1%S. Layers of ferricrete are also present on the site (Stantec, July 2024).

Due to the presence of ASS and estimated dewatering requirements being potentially high impact activities, i.e. risk to groundwater quality and groundwater dependent ecosystems (GDEs) (Stantec, August 2025), and subsequent development, an Acid Sulfate Soils and Dewatering Management Plan (ASSDMP) is required to identify and manage the potential risks associated with construction in accordance with guidelines developed by the DWER. The ASSDMP has also been prepared to support environmental approvals for the project under the *Environmental Protection Act 1986*.

As the proposed infrastructure and layout for the project has not been finalised, this Preliminary ASSDMP presents the findings of a Preliminary ASS Assessment and details the proposed management framework, controls and monitoring procedures within which soil excavation, dewatering and discharge activities will be undertaken during construction, in-line with current Department of Water and Environmental Regulation (DWER) guidelines.

Upon completion of detailed engineering design, this Preliminary ASSDMP will be revised to reflect the final proposed design and detail additional investigation(s) completed to support the project.

This version of the Preliminary ASSDMP relates specifically to the construction of the project.

The major components of the earthworks and dewatering program are outlined in Table 0-1, providing context for the subsequent sections detailing ASS and groundwater management. This ASSDMP contains Management Strategies specific to the construction of the project.

Table 0-1: Earthworks Program

Component	Description
Turbine Construction	Up to 20 wind turbines, up to 250 m in height, will be constructed onsite. The works will involve the excavation and dewatering of in-situ soils. There are currently two primary foundation options being explored: Option 1 – Partially above ground foundation: would require foundations (~30 x 30 m in area) to be installed to depth of between 0.8-1.2 mbgl. The main gravity foundation would be supported by a series of concrete piles, which would be installed via concrete injected down augers to displace soils. Minimal soil from depth may be recovered when the auger is being removed as concrete is injected. Dewatering requirements would vary depending on the time of year and location of the turbine on-site. There may be up to ~1 m of dewatering required in summer, with up to ~2 m required in winter for a 3–4-week duration at each foundation. Option 2 – Fully above ground foundation: is similar to option 1 except the gravity foundation will be installed at the ground surface. As such there would be minimal excavation and no dewatering requirement. A third option, a traditional below ground foundation: is similar to option 1 except the gravity foundation will be installed completely below the ground surface. While considered unlikely at this stage, this option may be utilised, where it is confirmed prior to construction, through detailed site investigation and further modelling, that the proposed turbine location would not require dewatering that would present any risk to groundwater dependent values (i.e., drawdown greater than natural seasonal variation), and the potential risk associated with disturbance of ASS is considered low.
Underground services (e.g., cabling)	A network of underground electrical cabling will be required to be installed from each wind turbine to the substation(s). The electrical cabling will be installed at a depth of ~1.2 mbgl and require the excavation and potentially dewatering of in-situ soils.
Wind monitoring and communication towers	Foundations for wind monitoring and communication towers will involve the excavation and dewatering of in-situ soils similar to turbine construction but limited to depth of between 0.25-1.5 mbgl. Dewatering requirements would vary depending on the time of year, location and maximum depth of the foundation. There may be up to ~1 m of dewatering required in summer, with up to ~2 m required in winter for a 3–4-week duration at each foundation.
Transmission Poles and Towers	Western Power will be responsible for the installation of transmission poles and towers across the site. Foundations for the pole and towers will be concrete caisson (bored concrete) foundations, with displaced soil managed via the ASSDMP. No dewatering is required for these foundations however displaced water from the injection of concrete will be managed as per dewatering effluent in the ASSDMP.
Substation and Operations and maintenance area	Construction of support infrastructure may require the disturbance of insitu soils, and potentially dewatering for foundations and associated underground infrastructure, e.g. cabling, services.
Other supporting infrastructure (e.g., roads, temporary construction facilities)	A number of other supporting infrastructure will be required in support of the project, including, construction of site entrances and access roads, water storage infrastructure, public viewing area, and temporary construction facilities (e.g., site offices, laydown areas, and concrete batching plant). Minimal disturbance of insitu soils is anticipated in support of these components
Borrow pits	Local sourcing of gravel from borrow pits, should detailed geotechnical investigations confirm suitable source/s. Borrow pits will be excavated above the groundwater table and therefore no dewatering will be required.

Construction works will attempt to be scheduled for summer months where possible.

Findings

Soils across the site are predominately characterised as sand (pale grey) overlying a layer of ferricrete, which is likely discontinuous across the site, with dark brown/grey sands and clayey sands extending to depth. Exceedances of the net acidity management criteria were observed in all soil types, and across all depths, except pale grey sands.

Based upon the available information all soils, except shallow pale grey and white sands (<1 mbgl), will require active management and lime-neutralisation during construction where excavated.

Groundwater is slightly acidic and acidic to slightly acidic within the Leederville and Superficial Aquifers respectively and contain low concentrations of acid buffering capacity. Concentrations for dissolved aluminium (Superficial only), iron, manganese and zinc commonly exceed adopted guideline values, with concentrations of other metals typically below or marginally above the limit of reporting but below relevant guidelines. Dissolved metal concentrations are typically higher in the Superficial then Leederville Aquifer. Total nitrogen, total ammonia and total phosphorous concentrations reported in the Superficial Aquifer commonly exceeded adopted guidelines, with lower concentrations, which are predominately below adopted guidelines, observed in the Leederville Aquifer.

Based upon a review of the water quality results compared against the DWER ASS guidance, there is some evidence of acidification, i.e. low pH, especially in the Superficial Aquifer. The groundwater is recognised as being susceptible to further acidification should soils and dewatering not be managed appropriately during construction.

Surface water is slightly acidic to neutral (7.8 pH units) and contains measurable levels of acid buffering capacity. Concentrations for dissolved aluminium and iron commonly exceed adopted guideline values, with concentration of other metals typically below or marginally above the limit of reporting but below relevant guidelines. Total nitrogen, reactive phosphorous and total phosphorous concentrations reported in both wetland and creekline discharge samples commonly exceeded adopted guidelines, with isolated exceedances on total ammonia and oxidised nitrogen species.

Based upon a review of the surface water quality results compared against the DWER ASS guidance, there is minimal evidence of acidification. It is recognised however that surface water is at risk from impacts from acidification, should soils and dewatering effluent not be managed appropriately during construction.

Management

The outcomes of the preliminary ASS investigations have been assessed and preliminary management plans prepared for groundwater, surface water, dewatering effluent and soils (described herein) for the construction of the project.

Dewatering, Groundwater and Surface Water

Dewatering works will potentially be required during construction to support any excavation activities with the potential to interact with the water table, including the installation of foundations (i.e., wind turbines, wind monitoring and communication towers), and underground cabling, the proposed electrical substation, and operations and maintenance area. Dewatering requirements for other infrastructure is currently unknown. Transmissions poles/towers to be installed by Western Power are unlikely to require dewatering however groundwater will be displaced by concrete during the pouring of piles. The potential/volume of dewatering effluent is dependent on the time of year of construction and water levels at the time of construction.

Any dewatering effluent will likely require treatment in accordance with DWER guidelines (DWER, 2015b). Dewatering effluent would be required to be stored on-site after initial lime treatment (if required) prior to being recharged into the superficial aquifer. Where treatment is required, effluent will be pumped through an automated lime-dosing unit utilising calcium-based neutralising agent, i.e., hydrated lime, and discharged into a limestone lined settlement basin. The settlement basin will then overflow into unlined recharge areas/trenches. Infiltration basins/trenches will be positioned between the area under abstraction and any sensitive receptor(s) to limit potential impacts to receptors.

Monitoring works for groundwater, surface water[1], and dewatering effluent during and after construction have been detailed in accordance with the relevant DWER guidelines. Reporting provisions are also detailed.

Soils

Based upon the current proposed excavation depths, natural soils, except pale grey and white sands, exceed relevant DWER management criteria and will therefore require management and lime neutralisation upon disturbance. A summary of the management requirements, based upon the current proposed construction methodology and available information at the time of reporting, with respect to ASS is presented below in Table 0-2.

[1] Where groundwater decreases are observed >10 cm, 100 m from dewatering activities in the vicinity of surface water bodies

Table 0-2: ASS Management Summary

Soils Requiring Management	Depth* (mbgl)	Management Requirements
Sand – Dark grey/brown/black	All	Lime treatment and reuse onsite where possible Geotechnically unsuitable material to go for off-site disposal at licensed soil treatment facility and or used as non-structural fill.
Sandy clay – Pale and dark grey	>1.75	
Ferricrete	0.5-3.5	

Management Principles

The following management principles are to be promoted to limit the potential impact of oxidation and acid leaching for on-site soils.

1. The majority of the infrastructure for the wind farm will be installed into in-situ soils via open excavation and trenches. Soils requiring treatment will be:
    a. stockpiled prior to treatment on limestone pads. There are likely to be multiple treatment and stockpile locations given the area of development envelope, and distance between excavations.
        i. Where required, limestone pads will be constructed with crushed compacted[2] limestone, in accordance with DWER guidelines (2015b); i.e. ~300 mm thickness, with perimeter bunds (minimum 150 mm high)
        ii. The pad should be graded to a corner such that any leachate generated is contained/captured within the pad.
        iii. Where treatment on a limestone pad occurs, all soils are to be treated within 18 hours. Stockpiles must be <2 m in height;
    b. treated upon excavation (i.e. lime incorporated during excavation) and placed adjacent to the excavation, where possible;
2. Aglime will be incorporated into the material at the prescribed liming rate. Treated soils will either be reinterred, reused on-site.
3. In areas requiring soil management and treatment, soils at the base of excavations will be covered with a thin layer of aglime (~20 mm) as a precautionary measure to provide buffering capacity against minor releases of acidity.
4. Geotechnically unsuitable ASS material, where it cannot be used as non-structural fill onsite, will be disposed of offsite at a licensed soil treatment facility. All trucking and disposal documents must be kept and made available to SynergyRED at the end of works
5. During the works all material excavated and stockpiled, and or material imported to site, is to be stored an adequate distance away from waterways (creek/drainage lines) and wetlands, to minimise the potential for stockpile leachate/runoff entering such water bodies.

Responsibilities and Monitoring Schedule

The monitoring frequency and requirements for groundwater, dewater effluent, surface water, lime-treated soils and accumulated sediments are summarised in Table 0-3.

Table 0-3: Monitoring Program and Responsibilities

Monitoring Activity	Parameters	Responsibility
Dewatering Monitoring		
Daily	Field analysis: pH, EC, total titratable acidity (TTA), total alkalinity (TA) Flow meter reading	Civil Contractor/ Site Environment representative/ Specialist consultant
Weekly	Laboratory: total acidity, total alkalinity, pH	

[2] The level of compaction used should produce an appropriately low permeability to prevent infiltration of leachate (DWER, 2015b)

Monitoring Activity	Parameters	Responsibility
Fortnightly	Laboratory: ▪ DWER Full Analytical Suite[1]	
Groundwater Monitoring		
Pre Construction Baseline^	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: DWER Full Analytical Suite[1]	Civil Contractor/ Site Environment representative/ Specialist consultant
Every second day	Field analysis: pH, EC, TTA, TA, standing water level	
Fortnightly	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: DWER Full Analytical Suite[1]	
Immediately After Dewatering		
Post-Construction		Site Environment representative/ Specialist consultant
Surface Water Monitoring		
Pre Construction Baseline^	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: ▪ DWER Full Analytical Suite[1] ▪ Turbidity	Civil Contractor/ Site Environment representative/ Specialist consultant
Level 1[2]		
Every second day	Standing water level	Civil Contractor/ Site Environment representative/ Specialist consultant
Level 2[3]		
Every second day	Standing water level Field analysis: pH, EC, TTA, TA	Civil Contractor/ Site Environment representative/ Specialist consultant
Fortnightly	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: ▪ DWER Full Analytical Suite[1] ▪ Turbidity	
Immediately After Dewatering		
Post-Construction[4]		Site Environment representative/ Specialist consultant
Validation of Treated PASS Soils		
Collection of soil samples upon notification from site contractor	Laboratory: pH_F and pH_{FOX}, and SPOCAS[5]	Site Environment representative/ Specialist consultant
Accumulated Sediments		
Upon completion of dewatering, use of each settlement/recharge basin	Heavy metals	Site Environment representative/ Specialist consultant

1. Total and dissolved metals, total acidity, total alkalinity, sulfate, chloride, total suspended solids (TSS), total dissolved solids (TDS), and nutrients. Field parameters including pH, EC, TTA, TA, dissolved oxygen and redox are recorded during sampling. 2. Groundwater levels (at 100 m): >0.1 m at 100 m (outside natural decreases). 3. Groundwater decrease (outside natural decreases) adjacent to wetland and or deterioration in groundwater quality adjacent to wetland. 4. Only if Level 2 monitoring is undertaken. 5. Suspension Peroxide Oxidation Combined Acidity and Sulfur. ^ Within four weeks prior of dewatering commencing.

1. INTRODUCTION

1.1 Background

Synergy Renewable Energy Developments Pty Ltd (SynergyRED) engaged PTG Consulting Pty Ltd (PTG) to support environmental approvals and management, with respect to Acid Sulfate Soils (ASS), for the proposed 100 MW wind farm (the "project") on the Scott River Plain, ~15 km northeast of Augusta, Western Australia (Figure 1, Appendix A).

The project (Figure 1, Appendix A) occupies an area of ~3,596.8 hectares (ha) and comprises agricultural properties bound by Dennis Road to the east and Scott River Road to the west. The northern end is bordered by a fence line approximately 1.5 km south of the Brockman Highway, and the southern boundary extends approximately 1.5 km south of Governor Broome Road (the "site").

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- Construction of up to 20 wind turbine generators, up to 250 m in height, with two primary foundations being explored:
  - primary concrete foundations up to 0.8-1.2 metres below ground level (mbgl), supported by a series of concrete piles.
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  - traditional below ground foundations up to 6 mbgl, whilst considered unlikely, may be considered where no dewatering is required and the ASS risk is considered low.
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- Construction/installation of associated infrastructure including:
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Upon completion of detailed engineering design, this ASSDMP will be revised to reflect the final proposed design and detail additional investigation(s) completed to support the project.

This version of the Preliminary ASSDMP relates specifically to the construction of the project.

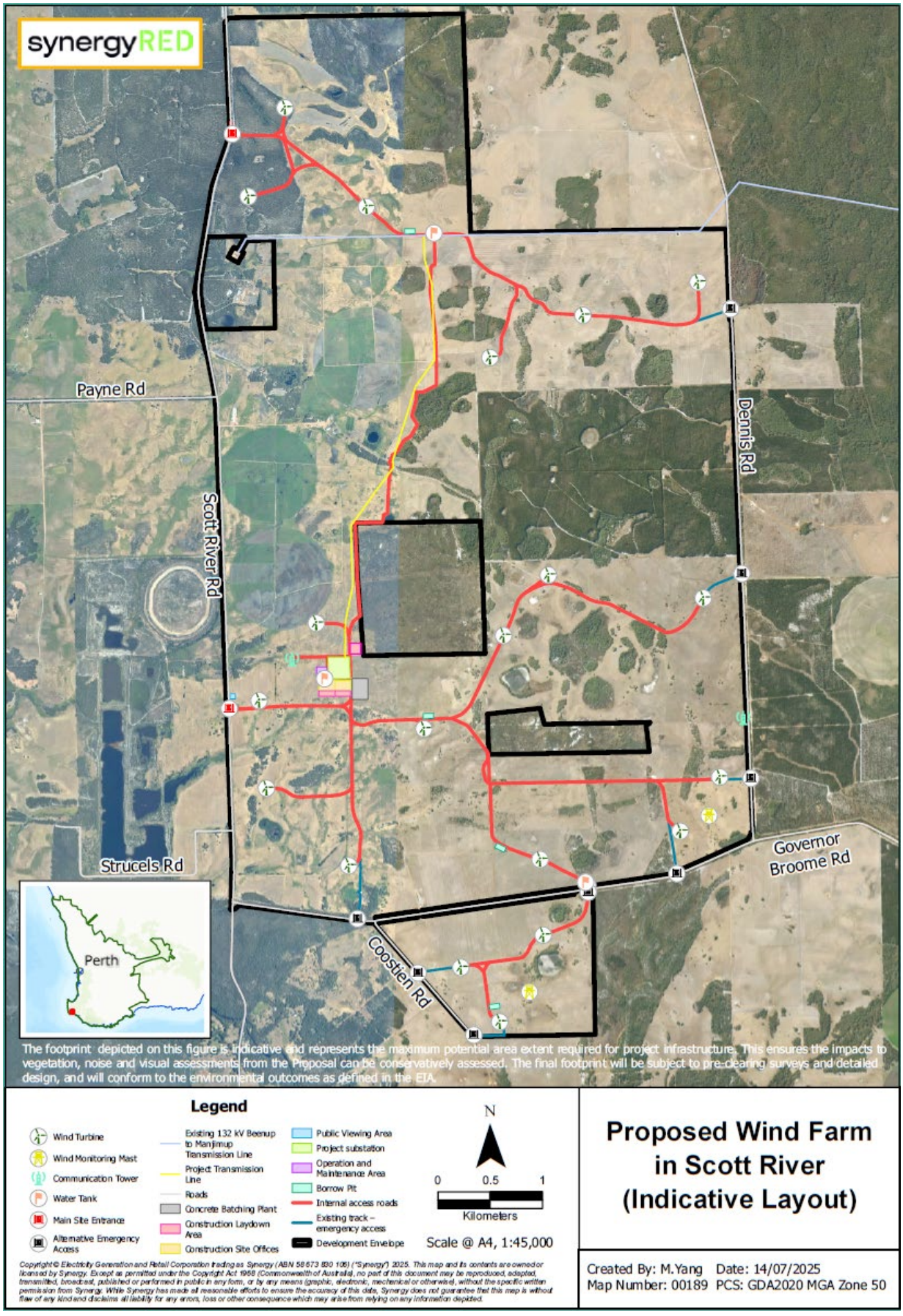

Figure 1-1: Indicative Project Layout

1.2 Acid Sulfate Soils – Definition

ASS are formed naturally under waterlogged, iron and sulfate-rich conditions, being typical of coastal lowlands where the land has been subject to inundation by sea water. These soils contain iron sulfide minerals (most commonly pyrite) or their oxidation products and remain stable under anaerobic conditions. Upon exposure to air however, they may be oxidised, with the result being the formation of sulfuric acid and the subsequent release of iron, aluminium and other heavy metals and nutrients from soils into surface water bodies and groundwater.

ASS as described above are the most commonly occurring form of acid generating soils encountered in Western Australia; however, a range of other acid generating soils that do not fit the traditional description of ASS may also be encountered during site investigations and can release a significant amount of acidity and/or iron when disturbed (DWER, 2015a).

Development of land containing ASS thereby introduces a risk of environmental harm that requires management. Earthmoving, dewatering and drainage works can result in exposure of these soils to oxidation either directly or indirectly through the lowering of the water table.

1.3 Scope and Objectives

The principal objectives for the Preliminary ASSDMP are to;

1. Present relevant soils, groundwater and surface water quality baseline data.
2. Detail the proposed soil and dewatering management programs to be adopted during construction.

Works undertaken for the Preliminary ASSDMP included:

- Detail findings of initial investigations.
- Estimate the potential dewatering rates and volumes based upon empirical groundwater modelling.
- Assess potential environmental impacts from proposed construction works that may result due to disturbing ASS (directly or indirectly) during excavation and or groundwater abstraction or disposal (dewatering effluent).
- Outline ASS and Dewatering Management Strategies for the construction works which detail:
    - Soil excavation, handling and stockpiling operations, including the neutralisation of acidity associated with ASS.
    - Treated soil validation testing programs.
    - Management of dewatering .
    - Soil, groundwater, surface water and dewatering monitoring programs.
    - Potential contingency measures and appropriate responses that may be implemented to rectify any breaches of nominated triggers and management measures.

1.4 Relevant Guidelines

The proposed scope of work was undertaken in accordance with applicable industry standards and guidelines to the extent relevant to an assessment of this type, and have been formulated in reference to the following (not limited to):

- *Assessment and management of contaminated sites – Contaminated Sites Guidelines* (DWER, 2021)
- *Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes* (DWER, June 2015a)
- *Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes* (DWER, June 2015b)

1.5 Standards of Assessment and Limitations

This assessment has been undertaken in general accordance with the current industry standards for the purpose, objectives and scope identified in this report.

The agreed scope of this assessment/management plan has been limited for the current purposes of SynergyRED. Conclusions and recommendations presented in this report are derived only from observations and results provided to PTG. Quality Assurance or Quality Control is limited to PTG data. This assessment report is not any of the following:

- A Preliminary Site Investigation (PSI) or Detailed Site Investigation (DSI) for contamination.
- A Voluntary Audit Report (VAR) or Mandatory Audit Report (MAR).

- A Geotechnical Report, and the bore logs or test pit logs may not be suitable as the basis for geotechnical advice.
- A detailed hydrogeological modelling assessment.
- An assessment of groundwater contamination potentially arising from other sources or sites nearby.
- A Remediation Action Plan (RAP) or Site Remediation and Validation (SRV) report.
- A Site Management Plan (SMP).

2 SITE DESCRIPTION AND ENVIRONMENTAL SETTING

2.1 Site Identification

A summary of the site identification details is provided in Table 2-1, with the site layout and location presented on Figure 1, Appendix A.

Table 2-1: Site Identification Details

Element	Details			
Address	**Lot (Number)**	**Plan**	**Street**	**Suburb**
	4265 (598)	208480	Dennis Rd	Scott River
	4260 (119)	208478	Governor Broome Rd	
	1 (399)	D69685		
	4261	208478		
	4154	207769		
	4263	208478		
	100	38071		
	4152 (599)	207770	Scott River Rd	
	6 (527)	33923	Scott River Rd	Courtenay
	4266	208480		
	4269	209300		Scott River
	2	D90280	Scott River Rd	
Certificate of Title	**Lot**	**Volume**	**Folio**	
	4265 (598)	1581	567	
	4260 (119)	1824	96	
	1 (399)	1924	610	
	4261	1726	538	
	4154	1930	228	
	4263	1930	516	
	100	2555	699	
	4152 (599)	2027	165	
	6 (527)	2543	911	
	4266	1818	129	
	4269	1981	387	
	2	2082	107	
Site Boundary Coordinates (Map Grid of Australia (MGA), Geocentric Datum of Australia (GDA) 2020, Zone 50)	**Location**	**Easting**	**Northing**	
	Northwest	340,574	6,217,219	
	Southwest	340,531	6,208,580	
	Northeast	345,393	6,215,205	
	Southeast	345,653	6,209,332	

Element	Details
Site Area	~3,596.8 hectares (ha)
Traditional Owners	Bibulmun and Wardandi Noongar
Local Government Authority	Shire of Augusta-Margaret River
Current Zoning	General agriculture[1]

1. Shire of Augusta-Margaret River Local Planning Scheme 1 (Department of Planning, Lands and Heritage, 2024)

2.2 Site Layout and Surrounding Land Uses

Uhe site predominantly consists of cleared agricultural land and blue gum plantation, with areas of remnant vegetation . Surrounding land uses are presented below in Table 2-2 with the areas presented on Figure 1, Appendix A.

Table 2-2: Surrounding Land Uses

Direction	Land Use
North	General agricultural land (including remnant native vegetation), South Blackwood State Forest and Blackwood River National Park
South	General agricultural land, (including remnant native vegetation), Scott River, native vegetation.
East	General agricultural land (including remnant native vegetation), Blue gum plantation, Chester and Pagett Nature Reserves and South Blackwood State Forest
West	BHP Beenup Mineral Sands mine, general agricultural land (including remnant and native vegetation), Scott National Park, Blackwood River

2.3 Environmental Setting

The key details for the environmental setting, modified from Stantec, November 2024, of the site are summarised in Table 2-3.

Table 2-3: Environmental Setting

Setting	Description
Climate	The climate of the site is described as moderate Mediterranean, with mild wet winters and hot summers (Stantec, Nov 2024). The mean annual rainfall (1974-2024) from DWER rainfall gauge at Breenans Ford, ~1.6 km south of the site on the Scott River, is 949.6 mm (DWER, 2025b), with the majority of rainfall falling between April and September. The nearest Bureau of Meteorology (BoM) (BoM, 2025) weather station is located at Cape Leeuwin (station 9518), ~18.6 km southwest of the site, indicates a mean temperature range (1897 to 2025) of between 14.2 and 19.8°C with an annual mean rainfall (1897 to 2025) of 947.5 mm.
Topography	Locally across the site, there is a gradual increase in elevation from the southwest (as little as 9 m Australian Height Datum (mAHD) to the northeast (as great as 38 mAHD). There is a poorly defined drainage divide that runs approximately through the centre of the site, segregating the Blackwood and Scott River headwater catchments. There is an average slope from north to south of approximately 2.5 m/km and less than 1 m/km from east to west (Stantec, August 2025) (Figure 2, Appendix A)
Geology	The Geological Survey of Western Australia (1967) 1:250,000 scale; Busselton and Augusta map sheet indicate that the site is primarily underlain by Quaternary alluvium, comprising quartz-rich sand dunes and Cainozoic laterite. The Scott Coastal Plain is comprised of alluvial, lake, swamp, estuarine, and shoreline deposits unconformably overlying Mesozoic sediments (Leederville Formation of the Warnbro Group) and basalt flows or marine sediments of the Eocene. The nearby 1:50,000 scale Karridale – Tooker map sheet (The Geological Survey of Western Australia, 2002) suggests that the Leederville Formation, comprising interbedded sedimentary rock and associated units derived via weathering may be encountered during excavation, underlying the dune deposits and

Setting	Description
	laterite (ferricrete) across the site. The Leederville Formation is the only one of the three formations that comprise the Lower Cretaceous Warnbro Group to occur beneath the Scott Coastal Plain (Chan 2011). The Warnbro group was defined by BHP (1998, 2015) as a series of distinct lithological units comprising the Strucel Beds and Beenup Beds, which likely make up the Leederville Formation (Quindalup and Mowen Members) (Figure 2, Appendix A). Geology across the site comprises siliceous dune sands deposited unconformably on the Leederville Formation. Within the dune sands localised diagenetic features comprise organic stained siliceous sands, bleached siliceous sands, and shallow sands overlying ferricrete (also referred to as coffee rock). The main geological stratigraphic units encountered at the site are the Quaternary alluvium, lake and swamp deposits, the Early Cretaceous Leederville Formation and Triassic Lesueur Sandstone (Stantec, Nov 2024).
Acid Sulfate Soil Mapping and Conditions	Based on the DWER regional Acid Sulfate Soil (ASS) risk mapping (NationalMap, 2025a), the site is mapped "high risk of ASS occurring within 3 m of the natural soil surface" (Figure 3, Appendix A)[1]. Investigations by BHP for the adjacent Beenup Mine identified grey/dark grey sands/silts as containing pyrite (only sulfide mineral present) and mainly present as very fine-grained framboidal form, from below ~18 mAHD. Total sulfur concentrations ranged between 0.15 to 6%, with ~70% of samples >1%S, with the majority in the top few metres of the grey/dark grey sands/silts. Minerals effective in neutralising any acidity generated were not present in the grey/dark grey sands/silts (Environmental Geochemistry International Pty Ltd, 1993).
Hydrology	The site intersects the Lower Blackwood, Beenup and Scott Surface Water Management Areas which are known to be influenced by natural groundwater flows, supporting environmental values (DoW, 2016). Key surface water features in the region consist of historically modified catchments with artificial drains to facilitate the agricultural and plantation activities. These drains have not been built in a coordinated way and intersect with roads and natural drainage lines, resulting in several areas of localised ponding due to catchment modification. The site has a poorly defined ridgeline that runs approximately through the centre of the site, segregating 11 Blackwood and Scott River headwater catchments that discharge from the site. Sheet flow occurs across cleared land areas, concentrating into more defined streamflow paths towards the site boundary. There are several areas of natural ponding following rainfall events in areas designated as wetlands and in depressions formed by historical anthropogenic activities. The roads on almost every boundary of the site act as an impediment to flow paths and cause localised upstream ponding, apart from the southernmost catchment which sheet flows across agricultural land (Stantec, November 2024).
Hydrogeology	The regional Study Area is defined by three distinct hydrostratigraphic units within the Vasse Shelf; the Superficial, Leederville and Lesueur aquifers (Diamond, 2000) (Baddock ,1992, BHP, 1998, Schafer et. Al., 2008, Chan, 2011, BHP, 2015). The Superficial and Leederville Aquifer were encountered within the top 25 m of the site (Stantec, August 2025), with the Lesueur Sandstone aquifer a deeper confined aquifer generally ranging from between 50 metres below ground level (mbgl) to 420 mbgl. Regionally, a confining layer known as the Mowen aquitard separates the Superficial Aquifer from the underlying Leederville Aquifer. Excluding the coastal dunes, the Superficial Formation typically has a saturated thickness of less than 10 meters; however, across the western sections of the broader coastal plains, it is only a few meters thick (Diamond, 2000). The occurrence of the Superficial Aquifer is localised, including perched groundwater above impermeable beds of the Leederville Formation, and local confinement zones of low permeability in the laterite (ferricrete) profile (DoW, 2009). Regionally the Leederville Aquifer on the Vasse Shelf (between Busselton and Dunsborough faults) is confined and lies beneath the Superficial Formation of the coastal plains. It can be found at the surface in certain areas of the Blackwood Plateau, where it has been weathered and lateritised. The Mowen Aquitard is composed of the Quindalup and Mowen members, which are primarily made up of clay and silty clay units. As a combined unit, these members effectively integrate into the Leederville Aquifer, as a multi-layered aquifer, comprising discontinuous interbedded sequences of sand and clay, typically up to 100 m thick, and up to 200 m in some places. (DoW 2009).
Groundwater Level and Flow	Regional groundwater flow is generally from north to south, ultimately discharging downwards into the underlying formations, surface-water features such as the Scott River, and into the Southern Ocean (Chan, 2011). Groundwater monitoring undertaken by Stantec (Stantec, April 2025) between April 2024 and January 2025, with groundwater levels in the Superficial Aquifer (shallow bores) ranging from 0.56 m below top of collar (mbtoc) to 3.75 mbtoc (elevation ranged between 26.25 mAHD and 35.32 mAHD).

Setting	Description
	Groundwater level in the Leederville Aquifer (deep bores) ranged from 0.72 mbtoc to 2.94 mbtoc (elevation ranged between 28.03 mAHD and 35.52 mAHD). Groundwater levels recorded in the aquifers suggests a generally south-westerly to southerly flow in the Superficial Aquifer (Figure 2-1) and southern direction of flow in the Leederville Aquifer (Figure 2-2). Groundwater levels recorded in the bores fluctuated by 2 m to 3 m across all bores in response rainfall (Stantec, April 2025).
Groundwater Management Zone	The site intersects the Beenup Groundwater Management Subarea, and is also defined within the Blackwood Groundwater Management Area, Beenup Subarea of the South-West Groundwater Allocation Plan (Blackwood GMA Beenup Subarea). It also intersects with Groundwater Management Zone 7 which is defined as a "buffer zone area defined by acid sulfate soil plume from Beenup mine site" (DoW, 2009). The Beenup Mine has been subject to extensive management, remediation, and rehabilitation as a result of the formation of an acid rock drainage plume, caused by waste rock generating acidic groundwater. In addition, the Leederville Aquifer is now artificially connected to the Lesueur Sandstone formation throughout the Beenup Titanium Mine site as a result of mining activities. The contaminated groundwater flows south towards the Scott River and Hardy Inlet (DoW, 2009). As a consequence of the implementation of Groundwater Management Zone 7, water use from the Superficial, Leederville and Lesueur aquifers is restricted, meaning that no new water allocation and no new bores or excavations are permitted to be constructed in the Superficial or Leederville aquifers, within the management zone boundary, other than for exempt use, replacement of existing bores, monitoring purposes, or remediation (DoW, 2009) (Stantec, August 2025).
Groundwater Bores and License	Two groundwater abstraction licenses are present on the site, both located Lesueur Sandstone south aquifer and across the western lots of the site, with licenses for 1,650,00 kL and 66,300 kL (DWER, 2025d). There are 24 registered groundwater bores on, or within 500 m, of the site. Of these, 11 are registered as being subject to monitoring, one is registered for water supply, one is registered for stock and domestic use, and 11 are registered as Unknown (Stantec, August 2025).
Drinking Water Source Areas	The site is not situated within a public drinking water source area. The closest public drinking water source area is the Fisher Road Wellfield ~8.5 km west of the site which supplies the town of Augusta. Groundwater from the Fisher Road Wellfield is abstracted from the Lesueur Sandstone aquifer (DoW, 2007) The next closest is the Margaret River Catchment Area ~27 km north of the site.
Waterways	There are several ephemeral waterways located within the site primarily flowing from northeast to southwest towards the Blackwood River, located ~3.8 km to the west of the site, with a smaller proportion flowing in a southeasterly direction towards the Scott River located ~1 km south of the site (Figure 4, Appendix A). The Blackwood and Scott River flow into the Hardy Estuary at Augusta, which has a catchment of 23,000 km^2 and has the highest volume of discharge to the ocean of all the south-west estuaries. The majority of the volume comes from the Blackwood (Lower) and Scott Rivers (DWER, 2025b).
Wetlands	The site was historically a widespread wetland environment and was predominantly palusplain (seasonally waterlogged flats), characterised by a series of damplands and sumplands in varying condition (Phoenix in prep.-b; V & C Semeniuk Research Group 1997). Geomorphic wetlands in the site are also designated as an Environmentally Sensitive Area, gazetted under the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005* (Stantec, August 2025).

1. The most northern portion of the site is outside the DWER mapping area however given the consistent geological units, the area would be considered to have a moderate to high ASS risk.

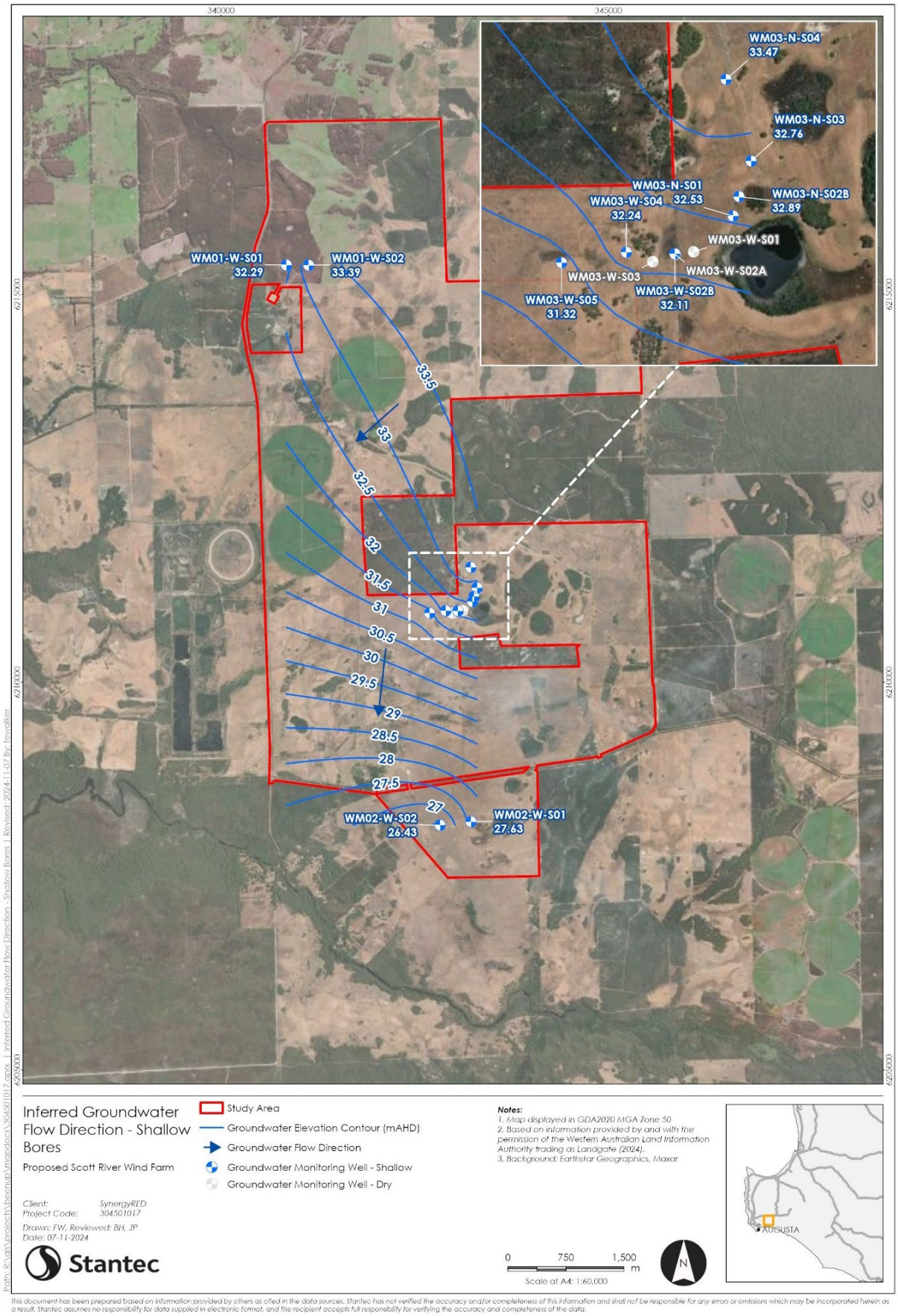

Figure 2-1: Superficial Aquifer Inferred Groundwater Flow Direction (Shallow Bores) (Stantec, August 2025)

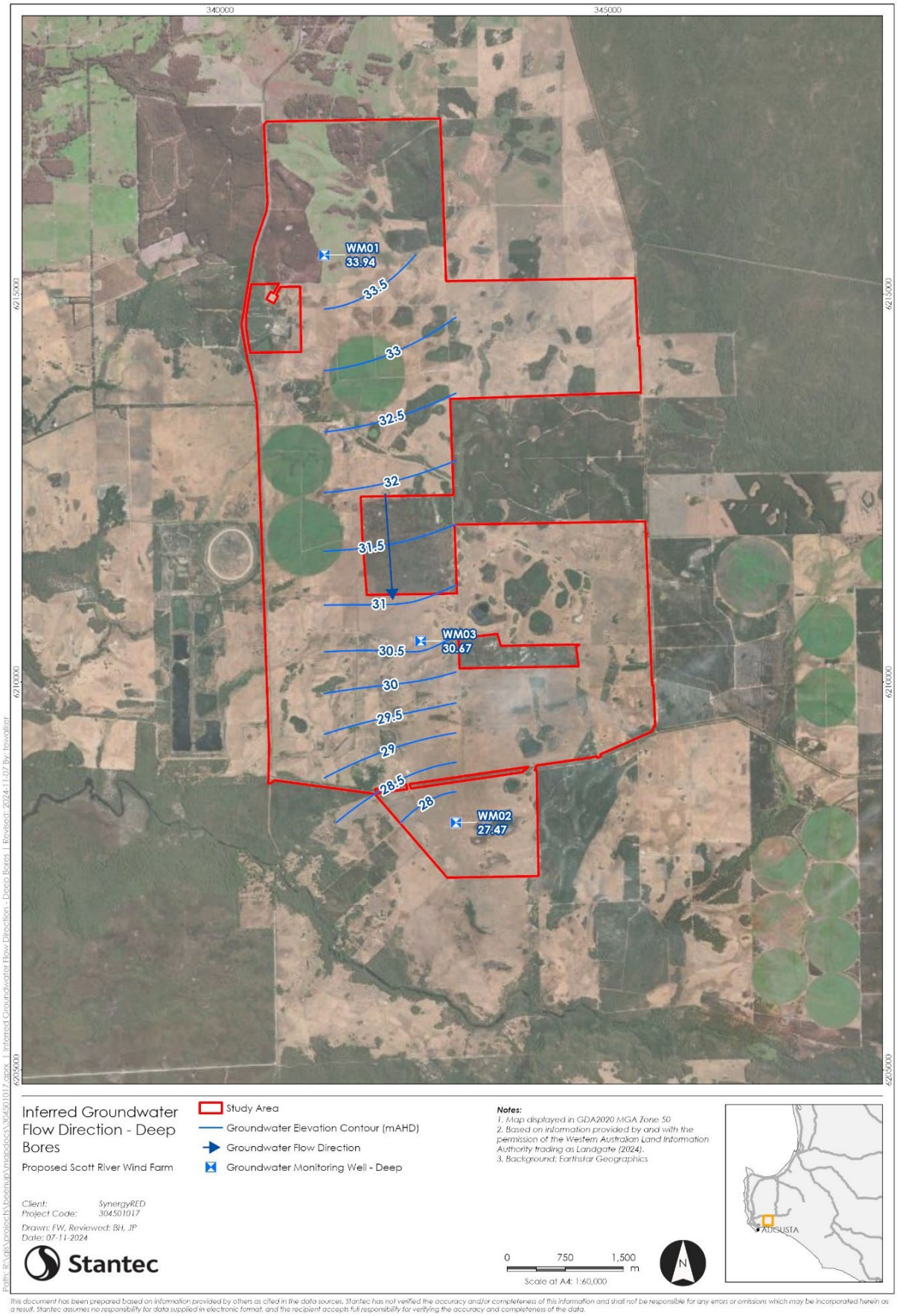

Figure 2-2: Leederville Aquifer Inferred Groundwater Flow Direction (Deep Bores) (Stantec, August 2025)

2.4 Sensitive Environmental Receptors

Table 2-4 below presents the sensitive environmental receptors within and surrounding the site and presented on Figure 2-3.

Table 2-4: Sensitive Environmental Receptors

Setting	Description
Surface Water Bodies	Refer Table 3-3 above for details on wetlands and waterways.
Groundwater Dependent Ecosystems (GDEs)	There are several known or potential GDEs (Figure 2-3), within the site (Stantec, August 2025) including: ▪ Four vegetation types recorded in the site are classified as, or analogous to, Scott River Threatened Ecological Community (TEC) (listed as Endangered), a 'known' obligate GDE (DBCA, 2023). This TEC occurs on red clay to clay loam soils and is seasonally inundated (DBCA, 2023). Vegetation generally includes heaths, shrublands and thickets, with representatives from the *Melaleuca, Hakea and Kunzea* genera dominant, and has a diverse annual flora community that comprises several endemic and restricted taxa. This "Scott River Ironstone Association" community is listed as a critically endangered ecological community under the *Biodiversity Conservation Act 2016* with the TEC are declared environmentally sensitive areas under the *Environmental Protection Act 1986*. Nationally the community is listed as endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (DBCA, 2023). ▪ Another three vegetation types recorded within the site have been classified as 'potential' facultative GDE as they were dominated by *Melaleuca preissiana* and *Melaleuca rhaphiophylla*, species considered to be facultative phreatophytes. ▪ The four confirmed and three potential groundwater-dependent vegetation types above, provide habitat for eleven flora taxa listed as either Threatened and Endangered, or Priority 1, Priority 3 or Priority 4. ▪ Several occurrences of another seven vegetation types within the site were recorded with incidental or non-dominant groundwater dependent flora species and where these species occur may have the potential to represent GDE. ▪ Most of the above known and potential groundwater dependent vegetation has been mapped growing in association with wetlands, although the remaining wetlands may also potentially be groundwater-dependent. The degree of connectivity between these wetlands and the shallow aquifer is currently unknown (Stantec, August 2025).
Flora and Fauna	A detailed flora study (Phoenix, 2025) was undertaken on-site. The survey identified 20 vegetation types, comprising of 18 native and 2 non-native vegetation types. Native vegetation covered 20.3% (790 ha) of the site, occurring as remnant patches mainly within farmland, and roadside vegetation corridors. Fifteen of the 18 native vegetation types were designated to have local or regional significance. Significant vegetation within this survey was classified under 4 categories: representative of a Threatened Ecological Community (TEC) (regionally significant), restricted vegetation types (locally significant), habitat for significant flora species types (locally significant) and groundwater dependent ecosystems (GDEs; locally significant). Four vegetation types were identified as analogous to the Scott River Ironstone TEC. Three vegetation types were identified as 'restricted'. Twelve vegetation types were identified as habitat for significant flora species. Seven vegetation types were identified as known or potential GDEs. In terms of vegetation condition, a very large proportion of the study area (79.4%) was classified as Completely Degraded, representing cleared areas and plantations. Native vegetation in the study area was in varying states of condition, with 279.1 ha (7.2% of the study area) containing remnant vegetation in Pristine or Excellent condition, and the rest being impacted by grazing or invasive species (with Very Good to Degraded condition ratings). A target fauna survey was undertaken on site (Phoenix in prep.-a). The fauna survey found that the site comprises mostly cleared areas interspersed with native wetland and woodland habitat remnants of varying size, condition and contribution to fauna values. The larger habitat patches are typically better quality and of higher value for vertebrate fauna than the smaller, more isolated remnants. Key habitat values in the site mainly relate to significant species such as the 3 Threatened black cockatoo species and Western Ringtail Possum, with one main habitat Marri-Jarrah-Peppermint woodland providing the highest value to these species. Even these values are relatively low compared with those likely to be present in the expansive, intact conservation reserves immediately north-east and south-west of the study area.

Setting	Description
	Observed use of the study area by black cockatoos was limited to foraging, with no evidence of breeding or night roosting recorded. Foraging habitat in the study area probably represents supplementary resources to the abundant habitats adjacent to the study area. Use of the site by Western Ringtail Possum appeared to be restricted to Marri-Jarrah-Peppermint woodland near its boundaries, where such habitat is contiguous with, or occurs near, larger intact remnants outside the site. The value of the wetlands in the study area to Migratory shorebirds is low relative to the higher value shorebird habitat elsewhere in the region, such as at the Hardy Inlet. Most wetland habitats in the study area are only of foraging value to Migratory shorebirds in spring and early summer, between their arrival in the Southwest and the drying out of most of the wetlands.

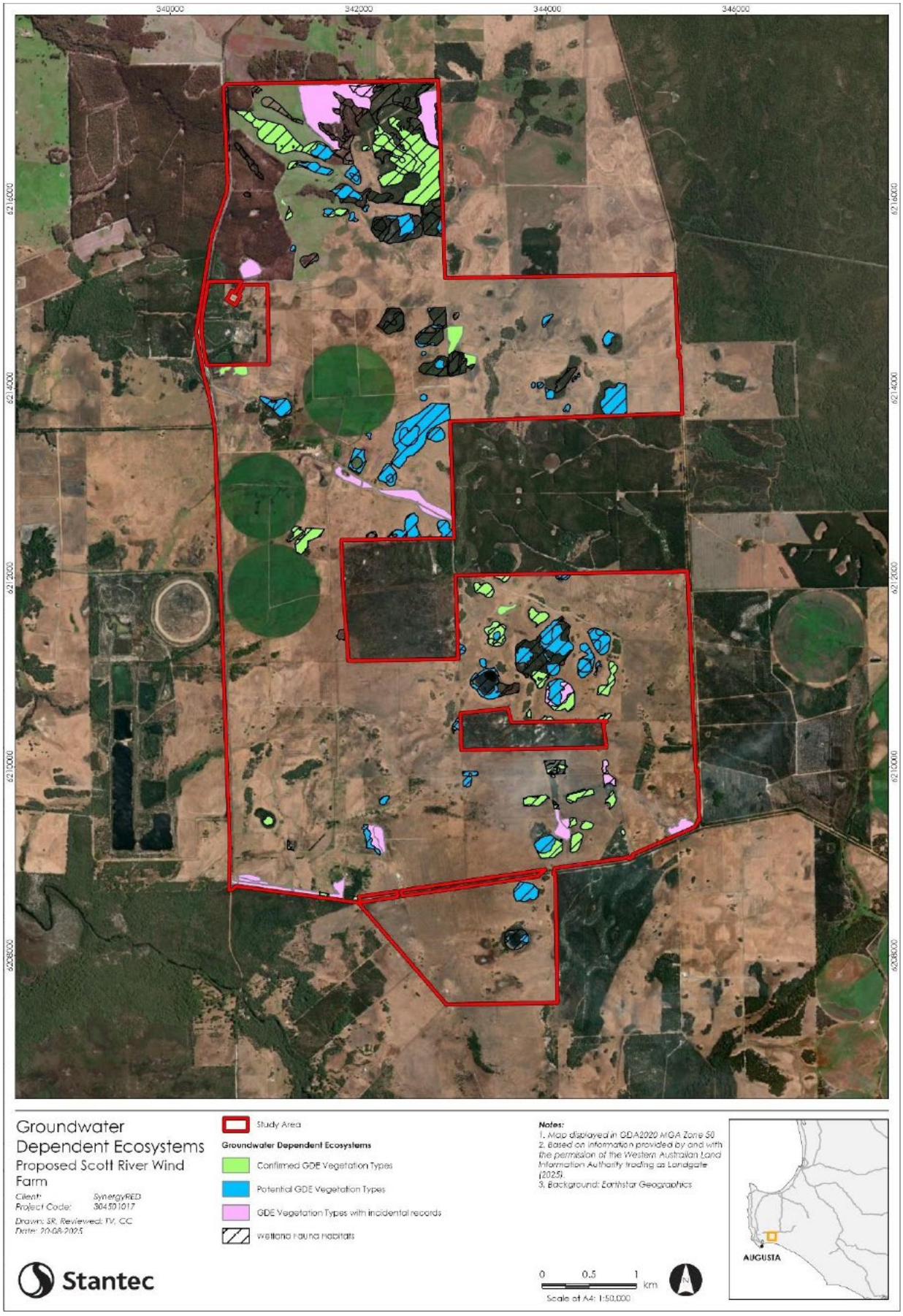

Figure 2-3: Confirmed and Potential Groundwater Dependent Values within the site (Stantec, August 2025)

2.5 Contaminated Sites

A review of the online DWER Contaminated Sites Database (DWER, 2025a) indicated the presence of contaminated sites at 886 (Lot 200 on Plan 36387) and 4254 (Lot 4254 on Plan 208478), Scott River Rd, Scott River, adjacent to the western side boundary (Figure 1, Appendix A). Note, the online Contaminated Sites Database only provides information on sites classified:

- contaminated - remediation required.
- contaminated - restricted use.
- remediated for restricted use.

Both contaminated sites are related to BHP's historic mining of heavy mineral sands at the Beenup Titanium mine, which is located to the west and hydraulically downgradient of the site. The DWER basic summary of records (BSR) (classified August 2018) indicates that the two lots are classified as "remediated for restricted use" due to the presence of elevated levels of acidity, sulphate and aluminium present in groundwater beneath the site.

Works involved the excavation of heavy mineral sands via dredging methods, and subsequent wet mineral separation and concentration, which disturbed PASS material. Remedial works associated with PASS were completed between 2000 and 2001, including treatment of the unsaturated zone with lime sand and addition of sand to materials returned to the dredge pond.

Groundwater and surface water assessments at the mine have identified metal and acidity-impacted groundwater generated by the disturbance of ASS at the site above freshwater and long-term irrigation guidelines at the time of classification. Fate and transport modelling of groundwater contaminants and a risk assessment indicate that groundwater concentrations do not pose an unacceptable risk to the environment, including downgradient receptors (Scott and Blackwood Rivers) or human health.

It is noted that other than for analytical testing or remediation, and except for groundwater abstraction from the existing licensed production bores on the northern boundary of Lot 4254 on Plan 208478, further groundwater abstraction is not permitted at 886 (Lot 200 on Plan 36387) Scott River Rd, Scott River.

2.6 Cultural Heritage

A search of the Department of Planning, Lands and Heritage (DPLH) Aboriginal Cultural Heritage Inquiry System (DPLH, 2025) identified that the Blackwood and Scott Rivers and associated tributaries are listed as a Registered Site and Lodged Heritage place respectively under the *Aboriginal Heritage Act 1972* (Appendix B).

3 PROPOSED DEVELOPMENT WORKS

The major development components are outlined in Table 3-1 and depicted in Figure 1-1, providing context for the subsequent sections detailing ASS and groundwater management. These works have been identified and detailed in consultation with SynergyRED. This preliminary ASSDMP contains Preliminary Operating Strategies specific to the proposed Scott River Wind Farm.

Table 3-1: Summary of Development Works

Component	Description
Turbine Construction	Up to 20 wind turbines, up to 250 m in height, will be constructed onsite. The works will involve the excavation and dewatering of in-situ soils. There are currently two primary foundation options being explored: Option 1 – Partially above ground foundation: would require foundations (~30 x 30 m in area) to be installed to depth of between 0.8-1.2 mbgl. The main gravity foundation would be supported by a series of concrete piles, which would be installed via concrete injected down augers to displace soils. Minimal soil from depth may be recovered when the auger is being removed as concrete is injected. Dewatering requirements would vary depending on the time of year and location of the turbine on-site. There may be up to ~1 m of dewatering required in summer, with up to ~2 m required in winter for a 3–4-week duration at each foundation. Option 2 – Fully above ground foundation: is similar to option 1 except the gravity foundation will be installed at the ground surface. As such there would be minimal excavation and no dewatering requirement. A third option, a traditional below ground foundation: is similar to option 1 except the gravity foundation will be installed completely below the ground surface. While considered unlikely at this stage, this option may be utilised, where it is confirmed prior to construction, through detailed site investigation and further modelling, that the proposed turbine location would not require dewatering that would present any risk to groundwater dependent values (i.e., drawdown greater than natural seasonal variation), and the potential risk associated with disturbance of ASS is considered low.
Underground services (e.g., cabling)	A network of underground electrical cabling will be required to be installed from each wind turbine to the substation(s). The electrical cabling will be installed at a depth of ~1.2 mbgl and require the excavation and potentially dewatering of in-situ soils.
Wind monitoring and communication towers	Foundations for wind monitoring and communication towers will involve the excavation and dewatering of in-situ soils similar to turbine construction but limited to depth of between 0.25-1.5 mbgl. Dewatering requirements would vary depending on the time of year, location and maximum depth of the foundation. There may be up to ~1 m of dewatering required in summer, with up to ~2 m required in winter for a 3–4-week duration at each foundation.
Transmission Poles and Towers	Western Power will be responsible for the installation of transmission poles and towers across the site. Foundations for the pole and towers will be concrete caisson (bored concrete) foundations, with displaced soil managed via the ASSDMP. No dewatering is required for these foundations however displaced water from the injection of concrete will be managed as per dewatering effluent in the ASSDMP.
Substation and Operations and maintenance area	Construction of support infrastructure may require the disturbance of insitu soils, and potentially dewatering for foundations and associated underground infrastructure, e.g. cabling, services.
Other supporting infrastructure (e.g., roads, temporary construction facilities)	A number of other supporting infrastructure will be required in support of the project, including, construction of site entrances and access roads, water storage infrastructure, public viewing area, and temporary construction facilities (e.g., site offices, laydown areas, and concrete batching plant). Minimal disturbance of insitu soils is anticipated in support of these components
Borrow pits	Local sourcing of gravel from borrow pits, should detailed geotechnical investigations confirm suitable source/s. Borrow pits will be excavated above the groundwater table and therefore no dewatering will be required.

Construction works will attempt to be scheduled for summer months where possible.

4 SITE INVESTIGATIONS

4.1 Soil

A preliminary ASS investigation was undertaken in February/March 2024 by Stantec as part of geotechnical investigations for the site (Stantec, July 2024). The scope of work completed whilst undertaking the soil investigation was:

- A soil sampling program comprising visual/olfactory inspection and laboratory analysis of soil samples taken from:
  - 20 test pit locations (TP01 to TP20) to a depth maximum depth of 2.1 mbgl
  - three deep boreholes (WM01 to WM03) to a maximum sampling depth of 10 mbgl.
- A total of 206 samples were collected from the 23 locations. All samples collected were subjected to "field measurements" of pH in water (pH_F) and field oxidised pH (pH_{FOX}), equivalent to one sample being field tested for every ~0.25 vertical metres investigated which is in line with DWER guidance (DWER, June 2015a)
- Comparison of field data results with applicable DWER indicator assessment criteria.
- Conducted selective laboratory analysis of 70 samples via the Suspension Peroxide Oxidation Combined Acidity and Sulfate (SPOCAS) suite method.

Soil sampling locations are provided in Figure 3, Appendix A, with sampling logs presented in Appendix C.

4.2 Groundwater

4.2.1 Scope and Sampling Locations

A total of 17 groundwater bores have been installed on-site by Stantec and form a monitoring network for the site (Figure 4, Appendix A) to assess groundwater quality and levels across the site, with the investigations primarily for understanding hydrogeological and hydrology on-site and not specifically for ASS. The on-site investigations entailed groundwater levels measurements from all 17 bores across the site and sampling of the following nine bores:

- Leederville Aquifer
  - WM01
  - WM02
  - WM03
- Superficial Aquifer
  - WM01-W-S01
  - WM01-W-S02
  - WM02-W-S01
  - WM02-W-S02
  - WM03-N-S03
  - WM03-W-S02B

4.2.2 Sampling Method and Analytical Suite

All bores have been measured for static water levels over four events (April, July and September 2024 and January 2025), with nine bores sampled (Section 5.2.1), via low-flow methods, i.e. peristaltic pump, and analysed in the field and at the laboratory for the following parameters[3] relative to ASS:

- Dissolved metals and metalloids: aluminium, arsenic, cadmium, chromium, iron, manganese, nickel, selenium, and zinc
- Physico-chemical parameters: pH, electrical conductivity (EC), dissolved oxygen (DO), and reduction/oxidation (redox) potential
- Major cations: calcium (Ca^{2+}), magnesium (Mg^{2+}), potassium (K^{+}) and sodium (Na^{+})

[3] Not all parameters were analysed in all events

- Major anions: sulfate (SO_4^{2-}), chloride (Cl^-), alkalinity ((carbonate (CO_3^{2-}), bicarbonate (HCO_3^-) and hydroxide (OH^-))
- Nutrients: total phosphorus (TP), reactive phosphorus (RP), total nitrogen (TN), total kjeldahl nitrogen (TKN), total ammonia-N (NH_3+ NH_4-N), nitrates and nitrites (NO_X-N)
- Total dissolved solids (TDS).

Certain parameters (total iron and aluminium and acidity) from the nominated DWER groundwater suite (2015b) were not analysed, however this has not affected the overall assessment and sufficient to inform the ASSDMP. Ongoing baseline monitoring at a series of groundwater bores across the site is proposed for the nominated DWER groundwater suite (2015b) to provide a baseline data set prior to the commencement of works.

4.2.3 Groundwater Bore Installation Details

During the soil sampling program three deep groundwater monitoring bores (WM01-WM03) were installed by Stantec, with a further 14 shallow bores installed during a subsequent program (Figure 4, Appendix A).

Groundwater bores appear to have been installed in general accordance with the Minimum Construction Requirements for Water Bores in Australia (NUDLC, 2020) and the Water Quality Protection Note – Groundwater Monitoring Bores (DoW, 2006).

The screening intervals were placed at varying depths depending on the targeted geology, with the base of screens ranging from between 1.0 and 24.5 mbgl. The bores were screened using slotted 50 mm Class 18 PVC fitted with an end cap. The screen was packed with gravel and a bentonite seal placed above the screen. The soil profiles and bore construction details were logged during construction (Stantec, July 2024 and August 2025). Groundwater construction logs for the installed bores are presented in Appendix C and the locations provided in Figure 4, Appendix A, with a summary of the installation details presented below in Table 4-1, with the noted aquifer defined per the hydrogeological report (Stantec, August 2025).

Table 4-1: Bore Construction Details

Bore	Coordinates*		Top of Collar (mAHD)	Surface level (mAHD)	Depth (mbgl)	Screened interval (mbgl)	Aquifer
	Easting	Northing					
WM01	341,346	6,215,506	36.73	36.04	24.95	18.50 – 24.5	Leederville
WM01-W-S01	340,845	6,215,379	35.60	35.14	7.00	2.5 – 5.5	Superficial
WM01-W-S02	341,131	6,215,376	36.95	36.35	7.00	4.0 – 7.0	
WM02	343,044	6,208,189	29.22	28.57	24.95	12.50 – 24.5	Leederville
WM02-W-S01	343,227	6,208,201	29.52	28.92	4.50	1.5 – 4.0	Superficial
WM02-W-S02	342,828	6,208,156	28.09	27.45	6.0	3.0 – 6.0	
WM03	342,583	6,210,534	33.06	32.43	24.95	18.50 – 24.5	Leederville
WM03-N-S01	343,247	6,211,040	34.53	33.84	2.0	1.0 – 2.0	Superficial
WM03-N-S02B	343,266	6,211,102	34.38	33.71	1.00	0.5 - 1.0	
WM03-N-S03	343,304	6,211,217	34.65	34.00	3.0	1.5 – 3.0	
WM03-N-S04	343,224	6,211,480	35.39	34.79	1.90	0.9 – 1.9	
WM03-W-S01	343,119	6,210,924	34.37	33.67	1.00	0.4 – 1.0	
WM03-W-S02A	343,059	6,210,916	34.06	33.34	1.00	0.1 - 1.0	
WM03-W-S02B	343,059	6,210,918	34.02	33.35	3.00	1.0 – 3.0	
WM03-W-S03	342,987	6,210,892	34.51	33.87	1.00	0.4 – 1.0	
WM03-W-S04	342,902	6,210,923	33.70	33.14	2.00	1.5 – 2.0	
WM03-W-S05	342,693	6,210,889	33.07	32.50	4.5	1.5 – 4.5	

* GDA 94 MGA Zone 50

4.3 Surface Water

4.3.1 Scope and Sampling Locations

A total of eight surface water locations (Creekline Discharge: SW01-SW05 and wetlands: WM01-WL, WM02-WL and WM03-WL) have been sampled on-site by Stantec and form a monitoring network for the site (Figure 4, Appendix A) to assess surface water quality in several creeks and wetlands across the site, as detailed below, with the investigations primarily for understanding hydrogeological and hydrology on-site .

Sampling at all locations has been attempted during April, July and September 2024 and January 2025, however not locations contained surface water at the time of sampling (Stantec, April 2025). No sampling logs were available at the time of reporting.

A summary of the sampling program is presented in Table 4-2 below:

Table 4-2: Surface Water Sampling Summary

Id	Location Description	Coordinates*		Water Present/Sampled (✓/×)			
		Easting	Northing	April 24	July 24	Sept 24	Jan 25
Creekline Discharge							
SW01	Northeast boundary	345,146	6,216,210	×	×	✓	×
SW02	Western boundary	341,226	6,211,909	✓	✓	✓	✓
SW03	Easten boundary	345,580	6,209,394	×	✓	✓	×
SW04	Southeast boundary	345,505	6,211,598	×	✓	✓	×
SW05	Southwest boundary	341,534	6,208,684	×	✓	✓	×
Wetland							
WM01-WL	Wetland near WM01	341,467	6,215,363	×	✓	✓	×
WM02-WL	Wetland near WM02	343,671	6,208,174	×	✓	✓	✓
WM03-WL	Wetland near WM03	343,343	6,210,886	×	✓	✓	✓

* GDA 94 MGA Zone 50

4.3.2 Sampling Method and Analytical Suite

Surface water has been sampled via grab methods with parameters[4] analysed in field and laboratory for the following (relevant to ASS):

- Dissolved metals and metalloids: aluminium, arsenic, cadmium, chromium, iron, manganese, nickel, selenium, and zinc
- Physico-chemical parameters: pH, electrical conductivity (EC), dissolved oxygen (DO), and reduction/oxidation (redox) potential
- Major cations: calcium (Ca^{2+}), magnesium (Mg^{2+}), potassium (K+) and sodium (Na+)
- Major anions: sulfate (SO_4^{2-}), chloride (Cl^-), carbonate (CO_3^{2-}) and bicarbonate (HCO_3^-)
- Nutrients: total phosphorus (TP), reactive phosphorus (RP), total nitrogen (TN), total kjeldahl nitrogen (TKN) (calculated), total ammonia-N (NH_3+ NH_4-N), nitrates and nitrites (NO_X-N)
- Total dissolved solids (TDS)
- Turbidity.

Certain parameters (total iron and aluminium and acidity) from the nominated DWER surface water suite (2015b) were not analysed, however this has not affected the overall assessment and sufficient to inform the ASSDMP. Ongoing baseline monitoring is proposed to be undertaken for the project, for the nominated DWER surface water suite (2015b), to provide a baseline data set prior to the commencement of works.

[4] Not all parameters were analysed in all events

5 ASSESSMENT CRITERIA

5.1 Soil

Assessment criteria for ASS were adopted from the DWER guideline, *Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes* (DWER, June 2015a) and *Treatment and Management of Soil and Water in Acid Sulfate Soils Landscapes* (DWER, June 2015b).

Table 5-1 below presents the indicative pH assessment criteria for ASS field test results.

Table 5-1: DWER Indicative pH Assessment Criteria for ASS

pH Measurement Type	AASS*	PASS^	Non-ASS (NASS)
pH_F	<4	>4	>4
pH_{FOX}	<4	<4	>4

* Actual ASS, ^ Potential ASS

Table 5-2 below presents the texture-based ASS action criteria for management. For excavation quantities of <1,000 tonnes ASS with ≥0.03 %S or ≥18 mol H+/tonne equivalent acidity a detailed management plan is required.

As further detail has not been provided on the total volume soil requiring excavation for the proposed project the most conservative action criteria have been applied.

Table 5-2: DWER ASS Management Action Criteria

Monitoring Activity		Action criteria (<1,000 tonnes)		Action criteria (>1,000 tonnes)	
		Existing + Potential Acidity		Existing + Potential acidity	
Texture	Approx. clay content	Equivalent sulfur	Equivalent acidity	Equivalent sulfur	Equivalent acidity
	(%<0.002 mm)	(%S)	(H^+/tonne)	(%S)	(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 and silty clays)	≥40	0.10	62	0.03	18

5.2 Groundwater and Surface Water

Guideline levels for water quality were generally sourced from:

- Assessment and management of contaminated sites – Contaminated Sites Guidelines (DWER, 2021)
- Treatment and management of soil and water in acid sulfate soil landscapes (DWER, June 2015b).
- Guidelines for Fresh and Marine Water Quality (ANZG, 2023)

In cases where no guideline is reported, a guideline is sourced from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000).

The guideline levels used for comparison with groundwater based upon ecological receptors and beneficial use are:

- Freshwater Guidelines (FWG) – South-west Australia wetland
- Long-term Irrigation Water Guidelines (LIWG)
- Livestock Drinking Water Guidelines (LDWG) - Cattle
- Acid Sulfate Soil (ASS) Indicator Parameters
- Non-potable Drinking Water Guidelines (NPUG).

Levels below the above stated criteria are generally inferred as safe. Levels that exceed the criteria should be used as a proxy for further investigation and assessment of the risk to humans or the environment, but do not necessarily signify environmental harm or risk of contamination.

6 RESULTS

6.1 Soils

6.1.1 Description

From the test pitting works, soil profiles encountered during the soil sampling exercise across the site may be generalised as; the shallow (<3 m) sub-surface profile generally comprised a thin layer of topsoil, overlying sand (of various silty fines fraction), often overlying iron cemented rock strength material (ferricrete). Where ferricrete was not encountered, further sand was present to termination depth though, some layers of rich organic materials were encountered (Stantec, July 2024).

From the boreholes the geology varied between the north (WM01) and the southern and central portions of the site (WM02 and WM03 respectively) (Figure 4, Appendix A).

A summary of the encountered soil profiles across the site is presented in Table 6-1.

Table 6-1: Soil Profile

Area	Soil Description
Northern	A thin layer of dune sands (< 1.6 m) was present immediately overlying saturated grey and dark grey, interbedded / alternating bands of clayey and sandy soils and frequent pockets of organic and peaty material.
Southern	A thin layer of dune sands (<1.0 m) was present overlying iron-cemented sands (ferricrete). The ferricrete was encountered as a 1.7 m thick, massive rock unit directly overlying weakly cemented organic rich sands. Residual sands and clays likely derived from the Leederville Formation were present underlying this unit.
Central	Similar to the southern area, though ferricrete was present only 0.35 m below surface, underlying topsoil and dune sands, and was encountered as a 2 m thick, massive rock unit. Weakly cemented organic rich sands were present directly beneath ferricrete, extending to 6.2 m before intersecting clayey and sandy soils likely residuals of the Leederville Formation.

Soil profiles for each location are presented in Appendix C.

6.1.2 ASS Findings

ASS results are presented on Table A, Appendix D, with laboratory documentation presented in Appendix E.

6.1.2.1 Field pH Parameters

Conclusions drawn from comparison of the field data with accepted DWER field assessment criteria (as outlined in Table 5-1) are as follows:

Table 6-2: pH_F and pH_{FOX} Summary

Indicative Classification	Number of Samples	Percentage of Total Samples
AASS (pH_F <4)	0	0%
PASS (pH_{FOX} <4)	139	67%
NASS	67	32%

The results show that the lowest reported pH (pH_F) prior to oxidation was 4.5 indicating that AASS were not present within the soils tested.

Following oxidation (pH_{FOX}) some pH values decreased to as low as pH 1.9. This suggests that oxidisable sulfur is likely to be present in the corresponding samples (where pH_{FOX} <3).

6.1.2.2 Confirmatory Assessment

Conclusions drawn from the ASS laboratory results (Table A, Appendix D) are summarised below in Table 6-3 to Table 6-5:

Table 6-3: ASS Summary

Analyte	Unit	Management Criteria	Number of Samples	Concentration (%S)			Number of Samples Exceeding Criteria (%)
				Minimum (Sample)	Mean	Maximum (Sample)	
SPOS	%S	>0.03	70	<0.005 (Numerous)	**0.17**	**1.9** (WM02-9.0)	43 (61%)
Net acidity*				<0.02 (Numerous)	**0.21**	**2.1** (WM02-9.0)	51 (73%)
TAA				<0.003 (Numerous)	**0.03**	**0.18** (WM02-9.0)	23 (33%)
TPA				<0.02 (Numerous)	**0.25**	**2.2** (WM02-9.0)	39 (56%)
S_{NAS}			2	<0.005 (WM03-3.50)	0.011	0.02 (WM02-9.0)	0 (0%)
pH_{KCl}	pH Units	Not Defined	70	4.3 (TP13–2.00)	5.3	7.3 (WM02-0.0)	N/A
pH_{OX}	pH Units	Not Defined		1.9 (WM02-9.0)	3.4	6.5 (TP03-0.0)	N/A
ANC	%S	Not Defined	0	Not tested			

* Excluding ANC. **Bold** denotes > criteria

Key findings from the above summary are presented below:

- SPOS was observed throughout the soil profile and the dominant form of acidity on-site.
- The majority of TPA present on-site is in the form of inorganic sulfur species, with elevated concentrations, with respect to SPOS, of acidity associated with organic acids or metal speciated acidity predominately present in the central portion of the site.
- There is no measurable ANC in the samples on-site.
- The calculated mean net acidity (excluding ANC) across all samples is 0.21%S, which exceeds the management criteria of 0.03%S.
- All investigation locations, except TP03, had at least one positive test results above the management criteria of 0.03%S.

Table 6-4 and Table 6-5 below provide a summary of the analytical data based upon geological units and depth, respectively.

Table 6-4: ASS Key Results Summary – Geological Units

Analyte	Unit	Sand – Pale Grey			Sand – Dark Brown/Grey			Sandy Clay			Ferricrete			Gravelly Sand		
		Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
SPOS	%S	<0.005	0.007	0.014	<0.005	**0.21**	**1.9**	0.008	**0.28**	**1.3**	0.007	0.02	**0.05**	0.02	0.02	**0.03**
Net acidity*		<0.02	<0.02	0.023	<0.02	**0.25**	**2.1**	0.022	**1.4**	**0.31**	0.02	**0.04**	**0.09**	0.02	**0.04**	**0.06**
TAA		<0.003	0.007	0.014	<0.003	**0.04**	**0.18**	0.01	**0.03**	**0.12**	0.005	0.02	**0.08**	<0.003	0.02	0.028
TPA		<0.02	<0.02	<0.02	<0.02	**0.31**	**2.2**	**0.03**	**0.33**	**1.4**	0.02	**0.06**	**0.14**	<0.02		
S_{NAS}		-	-	-	<0.005	0.011	0.02	-	-	-	-	-	-	-	-	-
ANC		Not tested														
Number of samples		9			43			10			6			2		
Number of samples exceeding criteria		0			38			10			5			1		

* Excluding ANC. **Bold** denotes > criteria

Table 6-5: ASS Key Results Summary – Depth

Analyte	Unit	0-1 mbgl			1-2 mbgl			2-10 mbgl		
		Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
SPOS	%S	0.005	0.029	**0.15**	0.012	**0.08**	**0.21**	0.008	**0.41**	**1.9**
Net acidity*		<0.02	**0.05**	**0.20**	0.022	**0.13**	**0.29**	0.02	**0.45**	**2.1**
TAA		<0.003	0.02	**0.08**	0.009	**0.05**	**0.17**	0.01	**0.05**	**0.18**
TPA		<0.02	**0.07**	**1.2**	<0.02	**0.18**	**0.49**	**0.03**	**0.52**	**2.20**
S_{NAS}		0.006			0.006			<0.005	0.014	0.02
ANC	%S	Not tested								
Number of samples		38			6			26		
Number of samples exceeding criteria		22			5			26		

* Excluding ANC. **Bold** denotes > criteria

Key findings from the above summary are presented below:

- SPOS exceeds the management criteria in all the majority of soil units, with the dark grey/brown sands having the highest concentrations onsite.
- The mean net acidity of all soil types exceeded the management criteria, except pale grey sands.
- Soils contained no measurable acid neutralising capacity (ANC).
- Soils in the top 1 m pose a lower risk compared to deeper soils, especially those beyond 2 mbgl.
- The dark brown/grey sands and sandy clays (pale and dark grey) contain the highest concentrations of net acidity and SPOS observed on-site and are predominately located >2 mbgl.

6.1.3 Summary

Soils across the site are predominately characterised as sand (pale grey) overlying a layer of ferricrete, which is likely discontinuous across the site, with dark brown/grey sands and clayey sands extending to the depth of investigation.

The data supports a conclusion that ASS is present at the site in all the soil profiles, except shallow pale grey/white sands (<1 mbgl), with the dark grey/brown sands and sandy clay >2 mbgl exhibiting, the highest risk soils onsite. All soils exceeding the guidelines, with the exception of the shallow pale grey/white sands (<1 mbgl), will require management and lime-neutralisation during construction to manage the risk of acidification in line with DWER guidelines (2015b).

Whilst all soil types and across all depths, except shallow pale grey/white sands (<1 mbgl), exceeded the relevant DWER action management criteria and will require management and lime-neutralisation should these soils be disturbed, soils predominantly >2 mbgl pose the highest risk on-site, due to elevated concentrations of inorganic sulfur. Under the current proposed design, soils at this depth are unlikely to be disturbed either via excavation and or dewatering, except for minor volumes recovered when the auger is pulled up whilst injecting concrete to construct piles.

6.2 Groundwater

The following presents a summary of the monitoring completed to date relevant to ASS and preparation of this ASSDMP, which entails groundwater levels and flow from across the site and sampling results from nine bores (three deep and six shallow) undertaken by Stantec between April 2024 and January 2025.

6.2.1 Groundwater Elevation and Flow

Groundwater monitoring undertaken by Stantec (Stantec, August 2025) between April 2024 and September 2024, which typically represents the groundwater water level at its lowest and highest, respectively, with groundwater level in the Superficial Aquifer (shallow bores) ranging from 0.23 - 3.15 mbgl (elevation ranged between 26.25 mAHD and 35.32 mAHD). Groundwater level in the Leederville Aquifer (deep bores) ranged from 0.53 - 2.78 mbtoc (elevation ranged between 28.03 mAHD and 35.52 mAHD) (Table 6-6). The groundwater flow is in a general southerly direction in the Leederville Aquifer. The groundwater flow in the Superficial Aquifer is generally south-westerly and southerly in the north and central and southern portions of the site, respectively.

Table 6-6: Depth to Water and Static Water Levels

Bore	Top of Collar (mAHD)	Surface level (mAHD)	Apr-24		Sep-24	
			Depth to Water (mbgl)	Groundwater Elevation (mAHD)	Depth to Water (mbgl)	Groundwater Elevation (mAHD)
Leederville Aquifer						
WM01	36.73	36.04	2.25	33.79	0.53	35.51
WM02	29.22	28.57	2.78	25.79	0.72	27.85
WM03	33.06	32.43	1.21	31.22	0.70	31.73
Superficial Aquifer						
WM01-W-S01	35.60	35.14	0.63	34.51	0.74	34.4
WM01-W-S02	36.95	36.35	1.89	34.46	0.62	35.73
WM02-W-S01	29.52	28.92	3.15	25.77	1.04	27.88
WM02-W-S02	28.09	27.45	1.30	26.15	0.63	26.82
WM03-N-S01	34.53	33.84	1.46	32.38	0.61	33.23
WM03-N-S03	34.65	34.00	1.35	32.65	0.30	33.7
WM03-N-S04	35.39	34.79	1.38	33.41	0.58	34.21
WM03-W-S01	34.37	33.67	-	-	0.68	32.99
WM03-W-S03	34.51	33.87	-	-	0.66	33.21
WM03-W-S04	33.70	33.14	0.99	32.15	0.23	32.91
WM03-W-S05	33.07	32.50	1.20	31.3	0.47	32.03

6.2.2 Groundwater Quality Findings

Groundwater conditions were assessed from the nine groundwater monitoring bores sampled (Section 5.2.1), across the site (Figure 4). Groundwater results presented in Table B (Appendix D).

6.2.2.1 Physical Parameters

A summary of field observations from the ongoing baseline investigation are presented in Table 6-7 below.

Table 6-7: Groundwater Physical Parameters Summary

Parameter	Unit	Leederville Aquifer			Superficial Aquifer		
		Min	Mean	Max	Min	Mean	Max
pH	pH units	5.9	6.3	6.8	3.7	5.5	6.6
EC	µS/cm	266	447	633	296	636	2,740
Redox	mV	6	55	169	-161	29	317
DO	mg/L	0.06	0.7	2.9	0.07	0.7	6.6

6.2.2.2 Analytical results

A summary of key ASS parameters and guideline exceedances for the site is provided below in Table 6-8 and Table 6-9 for the Leederville and Superficial Aquifers respectively.

Table 6-8: Groundwater Analytical Results Summary – Leederville Aquifer

Analyte	Unit	Concentrations			Guideline Noncompliance	Noncompliant Bores
		Min (Bore)	Mean	Max (Bore)		
pH	pH units	**5.1** (WM01)	**5.8**	**6.2** (WM03)	ASS (<6), FWG (7.0-8.5)	ASS and FWG – All
EC	µS/cm	266 (WM01)	447	633 (WM02)	-	
TDS	mg/L	178 (WM01)	246	332 (WM02)	N/A	N/A
Alkalinity	mg/L	11 (WM01)	21	34 (WM03)	N/A	N/A
Chloride	mg/L	72 (WM01)	142	207 (WM02)	-	-
Sulfate	mg/L	5 (WM01)	9	15 (WM02)	-	-
Sulfate:Chloride	N/A	0.04 (WM02)	0.07	0.11 (WM03)	-	-
Aluminium	mg/L	<0.01 (All)	0.016	0.05 (WM03)	-	-
Arsenic	mg/L	<0.001 (All)	<0.001	0.002 (WM02)	-	-
Iron	mg/L	<0.05 (WM01, WM02)	**4.3**	**14.9** (WM02)	LIWG (0.2), NPUG (0.3)	LIWG and NPUG – All
Manganese	mg/L	0.06 (WM01)	0.25	**0.61** (WM02)	LIWG (0.2)	WM02, WM03
Nickel	mg/L	<0.001 (WM02)	0.004	**0.012** (WM03)	FWG (0.011)	WM03
Zinc	mg/L	<0.005 (WM01, WM02)	**0.008**	**0.021** (WM03)	FWG (0.008)	WM01, WM03
Total Phosphorus	mg/L	<0.01 (WM01, WM03)	0.04	**0.1** (WM02)	FWG (0.065)	WM02
Total Nitrogen	mg/L	0.2 (WM02)	0.3	0.6 (WM01)	-	-
Total Ammonia	mg/L	<0.01 (WM01)	0.1	0.17 (WM03)	-	-
Nitrate and Nitrite	mg/L	<0.01 (All)	0.06	**0.36** (WM03)	FWG (0.1)	WM03

Bold denotes guideline noncompliance. N/A – Not applicable. All metals are dissolved concentrations. Freshwater Guidelines (FWG) – South-west Australia wetland; Long-term Irrigation Water Guidelines (LIWG); Livestock Drinking Water Guidelines (LDWG) – Cattle; Acid Sulfate Soil (ASS) Indicator Parameters ; Non-potable Drinking Water Guidelines (NPUG).

Table 6-9: Groundwater Analytical Results Summary – Superficial Aquifer

Analyte	Unit	Concentrations			Guideline Noncompliance	Noncompliant Bores
		Min (Bore)	Mean	Max (Bore)		
pH	pH units	**4.6** (WM01-W-S01)	**5.6**	**6.4** (WM02-W-S02)	ASS (<6), FWG (7.0-8.5)	ASS and FWG – All
EC	µS/cm	296 (WM01-W-S02)	636	**2,740** (WM03-W-S02B)	LIWG (2,300)	WM03-W-S02B
TDS	mg/L	173 (WM01-W-S01)	388	822 (WM03-W-S02B)	N/A	N/A
Alkalinity	mg/L	<1 (Numerous)	14	59 (WM03-N-S03)	N/A	N/A
Chloride	mg/L	59 (WM01-W-S01)	153	320 (WM03-W-S02B)	NPUG (250)	WM03-W-S02B
Sulfate	mg/L	3 (WM02-W-S02)	44	109 (WM03-W-S02B)	-	-
Sulfate: Chloride	N/A	0.02 (WM02-W-S02)	0.32	0.68 (WM01-W-S01)	ASS (>0.5)	WM01-W-S01
Aluminium	mg/L	<0.01 (Numerous)	**0.29**	**2.2** (WM03-N-S03)	FWG (0.055) NPUG (0.2) ASS (1)	FWG – WM01-W-S02, WM02-W-S01, WM03-N-S03, WM03-W-S02B NPUG - WM03-N-S03, WM03-W-S02B ASS - WM03-N-S03, WM03-W-S02B
Arsenic	mg/L	<0.001 (All)	<0.001	0.006 (WM03-N-S03)	-	-
Iron	mg/L	<0.05 (Numerous)	**8.1**	**30.2** (WM02-W0S02)	LIWG (0.2) NPUG (0.3)	LIWG – All NPUG - All
Manganese	mg/L	0.015 (WM03-N-S03)	0.15	**0.44** (WM01-W-S01)	LIWG (0.2)	WM01-W-S01, WM02-W-S02, WM03-W-S02B
Nickel	mg/L	<0.001 (Numerous)	<0.001	**0.004** (WM01-W-S01)	-	-
Zinc	mg/L	<0.005 (Numerous)	0.008	**0.03** (WM01-W-S01)	FWG (0.008)	WM01-W-S01
Total Phosphorus	mg/L	<0.01 (Numerous)	**0.2**	**1.06** (WM01-S-S02)	FWG (0.065)	WM01-W-S01, WM01-W-S02, WM02-W-S02, WM03-N-S03, WM03-W-S02B
Total Nitrogen	mg/L	0.1 (WM01-W-S01)	**3.7**	**42** (WM03-N-S03)	FWG (1.5) LIWG (9)	FWG - WM01-W-S01, WM01-W-S02, WM02-W-S01, WM03-N-S03, WM03-W-S02B

Analyte	Unit	Concentrations			Guideline Noncompliance	Noncompliant Bores
		Min (Bore)	Mean	Max (Bore)		
						LIWG - WM03-N-S03, WM03-W-S02B
Total Ammonia	mg/L	<0.01 (WM01-W-S01)	**2.3**	**35.1** (WM03-N-S03)	NPUG (0.41) FWG (2.57)	NPUG - WM02-W-S01, WM03-N-S03, WM03-W-S02B FWG - WM03-N-S03
Nitrate and Nitrite	mg/L	<0.01 (All)	**0.28**	**5.97** (WM03-N-S03)	FWG (0.1)	WM02-W-S02, WM03-N-S03

Bold denotes guideline noncompliance. N/A – Not applicable. All metals are dissolved concentrations. Results not presented where all results were below the limit of reporting. Freshwater Guidelines (FWG) – South-west Australia wetland; Long-term Irrigation Water Guidelines (LIWG); Livestock Drinking Water Guidelines (LDWG) – Cattle; Acid Sulfate Soil (ASS) Indicator Parameters ; Non-potable Drinking Water Guidelines (NPUG).

6.2.3 Summary

Groundwater is slightly acidic and acidic to slightly acidic within the Leederville and Superficial Aquifers respectively, both containing low concentrations of acid buffering capacity. Concentrations for dissolved aluminium (Superficial only), iron, manganese and zinc commonly exceed adopted guideline values, with concentration of other metals typically below or marginally above the limit of reporting but below relevant guidelines. Dissolved metal concentrations are typically higher in the Superficial then Leederville Aquifer. Total nitrogen, total ammonia and total phosphorous concentrations reported in the Superficial Aquifer commonly exceeded adopted guidelines, with lower concentrations, which are predominately below adopted guidelines, observed in the Leederville Aquifer.

Based upon a review of the water quality results compared against the DWER ASS guidance, there is some evidence of acidification, i.e. low pH, especially in the Superficial Aquifer.

The groundwater is recognised as being susceptible to further acidification should soils and dewatering not be managed appropriately during construction.

6.3 Surface Water

6.3.1 Surface Water Quality Findings

Surface water conditions were assessed from the nine surface water locations sampled (Section 5.2.1), across the site (Figure 4, Appendix A). Surface water results presented in Table C (Appendix D).

6.3.1.1 Physical Parameters

A summary of field observations from the baseline investigation are presented in Table 6-10 below.

Table 6-10: Surface Water Physical Parameters Summary

Parameter	Unit	Creekline Discharge			Wetland		
		Min	Mean	Max	Min	Mean	Max
pH	pH units	6.4	7.1	7.4	6.1	6.4	7.3
EC	µS/cm	438	750	1,284	256	1,086	3,415
Redox	mV	-37	26	62	5	49	108
DO	mg/L	4.26	7.06	9.1	3.12	6.29	11.42

6.3.1.2 Analytical results

A summary of key ASS parameters and guideline exceedances for the site is provided below in Table 6-11 and Table 6-12 for the creekline discharge and wetlands respectively.

Table 6-11: Surface Water Analytical Results Summary – Creekline Discharge

Analyte	Unit	Concentrations			Guideline Noncompliance	Noncompliant Location(s)
		Min (Location)	Mean	Max (Location)		
pH	pH units	**6.4** (SW04)	**7.1**	**7.54** (SW04)	FWG (7.0-8.5)	SW02, SW03, SW04, SW05
EC	µS/cm	438 (SW03)	751	1,284 (SW02)	-	-
TDS	mg/L	269 (SW01)	504	619 (SW02)	N/A	N/A
TSS	NTU	21 (SW04)	72	180 (SW05)	N/A	N/A
Alkalinity	mg/L	55 (SW04)	113	175 (SW01)	N/A	N/A
Chloride	mg/L	56 (SW01)	207	326 (SW02)	NPUG (250)	SW02
Sulfate	mg/L	<5 (SW01)	34	47 (SW02)	-	-
Sulfate:Chloride	N/A	0.08 (SW04)	0.13	0.25 (SW03)	-	-
Aluminium	mg/L	<0.01 (SW02)	0.05	**0.14** (SW04)	FWG (0.055)	SW01, SW03, SW04
Arsenic	mg/L	<0.001 (SW01-SW04)	<0.001	0.001 (SW05)		
Iron	mg/L	0.28 (SW03)	**2.08**	**8.63** (SW03)	LIWG (0.2), NPUG (0.3)	LIWG, NPUG - All
Manganese	mg/L	<0.001 (SW01)	0.06	0.18 (SW05)	-	-
Total Phosphorus	mg/L	0.06 (SW02)	**0.83**	**6.23** (SW05)	FWG (0.065)	SW02, SW03, SW04, SW05
Reactive Phosphorus	mg/L	<0.01 (SW02)	0.08	**0.33** (SW04)	FWG (0.03)	SW02, SW04, SW5
Total Nitrogen	mg/L	1.3 (SW02)	**5.7**	**12.6** (SW05)	FWG (1.5) LIWG (5)	FWG - All LIWG – SW02, SW03, SW05
Total Ammonia	mg/L	<0.01 (SW01)	**1.48**	**4.61** (SW02)	NPUG (0.41) FWG (2.57)	NPUG, FWG: SW02
Nitrate and Nitrite	mg/L	<0.01 (SW02, SW04)	**0.21**	**1.23** (SW05)	FWG (0.1)	SW02, SW05

Bold denotes guideline noncompliance. N/A – Not applicable. All metals are dissolved concentrations. Results not presented where all results were below the limit of reporting. Freshwater Guidelines (FWG) – South-west Australia wetland; Long-term Irrigation Water Guidelines (LIWG); Livestock Drinking Water Guidelines (LDWG) – Cattle; Acid Sulfate Soil (ASS) Indicator Parameters ; Non-potable Drinking Water Guidelines (NPUG).

Table 6-12: Surface Water Analytical Results Summary – Wetland

Analyte	Unit	Concentrations			Guideline Noncompliance	Noncompliant Location(s)
		Min (Location)	Mean	Max (Location)		
pH	pH units	**6.1** (WM03-WL)	**6.4**	**7.3** (WM02-WL)	FWG (7.0-8.5)	FWG – All
EC	µS/cm	256 (WM01-WL)	1,089	**3,415** (WM03-WL)	LIWG (2,300)	WM03-WL
TDS	mg/L	214 (WM01-WL)	826	**2,240** (WM03-WL)	LIWG (1,500)	WM03-WL
Turbidity	NTU	2 (WM03-WL)	24	55 (WM02-WL)	N/A	N/A
Alkalinity	mg/L	17 (WM01-WL)	52	82 (WM02-WL)	N/A	N/A
Chloride	mg/L	86 (WM01-WL)	356	942 (WM03-WL)	NPUG (250) LWIG (710)	NPUG – WM02-WL, WM03-WL, LIWG – WM03-WL
Sulfate	mg/L	<5 (WM02-WL)	22	<50 (WM03-WL)	-	-
Sulfate: Chloride	N/A	0.01 (WM02-WL)	0.08	0.16 (WM03-WL)	-	-
Aluminium	mg/L	0.03 (WM01-WL)	**0.46**	**1.47** (WM03-N-S03)	FWG (0.055), NPUG (0.2), ASS (1)	FWG – All, NPUG – WM01-WL, WM03-WL, ASS – WM03-WL
Iron	mg/L	0.12 (WM01-WL)	**1.6**	**6.3** (WM03-WL)	LIWG (0.2), NPUG (0.3)	LIWG – All, NPUG - All
Manganese	mg/L	0.009 (WM03-WL)	0.03	0.078 (WM03-WL)	-	-
Zinc	mg/L	<0.005 (All)	<0.005	0.007 (WM03-WL)	-	-
Total Phosphorus	mg/L	**0.17** (WM02-WL)	**1.59**	**6.53** (WM03-WL)	FWG (0.065)	All
Reactive Phosphorus	mg/L	**0.09** (WM02-WL)	1.72	**6.1** (WM03-WL)	FWG (0.03)	All
Total Nitrogen	mg/L	**2.7** (WM02-WL)	**5.6**	**12.5** (WM03-WL)	FWG (1.5), LIWG (5)	FWG – All, LIWG – WM02-WL, WM03-WL,
Total Ammonia	mg/L	0.03 (WM02-WL)	0.17	**0.5** (WM01-WL)	NPUG (0.41)	NPUG – WM01-WL
Nitrate and Nitrite	mg/L	<0.01 (WM02-WL)	0.04	**0.11** (WM03-WL)	FWG (0.1)	WM03-WL

Bold denotes guideline noncompliance. N/A – Not applicable. All metals are dissolved concentrations. Freshwater Guidelines (FWG) – South-west Australia wetland; Long-term Irrigation Water Guidelines (LIWG); Livestock Drinking Water Guidelines (LDWG) – Cattle; Acid Sulfate Soil (ASS) Indicator Parameters ; Non-potable Drinking Water Guidelines (NPUG).

6.3.2 Summary

Surface water is slightly acidic to neutral (7.8 pH units) and contains measurable levels of acid buffering capacity. Concentrations for dissolved aluminium and iron commonly exceed adopted guideline values, with concentration of other metals typically below or marginally above the limit of reporting but below relevant guidelines. Total nitrogen, reactive phosphorous and total phosphorous concentrations reported in both wetland and creekline discharge samples commonly exceeded adopted guidelines, with isolated exceedances on total ammonia and oxidised nitrogen species.

Based upon a review of the surface water quality results compared against the DWER ASS guidance, there is minimal evidence of acidification.

It is recognised however that surface water is at risk from impacts from acidification, should soils and dewatering effluent not be managed appropriately during construction.

7 GROUNDWATER MODELLING

A preliminary estimation of potential dewatering volumes for the construction of foundations for the turbines and wind monitoring and communication towers has been undertaken by Stantec (August 2025). A summary of the modelling inputs, assumptions and results are presented below. Note the extent of drawdown and pumping rates will be dependent on the water levels at the time of construction.

7.1 Approach

Groundwater time-varying drawdown extent has been based upon Cooper-Jacob equation (Kruseman and de Ridder, 1994), with the Dupuit-Thiem model used to evaluate distance-drawdown and Marinelli and Niccoli (2000) model used to evaluate inflows in steady state conditions.

7.2 Drawdown Modelling Assumptions

7.2.1 General Model Inputs

The following general modelling inputs applied to both time-variant and steady-state models:

- Models rely on limited data and are based on conservative estimates.
- Excavation dimensions will be:
  - Turbines: 30 m by 30 m, depth 0.8-1.2 mbgl.
  - Meteorological tower (Met mast): maximum dimensions – 1.8 m by 1.8 m, depth 1.5 mbgl.
- The models assume that the entire sub-surface is fully saturated from ground surface level.
- To provide dry working conditions across the excavation, groundwater was assumed to be lowered to a maximum depth of approximately:
  - Turbines: 2 mbgl.
  - Meteorological tower: 3 mbgl.
- Horizontal hydraulic conductivity (based on Domenico and Schwartz 1990) was assigned as two zones to enable flexibility across the site, with regards to potential infrastructure placement (Figure 7-1):
  - Zone 1 (bore group WM01): dominant sandy clay (typical silt, clay range) aquifer was assigned 0.5 m/d.
  - Zone 2 (All other locations): dominant sand (typical fine sand range) aquifer was conservatively set to 20 m/day.
  - Transition zone: assigned to highlight an arbitrary boundary between the two zones and was estimated based on the limited soil bores and test pits in the northern area. The transition zone approximately circles the WM01 bore group and extends toward two proposed turbine locations in the north.

7.2.2 Time-Variant Inflow

The following model assumptions have been made in evaluating time-variant groundwater inflow and drawdown:

- For the Cooper-Jacob model the aquifer was unconfined, infinite, homogeneous, isotropic, uniform thickness and pumped at an initial time variant pumping rate attain the target drawdown.
- Five days of initial pumping to attain the target drawdown (which may vary per location). followed by steady-state pumping to maintain the target drawdown to satisfy the excavation development and typical 28-day curing of the concrete. Total dewatering is 33 days. The actual time needed to achieve the target groundwater drawdown may vary between excavation sites; it could be shorter or longer than five days, depending on conditions.
- The discharge is from a single, small diameter bore that is fully penetrating.
- Aquifer thickness was set to 20 m to satisfy the model equations.
- A specific yield of:
  - Zone 1: sandy clay or clayey sand 5% (based on silt) (Morris and Johnson, 1967).
  - Zone 2: sand 20% (based on typical sand) (Heath, 1983).

7.2.3 Steady-State Inflow & Distance-Drawdown

The following model assumptions have been made in evaluating steady-state groundwater inflow and drawdown:

- Aquifer was infinite, homogeneous and anisotropic in both zones (Marinelli and Niccoli 2000).
- For the Dupuit-Thiem model,
  - the aquifer was considered unconfined and was evaluated for steady-state constant daily discharge to maintain the target drawdown.
  - flat initial water table with pumping from a fully penetrating bore under steady-state conditions.
- For the Marinelli and Niccoli model
  - recharge was 30% of the average annual rainfall of 933 mm for the nearest BoM station (Scott River).
  - vertical conductivity was assumed to be half of the horizontal hydraulic conductivity, to account for a matrix comprised of sand.
- No sheet piling or cut off walls are used.

7.3 Results

7.3.1 Drawdown

The potential dewatering drawdown extents are presented in Table 7-1 and visually in Figure 7-1 with potential drawdown, on GDEs and social receptors presented in Figure 7-2 and Figure 7-3, respectively.

Table 7-1: Predicted Drawdown Distances

Structure Type	Maximum Depth of Drawdown (m)*	Location	Predicted Distance-Drawdown (m)			
			>3 m	2 m	1 m	0.5 m
Turbine	2	North (Zone 1)	9.5	17	31	43
		Central/South (Zone 2)	5	17	60	117
Meteorological tower	3	North (Zone 1)	N/A			
		Central/South (Zone 2)	1	6	34	86

* At edge of excavation. N/A not applicable. Meteorological tower not currently proposed in the north. Distances are reported as the radius from the centre of an excavation. Note: Communication Towers will have similar drawdown requirement to the meteorological tower.

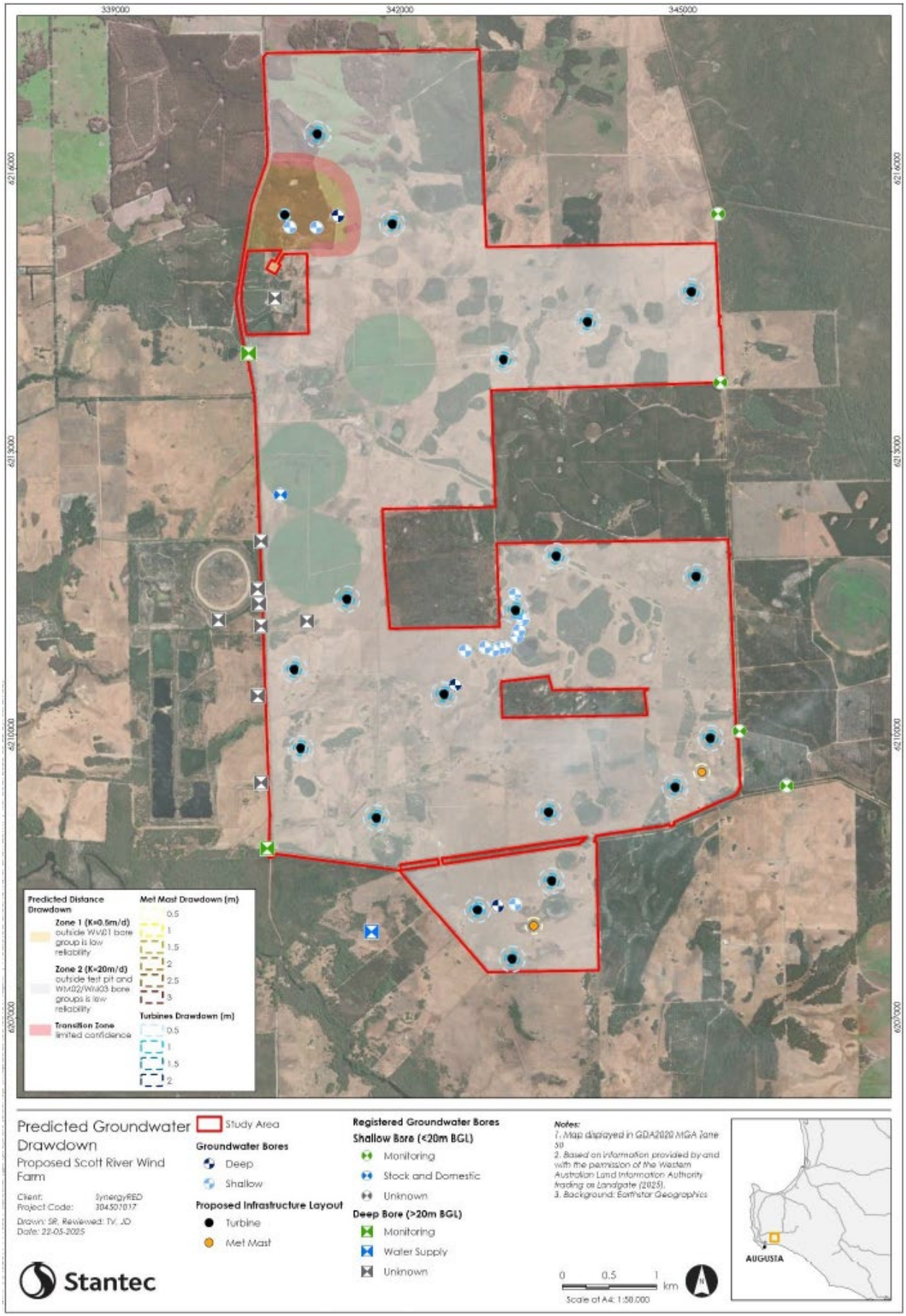

Figure 7-1: Predicted Groundwater Drawdown (Stantec, August 2025)

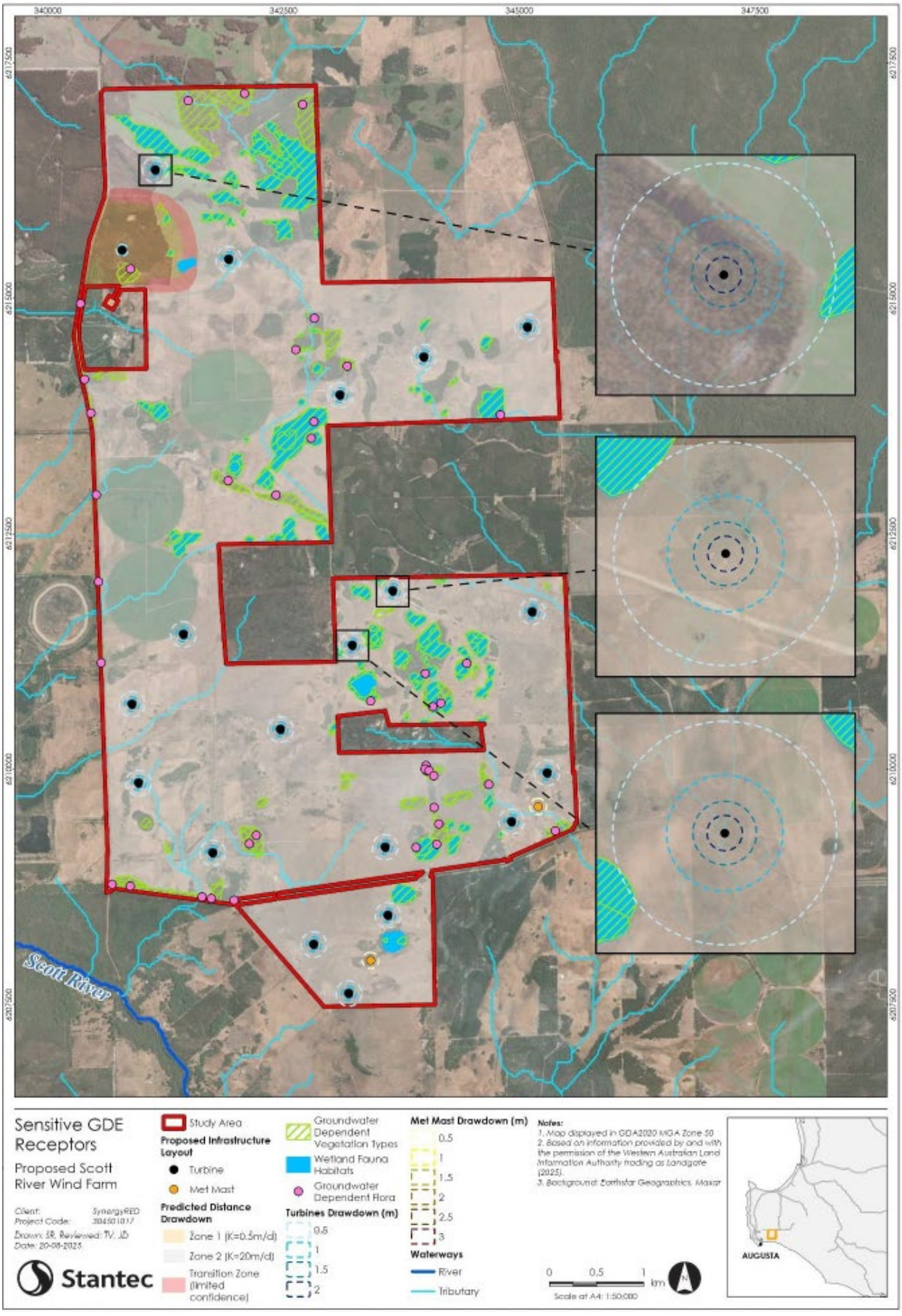

Figure 7-2: Predicted Groundwater Drawdown – GDEs (Stantec, August 2025)

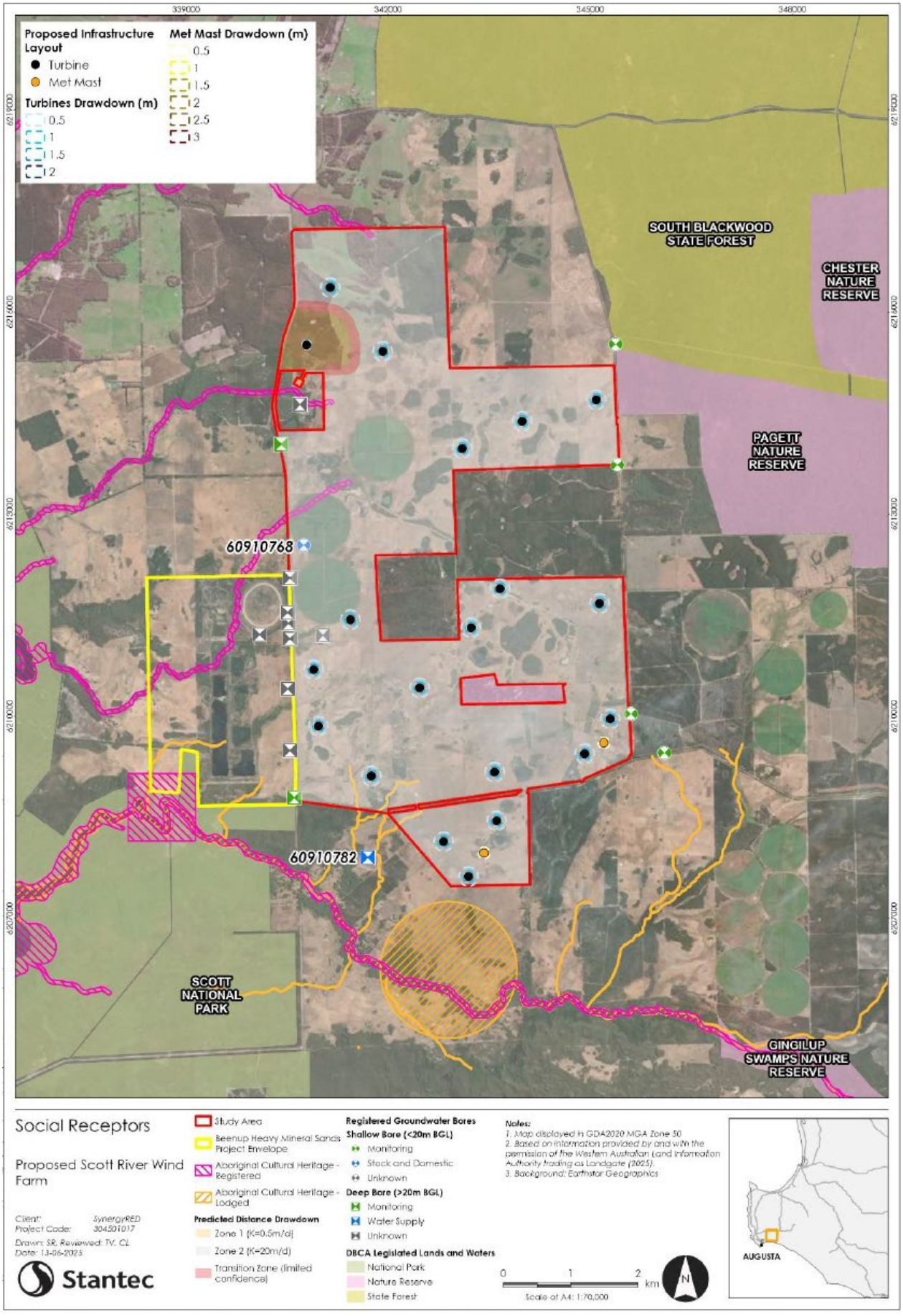

Figure 7-3: Predicted Groundwater Drawdown – Social Receptors (Stantec, August 2025)

7.3.2 Time-Variant Pumping (Cooper-Jacob model)

The elapsed time to attain the targeted drawdown depends upon the pumping rate. For the meteorological tower and turbines in zone 2 (K=20 m/d), to achieve the target drawdown at 5 days the following pumping rate is required, per location (Table 7-2).

Table 7-2: Summary of Time-Variant Discharge Rates, Per Location

Model Type	Zone	Hydraulic Conductivity (m/day)	Turbine: Discharge to Achieve Target 2.0 m Drawdown After 5 Days			Meteorological Tower: Discharge to Achieve Target 3.0 m Drawdown After 5 Days		
			Discharge (m^3/day)	Pumping Rate (L/s)	Cumulative Volume in 5 days (m^3)	Discharge (m^3/day)	Pumping Rate (L/s)	Cumulative Volume in 5 days (m^3)
Cooper Jacobs (unconfined)	1	0.5[1]	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
	2	20[2]	2,295	27	11,475	1,525	18	7,625

Notes:

N/A model was unable to calculate initial discharge for target drawdown. To satisfy the model equation, when Zone 1 was 0.5 m/day, the transient pumping estimated over 35 days to be valid and therefore was unable to be calculated. A steady-state model was likely to be representative of the initial discharge (see below).

[1] Clayey sand and sandy clay; [2] Sand.

7.3.3 Steady-State Pumping (Marinelli & Niccoli; Dupuit-Thiem models)

The below pumping rates (Table 7-3) are conservative based on the adopted horizontal hydraulic conductivity values and the absence of any cutoff structures in the excavation, such as sheet piles. Note that initial inflows are predicted to be greater to attain the target drawdown within a week, then the pumping rate would be reduced to maintain the target depth under steady-state conditions.

Table 7-3: Summary of Steady-State Discharge Rates

Model Type	Zone	Target 2.0 m Drawdown for a Single Turbine			Target 3.0 m Drawdown for a Single Meteorological Tower		
		Discharge (m^3/day)	Pumping Rate (L/s)	Cumulative Volume (m^3)[1]	Discharge (m^3/day)	Pumping Rate (L/s)	Cumulative Volume (m^3)
Dupuit-Thiem (unconfined)	1	95	1	2,660	N/A	N/A	N/A
	2	1,833	21	51,324	-	-	-
Marinelli & Niccoli (Flow to a Pit)	1	56	0.7	1,568	N/A	N/A	N/A
	2	2,045	24	57,260	296	3.4	8,204[2]

Notes: N/A meteorological tower not proposed within the northern area Zone 1; -Dupuit-Thiem model not used for inflow rate in zone 2, only Marinelli and Niccoli. [1]: cumulative value is based on 5 days to reach target drawdown using the steady-state inflow and 28 days dewatering, total 33 days; [2]: cumulative value is based on 5 days to reach target drawdown using the time-variant pumping and steady-state 28 days dewatering total, 33 days.

7.4 Summary

Maximum extent of drawdown (i.e., the area experiencing more than ~0.5 m drawdown) is expected to extend ~117 m from turbines in Zone 2, and ~43 m in Zone 1, with the drawdown expected for the meteorological tower: to be ~86 m in Zone 2.

Table 7-4 below presents a summary of the preliminary modelling outputs with dewatering rates potentially up to 24 L/s, per turbine location, in the majority of site.

Table 7-4: Summary of Pumping Rates and Estimated Volume, Per Location

Zone	Turbine: Discharge for Target 2.0 m Drawdown After 33 Days			Meteorological Tower: Discharge for Target 3.0 m Drawdown After 33 Days		
	Discharge[1] (m^3/day)	Pumping Rate (L/s)	Cumulative Volume (m^3)	Discharge (m^3/day)	Pumping Rate (L/s)	Cumulative Volume days (m^3)
1	75.5	0.9	2,492[1]	-	-	-
2	2,058	24	65,767[2]	293	3.4	15,829[2]

Note: Initial pumping rate to achieve target drawdown will be higher before achieving steady state; Meteorological tower: not planned to be installed in Zone 1; [1]: Mean steady-state models [2]: Cumulative total based on discharge from time-variant 5 days to achieve target drawdown and 28 days steady-state model output

8 POTENTIAL ENVIRONMENTAL IMPACTS

The identified potential environmental impacts associated with earth working and or dewatering of ASS for the proposed construction activities is detailed in the Table 9-1 below. Potential impacts that have been determined as requiring management are addressed in detail within Dewatering Management (Section 10) and ASS Management (Section 11).

Table 8-1: Potential Environmental Impacts

Aspect	Potential Impact	Modelled Predictions	Management Measure
Oxidation of ASS			
Soils/sediments (excavated)	Problems, e.g., oxidation, (acid generation and metal leaching/ mobilisation) caused through the inappropriate handling, treatment or disposal of excavated soils.		Per ASSDMP ASS Management.
Soils/sediments (in situ)	ASS oxidation effects caused through exposure of the soils to air via open excavation and or dewatering.	The drawdown, if required, will be temporary (maximum of four weeks at any location) and localised per location. The cone of depression is modelled, based upon a worst-case scenario, i.e. groundwater at the site surface and with no active management, to exceed 50 cm at 100 m from the centre of turbine excavation across the majority of the site. This modelled cone of depression is greater than the recommended maximum in DWER guidelines (2015b), <10 cm at 100 m. Where construction works are scheduled in summer months, the cone of depression would be smaller due to lower water tables.	Per the ASSDMP Dewatering Management. Strategic use of dewatering infiltration basins/trenches to reduce the cone of depression.
Groundwater	Potential for acid and metal leaching through groundwater from oxidised ASS.		Groundwater level and quality monitoring per the ASSDMP to confirm modelling predictions. Strategic use of dewatering infiltration basins/trenches to reduce the cone of depression. Surface water level monitoring and quality monitoring (contingency).
Surface Water	Potential for acid and metal mobilisation into surface water from oxidised ASS.		
Groundwater Drawdown			
Impact on surface water bodies	Reduction in groundwater levels leading to a reduction in surface water levels in adjacent wetlands, with associated reduction in water quality.	The lateral extent of drawdown, based upon a worst-case scenario, i.e. groundwater at the site surface, may potentially impact permanent surface water bodies, i.e. wetlands; however, where construction works are scheduled in summer months, the potential impacts would be minimised due to lower water tables.	Groundwater level and quality monitoring per the ASSDMP to confirm modelling predictions. Strategic use of dewatering infiltration basins/trenches to reduce the cone of depression. Surface water level monitoring and quality monitoring (contingency).
GDE/Vegetation stress	Reduction in groundwater levels (i.e., below root zone) leading to stress of groundwater-dependent vegetation (phreatophytes).	Lateral extent of drawdown has the potential to impact GDEs and other sensitive ecology. Where construction works are scheduled in summer months, the potential impacts would be minimised due to lower water tables.	

Aspect	Potential Impact	Modelled Predictions	Management Measure
Residential users (bores)	Disruption to residential bores through lowering the water table below the intake level.	The radius of influence, based upon a worst-case scenario, i.e. groundwater at the site surface, is not anticipated to impact on- or off-site bores, likely to be installed in the deeper confined aquifer.	None required.
Irrigation bores	Disruption to residential bores through lowering the water table below the intake level.	The radius of influence, based upon a worst-case scenario, i.e. groundwater at the site surface, is not anticipated to extend to off-site residences and or impact on-off or off-site bores, installed in the deeper confined aquifer.	None required.
Contaminated Sites	Mobilisation and or migration of contaminants from contaminated sites in groundwater due to dewatering	The radius of influence, based upon a worst-case scenario, i.e. groundwater at the site surface, is not anticipated to extend off-site or influence groundwater impacted by the former Beenup Mineral Sands mine.	None required.
Dewatering Disposal			
Poor water quality	Ineffective treatment and or disposal resulting in environmental impacts to soils and or groundwater.		Treatment of dewatering in line with ASSDMP
Overflow of dewatering infrastructure	Ineffective management and or sizing of dewatering infrastructure resulting in environmental impacts, e.g. contamination, decline in health, sediment plumes to surface waters and or vegetation		Sizing and management of dewatering infrastructure per ASSDMP

9 MANAGEMENT OBJECTIVES

To minimise potential impacts on the environment and other groundwater users, active management of earthworks and dewatering operations is required during construction. This Preliminary ASSDMP presents preliminary management strategies, based upon available information at the time of reporting, for managing the proposed dewatering and earth working of ASS at the site.

The Preliminary ASSDMP specifically addresses the following proposed measures:

- Management of soil excavation, handling and stockpiling operations, including the neutralisation of acidity associated with ASS.
- Water table management to mitigate on- and off-site environmental impacts, this includes management of dewatering effluent produced during construction, if required and minimisation of the cone of depression.
- Potential contingency measures and corrective actions that may be implemented to rectify any breaches of the nominated triggers and management measures.
- Proposed soil, groundwater, dewatering effluent and surface water monitoring and validation to confirm works are undertaken in accordance with the performance objectives detailed herein.

10 DEWATERING AND GROUNDWATER MANAGEMENT

The following section outlines the most likely strategies for the management of dewatering effluent and groundwater, to be implemented on-site during construction works based upon information at the time of reporting.

10.1 Administrative Requirements

Dewatering works will potentially be required during construction of various elements of the wind farm including:

- Foundation construction for wind turbines (specifically the partially below ground foundation and the traditional below ground foundation options), wind monitoring and communication towers and potentially the O&M buildings and substation.
- Installation of underground services (e.g., cabling).

These estimates are dependent on the final infrastructure locations and design levels as well as the time of year and associated groundwater levels at the time of construction. Based upon proposed construction methodologies, it has been estimated that a maximum dewatering period of approximately 33 days per turbine or wind monitoring/communication tower location will be required. No dewatering is required for Turbine foundation option 2 (fully above ground foundation) nor transmission poles/towers to be installed by Western Power, however groundwater will be displaced by concrete during the pouring of piles. Dewatering requirements for other infrastructure is currently unknown. The results of dewatering estimates have required the adoption of 'dewatering management level 2' requirements, per DWER guidelines (DWER, 2015b).

Depending on the time of construction works the above may overestimate the actual dewatering required. The estimates are based on groundwater levels being at the surface, however, should construction works occur in summer, the groundwater levels will potentially be lower than those estimated.

This section describes how the groundwater dewatering will be managed within the site to ensure minimal impact to the environment and other groundwater users. It is acknowledged that the management strategies outlined will be part of the dewatering licence granted by the DWER and must be adhered to, as would any other condition of the water extraction licence.

Based upon information to date, the groundwater source to be used is considered to be the Superficial system (Superficial Aquifer and potentially shallow Leederville Aquifer in the north of the site). Groundwater levels and quality in the Superficial Aquifer (and potentially shallow Leederville Aquifer in the north of the site) will be monitored and reviewed during construction by a suitably qualified professional. This operating strategy is limited to the proposed project. It will only be reviewed if works are substantially altered.

10.2 Management Principles

The following management principles are to be promoted to limit the potential impact of dewatering on-site:

- Minimisation of dewatering requirements via modification to the construction methods, i.e. use of pile support foundations as opposed to traditional gravity foundations.
- Minimisation of the cone of depression via infiltration/recharge of most of the treated dewatering effluent and strategic siting and use of recharge basins/trenches.
- Treatment of dewatering effluent
- Monitoring of groundwater table and surface water (if required) levels and quality.

Requirements for the above management principles are outlined in the following sections.

10.3 Dewatering Treatment and Disposal

It is anticipated that dewatering will be required in support of excavation activities during construction. The requirement for dewatering is in part dependent on the earthwork component and depth of excavation and groundwater levels at the time of construction, which varies seasonally with rainfall.

10.3.1 Dewatering Treatment Method and Materials

Table 10-1 below details the dewatering effluent treatment method and neutralising agent proposed for the works.

Table 10-1: Dewatering Treatment Method and Materials

Dewatering Element	Requirement
Dewatering Treatment Method	Automated Dosing Unit
Dewatering Treatment Neutralising Agent	Calcium-based neutralising agent

10.3.2 Dewatering Disposal Assessment

Due to the likely constrained nature of individual construction footprints, e.g. wind turbine construction area, and the hydrogeological and geological conditions of the site an assessment of potential dewatering disposal options, after treatment, per options in DWER ASS guidelines (2015b) has been undertaken to determine the most suitable disposal method following treatment (Section 10.2.3) and detailed in below.

Table 10-2: Dewatering Disposal Options Assessment

Disposal Method	Comments	Suitability
Infiltration	Shallow water table and underlying ferricrete (depending on the time of year and location on-site) potentially limits the volume of water that can be infiltrated back into the superficial aquifer. Infiltration will require suitably sized areas (based upon volumes/rates) located in the project development envelope. Additional storage, e.g. holding tanks/bladders, and or strategic use of infrastructure for infiltration of treated effluent, due to the high-water table, is likely required to make infiltration more effective and minimise potential risks to sensitive receptors, i.e. GDEs.	Suitable with potential limitations to infiltration rates and areas.
Irrigation/ Dust Suppression/ Concrete Production	Groundwater will likely be suitable for irrigation (including surrounding paddocks) and or dust suppression onsite and or potentially used in the production of concrete at the onsite concrete batching plant, though some pre-treatment for pH, acidity and metals, may be required.	Suitable.
Discharge to Sewer	Not applicable (N/A) - No reticulated sewer infrastructure in the area.	N/A
Off-site Disposal	Dewatering effluent could potentially be treated and stored onsite prior to offsite disposal to a wastewater treatment plant, however the volume of dewatering and distance to plant likely make this option.	Not considered suitable - significant cost and emissions to transport to offsite disposal facility.
Discharge to Surface Water	Only considered an option when all other options have been exhausted (DWER 2015b). Dewatering effluent will be required to meet DWER surface water (2015b) criteria prior to any discharge and as such depending on the quality of the receiving water, may potentially not be viable. The drainage channels and ephemeral creeks onsite are hydrologically connected to the Blackwood and Scott Rivers.	Whilst the method may be suitable with likely additional treatment, e.g. metals, nutrients, and approval from DWER/DBCA; is it not considered a suitable option for the site at this time
Reinjection	Wells could potentially be constructed to facilitate reinjection of dewatering effluent. Potential limitations in rate of injection due to underlying geology/hydrogeology and would therefore require multiple wells, per dewatering location, to achieve sufficient rates.	Significant cost to construct wells and approach not guaranteed to achieve required rates.

Based upon a review of the potential dewatering disposal options and discussions with SynergyRED, a combination of dewatering disposal options will likely be required, namely infiltration and reuse for irrigation/dust suppression, with possible storage capacity. Construction methodologies (e.g., modifications to designs to minimise dewatering) to minimise the volume of dewatering have been considered to minimise dewatering requirements and manage dewatering onsite.

No dewatering effluent is to be disposed of, directly or indirectly, to the onsite wetlands, drainage lines and or the Scott or Blackwood Rivers.

10.3.3 Dewatering Treatment Setup

It has been proposed that the following management procedures will be applied for the handling of dewatering effluent, with the requirement for dewatering dependant on final invert levels, construction methodologies and groundwater elevation at the time of construction.

- Effluent will be pumped into an automated lime dosing (treatment) unit, utilising a calcium-based neutralising agent, i.e. hydrated lime, for the duration of the program, to increase the pH level. Lime dosing will be automatically controlled and based upon the results of monitored pH, acidity and alkalinity.
- Treated dewater effluent that is discharged from the automated lime treatment unit will be directed to a lined settlement basin (compacted limestone) and or holding tank/bladder. Sufficient retention time[5] will be provided to enable the precipitation of trace metals and settlement of solids from the dewatering effluent.
- Treated effluent will then be either:
  - Directed to a bunded recharge area, constructed into in-situ natural soils. The treated effluent will be recharged into the superficial aquifer as the primary disposal option, or
  - Reused for irrigation and/or dust suppression and/or in production of concrete onsite, may be considered should the treated effluent be of adequate quality to support this method of disposal.
- The capacity of the settlement basin/storage and recharge area will be maintained such that overflow does not occur to surrounding land. A small percentage of water is expected to recharge into the superficial aquifer via the settlement pond, where compacted limestone is used as a liner.

10.3.4 Dewatering Recharge/Infiltration Basins

Dewatering recharge/infiltration basins or trenches will be positioned to reduce the cone of depression by being positioned as close as possible to the area under abstraction. Depending on the construction footprint and available areas for recharge/infiltration either basins and or trenches will be used.

Where the cone of depression potentially impacts a sensitive receptor(s), e.g. GDE, wetland etc, basins/trenches will be positioned between the sensitive receptor(s) and the area under abstraction, to limit potential impacts to receptors.

All areas proposed for infiltration must be constructed and maintained within the allowable construction footprint for the project, i.e. no overland flow into surrounding vegetation and or surface water bodies.

10.4 Contact Details

Table 10-3: Contact Details

Project Role	Contact Details
Groundwater Consultant	PTG Consulting Pty Ltd Level 4, 167 St Georges Terrace, Perth, WA 6000 ATT: Alan Foley – 0493 090 390
Proponent	SynergyRED Level 23, 152-158 St Georges Terrace, Perth WA 6000

[5] DWER ASS guidelines (2015b) note; *The retention or settlement basins should be designed such that the dewatering effluent has a minimum of a six to 10-hour retention time, in order to settle sediment with a 0.015-mm target size.*

10.5 Roles and Responsibilities

The following responsibilities for the monitoring requirements are outlined in Table 10-4 below. All formal reporting to the SynergyRED/DWER will be undertaken by a suitably qualified environmental consultant.

All data must be provided to SynergyRED weekly and SynergyRED notified of any exceedances/non-compliance of triggers/criteria within 3 hours of receipt of data.

Table 10-4: Monitoring Program and Responsibilities

Monitoring Activity	Parameters	Responsibility
Dewatering Monitoring		
Daily	Field analysis: pH, EC, total titratable acidity (TTA), total alkalinity (TA) Flow meter reading	Civil Contractor/ Site Environment representative/ Specialist consultant
Weekly	Laboratory: total acidity, total alkalinity, pH	
Fortnightly	Laboratory: ▪ DWER Full Analytical Suite[1]	
Groundwater Monitoring		
Pre Construction Baseline^	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: DWER Full Analytical Suite[1]	Civil Contractor/ Site Environment representative/ Specialist consultant
Every second day	Field analysis: pH, EC, TTA, TA, standing water level	
Fortnightly	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: DWER Full Analytical Suite[1]	
Immediately After Dewatering		
Post-Construction		Site Environment representative/ Specialist consultant
Surface Water Monitoring		
Pre Construction Baseline^	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: ▪ DWER Full Analytical Suite[1] ▪ Turbidity	Civil Contractor/ Site Environment representative/ Specialist consultant
Level 1[2]		
Every second day	Standing water level	Civil Contractor/ Site Environment representative/ Specialist consultant
Level 2[3]		
Every second day	Standing water level Field analysis: pH, EC, TTA, TA	Civil Contractor/ Site Environment representative/ Specialist consultant
Fortnightly	Field analysis: pH, EC, TTA, TA, standing water level Laboratory:	
Immediately After Dewatering		

Monitoring Activity	Parameters	Responsibility
Post-Construction[4]	▪ DWER Full Analytical Suite[1] ▪ Turbidity	Site Environment representative/ Specialist consultant
Validation of Treated PASS Soils		
Collection of soil samples upon notification from site contractor	Laboratory: pH_F and pH_{FOX}, and SPOCAS[5]	Civil Contractor/Site Environment representative/ Specialist consultant
Accumulated Sediments		
Upon completion of dewatering, use of each settlement/recharge basin	Heavy metals	Civil Contractor/Site Environment representative/ Specialist consultant

1. Total and dissolved metals, total acidity, total alkalinity, sulfate, chloride, total suspended solids (TSS), total dissolved solids (TDS), and nutrients. Field parameters including pH, EC, TTA, TA, dissolved oxygen and redox are recorded during sampling. 2. Groundwater levels (at 100 m): >0.1 m at 100 m (outside natural decreases). 3. Groundwater decrease (outside natural decreases) adjacent to wetland and or deterioration in groundwater quality adjacent to wetland. 4. Only if Level 2 monitoring is undertaken. 5. Suspension Peroxide Oxidation Combined Acidity and Sulfur. ^ Within four weeks prior of dewatering commencing.

10.6 Management Guidance

10.6.1 Dewatering Effluent

A summary of the dewatering management requirements are presented below in Table 10-5.

Table 10-5: Dewatering Management Guidance

Dewatering Element	Guidance
Criteria for Source Use	Potential short-term dewatering of groundwater per location from the Superficial Aquifer and potentially shallow Leederville Aquifer (in the north of the site) (based upon current information) to allow the excavation of soil and construction of footings for various infrastructure and underground services.
Dewatering Program	Dewatering will be undertaken in stages, at low to relatively high pumping rates, depending on the location on site, foundation type and the water level at the time of construction. Dewatering at each location is not anticipated to exceed 33 days and is not expected to exceed 2 m of drawdown immediately adjacent to any location.
Timing of Pumping	Pumping when required will likely occur 24 hours a day. At all other times it would be suspended.
Dewatering Licence	A dewatering license from the DWER will be required to be obtained for the project, due the sites location within groundwater management zone and estimated dewatering rates, timeframes and volumes.
Method of Dewatering	The excavations will be dewatered using either groundwater spears or sump pumps.
Abstraction Rate	The abstraction rate for dewatering is predicted to be between 1-24 L/s, with potentially higher initial rates depending on the infrastructure being installed/constructed.
Dewater Treatment	Dewater will be treated on site before disposable. The quality of abstracted dewater may differ from the baseline results presented in this ASSDMP. However using the baseline groundwater data available, it would appear likely that dewater would have a pH of ~4.2-6.5, the TTA will likely be between 40 to 100 mg/L, and the alkalinity will potentially be below 30 mg/L, depending on the time of year. As such, dewater treatment for pH, acidity and alkalinity

Dewatering Element	Guidance
	will be required (as necessary) and is to be undertaken in accordance with current DWER standards which specify that dewater having pH <6.0 and/or TTA >40 mg/L and/or alkalinity <30 mg/L shall be subject to lime neutralisation.
Dewatering Treatment Material	Dewatering effluent is required to be treated with a calcium-based product.
Dewater Disposal	The primary options for disposing of dewatering effluent are via recharge to the Superficial aquifer and/or reuse onsite during construction (e.g., dust suppression). All areas proposed for infiltration must be constructed and maintained within the Development Envelope of the project, located as close as possible to dewatering works and located so as not to discharge directly/indirectly into any surface water bodies (i.e., wetlands). Dewatering recharge/infiltration basin/trenches should be strategically placed between dewatering locations and any nearby sensitive environmental receptor to mitigate potential impacts.

10.7 Dewatering Effluent and Groundwater Monitoring

The following monitoring program has been prepared in line with DWER guidance (2015b) and will be undertaken prior to, during and following the completion of dewatering operations.

10.7.1 Dewatering Effluent

10.7.1.1 Monitoring Regime and Responsibilities

Based upon the groundwater quality at the site exhibiting low pH, the schedule for dewater having pH between 4 and 6 and potentially total titratable acidity (TTA) between 40-100 mg/L ($CaCO_3$ equivalents)has been adopted, from the and is detailed below (Table 10-6). Samples for analysis will be collected:

- Prior to treatment, and
- Post treatment and before discharge.

Table 10-6: Dewatering Effluent Monitoring Program and Responsibilities

Monitoring Activity	Parameters	Responsibility
Daily	Field analysis: pH, EC, TTA, TA Flow meter reading	Civil Contractor/ Site Environment representative/ Specialist consultant
Weekly	Laboratory: total acidity, total alkalinity, pH	
Fortnightly	Laboratory: ▪ DWER Full Analytical Suite[1]	

1. Total and dissolved metals, total acidity, total alkalinity, sulfate, chloride, total suspended solids (TSS), total dissolved solids (TDS), and nutrients. Field parameters including pH, EC, TTA, total alkalinity, dissolved oxygen and redox are recorded during sampling.

The quality of the pre-treatment dewatering effluent will be assessed at the commencement of works and the monitoring regime amended, if required, in line with DWER (2015b) guidelines as detailed in Table 10-7 below.

Table 10-7: Dewatering Effluent Monitoring Matrix

Trigger	Monitoring Activity	Parameters
TTA: <40mg/L pH: >6	Daily	Field analysis: pH, EC, TTA, TA,
	Fortnightly	Laboratory: total acidity, total alkalinity, pH
TTA: <40mg/L, pH: 4 to 6	Daily	Field analysis: pH, EC, TTA, TA
	Weekly	Laboratory: total acidity, total alkalinity, pH
TTA: 40-100mg/L pH: >6	Daily	Field analysis: pH, EC, TTA, TA
	Weekly	Laboratory: total acidity, total alkalinity, pH
TTA: 40-100mg/L, pH: 4 to 6	Daily	Field analysis: pH, EC, TTA, TA
	Weekly	Laboratory: total acidity, total alkalinity, pH
	Fortnightly	Laboratory: DWER ASS Full Analytical Suite[1]
TTA: >100mg/L or pH: <4 or total alkalinity <30 mg/L	Twice Daily	Field analysis: pH, EC, TTA, TA
	Weekly	Laboratory: DWER Full Analytical Suite[1]

1. Total and dissolved metals, total acidity, total alkalinity, sulfate, chloride, TSS, TDS, and nutrients. Field parameters including pH, EC, TTA, TA, dissolved oxygen and redox are recorded during sampling

10.7.1.2 Sampling Requirements and Analytical Suite

A summary of the monitoring and analytical suite for during construction dewatering effluent sampling is presented in Table 10-8 below.

Table 10-8: Dewatering Effluent Sampling Requirements and Analytical Suite

Item	Description
Flow meter	A reading of the flow meter will be collected and recorded.
Locations	Pre-treatment – Prior to lime dosing unit Post-treatment – Infiltration basin opposite inflow point (where water is not present in the infiltration pond at a point furthest from the lime dosing unit outfall).
Dewatering Effluent Sampling Methodology	Dewatering samples submitted for will be recovered using grab methods or directly from a tap/sampling point in the treatment line in line with the following guidelines: ▪ Australian Standard AS/NZS 5667.4: 1998 - Water quality - Sampling - Guidance on sampling from lakes, natural and man-made (Standards Australia 1998b). Care should be taken not to disturb sediments during sampling collection. All dewatering samples for laboratory analysis will be chilled and submitted to the primary National Associated of Testing Authorities (NATA) accredited laboratory, for analysis within 24 hours of collection.
Analytical Suite	Daily: pH, EC, TTA, TA Weekly: total acidity, total alkalinity, pH Fortnightly: DWER Full Analytical Suite[1] Analytical suite may vary based upon pre-treatment dewatering effluent quality and is to be reviewed and revised in line with Table 10-5.
Quality Control	The following quality control samples will be collected during the DWER full analytical suite monitoring event only: ▪ Field duplicate ▪ Equipment rinsate (only where reusable sampling equipment is used) ▪ Field blank.

Item	Description
	The full analytical suite (above) will be conducted on the field duplicate, with the equipment rinsate and field blank submitted for analysis of total and dissolved metals only. Where sampling is completed with groundwater sampling, only one set of quality control samples is required.

1. Total and dissolved metals, total acidity, total alkalinity, sulfate, chloride, TSS, TDS, and nutrients. Field parameters including pH, EC, TTA, TA, dissolved oxygen and redox are recorded during sampling

10.7.2 Groundwater

10.7.2.1 Monitoring Regime and Responsibilities

All bores will be monitored during the baseline monitoring event, with selected bores (likely two to three per location) monitored during and after dewatering depending on the location of dewatering/construction works at the time. The monitoring regime and bore network will be finalised with further engineering design and additional bores installed, where required.

Per DWER guidance (DWER June 2015b), the monitoring schedule (Table 10-9) will comprise:

Table 10-9: Groundwater Monitoring Program and Responsibilities

Monitoring Activity	Parameters	Responsibility
Pre Dewatering Baseline^	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: DWER Full Analytical Suite[1]	Civil Contractor/Site Environment representative/ Specialist consultant
Every second day	Field analysis: pH, EC, TTA, TA, standing water level	
Fortnightly	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: DWER Full Analytical Suite[1]	
Immediately After Dewatering		
Post-Construction		Site Environment representative/ Specialist consultant

1. Total and dissolved metals, total acidity, total alkalinity, sulfate, chloride, total suspended solids (TSS), total dissolved solids (TDS), and nutrients. Field parameters including pH, EC, TTA, TA, dissolved oxygen and redox are recorded during sampling. ^ Within four weeks prior to dewatering commencing.

Upon the commencement of works, the quality of the pre-treatment dewatering effluent will be assessed and the monitoring regime amended, if required, in line with DWER (2015b) guidelines.

Where additional bores are required to be installed or existing bores are damaged/destroyed and are required to be reinstalled, all bores are to be installed accordance with the *Minimum Construction Requirements for Water Bores in Australia* (NUDLC, 2020) and the *Water Quality Protection Note – Groundwater Monitoring Bores* (DoW, 2006).

10.7.2.2 Sampling Requirements and Analytical Suite

A summary of the monitoring and analytical suite for baseline, during and post construction groundwater sampling is presented in Table 10-10 below.

Table 10-10: Groundwater Sampling Requirements and Analytical Suite

Item	Description
Standing Water Level	The depth to water will be measured via a water level meter, relative to ground level/top of the bore collar and converted to mAHD using the bore survey data.
Groundwater Sampling Methodology	Groundwater samples submitted for laboratory analysis will be recovered using a low-flow methods, i.e. peristaltic or bladder pump, in accordance with USEPA (1996) guidance (as referenced by Australian Standard, AS/NZS 5667.11:1998) or Victoria EPA guidance (VEPA, 2022).

Item	Description
	Prior to sampling, groundwater will be purged to stability (reference parameters being pH, EC, DO, redox and temperature), measured using electronic probes. Groundwater samples will be then collected into appropriately preserved laboratory supplied containers (being field-filtered for dissolved metals, as applicable). All groundwater samples will be chilled and submitted to the primary National Associated of Testing Authorities (NATA) accredited laboratory, for analysis within 24 hours of collection.
Post-Construction	Post completion of dewatering operations, groundwater samples would be collected every second month for a period of six months (three sampling events) from the selected bores within the final monitoring network (to be determined based upon final engineering design).
Analytical Suite	Groundwater parameters to be analysed in the field and at the laboratory will comprise of the following: ▪ Dissolved metals and metalloids: aluminium, arsenic, cadmium, chromium, iron, manganese, nickel, selenium, and zinc ▪ Total metals: aluminium and iron ▪ Physico-chemical parameters: pH, electrical conductivity (EC), dissolved oxygen (DO), and reduction/oxidation (redox) potential ▪ Major cations: calcium (Ca^{2+}), magnesium (Mg^{2+}), potassium (K^{+}) and sodium (Na^{+}) ▪ Major anions: sulfate (SO_4^{2-}), chloride (Cl^{-}), carbonate (CO_3^{2-}) and bicarbonate (HCO_3^{-}) ▪ Nutrients: total phosphorus (TP), reactive phosphorus (RP), total nitrogen (TN), total kjeldahl nitrogen (TKN) (calculated), total ammonia-N (NH_3+ NH_4-N), nitrates and nitrites (NO_X-N) ▪ Total dissolved solids (TDS), Total suspended solids (TSS) ▪ Acidity ▪ Field TTA and TA.
Quality Control	The following quality control samples will be collected during each groundwater monitoring event: ▪ Field duplicate ▪ Equipment rinsate ▪ Field blank. The full analytical suite (above) will be conducted on the field duplicate, with the equipment rinsate and field blank submitted for analysis of total and dissolved metals only.

10.8 Dewatering Effluent and Groundwater Water Quality Reference and Trigger Criteria

10.8.1 Groundwater

10.8.1.1 Groundwater Level (Drawdown) Triggers

Groundwater level triggers are developed to manage the depth of groundwater extraction across this site, mitigating impacts to ASS and groundwater dependent ecosystems. Prior to the commencement of dewatering, baseline monitoring event(s) will be undertaken to determine groundwater levels across various seasons and to develop appropriate trigger levels.

The framework for setting the trigger levels is defined below:

- The depth to groundwater in the monitoring bores will be recorded prior to the commencement, as part of a baseline monitoring event(s),
- The estimated maximum dewatering drawdown due to the construction activities at the bore will be determined based upon groundwater modelling,
- The trigger will be established based upon the estimated maximum dewatering drawdown at the bore with an additional tolerance of 0.2 metres (to account for variations in the modelling).

The ASSDMP will be revised to account for final engineering design details, additional baseline monitoring data and establishment of drawdown triggers for individual bores in accordance with the above framework. In

general groundwater will not be allowed to be drawdown by >0.1 m (excluding natural seasonal decreases) 100 m from dewatering works. Where dewatering activities potentially effect GDEs, more stringent groundwater level triggers (if required) will be defined cognisant of natural variation in groundwater levels to, ensure no impacts to GDEs greater than seasonal variation in groundwater levels.

Immediately prior to construction works (within a month of commencement), groundwater levels will be measured, and the drawdown triggers will be reviewed and revised where required.

10.8.1.2 Groundwater Quality Reference Criteria

The criteria nominated below are consistent with targets established in DWER guidance literature and have been standardised across all bores. It is noted that ASS criteria were exceeded, or were marginally within the guidelines, during sampling completed to date. It can therefore be expected that these triggers will likely be exceeded during the construction program.

Quarterly baseline groundwater monitoring across the site, should be undertaken at least one year prior to construction to contribute to the baseline dataset for the site, and inform the establishment of appropriate water quality targets and thresholds.

The criteria will serve as a value against which contingency responses would be considered, when taken in the wider context of "monitored data trends" over time, i.e. trends identifying deteriorating conditions.

The bore reference criteria for all bores are as follows:

- pH: 6.0 pH units
- Total Acidity: 40 mg/L ($CaCO_3$ equivalents)
- Dissolved Aluminium: 1 mg/L.

10.8.2 Dewatering Effluent

Presented in Table 10-11 is a summary of the dewatering treatment and discharge criteria for groundwater dewatering effluent, as specified in *Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes* (DWER June 2015b).

Table 10-11: Dewatering Treatment and Discharge Reference Criteria

Analyte	Treatment Criteria	Discharge Criteria
Acidity	>40 mg/L ($CaCO_3$ equivalents)	<40 mg/L ($CaCO_3$ equivalents)
pH	<6 pH units	7.0 to 8.5 pH units
Alkalinity	<30 mg/L ($CaCO_3$ equivalents)	>30 mg/L ($CaCO_3$ equivalents)

10.9 Surface Water Monitoring and Water Quality Triggers and Criteria

The lateral extent of drawdown, based upon a worst-case scenario, i.e. groundwater at the site surface, may potentially impact surface water bodies, i.e. wetlands. Drawdown is not anticipated to impact surface water levels within any wetlands where construction works are undertaken during a summer period. Wetland water levels, however, can be expected to fall naturally over the period of operations, due to evaporation over periods of low rainfall recharge. These effects would be accounted for in the monitoring program. Similarly, catchment runoff might temporarily increase levels after periods of rainfall.

Therefore, surface water monitoring will only be undertaken where groundwater drawdown of >0.1 m is observed 100 m from dewatering activities (outside natural decreases) and the dewatering activities are in the vicinity of a wetland. Based upon the current design and modelled cone of depression only the wetland atWM03-WL (Figure 4, Appendix A) may potentially be impacted by drawdown (based upon a worst-case scenario).

10.9.1 Monitoring Regime and Responsibilities

The proposed monitoring will be undertaken on a staged approach, with no surface water monitoring being undertaken unless the following occurs:

1. Groundwater levels (at 100 m): <0.1 m or nominate groundwater trigger level – no monitoring
2. Groundwater levels[6] (at 100 m): >0.1 m (outside natural decreases) implement Level 1 monitoring;
3. Groundwater decrease[8] (outside natural decreases) adjacent to wetland and or deterioration in groundwater quality adjacent to wetland implement Level 2 monitoring.

The staged monitoring requirements are detailed in (Table 10-12).

Table 10-12: Surface Water Monitoring Program and Responsibilities

Monitoring Activity	Parameters	Responsibility
Pre Dewatering Baseline^	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: ▪ DWER Full Analytical Suite[1] ▪ Turbidity	Civil Contractor /Site Environment representative/ Specialist consultant
Level 1		
Every second day	Standing water level	Civil Contractor/ Site Environment representative/ Specialist consultant
Level 2		
Every second day	Standing water level Field analysis: pH, EC, TTA, TA	Civil Contractor / Site Environment representative/ Specialist consultant
Fortnightly	Field analysis: pH, EC, TTA, TA, standing water level Laboratory: ▪ DWER Full Analytical Suite[1] ▪ Turbidity	
Immediately After Dewatering		
Post-Construction*		Site Environment representative/ Specialist consultant

1. Total and dissolved metals, total acidity, total alkalinity, sulfate, chloride, total suspended solids (TSS), total dissolved solids (TDS), and nutrients. Field parameters including pH, EC, TTA, TA, dissolved oxygen and redox are recorded during sampling.

^ Within four weeks prior to dewatering commencing.

* Only if Level 2 monitoring is undertaken.

10.9.1.1 Sampling Requirements and Analytical Suite

A summary of the monitoring and analytical suite for baseline, during and post construction surface water sampling is presented in Table 10-13 below.

Table 10-13: Surface Water Sampling Requirements and Analytical Suite

Item	Description
Standing Water Level	The depth of water will be measured via a surveyed staff gauge within the wetland.
Surface water Sampling Methodology	Surface water samples submitted for laboratory analysis were recovered via grab samples in line with the following guidelines: ▪ Australian Standard AS/NZS 5667.4: 1998 - Water quality - Sampling - Guidance on sampling from lakes, natural and man-made (Standards Australia 1998b). ▪ Australian Standard AS/NZS 5667.6: 1998 - Water quality - Sampling - Guidance on sampling of rivers and streams (Standards Australia 1998b).

[6] and the dewatering activities are in the vicinity of a wetland.

Item	Description
	Prior to or upon to sampling, surface water physical parameters being pH, EC, DO, redox and temperature, were measured using electronic probes. Surface water samples will then be collected into appropriately preserved laboratory supplied containers (being field-filtered for dissolved metals, as applicable). All surface water samples will be chilled and submitted to the primary National Associated of Testing Authorities (NATA) accredited laboratory, for analysis within 24 hours of collection
Post Construction	For post-dewatering operations surface water samples will be collected every second month for six months (three sampling events),where Level 2 monitoring (Table 10-12) is implement onsite during construction.
Analytical Suite	Surface water parameters analysed in the field and at the laboratory comprised the following: ▪ Dissolved metals and metalloids: aluminium, arsenic, cadmium, chromium, iron, manganese, nickel, selenium, and zinc ▪ Total metals: aluminium and iron ▪ Physico-chemical parameters: pH, electrical conductivity (EC), dissolved oxygen (DO), and reduction/oxidation (redox) potential ▪ Major cations: calcium (Ca^{2+}), magnesium (Mg^{2+}), potassium (K^{+}) and sodium (Na^{+}) ▪ Major anions: sulfate (SO_4^{2-}), chloride (Cl^{-}), carbonate (CO_3^{2-}) and bicarbonate (HCO_3^{-}) ▪ Nutrients: TP, RP, TN, TKN (calculated), total ammonia-N, NO_X-N ▪ Total dissolved solids (TDS), Total suspended solids (TSS), Turbidity ▪ Acidity ▪ Field TTA and TA.
Quality Control	The following quality control samples will be collected during each groundwater monitoring event: ▪ Field duplicate ▪ Equipment rinsate ▪ Field blank. The full analytical suite (above) will be conducted on the field duplicate, with the equipment rinsate and field blank submitted for analysis of total and dissolved metals and turbidity only.

10.9.2 Water Quality Reference and Trigger Criteria

10.9.2.1 Water Level (Drawdown) Triggers

DWER guidelines (DWER 2015b) nominate no decline in water levels in surface water bodies, however given the potential for other environmental factors, i.e. evaporation over the course of works, a working trigger will be developed for water levels within the surface water bodies to account for natural factors. Groundwater will not be allowed to be lowered by >10 cm at a distance of 100 m from dewatering activities, with no drawdown immediately adjacent to surface water bodies or within the surface water body itself (outside natural decreases).

As all wetlands are outside the 100 m radius from proposed dewatering works; surface water level monitoring via staff gauges (to be installed) will only be undertaken should a decrease in groundwater of >0.1 m at 100 m (outside natural decreases) occur in the vicinity of a wetland.

Surface water levels will be determined prior to the commencement of construction and a trigger level established. Potential staff gauge and surface sampling locations will be determined once further engineering design is completed.

10.9.2.2 Water Quality Reference Criteria

Quarterly baseline surface water monitoring across the site, should be undertaken at least one year prior to construction to contribute to the baseline dataset for the site, and inform the establishment of appropriate water quality targets and thresholds.

Criteria established in DWER guidance literature and standardised across all surface water locations, will serve as a criterion against which contingency responses would be considered when taken in the wider

context of "monitored data trends" over time, i.e. is there a trend identifying deteriorating conditions. It is noted that pH criteria were exceeded, or were marginally within the guidelines, during sampling completed to date. It can therefore be expected that these triggers will likely be exceeded naturally during the construction program and potentially not as a result of dewatering/construction activities.

The surface water reference criteria are as follows:

- pH – 7.0 to 8.5 pH units
- total acidity – 40 mg/L.

All other parameters will be monitored for data trends of the monitoring period[7].

10.10 Contingency Responses

The following section provides details regarding potential contingency responses that may be applied, where water quality impacts are deemed attributable to the proposal, and is based upon information at the time of reporting.

The approach to determining the appropriate contingency response is based upon identifying, managing and addressing the specific cause of the water quality impact. If additional measures to those detailed here are required, these will be agreed in consultation with DWER.

10.10.1 Groundwater

10.10.1.1 Bores

Where groundwater monitoring bores are damaged/destroyed prior to or during construction, replacement bores if required to support ongoing implementation of this plan, will be reinstalled to the same depth and construction as the damaged/destroyed bore. Replacement bores are to be installed by a licensed driller and in accordance with *Minimum Construction Requirements for Water Bores in Australia* (NUDLC 2020) and relevant 26D licence.

10.10.1.2 pH, Acidity and Groundwater Levels

Where the triggers are exceeded, the following contingency measures may be implemented:

- Increase frequency of field analysis sampling from every second day to daily
- The addition of a comprehensive suite of groundwater monitoring at an appropriate frequency may be required where dewater discharge and groundwater quality vary significantly from pre-dewatering conditions
- Pumping rates may be reduced
- The area under abstraction at any one time may be reduced
- Where a reduction in pumping rate or area under abstraction does not abate drawdown, pumps shall be suspended to allow groundwater levels to recover above the nominated trigger thresholds, unless otherwise agreed with the DWER/SynergyRED.
- Construction of additional infiltration/recharge basins.
- Implement surface water monitoring program[8].

10.10.2 Dewatering Effluent

10.10.2.1 Discharge Quality

Where the triggers are exceeded, the following contingency measures may be implemented:

- Increased liming of dewater, and or adjustment/enhancement of existing infrastructure

[7] It is noted that DWER guidelines (DWER 2015b), specifically Section 3.3.10, does not specify trigger criteria for surface water bodies when dewatering is not discharged directly and or indirectly to a surface water body.

[8] Where groundwater levels decrease by >0.1 m at 100 m (outside natural decreases) from dewatering activities in the vicinity of surface water bodies.

- Modifications to the settlement infrastructure and or additional onsite treatment infrastructure (as applicable) and or use of flocculants to promote improved settling and precipitation of metals.

10.10.2.2 Management

The dewatering settlement and discharge infrastructure should be designed and maintained to ensure suitable capacity and ongoing integrity for containment of all dewater (i.e., no unplanned loss of dewater to surrounding environment).

Where the integrity of the infrastructure is compromised and or effluent is not contained within the infrastructure, the following measure may be implemented :

- Reduce pump rates or cease all dewatering
- Reduce the area under abstraction
- Modifications to the settlement infrastructure to ensure all future dewater is contained. This may include the addition of extra storage capacity
- Increase volumes used for dust suppression.

Where any breaches occur, the SynergyRED project manager is required to be notified immediately and the aforementioned contingencies measures implemented under direction from SynergyRED.

10.10.3 Surface Water

Where the triggers are exceeded, the following contingency measures may be implemented:

- Dewatering operations in the vicinity of a surface water body to cease immediately should monitoring results show any decline in water levels (excluding natural variation i.e. evaporation) within the surface water body.
- Dewatering operations in the vicinity of a surface water body to cease immediately should monitoring results show any decline in surface water quality.
- Additional infiltration/recharge basins installed between dewatering activities and surface water body.

11 ASS MANAGEMENT

The following section outlines the most likely strategies for the management of soils identified as requiring treatment and management on-site during construction works, based upon information at the time of reporting.

11.1 Soil Excavation and Handling

11.1.1 Overview

Soils across the site are predominately characterised as sand (pale grey) overlying a layer of ferricrete, which is likely discontinuous across the site, with dark brown/grey sands and clayey sands exceeding the to the depth of investigation. Exceedances of the net acidity management criteria were observed in all soil types, and across all depths, except pale grey sands. Based upon the current proposed excavation depths natural soils, except shallow pale grey/white sands (<1 mbgl), exceed relevant DWER management criteria and will therefore require management and lime neutralisation upon disturbance.

A summary of the management requirements, based upon the current proposed construction methodology and available information at the time of reporting, with respect to ASS is presented below in Table 11-1. The soil management requirements will be reviewed and revised upon detailed design and further investigations. Infrastructure location specific criteria may potentially be developed.

Table 11-1: ASS Management Summary

Soils Requiring Management	Depth* (mbgl)	Management Requirements
Sand – Dark grey/brown/black	All	Lime treatment and reuse onsite where possible Geotechnically unsuitable material can be used as non-structural fill onsite or will be disposed of off-site at licensed soil treatment facility.
Sandy clay – Pale and dark grey	>1.75	
Ferricrete	0.5-3.5	

* Approximate. Soils requiring management, may be encountered at other depths.

11.1.2 Management Principles

The following management principles are to be promoted to limit the potential impact of oxidation and acid leaching for on-site soils.

1. The majority of the infrastructure for the wind farm will be installed into in-situ soils via open excavation and trenches. Soils requiring treatment will be:
    a. stockpiled prior to treatment on limestone pads. There are likely to be multiple treatment and stockpile locations given the area of development envelope, and distance between excavations.
        i. Where required, limestone pads will be constructed with crushed compacted[9] limestone, in accordance with DWER guidelines (2015b); i.e. ~300 mm thickness, with perimeter bunds (minimum 150 mm high)
        ii. The pad should be graded to a corner such that any leachate generated is contained/captured within the pad.
        iii. Where treatment on a limestone pad occurs, all soils are to be treated within 18 hours. Stockpiles must be <2 m in height;
    b. treated upon excavation (i.e. lime incorporated during excavation) and placed adjacent to the excavation, where possible;
2. Aglime will be incorporated into the material at the prescribed liming rate (Section 11.2.2). Treated soils will either be reinterred, reused on-site and or taken off site for disposal (refer Item 4).

[9] The level of compaction used should produce an appropriately low permeability to prevent infiltration of leachate (DWER, 2015b)

3. In areas requiring soil management and treatment, soils at the base and walls of excavations will be covered with a thin layer of aglime (~20 mm) as a precautionary measure to provide buffering capacity against minor releases of acidity.
4. Geotechnically unsuitable ASS material, where it cannot be used as non-structural fill onsite, will be disposed of offsite at a DWER licensed soil landfill facility and or treatment facility. All trucking and disposal documents must be kept and made available to SynergyRED at the end of works
5. During the works all material excavated and stockpiled, and or material imported to site, is to be stored an adequate distance away from waterways (creek/drainage lines) and wetlands, to minimise the potential for stockpile leachate/runoff entering such water bodies.

11.2 Liming Rate and Material

11.2.1 Lime Material

It is recommended that the lime material used on-site have a particle size distribution of predominately <1 mm. The liming rate will be updated based upon the liming material to be used, and validation test results.

Where material with a particle size of greater than 1 mm is utilised the required level of acid neutralisation may not occur due to the decreased surface area of the particles (neutralising sites), and additional aglime may be required in order to meet validation requirements. In addition, validation sampling may fail to meet accepted criteria due to the laboratory methodology screening soils to remove the >2 mm fraction prior to analysis.

11.2.2 Liming Rates

The liming rate for soils requiring treatment onsite, has been determined using the highest net acidity, and excluding ANC (refer Table 11-2 below). Additional assumptions include; bulk density of 1.6 tonne/m^3, a safety factor of 2, and effective neutralising value (ENV) of 50%, per the following calculation.

$$LR = \%S * \rho soil * CF * SF * \frac{100}{ENV}$$

Where: LR = liming rate

%S = percentage Sulfur

ρsoil = bulk density of soil (tonne/m^3) assumed at 1.6 tonne/m^3

CF = conversion factor (%S to kg pure $CaCO_3$/tonne) = 31.202

SF = safety factor of 2[10] as per DWER (2015b) guidelines

ENV = effective neutralising value

Table 11-2: Liming Rates

Soils Requiring Management	Depth[1] (mbgl)	Net acidity[2] (%S)	Liming rate (kg aglime/m^3)
Sand – Dark grey/brown/black	0-2.0	0.29	58 (50% ENV)
	2.0->10	2.1	420 (50% ENV)
All sandy clay – Pale and dark grey	>1.75	1.4	280 (50% ENV)
Ferricrete	0.5-3.5	0.09	18 (50% ENV)

1. Soils requiring management encountered outside of the nominated areas and or at different depths and must be treated and management as per the Earthworks Strategy. 2. Excluding ANC.

Upon confirmation of the neutralising agent to be used, and calculation of the neutralising agents ENV, per DWER guidance (2015b), the above liming rates will be adjusted accordingly.

[10] Given the highly reactive nature of the soils, a higher safety factor has been used to increase the neutralising capacity in the soils.

11.3 Validation Sampling

11.3.1 Sampling Protocol

Validation of treated soil will be undertaken via sampling and field pH tests (pH_F and pH_{FOX}) and confirmatory analysis assessment to validate the adequacy of the lime treatment. The number of samples to be collected to validate a stockpile (Table 11-3) will be in accordance with the sampling densities as specified in DWER ASS management guidance (DWER, 2015b) and in *Landfill Waste Classification and Waste Definitions 1996 (as amended 2019)* (DWER, 2019).

Table 11-3: Soil Validation Sampling Numbers

Volume (m^3)	Number of samples
100-200	4
200-500	6
500-1,000	8
1,000-2,000	11
2,000-3,000	15
3,000-4,000	18
4,000-5,000	20
5,000-10,000	24
>10,000	24 plus 4 for each additional 10,000 m^3

11.3.2 Validation Criteria

Treated soils/sediments should be well mixed and comply with the validation criteria, per DWER guidance (DWER, 2015b), presented below (Table 11-4). All validated soils are to be analysed for pH_F and pH_{FOX} with confirmatory analysis, SPOCAS, completed on 25% of field validated samples.

Table 11-4: Treated Soil Validation Criteria

Analyte	Criteria
pH_F	>6.5
pH_{FOX}	>5
pH_{KCl}	6.5-8.5
Net acidity	<0.03%S
Excess ANC (ANC_E)	>0.03%S

Experience is that typically the field tests underestimate the buffering capacity of the treated soils (by not reacting fully with the aglime material in the time taken to run the tests). Where the correlation between laboratory and field validation is poor, then the laboratory (confirmatory) results will take precedence, and future field results may be weighted to account for the discrepancy between the methods.

Minor non-compliances above the pH_{KCl} criteria, i.e. pH >8.5, are acceptable and unlikely to pose a risk to the environment however pH values should preferably be below pH 9.5.

11.3.3 Quality Control and Assurance

A minimum of one field duplicate sample will be collected per 20 primary samples.

11.3.4 Contingency measures

Where soils do not meet the above validation criteria, soils are to be retreated and tested, in line with the above protocols, until the results comply with the validation criteria.

11.4 Accumulated Sediments within Dewater Effluent Storage Infrastructure

11.4.1 Sampling Protocol

Sediments accumulated in the base of the dewater effluent storage infrastructure (i.e., settlement basins, holding tanks or inflatable bladders) can potentially contain elevated trace metal concentrations, precipitated from solution as a result of lime treatment. Sampling and analysis of accumulated sediments will be required to determine their suitability for backfill/reuse onsite and or for appropriate landfill disposal, during and on completion of dewatering activities. Sediment samples will be analysed for heavy metals including arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc.

11.4.2 Validation Criteria

As a conservative approach, noting the presence of residences and sensitive environmental receptors onsite, accumulated sediment results will be compared with the following criteria presented in the *Guideline on the Investigation Levels for Soil and Groundwater* (NEPC, 2013) :

- Ecological Investigation Levels (EILs) – Urban residential/public open space.
- Health Investigation Levels for residential (HIL-A).
- Background concentrations.

EILs and HILs define conservative values to protect the environment and human health respectively. EILs reflect levels that have no observable effect on the most sensitive receptor for each contaminant. HILs reflect levels in soils that would have no observable effect on humans over a lifetime of exposure.

Should the accumulated sediments not be suitable for reuse on site, results would also be compared to Contaminant Threshold and Concentration Limit Guidelines as specified in the *Landfill and Waste Classification and Waste Definitions (as amended 2019)* (DWER, 2019), Australian Standard Leaching Procedure (ASLP) Classes, to determine the appropriate disposal requirements.

11.4.3 Quality Control and Assurance

- A minimum of one field duplicate sample will be collected per 20 primary samples.

12 ASS ENVIRONMENTAL REPORTING

12.1 Overview

The following reports will be prepared for the site following construction activities, with detailed description provided below:

- Closure (Construction Activities Close-out) report.
- Post Dewatering Monitoring Closure Report.

All reporting is required to be completed in general accordance with the DWER ASS guidelines (2015b).

12.2 Closure (Construction Activities Close-out) Report

The initial closure report will be prepared by an environmental consultant and issued to the DWER (Contaminated Sites Branch)/SynergyRED at the cessation of construction works.

The report will contain:

- Management measures undertaken at the site and their effectiveness.
- Soil validation results, both field and laboratory testing as specified in the ASSDMP.
- Amount of neutralising agent used during construction.
- Discussion of potential human health and environmental risk, and any remediation required.
- Photographic record of the earthworks program.
- Summary of the dewatering activities.
- Results of the dewatering, groundwater and surface water monitoring.

12.3 Post Construction Monitoring Closure Report

The closure report will be prepared by an environmental consultant and issued to the DWER (Contaminated Sites Branch)/ SynergyRED at the cessation of construction works.

The report will contain:

- Summary of construction works.
- Findings of the groundwater and surface water post-construction monitoring.

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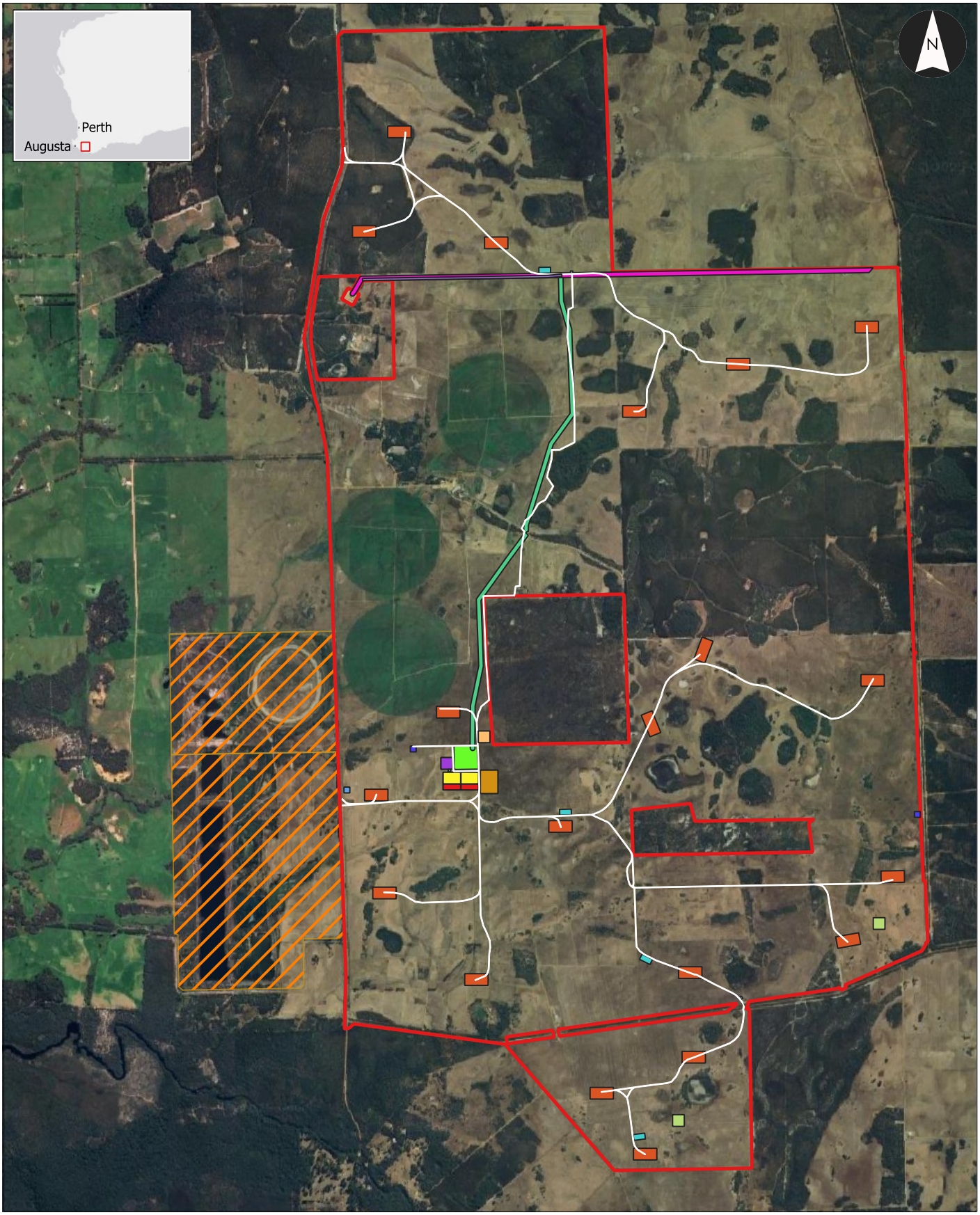
Appendix A - Figures



Site Location and Layout

Project: Proposed Scott River Wind Farm

Client: Synergy RED
Project Code: PTG - 02095
Drawn By: AW, Checked By: AF
Date: (2025-08-25)
Figure No: 1

Legend

- Site Boundary
- Contaminated Site

Indicative Infrastructure Location

- Borrow Pit
- Bushfire Water Tank
- Communication Tower
- Meteorological Mast
- Project Transmission Line
- Proposed Roads
- Wind Turbine
- Construction Laydown Area
- WP Transmission Line
- Conrete Batching Plant
- Construction Laydown Area
- Construction Site Offices
- Operation and Maintenance Area
- Project Substation

ptg consulting

Not For Construction

0 0.5 1 1.5 km

Scale at A4: 1:45000

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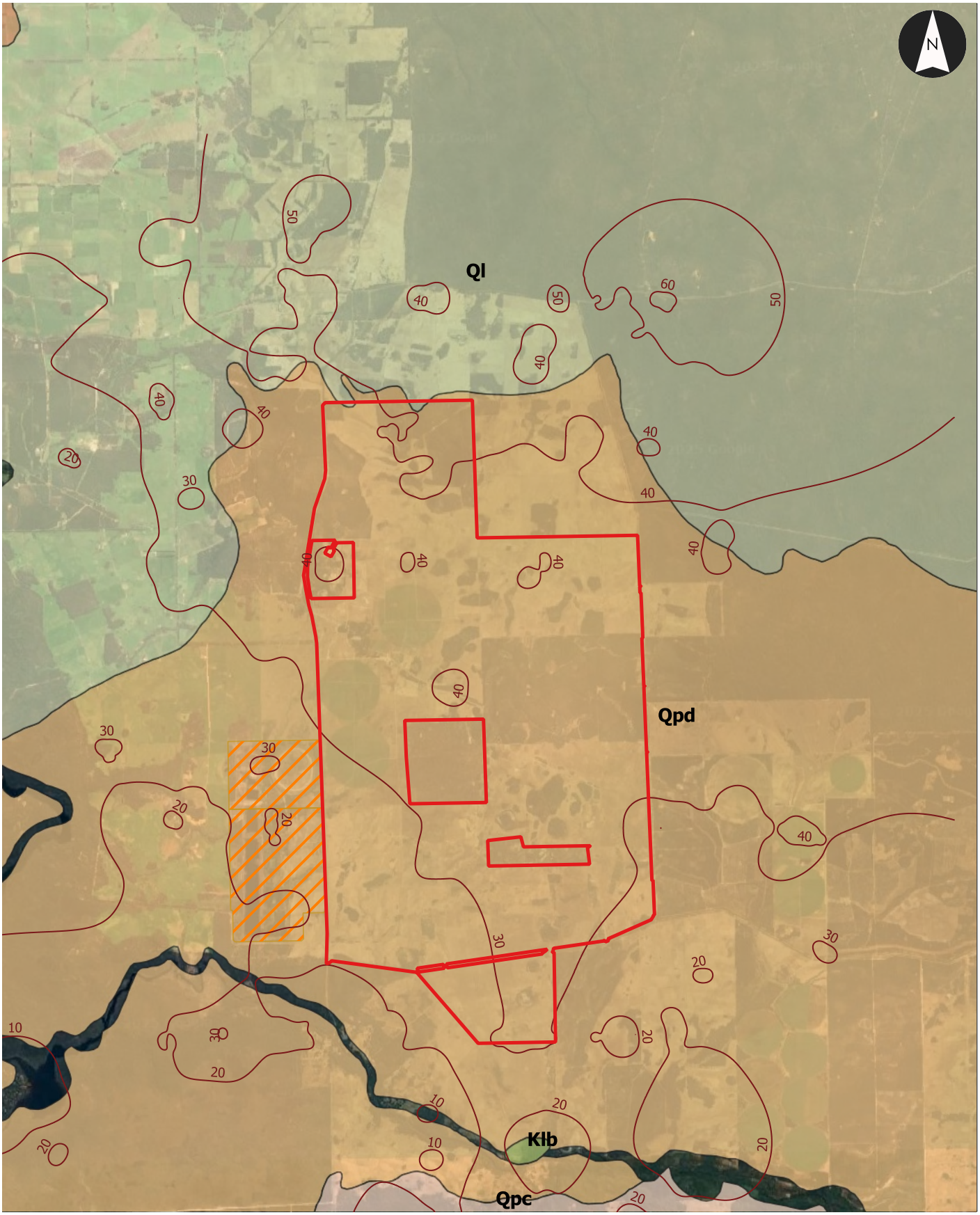

Topography and Geology

Project: Proposed Scott River Wind Farm

Client: Synergy RED
Project Code: PTG - 02095
Drawn By: AW, Checked By: AF
Date: (2025-07-11)
Figure No: 2

Legend

- Site Boundary
- Contaminated Site

Geology 1:250,000

- Qpd - Sand Dunes
- Ql - Laterite and Associated Quartz Sand (undifferentiated)
- Qpc - Coastal Limestone: Eolian alcarnite with minor occurences of fossil soil and beach conglomerate
- Klb - Bunbury Basalt
- 10m Elevation Contours (mAHD)

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Not For Construction

0 1 2 km

Scale at A4: 1:80000

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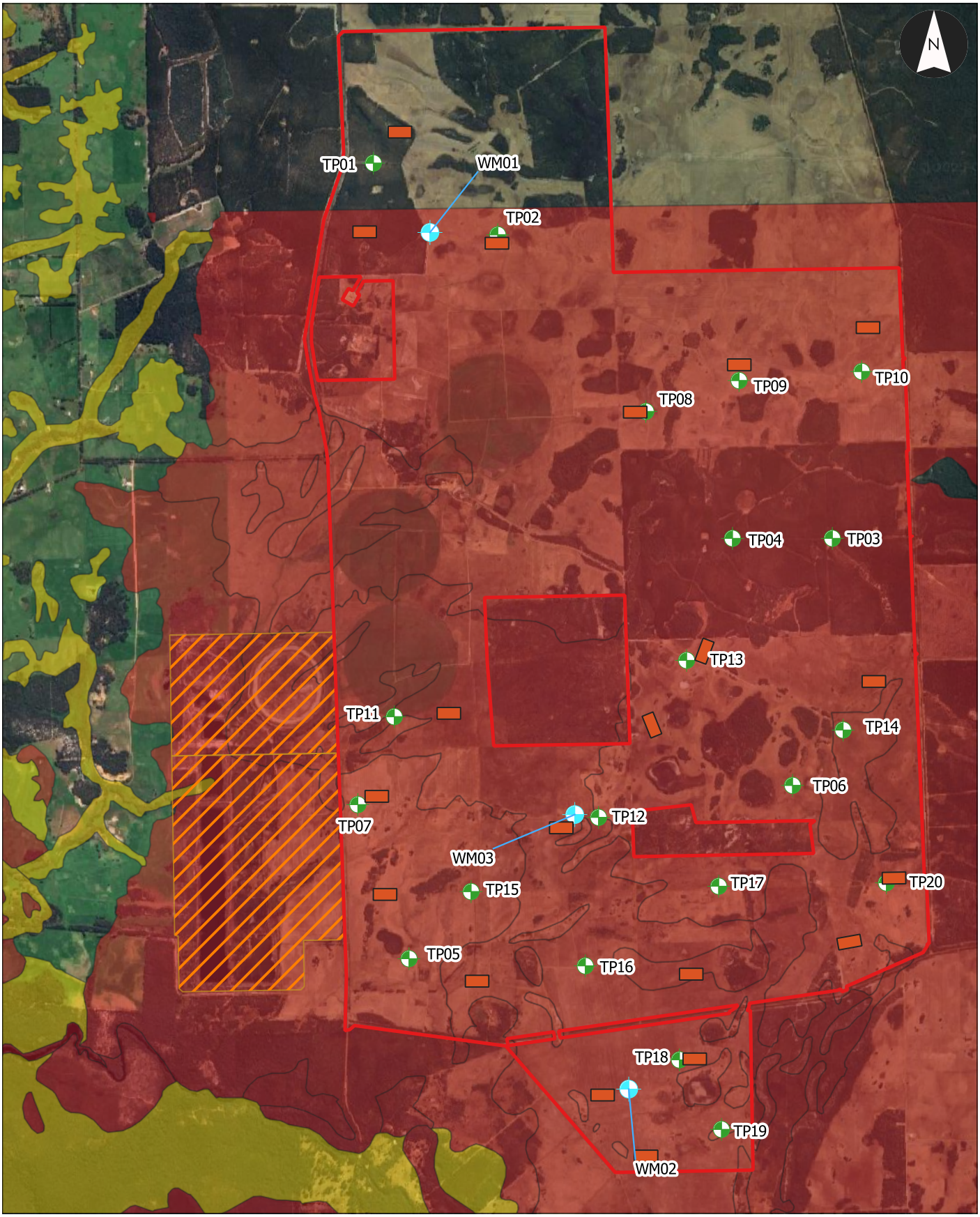

Acid Sulfate Risk and Soil Sampling Locations

Project: Proposed Scott River Wind Farm

Client: Synergy RED
Project Code: PTG - 02095
Drawn By: AW, Checked By: AF
Date: (2025-07-11)
Figure No: 3

Legend

- Site Boundary
- Contaminated Site
- Acid Sulfate Soil Risk
  - High to moderate risk
  - Moderate to low risk
- Indicative Wind Turbine
- Soil Sampling Locations
  - Test Pits
  - Deep Bore Hole

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Not For Construction

0 0.5 1 1.5 km

Scale at A4: 1:45000

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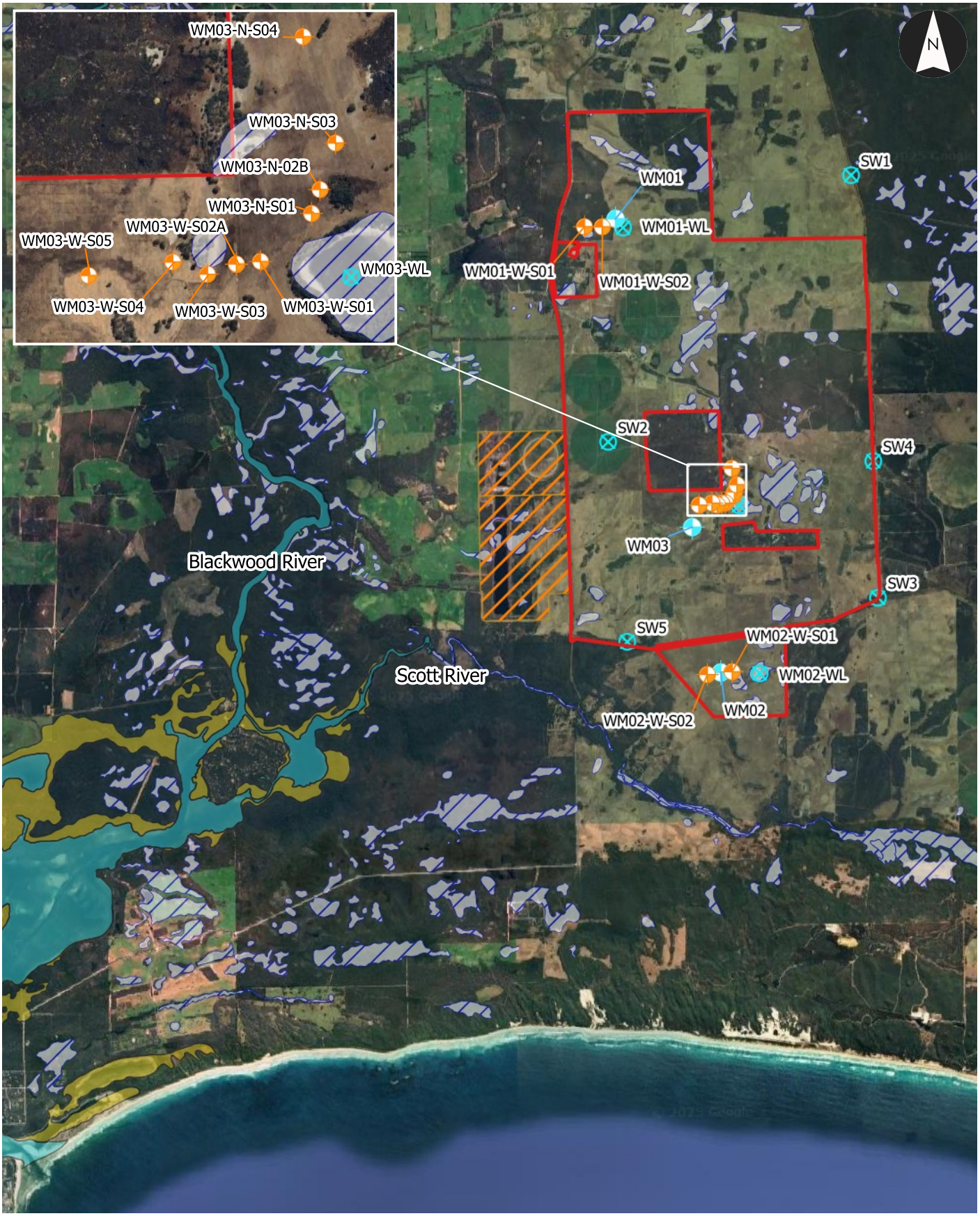

Groundwater, Waterways and Wetlands

Project: Proposed Scott River Wind Farm

Client: Synergy RED
Project Code: PTG - 02095
Drawn By: AW, Checked By: AF
Date: (2025-07-11)
Figure No: 4

Legend

- Site Boundary
- Contaminated Site
- Surface Water Sampling
- Shallow Bore Locations
- Deep Bore Hole

Hydrography (DWER 031)

- Major River
- Stream
- Tributary

Wetlands (DBCA 017)

- Sensitive Wetlands
- Estuary (shoreline and peripheral)
- Estuary (waterbody)

ptg consulting

Not For Construction

0 0.5 1 1.5 km

Scale at A4: 1:85000

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Appendix B – Database Search Results

GOVERNMENT OF WESTERN AUSTRALIA

Dandjoo Species List Export

Created by Guest User on 31 Mar 2025

Source	Dandjoo – Department of Biodiversity, Conservation and Attractions
Method	User defined polygon: [[[[115.26860061358323, -34.194962955512196], [115.29525288842055, -34.19553108080044], [115.29539027128051, -34.20632473397159], [115.29552765414051, -34.220638394499645], [115.3223173118378, -34.221319936733266], [115.32341637471768, -34.23483605180717], [115.29621456844045, -34.2349496234151], [115.29635195130041, -34.23733459179387], [115.32300422613773, -34.23756172811593], [115.32369114043765, -34.24528399844154], [115.30734258009932, -34.24937197238882], [115.30638090007942, -34.26072641362175], [115.29497812270057, -34.26208884359221], [115.28467440820158, -34.2520971780335], [115.26969967646312, -34.249485524386095], [115.26860061358323, -34.194962955512196]]]].
Date time	2025-03-31T15:19:47.135136+08:00

Conservation status summary	Count
CD	1
CR	4
EN	12
EX	1
None	109
OS	1
P1	9
P2	7
P3	27
P4	16
Parent of conservation listed taxa	3
VU	5
Total	**195**

Kingdoms	Count
Animalia	20
Fungi	1
Plantae	174
Total unique species	**195**

#	Class	Family	Name	Establishment	Conservation
Animalia					
1	Actinopterygii Klein, 1885	Galaxiidae	Galaxiella munda McDowall, 1978 *(mud minnow)*	native	VU
2	Actinopterygii Klein, 1885	Galaxiidae	Galaxiella nigrostriata (Shipway, 1953) *(Black-stripe Minnow)*	native	EN
3	Actinopterygii Klein, 1885	Lepidogalaxiidae Rosen, 1974	Lepidogalaxias salamandroides Mees, 1961 *(Salamanderfish)*	native	EN
4	Arachnida	Idiopidae Simon, 1889	Idiosoma Ausserer, 1871		Parent of conservation listed taxa
5	Aves	Ardeidae	Botaurus poiciloptilus (Wagler, 1827) *(Australasian Bittern)*	native	EN
6	Aves	Cacatuidae	Calyptorhynchus banksii naso Gould, 1837 *(Forest Red-tailed Black*	native	VU

			Cockatoo)		
7	Aves	Cacatuidae	Zanda Mathews, 1913		Parent of conservation listed taxa
8	Aves	Cacatuidae	Zanda baudinii Lear, 1832 *(Baudin's Cockatoo)*	native	EN
9	Aves	Cacatuidae	Zanda latirostris Carnaby, 1948 *(Carnaby's Cockatoo)*	native	EN
10	Aves	Falconidae	Falco peregrinus Tunstall, 1771 *(Peregrine Falcon)*	native	OS
11	Aves	Megapodiidae	Leipoa ocellata Gould, 1840 *(Malleefowl)*	native	VU
12	Bivalvia	Hyriidae	Westralunio carteri Iredale, 1934 *(Carter's Freshwater Mussel)*	native	VU
13	Insecta	Scarabaeidae	Onthophagus ferox Harold, 1867		
14	Malacostraca	Parastacidae	Cherax tenuimanus Smith, 2002	native	CR
15	Malacostraca	Parastacidae	Engaewa reducta Riek, 1967 *(Dunsborough Burrowing Crayfish)*	native	EN
16	Mammalia	Dasyuridae	Phascogale tapoatafa wambenger Aplin, Rhind, Ten Have & Chesser, 2015 *(South-western Brush-tailed Phascogale)*	native	CD
17	Mammalia	Macropodidae	Setonix brachyurus (Quoy & Gaimard, 1830) *(Quokka)*	native	VU
18	Mammalia	Muridae	Hydromys chrysogaster Geoffroy, 1804 *(Water-rat)*	native	P4
19	Mammalia	Peramelidae	Isoodon fusciventer (Gray, 1841)	native	P4
20	Mammalia	Pseudocheiridae	Pseudocheirus occidentalis (Thomas, 1888) *(Western Ringtail Possum)*	native	CR

Fungi

21	Basidiomycetes	Amanitaceae Pouzar	Amanita fibrillopes O.K.Mill.	native	P3

Plantae

22	Liliopsida	Anarthriaceae D.F.Cutler & Airy Shaw	Anarthria scabra R.Br.	native	
23	Liliopsida	Anarthriaceae D.F.Cutler & Airy Shaw	Lyginia imberbis R.Br.	native	
24	Liliopsida	Asparagaceae Juss.	Lomandra caespitosa (Benth.) Ewart *(Tufted Mat Rush)*	native	
25	Liliopsida	Asparagaceae Juss.	Lomandra suaveolens (Endl.) Ewart	native	
26	Liliopsida	Cyperaceae Juss.	Cyathochaeta stipoides K.L.Wilson	native	P3
27	Liliopsida	Cyperaceae Juss.	Cyathochaeta teretifolia W.Fitzg.	native	P3
28	Liliopsida	Cyperaceae Juss.	Evandra aristata R.Br.	native	
29	Liliopsida	Cyperaceae Juss.	Ficinia marginata (Thunb.) Fourc.		
30	Liliopsida	Cyperaceae Juss.	Isolepis cyperoides R.Br.	native	
31	Liliopsida	Cyperaceae Juss.	Lepidosperma Labill.		
32	Liliopsida	Cyperaceae Juss.	Machaerina ascendens R.L.Barrett & K.L.Wilson	native	P2
33	Liliopsida	Cyperaceae Juss.	Reedia spathacea F.Muell.	mixed	EN
34	Liliopsida	Cyperaceae Juss.	Schoenus elegans S.T.Blake	native	
35	Liliopsida	Cyperaceae Juss.	Schoenus indutus (F.Muell.) Benth.	native	P1
36	Liliopsida	Cyperaceae Juss.	Schoenus loliaceus KÃ¼k.	native	P2
37	Liliopsida	Cyperaceae Juss.	Tricostularia davisii R.L.Barrett & K.L.Wilson *(Davisâ€™ Tricostularia)*	native	P3
38	Liliopsida	Dasypogonaceae Dumort.	Dasypogon bromeliifolius R.Br. *(Pineapple Bush)*	native	
39	Liliopsida	Haemodoraceae R.Br.	Anigozanthos flavidus DC. *(Tall Kangaroo Paw)*	native	
40	Liliopsida	Haemodoraceae R.Br.	Anigozanthos viridis Endl. subsp. viridis	native	
41	Liliopsida	Haemodoraceae R.Br.	Haemodorum simplex Lindl.	native	
42	Liliopsida	Haemodoraceae R.Br.	Phlebocarya ciliata R.Br.	native	
43	Liliopsida	Hemerocallidaceae R.Br.	Caesia occidentalis R.Br.	native	
44	Liliopsida	Orchidaceae Juss.	Caladenia abbreviata Hopper & A.P.Br. *(Coastal Spider Orchid)*	native	P3
45	Liliopsida	Orchidaceae Juss.	Caladenia thinicola Hopper & A.P.Br. *(Scott River Spider Orchid)*	native	
46	Liliopsida	Orchidaceae Juss.	Microtis alba R.Br. *(White Mignonette Orchid)*	native	
47	Liliopsida	Orchidaceae Juss.	Microtis media R.Br. subsp. media	native	
48	Liliopsida	Philydraceae Link	Philydrella pygmaea subsp. minima L.G.Adams	native	P1
49	Liliopsida	Restionaceae R.Br.	Chordifex amblycoleus (F.Muell.) B.G.Briggs & L.A.S.Johnson	native	

50	Liliopsida	Restionaceae R.Br.	Chordifex gracilior (Benth.) B.G.Briggs & L.A.S.Johnson	native	P3
51	Liliopsida	Restionaceae R.Br.	Chordifex isomorphus (K.W.Dixon & Meney) B.G.Briggs & L.A.S.Johnson	native	
52	Liliopsida	Restionaceae R.Br.	Chordifex jacksonii B.G.Briggs & L.A.S.Johnson	native	P3
53	Liliopsida	Restionaceae R.Br.	Cytogonidium leptocarpoides (Benth.) B.G.Briggs & L.A.S.Johnson	native	
54	Liliopsida	Restionaceae R.Br.	Desmocladus Nees		
55	Liliopsida	Restionaceae R.Br.	Desmocladus castaneus B.G.Briggs & L.A.S.Johnson	native	
56	Liliopsida	Restionaceae R.Br.	Desmocladus fasciculatus (R.Br.) B.G.Briggs & L.A.S.Johnson	native	
57	Liliopsida	Restionaceae R.Br.	Empodisma gracillimum (F.Muell.) L.A.S.Johnson & D.F.Cutler	native	
58	Liliopsida	Restionaceae R.Br.	Hypolaena caespitosa B.G.Briggs & L.A.S.Johnson	native	
59	Liliopsida	Restionaceae R.Br.	Hypolaena pubescens (R.Br.) Nees	native	
60	Liliopsida	Restionaceae R.Br.	Hypolaena robusta Meney & Pate	native	P4
61	Liliopsida	Restionaceae R.Br.	Leptocarpus R.Br.		
62	Liliopsida	Restionaceae R.Br.	Leptocarpus laxus (R.Br.) B.G.Briggs	native	
63	Liliopsida	Restionaceae R.Br.	Leptocarpus scariosus R.Br.	native	
64	Liliopsida	Restionaceae R.Br.	Leptocarpus scoparius B.G.Briggs	native	
65	Liliopsida	Restionaceae R.Br.	Leptocarpus trisepalus (Nees) B.G.Briggs	native	
66	Liliopsida	Restionaceae R.Br.	Lepyrodia R.Br.		
67	Liliopsida	Restionaceae R.Br.	Lepyrodia heleocharoides Gilg	native	P3
68	Liliopsida	Restionaceae R.Br.	Lepyrodia macra Nees *(Large Scale Rush)*	native	
69	Liliopsida	Restionaceae R.Br.	Lepyrodia porterae B.G.Briggs & L.A.S.Johnson	native	
70	Liliopsida	Restionaceae R.Br.	Loxocarya cinerea R.Br.	native	
71	Liliopsida	Restionaceae R.Br.	Loxocarya magna Meney & K.W.Dixon	native	P3
72	Liliopsida	Restionaceae R.Br.	Melanostachya ustulata (Ewart & Sharman) B.G.Briggs & L.A.S.Johnson	native	
73	Liliopsida	Restionaceae R.Br.	Sporadanthus strictus (R.Br.) B.G.Briggs & L.A.S.Johnson	native	
74	Liliopsida	Restionaceae R.Br.	Tremulina B.G.Briggs & L.A.S.Johnson		
75	Liliopsida	Restionaceae R.Br.	Tremulina tremula (R.Br.) B.G.Briggs & L.A.S.Johnson	native	
76	Liliopsida	Xyridaceae C.Agardh	Xyris lanata R.Br.	native	
77	Liliopsida	Xyridaceae C.Agardh	Xyris roycei N.A.Wakef.	native	
78	Magnoliopsida	Apiaceae Lindl.	Xanthosia tasmanica Domin	native	
79	Magnoliopsida	Asteraceae Bercht. & J.Presl	Blennospora doliiformis Keighery	native	P3
80	Magnoliopsida	Asteraceae Bercht. & J.Presl	Cotula turbinata L.	alien	
81	Magnoliopsida	Asteraceae Bercht. & J.Presl	Leptinella drummondii (Benth.) D.G.Lloyd & C.J.Webb	native	P3
82	Magnoliopsida	Asteraceae Bercht. & J.Presl	Pithocarpa corymbulosa Lindl.	native	P3
83	Magnoliopsida	Asteraceae Bercht. & J.Presl	Vellereophyton dealbatum (Thunb.) Hilliard & B.L.Burtt	alien	
84	Magnoliopsida	Caryophyllaceae Juss.	Silene gallica L. var. gallica	alien	
85	Magnoliopsida	Celastraceae R.Br.	Tripterococcus sp. Brachylobus (A.S. George 14234)	native	P4
86	Magnoliopsida	Dilleniaceae Salisb.	Hibbertia stellaris Endl. *(Orange Stars)*	native	
87	Magnoliopsida	Droseraceae Salisb.	Drosera enodes N.G.Marchant & Lowrie	native	
88	Magnoliopsida	Droseraceae Salisb.	Drosera fimbriata DeBuhr	native	P4
89	Magnoliopsida	Droseraceae Salisb.	Drosera glanduligera Lehm.	native	
90	Magnoliopsida	Droseraceae Salisb.	Drosera leucoblasta Benth. *(Wheel Sundew)*	native	
91	Magnoliopsida	Ericaceae Juss.	Andersonia caerulea R.Br. subsp. caerulea	native	
92	Magnoliopsida	Ericaceae Juss.	Andersonia ferricola Lemson	native	P1
93	Magnoliopsida	Ericaceae Juss.	Andersonia sp. Amabile (N. Gibson & M. Lyons 355)	native	P3
94	Magnoliopsida	Ericaceae Juss.	Leucopogon alternifolius R.Br.	native	P3
95	Magnoliopsida	Ericaceae Juss.	Leucopogon australis R.Br.	native	
96	Magnoliopsida	Ericaceae Juss.	Leucopogon cordatus Sond.	native	
97	Magnoliopsida	Ericaceae Juss.	Leucopogon gilbertii Stschegl.	native	
98	Magnoliopsida	Ericaceae Juss.	Leucopogon wheelerae Hislop	native	P3
99	Magnoliopsida	Ericaceae Juss.	Needhamiella pumilio (R.Br.) L.Watson	native	

100	Magnoliopsida	Ericaceae Juss.	Sphenotoma gracilis (R.Br.) Sweet *(Swamp Paper-heath)*	native	
101	Magnoliopsida	Ericaceae Juss.	Styphelia intricata Hislop	native	P2
102	Magnoliopsida	Ericaceae Juss.	Styphelia pendula (R.Br.) Spreng.	native	
103	Magnoliopsida	Fabaceae Lindl.	Acacia inops Maiden & Blakely	native	P3
104	Magnoliopsida	Fabaceae Lindl.	Acacia lateriticola var. Glabrous variant (B.R.Maslin 6765)	native	P3
105	Magnoliopsida	Fabaceae Lindl.	Acacia myrtifolia (Sm.) Willd.	native	
106	Magnoliopsida	Fabaceae Lindl.	Acacia pulchella R.Br. var. pulchella	mixed	
107	Magnoliopsida	Fabaceae Lindl.	Acacia tayloriana F.Muell.	native	P4
108	Magnoliopsida	Fabaceae Lindl.	Aotus carinata Meisn.	native	P4
109	Magnoliopsida	Fabaceae Lindl.	Aotus gracillima Meisn.	native	
110	Magnoliopsida	Fabaceae Lindl.	Aotus intermedia Meisn.	native	
111	Magnoliopsida	Fabaceae Lindl.	Bossiaea praetermissa J.H.Ross	native	
112	Magnoliopsida	Fabaceae Lindl.	Daviesia inflata Crisp	native	
113	Magnoliopsida	Fabaceae Lindl.	Gastrolobium formosum (Lindl.) G.Chandler & Crisp	native	P3
114	Magnoliopsida	Fabaceae Lindl.	Gompholobium polymorphum R.Br.	native	
115	Magnoliopsida	Fabaceae Lindl.	Gompholobium tomentosum Labill. *(Hairy Yellow Pea)*	native	
116	Magnoliopsida	Fabaceae Lindl.	Jacksonia horrida DC.	native	
117	Magnoliopsida	Fabaceae Lindl.	Latrobea diosmifolia Benth.	native	
118	Magnoliopsida	Fabaceae Lindl.	Loricobbia pinifolia (Meisn.) R.L.Barrett & T.Macfarlane	native	P3
119	Magnoliopsida	Fabaceae Lindl.	Sphaerolobium drummondii Turcz.	native	
120	Magnoliopsida	Fabaceae Lindl.	Sphaerolobium macranthum Meisn.	native	
121	Magnoliopsida	Goodeniaceae R.Br.	Dampiera heteroptera Rajput & Carolin	native	P3
122	Magnoliopsida	Goodeniaceae R.Br.	Lechenaultia expansa R.Br.	native	
123	Magnoliopsida	Haloragaceae R.Br.	Gonocarpus pusillus (Benth.) Orchard	native	P4
124	Magnoliopsida	Lamiaceae Martinov	Hemigenia obovata F.Muell.	native	P1
125	Magnoliopsida	Lamiaceae Martinov	Hemigenia sp. Nillup (R.D. Royce 98)	native	P2
126	Magnoliopsida	Myrtaceae Juss.	Actinodium Schauer		
127	Magnoliopsida	Myrtaceae Juss.	Actinodium cunninghamii Schauer *(Albany Daisy)*	native	
128	Magnoliopsida	Myrtaceae Juss.	Agonis flexuosa (Willd.) Sweet var. flexuosa *(Peppermint)*	mixed	
129	Magnoliopsida	Myrtaceae Juss.	Astartea onycis Rye & Trudgen *(Clawed Astartea)*	native	P4
130	Magnoliopsida	Myrtaceae Juss.	Beaufortia sparsa R.Br. *(Swamp Bottlebrush)*	native	
131	Magnoliopsida	Myrtaceae Juss.	Calothamnus lateralis var. crassus (Benth.) A.S.George	native	P3
132	Magnoliopsida	Myrtaceae Juss.	Darwinia ferricola Keighery	native	EN
133	Magnoliopsida	Myrtaceae Juss.	Homalospermum firmum Schauer	native	
134	Magnoliopsida	Myrtaceae Juss.	Hypocalymma ericifolium Benth.	native	
135	Magnoliopsida	Myrtaceae Juss.	Hypocalymma strictum Schauer	native	
136	Magnoliopsida	Myrtaceae Juss.	Kunzea recurva Schauer	native	
137	Magnoliopsida	Myrtaceae Juss.	Kunzea sulphurea Tovey & P.Morris	native	
138	Magnoliopsida	Myrtaceae Juss.	Melaleuca basicephala Benth.	native	P4
139	Magnoliopsida	Myrtaceae Juss.	Melaleuca incana R.Br. subsp. incana	native	
140	Magnoliopsida	Myrtaceae Juss.	Melaleuca thymoides Labill.	native	
141	Magnoliopsida	Myrtaceae Juss.	Pericalymma crassipes Schauer	native	
142	Magnoliopsida	Myrtaceae Juss.	Pericalymma megaphyllum Cranfield	native	P1
143	Magnoliopsida	Myrtaceae Juss.	Pericalymma spongiocaule Cranfield	native	
144	Magnoliopsida	Myrtaceae Juss.	Taxandria inundata J.R.Wheeler & N.G.Marchant	native	
145	Magnoliopsida	Myrtaceae Juss.	Taxandria parviceps (Schauer) J.R.Wheeler & N.G.Marchant	native	
146	Magnoliopsida	Myrtaceae Juss.	Verticordia lehmannii Schauer	native	P4
147	Magnoliopsida	Myrtaceae Juss.	Verticordia plumosa var. vassensis A.S.George	native	EN
148	Magnoliopsida	Proteaceae Juss.	Adenanthos detmoldii F.Muell. *(Scott River Jugflower)*	native	P4
149	Magnoliopsida	Proteaceae Juss.	Adenanthos meisneri Lehm.	native	
150	Magnoliopsida	Proteaceae Juss.	Adenanthos x pamela E.C.Nelson	native	P4
151	Magnoliopsida	Proteaceae Juss.	Banksia attenuata R.Br. *(Slender Banksia)*	native	
152	Magnoliopsida	Proteaceae Juss.	Banksia dallanneyi A.R.Mast & K.R.Thiele subsp. dallanneyi	native	
153	Magnoliopsida	Proteaceae Juss.	Banksia ilicifolia R.Br. *(Holly-leaved Banksia)*	native	

154	Magnoliopsida	Proteaceae Juss.	Banksia littoralis R.Br. *(Swamp Banksia)*	native	
155	Magnoliopsida	Proteaceae Juss.	Banksia meisneri subsp. ascendens (A.S.George) A.S.George *(Scott River Banksia)*	native	P4
156	Magnoliopsida	Proteaceae Juss.	Banksia nivea subsp. uliginosa (A.S.George) A.R.Mast & K.R.Thiele	native	EN
157	Magnoliopsida	Proteaceae Juss.	Conospermum caeruleum subsp. debile (Meisn.) E.M.Benn.	native	
158	Magnoliopsida	Proteaceae Juss.	Conospermum flexuosum R.Br.	native	
159	Magnoliopsida	Proteaceae Juss.	Conospermum quadripetalum E.M.Benn.	native	CR
160	Magnoliopsida	Proteaceae Juss.	Grevillea brachystylis Meisn.	native	Parent of conservation listed taxa
161	Magnoliopsida	Proteaceae Juss.	Grevillea brachystylis subsp. australis Keighery	native	CR
162	Magnoliopsida	Proteaceae Juss.	Grevillea manglesii PÃ©pin	native	
163	Magnoliopsida	Proteaceae Juss.	Grevillea manglesioides subsp. ferricola Keighery	native	P3
164	Magnoliopsida	Proteaceae Juss.	Grevillea manglesioides subsp. metaxa Makinson	native	
165	Magnoliopsida	Proteaceae Juss.	Grevillea papillosa (McGill.) Olde & Marriott	native	P3
166	Magnoliopsida	Proteaceae Juss.	Hakea tuberculata R.Br.	native	
167	Magnoliopsida	Proteaceae Juss.	Hakea varia R.Br.	native	
168	Magnoliopsida	Proteaceae Juss.	Isopogon formosus subsp. dasylepis (Meisn.) Foreman	native	P3
169	Magnoliopsida	Proteaceae Juss.	Lambertia orbifolia subsp. vespera A.D.Webb, L.T.Monks & Wege *(Scott River Honeysuckle)*	native	EN
170	Magnoliopsida	Proteaceae Juss.	Synaphea macrophylla A.S.George	native	P1
171	Magnoliopsida	Proteaceae Juss.	Synaphea nexosa A.S.George	native	P1
172	Magnoliopsida	Proteaceae Juss.	Synaphea otiostigma A.S.George	native	P3
173	Magnoliopsida	Proteaceae Juss.	Synaphea petiolaris R.Br. *(Synaphea)*	native	
174	Magnoliopsida	Proteaceae Juss.	Synaphea petiolaris subsp. triloba A.S.George	native	
175	Magnoliopsida	Rhamnaceae Juss.	Spyridium spadiceum (Fenzl) Benth.	native	P4
176	Magnoliopsida	Rhamnaceae Juss.	Stenanthemum sublineare Rye	native	P2
177	Magnoliopsida	Rubiaceae Juss.	Opercularia hispidula Endl.	native	
178	Magnoliopsida	Rutaceae Juss.	Boronia anceps Paul G.Wilson	native	P3
179	Magnoliopsida	Rutaceae Juss.	Boronia exilis Paul G.Wilson	native	EN
180	Magnoliopsida	Rutaceae Juss.	Boronia spathulata Lindl. *(Boronia)*	native	
181	Magnoliopsida	Santalaceae R.Br.	Leptomeria dielsiana Pilg. *(Diel's Currant Bush)*	native	EX
182	Magnoliopsida	Santalaceae R.Br.	Leptomeria furtiva Lepschi	native	P2
183	Magnoliopsida	Santalaceae R.Br.	Leptomeria squarrulosa R.Br.	native	
184	Magnoliopsida	Stylidiaceae R.Br.	Levenhookia preissii (Sond.) F.Muell.	native	P1
185	Magnoliopsida	Stylidiaceae R.Br.	Stylidium amoenum R.Br. var. amoenum	native	
186	Magnoliopsida	Stylidiaceae R.Br.	Stylidium calcaratum R.Br.	native	
187	Magnoliopsida	Stylidiaceae R.Br.	Stylidium despectum R.Br. *(Dwarf Triggerplant)*	native	
188	Magnoliopsida	Stylidiaceae R.Br.	Stylidium inundatum R.Br.	native	
189	Magnoliopsida	Stylidiaceae R.Br.	Stylidium leeuwinense Lowrie & Kenneally	native	P4
190	Magnoliopsida	Stylidiaceae R.Br.	Stylidium repens R.Br. *(Matted Triggerplant)*	native	
191	Magnoliopsida	Stylidiaceae R.Br.	Stylidium sp. Scott River Plain (N.G. Marchant 74/23)	native	P1
192	Magnoliopsida	Stylidiaceae R.Br.	Stylidium trudgenii Lowrie & Kenneally	native	P3
193	Magnoliopsida	Thymelaeaceae Juss.	Pimelea hispida R.Br. *(Bristly Pimelea)*	native	
194	Magnoliopsida	Thymelaeaceae Juss.	Pimelea longiflora R.Br.	native	
195	Magnoliopsida	Violaceae Batsch	Pigea volubilis (E.M.Benn.) P.I.Forst.		P2

Conservation status definitions

Threatened species

- CR – Critically Endangered
- EN – Endangered
- VU – Vulnerable
- EX – Extinct
- EW – Extinct in the Wild
- CD – Species of special conservation interest (conservation dependent)
- OS – Species otherwise in need of special protection (other specially protected)
- MI – Migratory
- SP – Specially protected species

Priority species

- P1 – Priority 1: Poorly-known species – known from few locations, none on conservation lands
- P2 – Priority 2: Poorly-known species – known from few locations, some on conservation lands
- P3 – Priority 3: Poorly-known species – known from several locations
- P4 – Priority 4: Rare, Near Threatened and other species in need of monitoring

Dandjoo specific codes

- Parent of conservation listed taxa
- Cons code inherited from parent, X

Read full definitions at https://bio.wa.gov.au/guide/conservation-status-definitions

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Further note, precise locations of conservation listed species are considered sensitive. To protect this information, obfuscation has been applied to conservation-listed species records. For these species, the true location is Â±10km from the search area used to generate this species list.

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Register

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Search Criteria

1 Aboriginal Cultural Heritage (ACH) Register in Custom search area - Polygon - 115.265855430364°E, 34.2631202316705°S (GDA94) : 115.265855430364°E, 34.1928645767378°S (GDA94) : 115.327138541936°E, 34.1928645767378°S (GDA94) : 115.327138541936°E, 34.2631202316705°S (GDA94) : 115.265855430364°E, 34.2631202316705°S (GDA94)

Disclaimer

Aboriginal heritage holds significant value to Aboriginal people for their social, spiritual, historical, scientific, or aesthetic importance within Aboriginal traditions, and provides an essential link for Aboriginal people to their past, present and future. In Western Australia Aboriginal heritage is protected under the *Aboriginal Heritage Act 1972*.

All Aboriginal cultural heritage in Western Australia is protected, whether or not the ACH has been reported or exists on the Register.

The information provided is made available in good faith and is predominately based on the information provided to the Department of Planning, Lands and Heritage by third parties. The information is provided solely on the basis that readers will be responsible for making their own assessment as to the accuracy of the information. If you find any errors or omissions in our records, including our maps, it would be appreciated if you provide the details to the Department via https://achknowledge.dplh.wa.gov.au/ach-enquiry-form and we will make every effort to rectify it as soon as possible.

South West Settlement ILUA Disclaimer

Your heritage enquiry is on land **within or adjacent to** the following Indigenous Land Use Agreement(s): South West Boojarah #2 Indigenous Land Use Agreement.

On 8 June 2015, six identical Indigenous Land Use Agreements (ILUAs) were executed across the South West by the Western Australian Government and, respectively, the Yued, Whadjuk People, Gnaala Karla Booja, Ballardong People, South West Boojarah #2 and Wagyl Kaip & Southern Noongar groups, and the South West Aboriginal Land and Sea Council (SWALSC).

The ILUAs bind the parties (including 'the State', which encompasses all State Government Departments and certain State Government agencies) to enter into a Noongar Standard Heritage Agreement (NSHA) when conducting Aboriginal Heritage Surveys in the ILUA areas, unless they have an existing heritage agreement. It is also intended that other State agencies and instrumentalities enter into the NSHA when conducting Aboriginal Heritage Surveys in the ILUA areas. It is recommended a NSHA is entered into, and an 'Activity Notice' issued under the NSHA, if there is a risk that an activity will ‘impact’ (i.e. by excavating, damaging, destroying or altering in any way) an Aboriginal heritage site. The Aboriginal Heritage Due Diligence Guidelines, which are referenced by the NSHA, provide guidance on how to assess the potential risk to Aboriginal heritage.

Likewise, from 8 June 2015 the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) in granting Mineral, Petroleum and related Access Authority tenures within the South West Settlement ILUA areas, will place a condition on these tenures requiring a heritage agreement or a NSHA before any rights can be exercised.

If you are a State Government Department, Agency or Instrumentality, or have a heritage condition placed on your mineral or petroleum title by DEMIRS, you should seek advice as to the requirement to use the NSHA for your proposed activity. The full ILUA documents, maps of the ILUA areas and the NSHA template can be found at https://www.wa.gov.au/organisation/department-of-the-premier-and-cabinet/south-west-native-title-settlement.

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  - **Men only:** Only *males* can view restricted information.
  - **Women only:** Only *females* can view restricted information.

Status:

- **Register:** Aboriginal cultural heritage places that are assessed as meeting Section 5 of the *Aboriginal Heritage Act 1972*.
- **Lodged:** Information which has been received in relation to an Aboriginal cultural heritage place, but is yet to be assessed under Section 5 of the *Aboriginal Heritage Act 1972.*
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Coordinates

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Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Register

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
20434	Blackwood River	No	Yes	No	No Gender / Initiation Restrictions	Register	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	

Department of Planning, Lands and Heritage

Aboriginal Cultural Heritage Inquiry System

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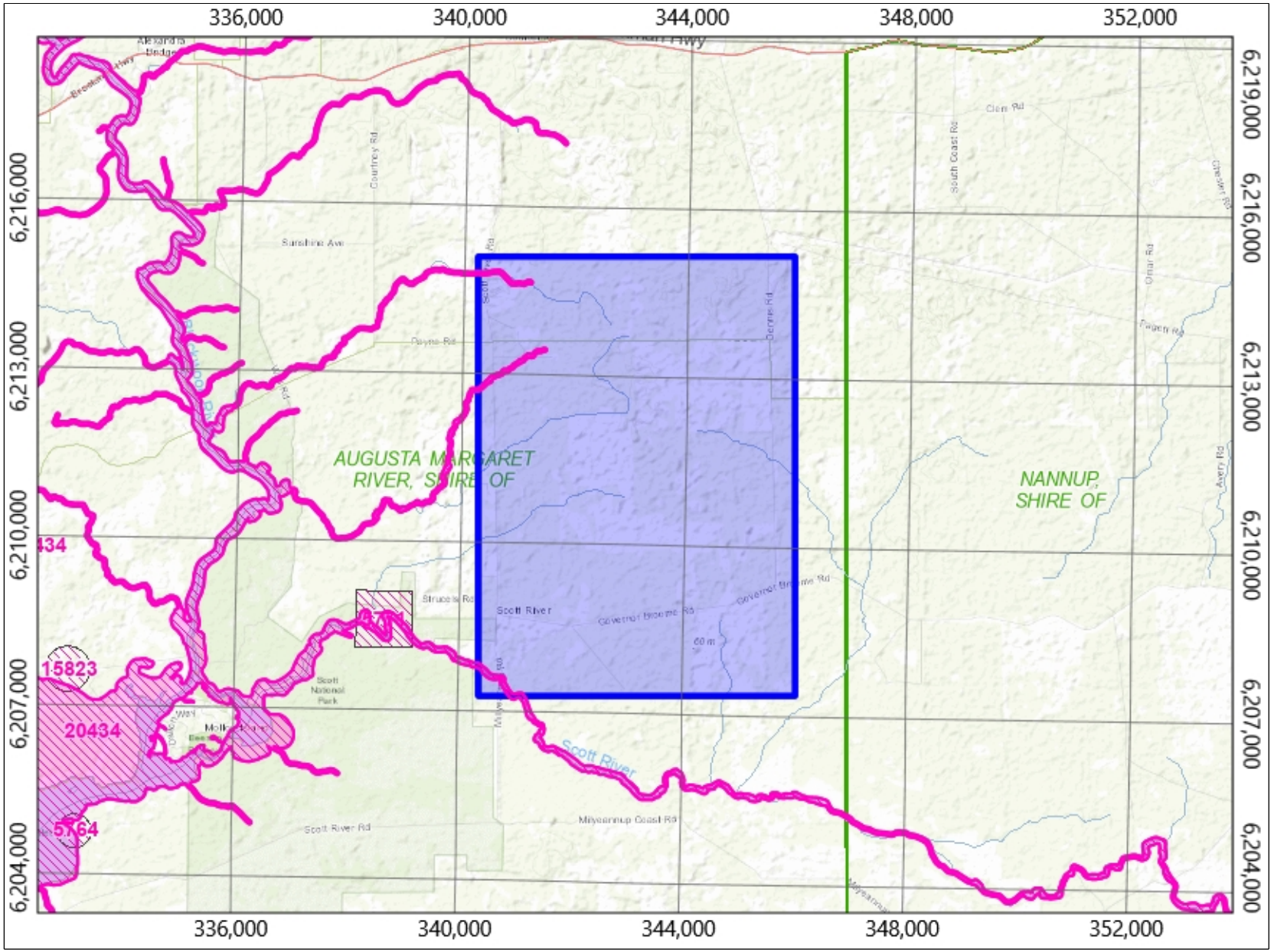

Legend

- Aboriginal Cultural Heritage (ACH) Register
- Search Area
- Aboriginal Community
  - *Permanent*
  - *Seasonal*
  - *Town Based*
- Town
- Road
- River
- Local Government Authority

4.12 kilometres

Map Scale 1 : 125,000

MGA Zone 50 (GDA2020)

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Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Lodged

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Search Criteria

1 Aboriginal Cultural Heritage (ACH) Lodged in Custom search area - Polygon - 115.265855430364°E, 34.2631202316705°S (GDA94) : 115.265855430364°E, 34.1928645767378°S (GDA94) : 115.327138541936°E, 34.1928645767378°S (GDA94) : 115.327138541936°E, 34.2631202316705°S (GDA94) : 115.265855430364°E, 34.2631202316705°S (GDA94)

Disclaimer

Aboriginal heritage holds significant value to Aboriginal people for their social, spiritual, historical, scientific, or aesthetic importance within Aboriginal traditions, and provides an essential link for Aboriginal people to their past, present and future. In Western Australia Aboriginal heritage is protected under the Aboriginal Heritage Act 1972.

All Aboriginal cultural heritage in Western Australia is protected, whether or not the ACH has been reported or exists on the Register.

The information provided is made available in good faith and is predominately based on the information provided to the Department of Planning, Lands and Heritage by third parties. The information is provided solely on the basis that readers will be responsible for making their own assessment as to the accuracy of the information. If you find any errors or omissions in our records, including our maps, it would be appreciated if you provide the details to the Department via https://achknowledge.dplh.wa.gov.au/ach-enquiry-form and we will make every effort to rectify it as soon as possible.

South West Settlement ILUA Disclaimer

Your heritage enquiry is on land within or adjacent to the following Indigenous Land Use Agreement(s): South West Boojarah #2 Indigenous Land Use Agreement.

On 8 June 2015, six identical Indigenous Land Use Agreements (ILUAs) were executed across the South West by the Western Australian Government and, respectively, the Yued, Whadjuk People, Gnaala Karla Booja, Ballardong People, South West Boojarah #2 and Wagyl Kaip & Southern Noongar groups, and the South West Aboriginal Land and Sea Council (SWALSC).

The ILUAs bind the parties (including 'the State', which encompasses all State Government Departments and certain State Government agencies) to enter into a Noongar Standard Heritage Agreement (NSHA) when conducting Aboriginal Heritage Surveys in the ILUA areas, unless they have an existing heritage agreement. It is also intended that other State agencies and instrumentalities enter into the NSHA when conducting Aboriginal Heritage Surveys in the ILUA areas. It is recommended a NSHA is entered into, and an 'Activity Notice' issued under the NSHA, if there is a risk that an activity will ‘impact’ (i.e. by excavating, damaging, destroying or altering in any way) an Aboriginal heritage site. The Aboriginal Heritage Due Diligence Guidelines, which are referenced by the NSHA, provide guidance on how to assess the potential risk to Aboriginal heritage.

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Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Lodged

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ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	Place Type	Knowledge Holders	Legacy ID
22928	Scott River	No	Yes	No	No Gender / Initiation Restrictions	Lodged	Creation / Dreaming Narrative; Water Source	*Registered Knowledge Holder names available from DPLH	

Department of Planning, Lands and Heritage

Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Lodged

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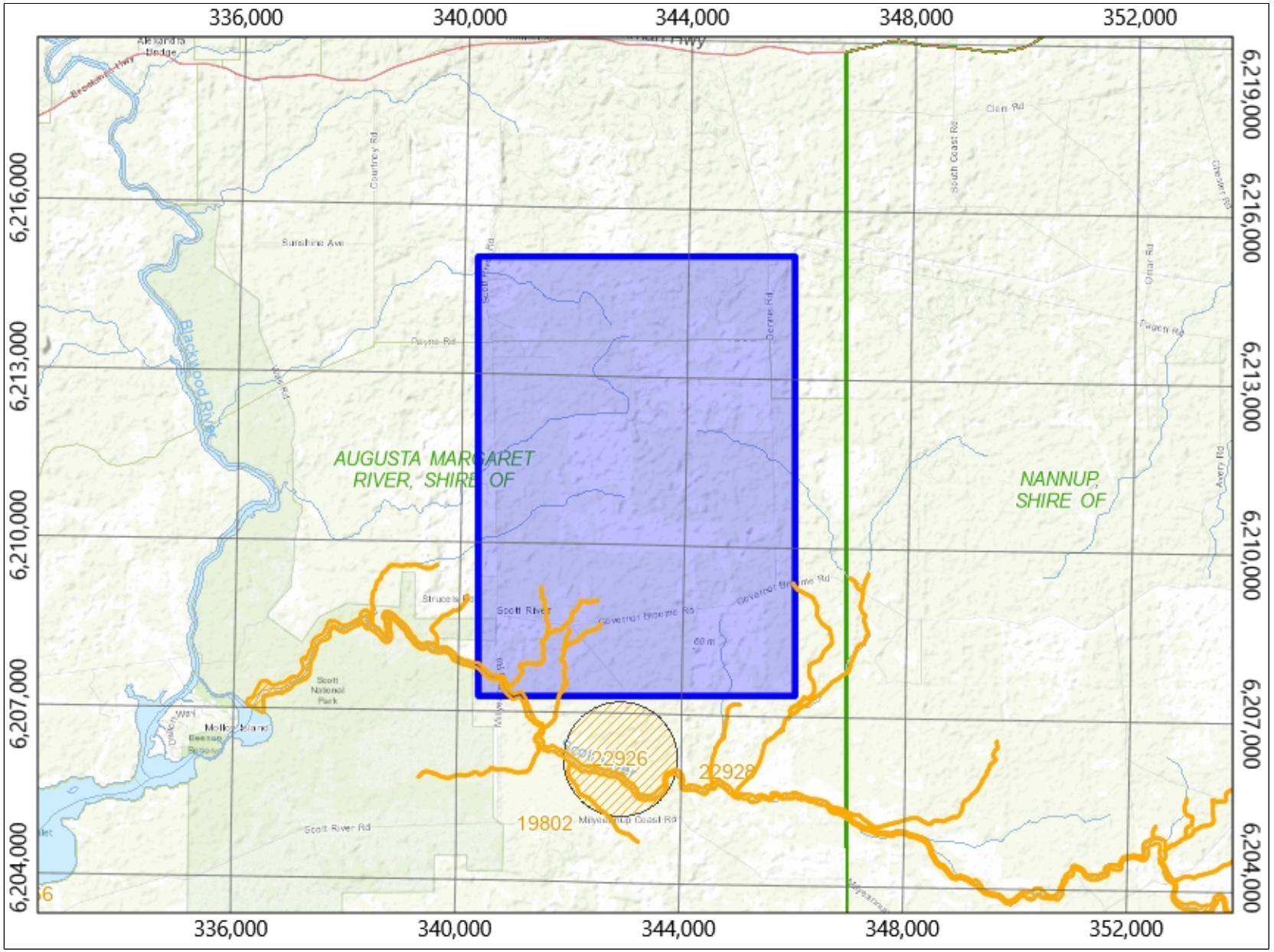

Legend

- Aboriginal Cultural Heritage (ACH) Lodged
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  - *Permanent*
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- Road
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- Local Government Authority

4.12 kilometres

Map Scale 1 : 125,000

MGA Zone 50 (GDA2020)

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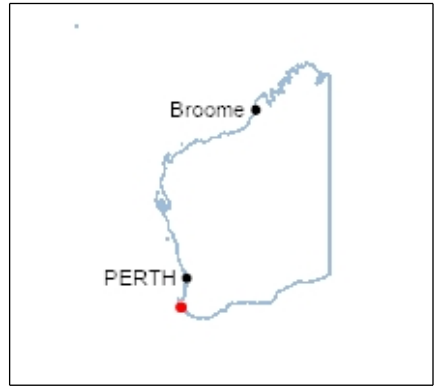


Appendix C – Sampling and Groundwater Bore Construction Logs

Stantec

SOIL AND ROCK EXPLANATORY NOTES, ABBREVATIONS & TERMS (DESCRIPTIONS, CLASSIFICATION CHARTS AND LOG KEYS)

CLASSIFICATION AND INFERRED STRATISGRAPHY

Soil and rock are classified and described in accordance with the recommendations of Australian Standard AS 1726-2017 Geotechnical Site Investigations which unless mentioned otherwise has been used to prepare these notes. The material properties are assessed in the field by visual/tactile methods. The order in which descriptions are provided on logs is as follows:

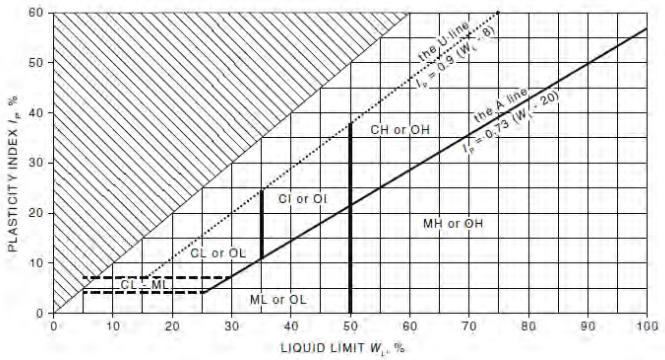
SOIL TYPE (AS 1726-2017 Classification) using BLOCK LETTERS, colour, structure, particle characteristics, geological origin, other minor components. The consistency/density and moisture conditions are listed as abbreviations in separate columns.

The presence of FILL and TOPSOIL shall be indicated at the beginning of the description using BLOCK LETTERS.

Particle Size Definitions

Fraction	Components	Sub Division	Particle Size
Oversize	BOULDERS		> 200mm
	COBBLES		63 – 200mm
Coarse Grained	GRAVEL	Coarse	19 – 63mm
		Medium	6.70 – 19mm
		Fine	2.36 – 6.70mm
	SAND	Coarse	0.60 – 2.36mm
		Medium	0.21 – 0.60mm
		Fine	0.075 – 0.21mm
Fine Grained	SILT		0.002 – 0.075mm
	CLAY		< 0.002mm

Plasticity Properties



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

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

Major Soil Group	Descriptor	
G - Gravel **S** - Sand	**W** - Well-Graded **P** - Poorly-Graded **S** - Silty **C** - Clayey	**Coefficient of Uniformity (C_u) :** $C_u = D_{60} / D_{10}$
		Coefficient of Curvature (C_c) : $C_c = (D_{30})^2 / (D_{10}D_{60})$
		D_{10} – Grain Diameter (mm) Corresponding to 10% Soil Passing
		D_{30} – Grain Diameter (mm) Corresponding to 30% Soil Passing
		D_{60} – Grain Diameter (mm) Corresponding to 60% Soil Passing
M - Silt **C** - Clay **O** - Organic	**L** - Low Plasticity (LL < 35%) **H** - High Plasticity (LL > 50%)	**NOTE:** Well-Graded Sand (SW) : $C_u > 6$ and $C_c = 1\text{-}3$ Well-Graded Gravel (GW) : $C_u > 4$ and $C_c = 1\text{-}3$

Organic – The soil has between 20% – 75% Organic Matter / Medium Plasticity (Fine Grained Clay Soils ONLY): 35% < LL < 50%

MINOR COMPONENTS

Zoning	Description
Layer	The zone is continuous across the exposure or sample
Lens	Discontinuous layer of different material, with lenticular shape
Pocket	Irregular inclusions of different material
Interbedded / Interlaminated	Layers of alternating soil types are too thin to be described individually

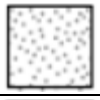
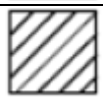
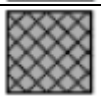
The structure of soil layers may include: defects such as softened zones, fissures, cracks, joints and root-holes; and coarse-grained soils may be described as strongly or weakly cemented.

Cementation State	Description
Uncemented (Uc)	No cementation present
Weakly Cemented (Wk)	The soil may be easily disaggregated by hand in air or water
Moderately Cemented (Mo)	Effort is required to disaggregate the soil by hand in air or water

Terminology	Field Guide	Coarse Grained Soils		Fine Grained Soils
		Percentage Fines	Percentage Coarse	Percentage Coarse
Trace	Presence just detectable	≤ 5%	≤ 15%	≤ 15%
With	Presence easily detectable	> 5% / ≤ 12%	> 15% / ≤ 30%	> 15% / ≤ 30%

Soil types may be qualified by the presence of minor components on the basis of field examination methods and/or the soil grading

SYMBOLS

	GRAVEL (GW / GP / GM /GC)		COBBLES & BOULDERS
	SAND (SW / SP / SM / SC)		PEAT (Pt)
	SILT (ML / OL / MH / OH)		TOPSOIL
	CLAY (CL / OL / CH / OH)		FILL

Combinations of these basic graphic symbols may be used to indicate and describe mixed materials such as Gravelly CLAY. EXAMPLE: GP-GC = Poorly-Graded GRAVEL with Silt

SOIL ORIGIN DESCRIPTIONS

Fill	Anthropogenic deposits or disturbed material
Topsoil	Zone of soil affected by roots and root fibres
Peat	Significantly organic soils
Colluvial	Transported down slopes by gravity and/or water
Aeolian	Transported and deposited by wind
Alluvial	Deposited by streams and rivers
Estuarine	Deposited in coastal estuaries
Lacustrine	Deposited in freshwater lakes
Marine	Deposits in marine environments
Residual Soil	Soil formed by in situ weathering of rock, with no structure/fabric of parent rock evident
Extremely Weathered Material	Formed by in-situ weathering of geological formations, with the structure/fabric of parent rock intact but with soil strength properties

MOISTURE CONDITIONS (COARSE GRAINED AND FINED GRAINED SOILS)

Symbol	Term	Description
Coarse Grained Soils -		
D	Dry	Non-cohesive and free running/flowing
M	Moist	Soil feels cool, darkened in colour, soil tends to stick together
W	Wet	Soil feels cool, darkened in colour, soil tends to stick together, free water forms when handling
Fine Grained Soils -		
w < PL	Moist	Moist, Dry of Plastic Limit (PL), hard and friable or powdery
w ≈ PL		Moist, near Plastic Limit (PL), soils can be moulded at a moisture content approximately equal to the Plastic Limit (PL)
w > PL		Moist, Wet of Plastic Limit (PL), soils usually weakened and free water forms on hands when handling
w ≈ LL	Wet	Wet, near Liquid Limit (LL)
w > LL		Wet, Wet of Liquid Limit (LL)

MOISTURE CONDITIONS (ROCK)		
Symbol	**Term**	**Description**
D	Dry	Looks and feels dry
M	Moist	Feels cool, darkened in colour, nut no water is visible on the surface
W	Wet	Feels cool, darkened in colour, water film or droplets visible on the surface

GROUNDWATER	
	Water Level at Date Shown
	Water Inflow - Water Flowing/Flooding into Hole
	Water Outflow - Partial Water Loss
	Water Outflow - Complete Water Loss
GROUNDWATER NOT OBSERVED	The observation of groundwater, whether present or not, was not possible due to drilling water surface seepage or cave in of the borehole and/or test pit
GROUNDWATER NOT ENCOUNTERED	The borehole and/or test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole and/or test pit been left open for a longer period.

Perched groundwater may result in a misleading indication of the depth to the true water table. Groundwater levels are also likely to fluctuate with variations in climatic and site conditions.

DENSITY / CONSISTENCY (COARSE GRAINED AND FINE GRAINED SOILS)

Relative Density (Coarse Grained Soils) -

Symbol	Term	Density Index (%)	SPT (150mm) *	DCP (100mm) *	DCP (150mm) *
VLs	Very Loose	Less than 15%	0 - 4	0 - 1	0 - 1
Ls	Loose	15% - 35%	4 - 10	1 - 2	1 - 3
MD	Medium Dense	35% - 65%	10 - 30	2 - 5	3 - 8
D	Dense	65% - 85%	30 - 50	5 - 10	8 - 15
VD	Very Dense	More than 85%	> 50	> 10	> 15

Consistency (Fine Grained Soils) -

Symbol	Term	Undrained Shear Strength (kPa)	Field Guide	DCP (100mm) *	DCP (150mm) *
VS	Very Soft	Less than 12kPa	Exudes between fingers when squeezed in hand	0	0
S	Soft	12kPa - 25kPa	Can be moulded by light finger pressure	0 -1	0 - 1.5
F	Firm	25kPa - 50kPa	Can be moulded by strong finger pressure	1 - 2	1.5 - 3
St	Stiff	50kPa - 100kPa	Cannot be moulded by fingers, can be indented by thumb	2 - 4	3 - 6
VSt	Very Stiff	100kPa - 200kPa	Can be easily indented by thumb nail	4 - 8	6 - 12
Hd	Hard	More than 200kPa	Can be indented with difficult by thumb nail	> 8	> 12

(*) - Number of blows are depth related and can vary significantly. In the absence of test results, consistency and density may be assessed from correlations with the observed behaviour of the material. SPT and DCP are not stated in AS 1726-2017, and may be subject to corrections for overburden pressure and equipment type. Corrections have not been performed in preparing the following logs.

C	Curved	The defect has a gradual change in orientation.
U	Undulating	The defect has a wavy surface.
St	Stepped	The defect has one or more well defined steps.
I	Irregular	The defect has many sharp changes of orientation.
Alternatively, the surface roughness may be characterised by the Joint Roughness Coefficient (JRC) [AS 1726:2017 – Figure 9]		
Defect Coatings and Composition of Seams -		
KL	Clean	No visible coatings.
S	Stained	No visible coating but surfaces are discoloured.
V	Veneer	A visible coating of soil or mineral, too thin to measure; may be patchy.
C	Coating	A visible coating up to 1mm thick. Thicker soil material shall be described using defect terms (e.g. infilled seam). Thicker rock strength material shall be described as a vein.

DRILLING / EXCAVATION METHODS

Subsurface investigations may be conducted by either one or a combination of the following methods.

Test Pitting: Excavation/Trench [TP] -		**Spiral Flight Auger Drilling [SFAD] -**	
BH	Backhoe Bucket	AS	Auger Screwing
EX	Excavator Bucket	AD/V	Continuous Flight Auger with V-Bit
R	Ripper	AD/T	Continuous Spiral Flight Auger with TC-Bit
H	Hydraulic Hammer	ADH	Continuous Hollow Flight Auger
EE	Existing Excavation	**Rotary Non-Core Drilling [RNCD] -**	
N	Natural Exposure	WB	Washbore Drilling
Manual Drilling: Hand Operated Tools [MD] -		RR	Rock Roller
HA	Hand Auger	AIRCORE	Air Core
HAND	Excavated by Hand Methods	JET	Jetting
Continuous Sample Drilling [CSD] -		**Rotary Core Drilling [RCD] -**	
PT	Push Tube Sampling	PQ3	83mm - Diamond Wire Line Core Barrel
EPT	Extruded Push Tube	HMLC	63mm - Diamond Wire Line Core Barrel
PS	Percussion Sampling	HQ3	61mm - Diamond Wire Line Core Barrel
SONIC	Sonic Drilling	NMLC	52mm - Diamond Conventional Core Barrel
Hammer Drilling [HD] -		NQ3	45mm - Diamond Wire Line Core Barrel
AH	Air Hammer	DTC	Diatube Concrete Coring
AT	Air Track		
RAB	Percussion Rotary Air Blast		
RC	Reverse Circulation		

Boreholes -

Vertical Boreholes	The dip (inclination from horizontal) of the defect is given
Inclined Boreholes	The inclination is measured as the acute angle between the core axis and the vertical direction

PENETRATION / EXCAVATION RESISTANCE

VE	Very Easy	Rapid penetration possible with very little effort from the equipment used
E	Easy	Rapid penetration possible with little effort from the equipment used
F	Firm	Excavation possible at an acceptable rate with moderate effort from the equipment used
H	Hard	Further penetration is possible at a slow rate and requires significant effort from the equipment used
VH	Very Hard	Further penetration is possible at a very slow rate and requires maximum effort from the equipment used

These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator.

EXCAVATION STABILITY CONDITIONS	
Stable	No obvious/gross short-term instability noted
Unstable	Collapse of the majority, or one or more faces of the excavation
Flooding	Excavation filled with water
Major Spalling	Major material falling into excavation
Minor Spalling	Minor material falling into excavation

CORE DRILLING PARAMETERS

There are a number of parameters that may be measured during core drilling (of both soil and rock profiles), and which may provide useful investigation data. The measurements that define these parameters should be taken during the drilling process, when drill core is relatively undamaged.

Symbol	Term	Calculation Formula
TCR	Total Core Recovery	$\text{TCR} = \frac{\text{Length of Core Recovered}}{\text{Length of Core Run}} \times 100\%$
RQD	Rock Quality Designation	$\text{RQD} = \frac{\sum \text{Length of Sound Core Pieces} > 100\text{mm in Length}}{\text{Length of Core Run}} \times 100\%$
FF	Fracture Frequency	$\text{FF} = \frac{\text{Number of Defects}}{\text{Length of Core Recovered (m)}}$

SAMPLING METHODS			
BDS	Bulk Disturbed Sample	SPT	Standard Penetration Test Sample
DS	Disturbed Sample	ES	Environmental Soil Sample
U	Thin Wall Tube Undisturbed Sample	WS	Environmental Water Sample
C	Core Sample	ASS	Acid Sulfate Soil Sample

TESTING METHODS	
SPT	Standard Penetration Test (AS 1289.6.3.1) – Blows per 150mm and N Value
N	Blows per 300mm Penetration following 150mm seating (First 150mm)
RW	Penetration occurred under the rod weight only
HW	Penetration occurred under the hammer and the rod weight only
HB	Hammer double bouncing on anvil
HP / PP	Hand/Pocket Penetrometer Test expressed as instrument reading in kPa
PSP	Perth Sand Penetrometer (AS 1289.6.3.3) – Blows per 150mm
DCP	Dynamic Cone Penetrometer (AS 1289.6.3.2) – Blows per 150mm
CPT	Cone Penetration Test
CPTu	Cone Penetration Test with Pore Pressure (u) measurement
WPT	Water Pressure Test
FP	Field Permeability Test over section noted
FV	Field Vane Shear Test expressed as Uncorrected Shear Strength (sv = Peak Value / sr = Residual Value)
PID	Photoionisation Detector Reading in ppm (Parts Per Million)
PM	Pressuremeter Test over section noted

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CORE LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: WM01

Job No: 304501017 **Sheet:** 1 of 4

Position: E341346.000 N6215506.000 **Angle from Horizontal:** 90° **Surface Elevation:** 40.000 m AHD
Rig Type: Geoprobe 7822dt **Mounting:** Track **Contractor:** National Geotech
Data Started: 26/2/24 **Date Completed:** 27/2/24 **Logged By:** ES **Checked By:** BP

Drilling					Material Description						Defect Description			
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects
PT	PVC	1	39	1	TS		0.10m TOPSOIL: SAND: fine to coarse grained, sub-rounded to sub-angular, quartz and organics, dark black brown mottled; with silt. (Topsoil)	Uc	VLs to Ls	SPT 0.00 - 0.45 m 2, 2, 2 N*=4	100	0		0.00: PID: 6.6ppm 0.00: PID: 6.6ppm; SPT Recovery: 0.45 m 0.00: QC1
					QDD		SAND (SP): fine to coarse grained, sub-rounded to sub-angular, pale grey brown to; with silty fines. (Aeolian)							0.50: PID: 4.0ppm
														1.00: PID: 4.6ppm
		2	38	2			1.60m Sandy CLAY (CI): medium plasticity, pale grey and dark grey; sand, fine to coarse grained, sub angular to sub rounded; zones of clay high plasticity; zones of sand; medium to coarse grained, sub angular to sub rounded; (Residual Soil)		VS	SPT 1.50 - 1.95 m 1, 0, 1 N*=1	100	0		1.50: PID: 5.3ppm 1.50: PID: 5.3ppm; SPT Recovery: 0.45 m
									S to F					
		3	37	3						SPT 3.00 - 3.45 m 0, 1, 2 N*=3	100	0		3.00: SPT Recovery: 0.45 m
			36	4										
		4	35	5	Leederville Formation					SPT 4.50 - 4.95 m 2, 1, 3 N*=4	100	0		4.50: SPT Recovery: 0.45 m
									St					
		5	34	6						SPT 6.00 - 6.45 m 1, 4, 5 N*=9	100	0		6.00: SPT Recovery: 0.45 m
			33	7						SPT 7.50 - 7.95 m 1, 3, 4 N*=7				7.50: SPT Recovery: 0.45 m

Water Level

Monitoring Well Details: WM01 - 0.7m stickup

DRILLING
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller
PQ Rotary core (85mm)
HQ Rotary core (63.5mm)
NMLC Rotary core (51.94mm)
DT Diatube concrete coring
PT Push tube
PS Percussion sampling
SON Sonic drilling
AH Air hammer

WATER
Water Level on date shown
water inflow
water outflow

ROCK QUALITY DESCRIPTIONS
RQD Rock Quality Designation (%)
TCR Total Core Recovery (%)

ROCK STRENGTH
EH Extremly High
VH Very High
H High
M Medium
L Low
VL Very Low

ROCK WEATHERING
FR Fresh
SW Slightly Weathered
MW Moderately Weathered
HW Highly Weathered
XW Extremly Weathered

DEFECT TYPE
J Joint
P Parting
SM Seam
SZ Sheared zone
FL Foliation
V Vein
CSM Crushed Seam
FZ Fracture Zone
HB Handing Break
DB Drilling Break

PLANARITY
PL Planar
IR Irregular
CU Curved
DIS Discontinuous
ST Stepped
UN Undulose

ROUGHNESS
VR Very Rough
RO Rough
SO Smooth
SL Slockensided
POL Polished

COATING
CN Clean
STN Stained
VN Veneer (thin or patchy)
CT Coating (up to 1mm)

INFILL MATERIALS
X Carbonaceus
MU Unidentified minteral
MS Secondary mineral
KT Chlorite
CA Calcite
Fe Iron Oxide
Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: WM01

Job No: 304501017 **Sheet:** 2 of 4

Position: E341346.000 N6215506.000 **Angle from Horizontal:** 90° **Surface Elevation:** 40.000 m AHD
Rig Type: Geoprobe 7822dt **Mounting:** Track **Contractor:** National Geotech
Data Started: 26/2/24 **Date Completed:** 27/2/24 **Logged By:** ES **Checked By:** BP

Drilling					Material Description						Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
PT		6	31	9			Sandy CLAY (Cl): medium plasticity, pale grey and dark grey; sand, fine to coarse grained, sub angular to sub rounded; zones of clay high plasticity; zones of sand; medium to coarse grained, sub angular to sub rounded; (Residual Soil) *(continued)*	Uc	St		100	0	20 60 200 600 2000			
											100	0		9.00: SPT Recovery: 0.75 m		
										SPT 9.00 - 9.45 m 6, 8, 5 N*=13						
		7	30	10							100	0				
										SPT 10.50 - 10.95 m 6, 6, 3 N*=9				10.50: SPT Recovery: 0.45 m		
		8	29	11			11.00m				100	0		11.00: SPT Recovery: 0.45 m		
					Leederville Formation		SAND (SP): medium to coarse grained, sub-rounded to sub-angular, quartz and lithics, pale grey mottled dark grey; with clay high plasticity; frequent lenses of clay and sandy clay, medium to high plasticity; (Residual Soil)		MD	SPT 11.00 - 11.45 m 3, 9, 11 N*=20						
		9	28	12							100	0				
										SPT 12.50 - 12.95 m 6, 10, 11 N*=21				12.50: SPT Recovery: 0.45 m		
HQ-3		10	27	13				CL			24	0		12.95-13.8: Core Loss		
								Uc	MD							
			26	14						SPT 14.00 - 14.45 m 5, 14, 14 N*=28				14.00: SPT Recovery: 0.45 m		
		11	25	15			15.10m				100	0				
							Clayey SAND (SC): fine to coarse grained, sub-rounded to sub-angular, quartz, lithics and peat, dark grey; high plasticity; trace black peat fragments; (Residual Soil)									
							15.40m		VSt					15.50: SPT Recovery: 0.45 m		
							CLAY (CH): high plasticity, dark grey and black; with peat; (Residual Soil)			SPT 15.50 - 15.95 m 5, 9, 9 N*=18						
							15.70m		MD							

DRILLING
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller
PQ Rotary core (85mm)
HQ Rotary core (63.5mm)
NMLC Rotary core (51.94mm)
DT Diatube concrete coring
PT Push tube
PS Percussion sampling
SON Sonic drilling
AH Air hammer

WATER
Water Level on date shown
water inflow
water outflow

ROCK QUALITY DESCRIPTIONS
RQD Rock Quality Designation (%)
TCR Total Core Recovery (%)

ROCK STRENGTH
EH Extremly High
VH Very High
H High
M Medium
L Low
VL Very Low

ROCK WEATHERING
FR Fresh
SW Slightly Weathered
MW Moderately Weathered
HW Highly Weathered
XW Extremly Weathered

DEFECT TYPE
J Joint
P Parting
SM Seam
SZ Sheared zone
FL Foliation
V Vein
CSM Crushed Seam
FZ Fracture Zone
HB Handing Break
DB Drilling Break

PLANARITY
PL Planar
IR Irregular
CU Curved
DIS Discontinuous
ST Stepped
UN Undulose

ROUGHNESS
VR Very Rough
RO Rough
SO Smooth
SL Slockensided
POL Polished

COATING
CN Clean
STN Stained
VN Veneer (thin or patchy)
CT Coating (up to 1mm)

INFILL MATERIALS
X Carbonaceus
MU Unidentified minteral
MS Secondary mineral
KT Chlorite
CA Calcite
Fe Iron Oxide
Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

Hole No: WM01

Sheet: 3 of 4

Position: E341346.000 N6215506.000 | **Angle from Horizontal:** 90° | **Surface Elevation:** 40.000 m AHD
Rig Type: Geoprobe 7822dt | **Mounting:** Track | **Contractor:** National Geotech
Data Started: 26/2/24 | **Date Completed:** 27/2/24 | **Logged By:** ES | **Checked By:** BP

Drilling					Material Description						Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
HQ-3		12	23	17	Leederville Formation		16.10m Clayey SAND (SC): fine to coarse grained, sub-rounded to sub-angular, quartz, lithics and peat, dark grey; high plasticity; trace black peat fragments; (Residual Soil) *(continued)*	Uc	VSt to Hd		100	0	20 60 200 600 2000			
							CLAY (CH): high plasticity, dark grey and black; with peat; frequent lenses of clayey sand & sandy clay; (Residual Soil)				100	0				
		13	22	18						SPT 17.00 - 17.45 m 5, 9, 13 N*=22	100	0		17.00: SPT Recovery: 0.45 m		
							18.55m									
		14	21	19			Clayey SAND (SC): fine to coarse grained, sub-rounded to sub-angular, quartz, lithics, pale grey; high plasticity; (Residual Soil)		MD	SPT 18.50 - 18.95 m 6, 10, 13 N*=23	100	0		18.50: SPT Recovery: 0.45 m		
							19.90m									
		15	20	20			CLAY (CH): high plasticity, dark grey and black; with peat; frequent lenses of clayey sand & sandy clay; (Residual Soil)		VSt	SPT 20.00 - 20.45 m 6, 7, 10 N*=17	100	0		20.00: SPT Recovery: 0.45 m		
							21.00m									
		16	19	21			Clayey SAND (SC): fine to coarse grained, sub-rounded to sub-angular, quartz, lithics, pale grey; low plasticity. (Residual Soil)	CL			52	0		21-21.5: Core Loss		
									MD to D	SPT 21.50 - 21.95 m 8, 11, 17 N*=28				21.50: SPT Recovery: 0.45 m		
			18	22							100	0				
		17	17	23						SPT 23.00 - 23.45 m 9, 13, 18 N*=31				23.00: SPT Recovery: 0.45 m		
							23.90m				100	0				

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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CORE LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: WM01

Job No: 304501017 **Sheet:** 4 of 4

Position: E341346.000 N6215506.000 **Angle from Horizontal:** 90° **Surface Elevation:** 40.000 m AHD
Rig Type: Geoprobe 7822dt **Mounting:** Track **Contractor:** National Geotech
Data Started: 26/2/24 **Date Completed:** 27/2/24 **Logged By:** ES **Checked By:** BP

Drilling					Material Description							Defect Description			
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
HQ-3		17			Leederville Formation		CLAY (CH): high plasticity, dark grey and black; with Peat; frequent lenses of clayey sand & sandy clay; (Residual Soil) *(continued)*	Uc	Hd		100	0				
							24.80m			SPT 24.50 - 24.95 m 6, 15, 15 N*=30				24.50: SPT Recovery: 0.45 m		
			15	25			24.95m Clayey SAND (SC): fine to medium grained, sub-rounded to sub-angular, quartz, lithics, grey; high plasticity; (Residual Soil)		MD to D							
							TERMINATED AT 24.95 m Target depth									
			14	26												
			13	27												
			12	28												
			11	29												
			10	30												
			9	31												

DRILLING
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller
PQ Rotary core (85mm)
HQ Rotary core (63.5mm)
NMLC Rotary core (51.94mm)
DT Diatube concrete coring
PT Push tube
PS Percussion sampling
SON Sonic drilling
AH Air hammer

WATER
Water Level on date shown
water inflow
water outflow

ROCK QUALITY DESCRIPTIONS
RQD Rock Quality Designation (%)
TCR Total Core Recovery (%)

ROCK STRENGTH
EH Extremly High
VH Very High
H High
M Medium
L Low
VL Very Low

ROCK WEATHERING
FR Fresh
SW Slightly Weathered
MW Moderately Weathered
HW Highly Weathered
XW Extremly Weathered

DEFECT TYPE
J Joint
P Parting
SM Seam
SZ Sheared zone
FL Foliation
V Vein
CSM Crushed Seam
FZ Fracture Zone
HB Handing Break
DB Drilling Break

PLANARITY
PL Planar
IR Irregular
CU Curved
DIS Discontinuous
ST Stepped
UN Undulose

ROUGHNESS
VR Very Rough
RO Rough
SO Smooth
SL Slockensided
POL Polished

COATING
CN Clean
STN Stained
VN Veneer (thin or patchy)
CT Coating (up to 1mm)

INFILL MATERIALS
X Carbonaceus
MU Unidentified minteral
MS Secondary mineral
KT Chlorite
CA Calcite
Fe Iron Oxide
Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

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CORE BOX - PHOTO SHEET Borehole No. WM01

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River **Job No:** 304501017

WM01: 0 - 5m,
0.0 - 3.0m

WM01: 5 - 10m,
5.0 - 10.0 m

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CORE BOX - PHOTO SHEET Borehole No. WM01

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River **Job No:** 304501017

WM01: 10 - 15m,
10.0 - 15.0m

WM01: 15 - 20m,
15 m to 20m

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CORE BOX - PHOTO SHEET Borehole No. WM01

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River **Job No:** 304501017

WM01: 20 - 25m,
20.0 - 25.0 m

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CORE LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: WM02

Job No: 304501017 **Sheet:** 1 of 4

Position: E343044.000 N6208189.000 **Angle from Horizontal:** 90° **Surface Elevation:** 31.000 m AHD
Rig Type: Geoprobe 7822dt **Mounting:** Track **Contractor:** National Geotech
Data Started: 27/2/24 **Date Completed:** 28/2/24 **Logged By:** ES **Checked By:** BP

Drilling					Material Description							Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
PT	PVC	1	30	1	TS		0.10m TOPSOIL: SAND: fine to coarse grained, sub-rounded to sub-angular, quartz and organics, dark black brown mottled; with silt. (Topsoil)	Uc	Ls	SPT 0.00 - 0.45 m 2, 4, 6 N*=10				0.00: PID: 3.2ppm 0.00: PID: 3.2ppm; SPT Recovery: 0.45 m 0.00: QC1		WM02 - 0.7m stickup
					QDD		SAND (SP): fine to medium grained, sub-rounded to sub-angular, pale grey brown to; trace; (Aeolian)							0.50: PID: 4.6ppm		
							1.00m							1.00: PID: 6.4ppm	▽	
			29	2	Duricrust		FERRICRETE: granular, fine to coarse grained, dark orange brown to red-brown; <10% vuggs (DI Duricrust).	Mo	M to H		100			1.50: PID: 3.2ppm		
							2.70m			SPT 2.00 - 2.05 m 30/50mm N*=R				2.00: 50mm 2.00: SPT Recovery: 0.45 m; 50mm		
		2	28	3	Quaternary Dune Deposits		SAND (SP): fine to medium grained, sub-rounded to sub-angular, quartz, lithics and rich in organics; dark brown to grey; with silty fines. (Aeolian)	Uc	MD to D		100					
										SPT 3.50 - 3.95 m 11, 15, 16 N*=31				3.50: SPT Recovery: 0.45 m		
HQ-3		3	27	4							100					
			26	5						SPT 5.00 - 5.45 m 6, 10, 17 N*=27				5.00: SPT Recovery: 0.45 m 5.45: Core was recovered but driller dropped core upon transfer to split		
		4	25	6							100					
										SPT 6.50 - 6.95 m 5, 10, 13 N*=23				6.50: SPT Recovery: 0.45 m		
		5	24	7							100			8.00: SPT Recovery:		

DRILLING
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller
PQ Rotary core (85mm)
HQ Rotary core (63.5mm)
NMLC Rotary core (51.94mm)
DT Diatube concrete coring
PT Push tube
PS Percussion sampling
SON Sonic drilling
AH Air hammer

WATER
Water Level on date shown
water inflow
water outflow

ROCK QUALITY DESCRIPTIONS
RQD Rock Quality Designation (%)
TCR Total Core Recovery (%)

ROCK STRENGTH
EH Extremly High
VH Very High
H High
M Medium
L Low
VL Very Low

ROCK WEATHERING
FR Fresh
SW Slightly Weathered
MW Moderately Weathered
HW Highly Weathered
XW Extremly Weathered

DEFECT TYPE
J Joint
P Parting
SM Seam
SZ Sheared zone
FL Foliation
V Vein
CSM Crushed Seam
FZ Fracture Zone
HB Handing Break
DB Drilling Break

PLANARITY
PL Planar
IR Irregular
CU Curved
DIS Discontinuous
ST Stepped
UN Undulose

ROUGHNESS
VR Very Rough
RO Rough
SO Smooth
SL Slockensided
POL Polished

COATING
CN Clean
STN Stained
VN Veneer (thin or patchy)
CT Coating (up to 1mm)

INFILL MATERIALS
X Carbonaceus
MU Unidentified minteral
MS Secondary mineral
KT Chlorite
CA Calcite
Fe Iron Oxide
Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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2023_03_16_STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06.GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 304501017_BH_REVA.GPJ <<DrawingFile>> 17/05/2024 15:23 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: WM02

Job No: 304501017 **Sheet:** 2 of 4

Position: E343044.000 N6208189.000 **Angle from Horizontal:** 90° **Surface Elevation:** 31.000 m AHD
Rig Type: Geoprobe 7822dt **Mounting:** Track **Contractor:** National Geotech
Data Started: 27/2/24 **Date Completed:** 28/2/24 **Logged By:** ES **Checked By:** BP

Drilling					Material Description							Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
HQ-3		6	22	9	Quaternary Dune Deposits		SAND (SP): fine to medium grained, sub-rounded to sub-angular, quartz, lithics and rich in organics; dark brown to grey; with silty fines. (Aeolian) *(continued)*	Uc	MD to D	SPT 8.00 - 8.45 m 4, 7, 14 N*=21	100			0.45 m		
							9.25m									
		7	21	10			Sandy CLAY (CI): medium plasticity; pale grey and dark grey; sand, fine to medium grained, sub angular to sub rounded; zones of clay, high plasticity; zones of sand; medium to coarse grained, sub angular to sub rounded. (Residual Soil)		F to St	SPT 9.50 - 9.95 m 0, 0, 3 N*=3	100			9.50: SPT Recovery: 0.45 m		
		8	20	11			11.00m									
							CLAY (CH): high plasticity, dark grey and black; frequent lenses of clayey sand & sandy clay. (Residual Soil)			SPT 11.00 - 11.45 m 1, 5, 4 N*=9	100			11.00: SPT Recovery: 0.45 m		
			19	12	Leederville Formation		12.70m									
		9	18	13			SAND (SP): fine to coarse grained, rounded to sub-rounded, quartz & lithics; trace clayey fines. (Residual Soil)		VD	SPT 12.50 - 12.95 m 12, 27, 30 N*=57	100			12.50: SPT Recovery: 1.05 m		
									MD							
			17	14						SPT 14.00 - 14.45 m 11, 13, 7 N*=20				14.00: SPT Recovery: 1.05 m		
		10	16	15			15.10m				100					
							CLAY (CH): high plasticity, dark grey and black; frequent lenses of clayey sand & sandy clay. (Residual Soil)		Hd							
							15.55m									
							SAND (SP): fine to coarse grained, rounded to sub-rounded, quartz & lithics; trace clayey fines. (Residual Soil)		D	SPT 15.50 - 15.95 m 5, 17, 28 N*=45				15.50: SPT Recovery: 1.05 m		

DRILLING
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller
PQ Rotary core (85mm)
HQ Rotary core (63.5mm)
NMLC Rotary core (51.94mm)
DT Diatube concrete coring
PT Push tube
PS Percussion sampling
SON Sonic drilling
AH Air hammer

WATER
Water Level on date shown
water inflow
water outflow

ROCK QUALITY DESCRIPTIONS
RQD Rock Quality Designation (%)
TCR Total Core Recovery (%)

ROCK STRENGTH
EH Extremly High
VH Very High
H High
M Medium
L Low
VL Very Low

ROCK WEATHERING
FR Fresh
SW Slightly Weathered
MW Moderately Weathered
HW Highly Weathered
XW Extremly Weathered

DEFECT TYPE
J Joint
P Parting
SM Seam
SZ Sheared zone
FL Foliation
V Vein
CSM Crushed Seam
FZ Fracture Zone
HB Handing Break
DB Drilling Break

PLANARITY
PL Planar
IR Irregular
CU Curved
DIS Discontinuous
ST Stepped
UN Undulose

ROUGHNESS
VR Very Rough
RO Rough
SO Smooth
SL Slockensided
POL Polished

COATING
CN Clean
STN Stained
VN Veneer (thin or patchy)
CT Coating (up to 1mm)

INFILL MATERIALS
X Carbonaceus
MU Unidentified minteral
MS Secondary mineral
KT Chlorite
CA Calcite
Fe Iron Oxide
Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

2023_03_16_STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06.GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 304501017_BH_REVA.GPJ <<DrawingFile>> 17/05/2024 15:23 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: WM02

Job No: 304501017 **Sheet:** 3 of 4

Position: E343044.000 N6208189.000 **Angle from Horizontal:** 90° **Surface Elevation:** 31.000 m AHD
Rig Type: Geoprobe 7822dt **Mounting:** Track **Contractor:** National Geotech
Data Started: 27/2/24 **Date Completed:** 28/2/24 **Logged By:** ES **Checked By:** BP

Drilling					Material Description						Defect Description			
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
HQ-3		11	14	17	Leederville Formation		SAND (SP): fine to coarse grained, rounded to sub-rounded, quartz & lithics; trace clayey fines. (Residual Soil) *(continued)*	Uc	D		100					
											100					
										SPT 17.00 - 17.45 m 9, 17, 19 N*=36				17.00: SPT Recovery: 1.05 m		
		12	13	18			17.90m SAND (SP): fine to coarse grained, sub-rounded to sub-angular; dark grey; with clay, medium plasticity. (Residual Soil)		MD		100					
										SPT 18.50 - 18.95 m 5, 9, 7 N*=16				18.50: SPT Recovery: 1.05 m		
		13	12	19							100					
			11	20			20.10m SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz & lithics; pale grey; with clay, low to medium plasticity. (Residual Soil)			SPT 20.00 - 20.45 m 7, 10, 13 N*=23				20.00: SPT Recovery: 1.05 m		
		14	10	21			20.90m CLAY (CH): medium plasticity, pale grey and black; frequent lenses of clayey sand & sandy clay. (Residual Soil)		VSt to Hd		100					
										SPT 21.50 - 21.95 m 4, 4, 10 N*=14				21.50: SPT Recovery: 1.05 m		
		15	9	22							100					
			8	23						SPT 23.00 - 23.45 m 7, 11, 13 N*=24				23.00: SPT Recovery: 1.05 m		
		16									100					

DRILLING
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
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PQ Rotary core (85mm)
HQ Rotary core (63.5mm)
NMLC Rotary core (51.94mm)
DT Diatube concrete coring
PT Push tube
PS Percussion sampling
SON Sonic drilling
AH Air hammer

WATER
Water Level on date shown
water inflow
water outflow

ROCK QUALITY DESCRIPTIONS
RQD Rock Quality Designation (%)
TCR Total Core Recovery (%)

ROCK STRENGTH
EH Extremly High
VH Very High
H High
M Medium
L Low
VL Very Low

ROCK WEATHERING
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SW Slightly Weathered
MW Moderately Weathered
HW Highly Weathered
XW Extremely Weathered

DEFECT TYPE
J Joint
P Parting
SM Seam
SZ Sheared zone
FL Foliation
V Vein
CSM Crushed Seam
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HB Handing Break
DB Drilling Break

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Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: WM02

Job No: 304501017 **Sheet:** 4 of 4

Position: E343044.000 N6208189.000 **Angle from Horizontal:** 90° **Surface Elevation:** 31.000 m AHD
Rig Type: Geoprobe 7822dt **Mounting:** Track **Contractor:** National Geotech
Data Started: 27/2/24 **Date Completed:** 28/2/24 **Logged By:** ES **Checked By:** BP

Drilling					Material Description							Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
HQ-3		16			Leederville Formation		CLAY (CH): medium plasticity, pale grey and black; frequent lenses of clayey sand & sandy clay. (Residual Soil) *(continued)*	Uc	VSt to Hd		100			24.50: SPT Recovery: 1.05 m		
							24.95m			SPT 24.50 - 24.95 m 10, 14, 16 N*=30						
			6	25			TERMINATED AT 24.95 m Target depth									
			5	26												
			4	27												
			3	28												
			2	29												
			1	30												
			0	31												

DRILLING
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
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RR Rock roller
PQ Rotary core (85mm)
HQ Rotary core (63.5mm)
NMLC Rotary core (51.94mm)
DT Diatube concrete coring
PT Push tube
PS Percussion sampling
SON Sonic drilling
AH Air hammer

WATER
Water Level on date shown
water inflow
water outflow

ROCK QUALITY DESCRIPTIONS
RQD Rock Quality Designation (%)
TCR Total Core Recovery (%)

ROCK STRENGTH
EH Extremly High
VH Very High
H High
M Medium
L Low
VL Very Low

ROCK WEATHERING
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SW Slightly Weathered
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XW Extremely Weathered

DEFECT TYPE
J Joint
P Parting
SM Seam
SZ Sheared zone
FL Foliation
V Vein
CSM Crushed Seam
FZ Fracture Zone
HB Handing Break
DB Drilling Break

PLANARITY
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CU Curved
DIS Discontinuous
ST Stepped
UN Undulose

ROUGHNESS
VR Very Rough
RO Rough
SO Smooth
SL Slockensided
POL Polished

COATING
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STN Stained
VN Veneer (thin or patchy)
CT Coating (up to 1mm)

INFILL MATERIALS
X Carbonaceus
MU Unidentified minteral
MS Secondary mineral
KT Chlorite
CA Calcite
Fe Iron Oxide
Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

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CORE BOX - PHOTO SHEET Borehole No. WM02

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River **Job No: 304501017**

**WM02: 0 - 0.5m,
0.0 - 5.0**

**WM02: 5 - 10m,
5.0 - 10.0**

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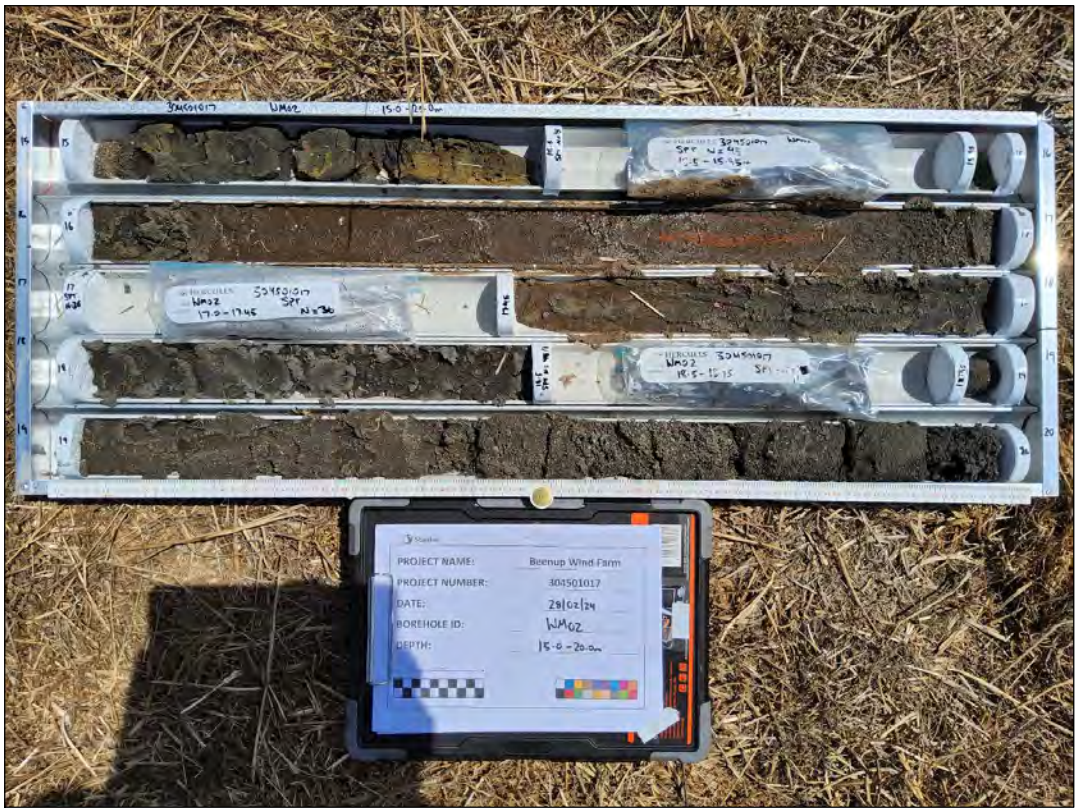
CORE BOX - PHOTO SHEET Borehole No. WM02

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River **Job No:** 304501017

**WM02: 10 - 15m,
10.0 - 15.0**



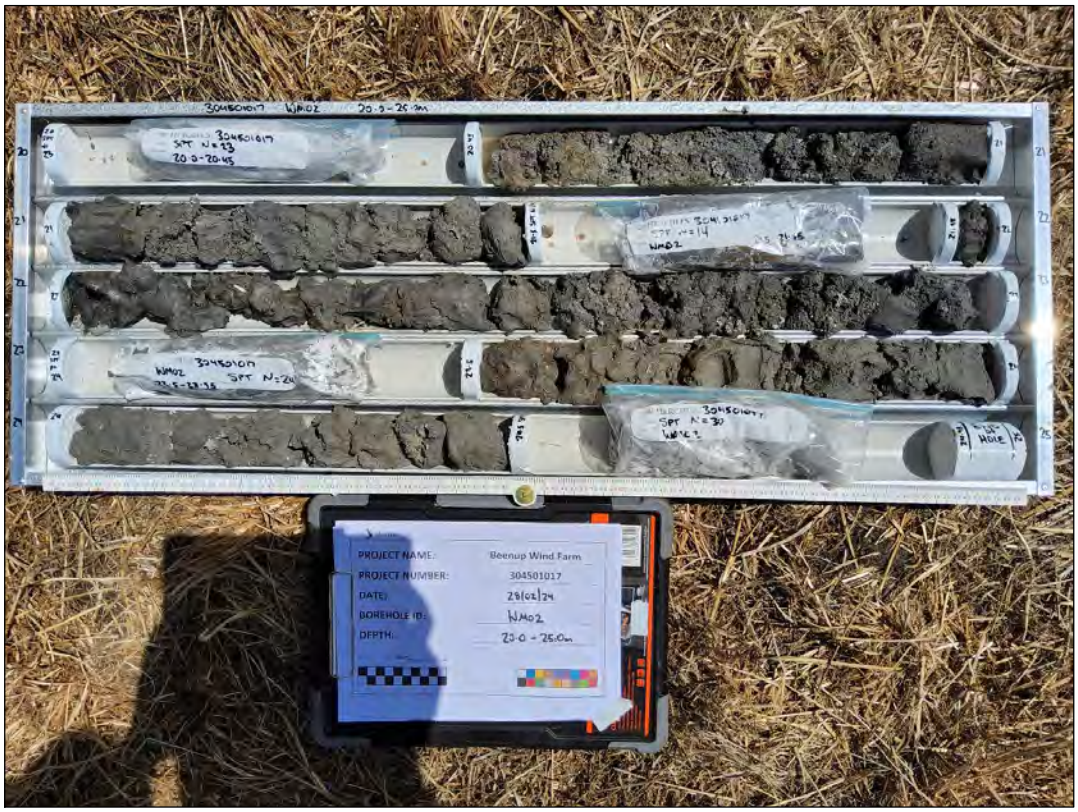
**WM02: 15 - 20m,
15.0 - 20.0**

2023_03_16_STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06.GLB GrfcText CORE BOX PHOTO 2 PHOTOS PER PAGE 304501017_BH_REVA.GPJ <<DrawingFile>> 17/05/2024 10:44

CORE BOX - PHOTO SHEET

Borehole No. WM02

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017



WM02: 20 - 25m,
20.0 - 25.0

2023_03_16_STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06.GLB GrfcText CORE BOX PHOTO 2 PHOTOS PER PAGE 304501017_BH_REVA.GPJ <<DrawingFile>> 17/05/2024 10:44

Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: WM03

Job No: 304501017 **Sheet:** 1 of 4

Position: E342583.000 N6210534.000 **Angle from Horizontal:** 90° **Surface Elevation:** 32.000 m AHD
Rig Type: Geoprobe 7822dt **Mounting:** Track **Contractor:** National Geotech
Data Started: 28/2/24 **Date Completed:** 29/2/24 **Logged By:** ES **Checked By:** BP

Drilling					Material Description						Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm)	Observations / Description of Defects	Water Level	Monitoring Well Details
PT	PVC	1	31	1	TS		0.20m TOPSOIL: SAND: fine to coarse grained, sub-rounded to sub-angular, quartz and organics; dark black & mottled brown; with silty fines. (Topsoil)	Uc	Ls	SPT 0.00 - 0.40 m 3, 6, 30/100mm N*=R	100			0.00: PID: 6.1ppm; 400mm 0.00: PID: 6.1ppm; SPT Recovery: 0.45 m; 400mm 0.00: QC1		WM03 - 0.7m stickup
HQ-3					QD		0.35m SAND (SP): fine to medium grained, sub-rounded to sub-angular, pale grey-brown. (Aeolian)	Mo	M to H					0.50: PID: 3.8ppm		
					Duricrust		FERRICRETE: granular, fine to coarse grained, dark orange brown to red-brown; <10% vuggs (DI Duricrust).							1.00: PID: 4.3ppm		
														1.50: PID: 5.4ppm	▽	
		2	30	2						SPT 2.00 - 2.07 m 30/70mm N*=R				2.00: 70mm 2.00: SPT Recovery: 0.07 m; 70mm		
			29	3			3.40m				100					
		3			Quaternary Dune Deposits		SAND (SP): fine to medium grained, sub-rounded to sub-angular, quartz, lithics and rich in organics; dark brown mottled orange; trace silty fines. (Aeolian)	Wk	D					3.50: SPT Recovery: 0.45 m		
			28	4				Uc		SPT 3.50 - 3.95 m 13, 18, 18 N*=36	100					
		4	27	5						SPT 5.00 - 5.45 m 9, 15, 16 N*=31				5.00: SPT Recovery: 0.45 m		
			26	6			6.18m				100					
					Leederville Formation		SAND (SP): fine to medium grained, sub-rounded to sub-angular, dark grey, mottled black. (Residual Soil)		MD					6.50: SPT Recovery: 0.45 m		
		5	25	7						SPT 6.50 - 6.95 m 8, 9, 8 N*=17	100					
														8.00: SPT Recovery:		

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: WM03

Job No: 304501017 **Sheet:** 2 of 4

Position: E342583.000 N6210534.000 **Angle from Horizontal:** 90° **Surface Elevation:** 32.000 m AHD
Rig Type: Geoprobe 7822dt **Mounting:** Track **Contractor:** National Geotech
Data Started: 28/2/24 **Date Completed:** 29/2/24 **Logged By:** ES **Checked By:** BP

Drilling					Material Description						Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
HQ-3		6	23	9	Leederville Formation		SAND (SP): fine to medium grained, sub-rounded to sub-angular, dark grey, mottled black. (Residual Soil) *(continued)*	Uc	MD	SPT 8.00 - 8.45 m 7, 10, 14 N*=24	100			0.45 m		
									D							
										SPT 9.50 - 9.95 m 7, 16, 20 N*=36				9.50: SPT Recovery: 0.45 m		
		7	22	10							100					
										SPT 11.00 - 11.45 m 11, 21, 28 N*=49				11.00: SPT Recovery: 0.45 m		
		8	21	11							100					
										SPT 12.50 - 12.95 m 7, 15, 18 N*=33				12.50: SPT Recovery: 0.45 m		
							12.90m									
		9	20	12			SAND (SP): fine to coarse grained, rounded to sub-rounded, quartz & lithics; pale grey to dark grey; trace clayey fines. (Residual Soil)		MD		100					
										SPT 14.00 - 14.45 m 5, 12, 14 N*=26				14.00: SPT Recovery: 0.45 m		
		10	19	13							100					
							from 15.4m... with medium plasticity clay.		D							
										SPT 15.50 - 15.95 m 4, 12, 29 N*=41				15.50: SPT Recovery: 0.45 m		
			18	14												
			17	15												

DRILLING
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CORE LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: WM03

Job No: 304501017 **Sheet:** 3 of 4

Position: E342583.000 N6210534.000 **Angle from Horizontal:** 90° **Surface Elevation:** 32.000 m AHD
Rig Type: Geoprobe 7822dt **Mounting:** Track **Contractor:** National Geotech
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Drilling					Material Description						Defect Description				
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HQ-3		11	15	17			SAND (SP): fine to coarse grained, rounded to sub-rounded, quartz & lithics; pale grey to dark grey; trace clayey fines. (Residual Soil) *(continued)*	Uc	D		100					
											100					
									VD	SPT 17.00 - 17.24 m 19, 30/90mm N*=R				17.00: 180mm 17.00: SPT Recovery: 0.45 m; 180mm		
							17.40m									
		12	14	18			SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz & lithics; pale grey to dark grey; layers of clay, low to medium plasticity. (Residual Soil)		MD		100					
														18.50: SPT Recovery: 0.45 m		
										SPT 18.50 - 18.95 m 10, 12, 21 N*=33						
		13	13	19							100					
					Leederville Formation		19.65m									
							19.80m SANDSTONE: fine grained, siliceous; dark grey-brown. (Weathered Rock)									
							SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz & lithics; pale grey; with clay, low plasticity. (Residual Soil)							20.00: SPT Recovery: 0.45 m		
										SPT 20.00 - 20.45 m 8, 9, 11 N*=20						
		14	11	21							100					
														21.50: SPT Recovery: 0.45 m		
										SPT 21.50 - 21.95 m 9, 12, 12 N*=24						
		15	10	22							100					
														23.00: SPT Recovery: 0.45 m		
										SPT 23.00 - 23.45 m 8, 13, 17 N*=30						
		16	9	23			23.90m				100					

DRILLING
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller
PQ Rotary core (85mm)
HQ Rotary core (63.5mm)
NMLC Rotary core (51.94mm)
DT Diatube concrete coring
PT Push tube
PS Percussion sampling
SON Sonic drilling
AH Air hammer

WATER
Water Level on date shown
water inflow
water outflow

ROCK QUALITY DESCRIPTIONS
RQD Rock Quality Designation (%)
TCR Total Core Recovery (%)

ROCK STRENGTH
EH Extremly High
VH Very High
H High
M Medium
L Low
VL Very Low

ROCK WEATHERING
FR Fresh
SW Slightly Weathered
MW Moderately Weathered
HW Highly Weathered
XW Extremly Weathered

DEFECT TYPE
J Joint
P Parting
SM Seam
SZ Sheared zone
FL Foliation
V Vein
CSM Crushed Seam
FZ Fracture Zone
HB Handing Break
DB Drilling Break

PLANARITY
PL Planar
IR Irregular
CU Curved
DIS Discontinuous
ST Stepped
UN Undulose

ROUGHNESS
VR Very Rough
RO Rough
SO Smooth
SL Slockensided
POL Polished

COATING
CN Clean
STN Stained
VN Veneer (thin or patchy)
CT Coating (up to 1mm)

INFILL MATERIALS
X Carbonaceus
MU Unidentified minteral
MS Secondary mineral
KT Chlorite
CA Calcite
Fe Iron Oxide
Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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2023_03_16_STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06.GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 304501017_BH_REVA.GPJ <<DrawingFile>> 17/05/2024 15:23 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

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CORE LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: WM03

Job No: 304501017 **Sheet:** 4 of 4

Position: E342583.000 N6210534.000 **Angle from Horizontal:** 90° **Surface Elevation:** 32.000 m AHD
Rig Type: Geoprobe 7822dt **Mounting:** Track **Contractor:** National Geotech
Data Started: 28/2/24 **Date Completed:** 29/2/24 **Logged By:** ES **Checked By:** BP

Drilling					Material Description							Defect Description			
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
HQ-3		16	7	25	Leederville Formation		Sandy CLAY (Cl): medium plasticity, fine to coarse grained, sub-rounded to sub-angular; pale grey and dark grey; sand, fine to coarse grained, sub angular to sub rounded; interbedded high plasticity clays and fine to coarse-grained, sub-rounded to angular sands; trace fine gravel. (Residual Soil) *(continued)*	Uc	VSt		100				
							24.95m			SPT 24.50 - 24.95 m 4, 7, 11 N*=18				24.50: SPT Recovery: 0.45 m		
			6	26			TERMINATED AT 24.95 m Target depth									
			5	27												
			4	28												
			3	29												
			2	30												
			1	31												

DRILLING
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller
PQ Rotary core (85mm)
HQ Rotary core (63.5mm)
NMLC Rotary core (51.94mm)
DT Diatube concrete coring
PT Push tube
PS Percussion sampling
SON Sonic drilling
AH Air hammer

WATER
Water Level on date shown
water inflow
water outflow

ROCK QUALITY DESCRIPTIONS
RQD Rock Quality Designation (%)
TCR Total Core Recovery (%)

ROCK STRENGTH
EH Extremly High
VH Very High
H High
M Medium
L Low
VL Very Low

ROCK WEATHERING
FR Fresh
SW Slightly Weathered
MW Moderately Weathered
HW Highly Weathered
XW Extremly Weathered

DEFECT TYPE
J Joint
P Parting
SM Seam
SZ Sheared zone
FL Foliation
V Vein
CSM Crushed Seam
FZ Fracture Zone
HB Handing Break
DB Drilling Break

PLANARITY
PL Planar
IR Irregular
CU Curved
DIS Discontinuous
ST Stepped
UN Undulose

ROUGHNESS
VR Very Rough
RO Rough
SO Smooth
SL Slockensided
POL Polished

COATING
CN Clean
STN Stained
VN Veneer (thin or patchy)
CT Coating (up to 1mm)

INFILL MATERIALS
X Carbonaceus
MU Unidentified minteral
MS Secondary mineral
KT Chlorite
CA Calcite
Fe Iron Oxide
Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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CORE BOX - PHOTO SHEET Borehole No. WM03

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River **Job No:** 304501017

**WM03: 0 - 0.5m,
0.0 - 5.0**

**WM03: 5 - 10m,
5.0 - 10.0**

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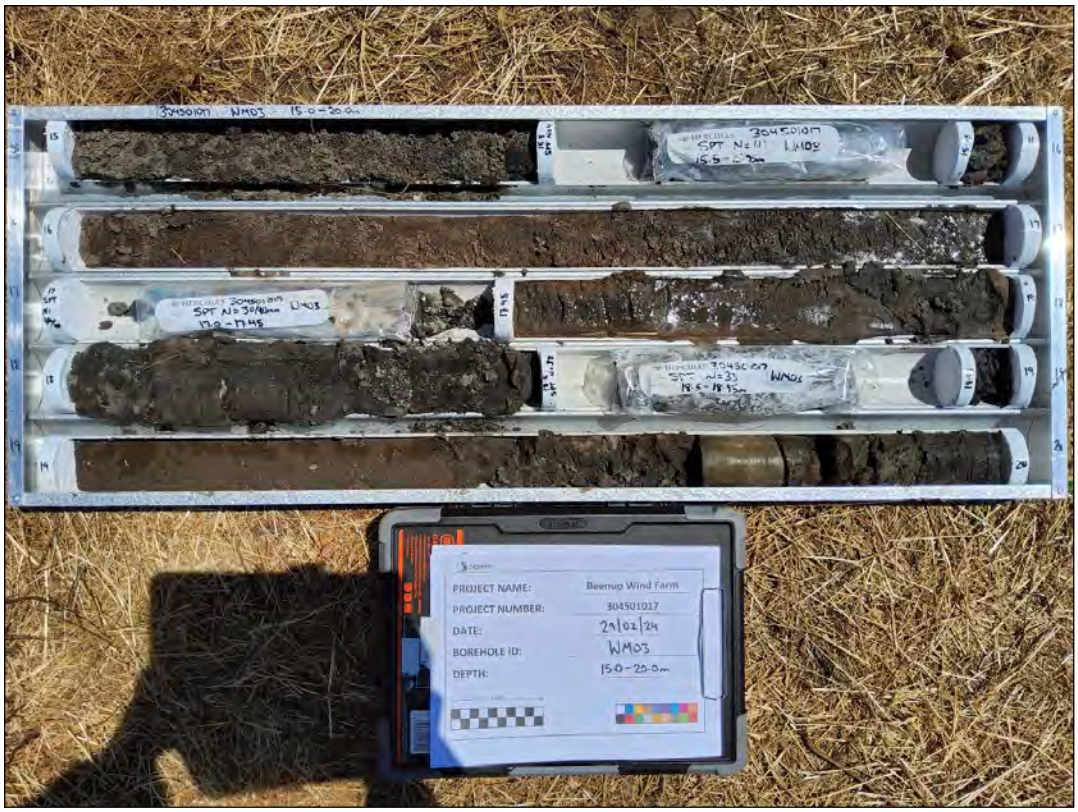
CORE BOX - PHOTO SHEET Borehole No. WM03

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River **Job No: 304501017**

**WM03: 10 - 15m,
10.0 - 15.0**



**WM03: 15 - 20m,
15.0 - 20.0**

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CORE BOX - PHOTO SHEET

Borehole No. WM03

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

WM03: 20 - 25m,
20.0 - 25.0

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP01

Job No: 304501017 **Sheet:** 1 of 1

Position: E340863.000 N6216098.000 **Angle from Horizontal:** 90° **Surface Elevation:** 40.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 3.00m (Length) by 1.00m (Width) **Contractor:** RemX Australia
Date Excavated: 14/3/24 **Logged By:** ES **Checked By:** BP

Excavation				Sampling & Testing		RL (m AHD)	Depth (m)	Material Description						
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows (3 6 9 12)			Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Stable		ES 0.00 m DUP 0.00 m TRIP 0.00 m	2			TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular, dark grey; with gravel, sub-angular, iron cemented sand nodules; trace silty fines. (Topsoil)	D	Uc	Ls	0.00 m: PID - 3.5ppm
									0.10m	SAND (SP): fine to coarse grained, sub-rounded, quartz; pale grey with dark grey; trace fines. (aeolian)			MD	
				ES 0.25 m	3 4 5								D	
				ES 0.50 m	4 4	39.5	0.5							0.50 m: PID - 2.8ppm
				ES 0.75 m	5 6									
				ES 1.00 m	5 6	39.0	1.0	Quaternary Dune Deposits (QDD)						1.00 m: PID - 4.1ppm
				ES 1.25 m	5 6 7									
				ES 1.50 m	7 7	38.5	1.5						VD	
				ES 1.75 m	11 23									
					Refusal 28									
	H		▽	D 2.00 m		38.0	2.0		2.00m	SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz and lithics; brown to dark brown; pockets of organics. (aeolian).	W	Wk		
									2.10m	TERMINATED AT 2.10 m Refusal (machine limit - penetration)				
						37.5	2.5							

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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TEST PIT - PHOTO SHEET

Test Pit No. TP01

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP01: Downhole

TP01: Coretray - 0.0 - 2.1

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP02

Job No: 304501017 **Sheet:** 1 of 1

Position: E341925.000 N6215486.000 **Angle from Horizontal:** 90° **Surface Elevation:** 43.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 2.50m (Length) by 4.00m (Width) **Contractor:** RemX Australia
Date Excavated: 14/3/24 **Logged By:** ES **Checked By:** BP

Excavation			Water	Sampling & Testing		RL (m AHD)	Depth (m)	Material Description						
Method	Resistance	Stability		Sample or Field Test	DCP TEST Blows (3 6 9 12)			Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
EX	VE	Stable	Not Encountered	ES 0.00 m	2	43.0	0.0	TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular, dark grey; trace silty fines. (Topsoil)	D	Uc	Ls	0.00 m: PID - 2.3ppm
										0.10m				
				ES 0.25 m	3			Quaternary Dune Deposits (QDD)		SAND (SP): fine to coarse grained, sub-rounded, quartz; pale grey, with dark grey; trace silty fines. (aeolian)			MD to D	
					3									
				ES 0.50 m	4	42.5	0.5							0.50 m: PID - 3.2ppm
					4									
				ES 0.75 m	3									
					4								VD	
	VH				4					0.90m				
					Refusal 2			DI		FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust).		We	M	
				ES 1.00 m		42.0	1.0			1.00m				1.00 m: PID - 4.1ppm
										TERMINATED AT 1.00 m Refusal on rock				
						41.5	1.5							
						41.0	2.0							
						40.5	2.5							

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
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DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
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Refer to explanatory notes for details of abbreviations and basis of descriptions

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TEST PIT - PHOTO SHEET

Test Pit No. TP02

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP02: Downhole

TP02: Coretray - 0.0 - 1.0m

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP03

Job No: 304501017 **Sheet:** 1 of 1

Position: E344783.000 N6212893.000 **Angle from Horizontal:** 90° **Surface Elevation:** 43.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 3.00m (Length) by 1.00m (Width) **Contractor:** RemX Australia
Date Excavated: 12/3/24 **Logged By:** ES **Checked By:** BP

Excavation				Sampling & Testing				Material Description						
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows (3 6 9 12)	RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Unstable	Not Encountered	ES 0.00 m	Cap refusal - dug through 30			Fill		FILL: Gravelly SAND: Fine to Coarse, sub angular to sub rounded, white sand; Fine to coarse, sub angular, white gravel. (Unsealed Road).	D	Uc	VD	
										0.15m SAND (SP): fine to medium grained, rounded to angular, quartz; pale grey, mottled pale brown. (aeolian)			MD	
				ES 0.25 m	3 2 3									
				ES 0.50 m	3 3 2	42.5	0.5			0.50m SAND (SP): fine to medium grained, sub-rounded to sub-angular, quartz; white. (aeolian)				
				ES 0.75 m	2 3 3									
				ES 1.00 m	3 3 2	42.0	1.0	Quaternary Dune Deposits (QDD)						
				ES 1.25 m	2 3 2									
				ES 1.50 m	2 2 2	41.5	1.5							
				ES 1.75 m	2 2 2									
					2 3					2.00m				
				ES 2.00 m	3 3 4	41.0	2.0			TERMINATED AT 2.00 m Practical Refusal (side wall collapse)				
					4 5 5	40.5	2.5							
					4 6 6									

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
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RR Rock roller

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WATER
Water Level on Date shown
water inflow
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TEST PIT - PHOTO SHEET

Test Pit No. TP03

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP03: Downhole

TP03: Coretray - 0.0. - 2.0

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP04

Job No: 304501017 **Sheet:** 1 of 1

Position: E343930.000 N6212893.000 **Angle from Horizontal:** 90° **Surface Elevation:** 41.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 3.00m (Length) by 1.00m (Width) **Contractor:** RemX Australia
Date Excavated: 12/3/24 **Logged By:** ES **Checked By:** BP

Excavation			Water	Sampling & Testing		RL (m AHD)	Depth (m)	Material Description						
Method	Resistance	Stability		Sample or Field Test	DCP TEST Blows 3 6 9 12			Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Unstable	Not Encountered	ES 0.00 m DUP 0.00 m TRIP 0.00 m	Refusal on surface 35			TS		TOPSOIL: Gravelly SAND: fine to coarse grained, sub angular to sub rounded, grey sand; Fine to coarse,Sub angular, white gravel; trace fines; Organics; (Topsoil)	D	Uc	VD	0.00 m: PID - 1.8ppm
										0.15m SAND (SP): fine to medium grained, rounded to angular, quartz; pale grey mottled pale brown. (aeolian)			D	
				ASS 0.25 m	5 3 2								MD	
													Ls to MD	
					2	40.5	0.5			0.50m SAND (SP): fine to medium grained, sub-rounded to sub-angular, quartz; white. (aeolian)			MD	0.50 m: PID - 2.2ppm
				ES 0.75 m	3 3 3 3			Quaternary Dune Deposits (QDD)						
				ES 1.00 m	2 2	40.0	1.0							1.00 m: PID - 4.3ppm
				ES 1.25 m	3 3 3 3									
				ES 1.50 m	3 3 3	39.5	1.5						D	
				ES 1.75 m	4					1.75m TERMINATED AT 1.75 m Practical Refusal (side wall collapse)				
					4 3	39.0	2.0							
					4 4 5									
					5 6	38.5	2.5							
					5 4 5 6									

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
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F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

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IMP - Borehole Impression Test
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VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
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MOISTURE
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M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
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STANTEC AUSTRALIA PTY LTD

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TEST PIT - PHOTO SHEET

Test Pit No. TP04

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP04: Downhole

TP04: Core tray - 0.0 - 1.75m

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP05

Job No: 304501017 **Sheet:** 1 of 1

Position: E341167.000 N6209303.000 **Angle from Horizontal:** 90° **Surface Elevation:** 27.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 3.00m (Length) by 1.00m (Width) **Contractor:** RemX Australia
Date Excavated: 13/3/24 **Logged By:** ES **Checked By:** BP

Excavation			Water	Sampling & Testing		RL (m AHD)	Depth (m)	Material Description						
Method	Resistance	Stability		Sample or Field Test	DCP TEST Blows (3 6 9 12)			Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Stable	Not Encountered	ES 0.00 m	2			TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular, dark grey; trace silty fines. (Topsoil)	D	Uc	Ls to MD	0.00 m: PID - 2.0ppm
				ES 0.25 m	2 4					0.10m				
					4			Quaternary Dune Deposits (QDD)		SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz and lithics; pale grey, mottled dark brown. (aeolian)			D	
				ES 0.50 m	5 6	26.5	0.5				M			0.50 m: PID - 4.5ppm
				ES 0.75 m	5 4					0.85m			VD	
	VH				Refusal 1			D		0.90m FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust).		We	M	
						26.0	1.0			TERMINATED AT 0.90 m Refusal on rock				
						25.5	1.5							
						25.0	2.0							
						24.5	2.5							

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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TEST PIT - PHOTO SHEET

Test Pit No. TP05

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP05: Downhole

TP05: Coretray - 0.0 - 0.9m

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP06

Job No: 304501017 **Sheet:** 1 of 1

Position: E344443.000 N6210783.000 **Angle from Horizontal:** 90° **Surface Elevation:** 40.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 1.00m (Length) by 3.00m (Width) **Contractor:** RemX Australia
Date Excavated: 13/3/24 **Logged By:** ES **Checked By:** BP

Excavation			Water	Sampling & Testing		RL (m AHD)	Depth (m)	Material Description						
Method	Resistance	Stability		Sample or Field Test	DCP TEST Blows 3 6 9 12			Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Stable	Not Encountered	ES 0.00 m DUP 0.00 m TRIP 0.00 m	2			TS		0.10m TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular, dark grey. (Topsoil)	D	Uc	Ls to MD	0.00 m: PID- 1.5ppm
								Quaternary Dune Deposits (QDD)		SAND (SP): fine to medium grained, rounded to angular quartz; pale grey, mottled pale brown. (aeolian)			MD	
				ES 0.25 m	3 3 3									
				ES 0.50 m	6	39.5	0.5							0.50 m: PID- 3.3ppm
	VH				Refusal 2			D		0.65m 0.70m FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust).		We	M	
										TERMINATED AT 0.70 m Refusal on rock				
						39.0	1.0							
						38.5	1.5							
						38.0	2.0							
						37.5	2.5							

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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TEST PIT - PHOTO SHEET

Test Pit No. TP06

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP06: Downhole

TP06: Coretray - 0.0 - 0.7m

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP07

Job No: 304501017 **Sheet:** 1 of 1

Position: E340730.000 N6210619.000 **Angle from Horizontal:** 90° **Surface Elevation:** 25.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 2.00m (Length) by 1.00m (Width) **Contractor:** RemX Australia
Date Excavated: 14/3/24 **Logged By:** ES **Checked By:** BP

Excavation				Sampling & Testing		RL (m AHD)	Depth (m)	Material Description						
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows (3 6 9 12)			Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Unstable	▽	ES 0.00 m	1	25.000	0.0	TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular, dark grey; trace fines. (Topsoil)	D	Uc	Ls to MD	0.00 m: PID - 1.6ppm
										0.10m				
				ES 0.25 m	2 5					SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz and lithics; pale grey; trace silty fines. (aeolian)	M		D	
				ES 0.50 m	6 7 7	24.5	0.5							0.50 m: PID - 3.1ppm
				ES 0.75 m	8 9 8									
				ES 1.00 m	8 7 8	24.0	1.0	Quaternary Dune Deposits (QDD)		1.00m SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz; dark grey, mottled dark brown; pockets of organics. (aeolian)			VD	1.00 m: PID - 4.8ppm
				ES 1.25 m	9 9 10									
			▽	ES 1.50 m	9	23.5	1.5				W			
					26/100 26					1.70m				
				Bs 1.70 m	24/100 24 25 23 22 23	23.0	2.0			TERMINATED AT 1.70 m Practical Refusal (side wall collapse)				
					Practical refusal 25	22.5	2.5							

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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TEST PIT - PHOTO SHEET

Test Pit No. TP07

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP07: Downhole

TP07: Coretray - 0.0 - 1.7m

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP08

Job No: 304501017 **Sheet:** 1 of 1

Position: E343189.728 N6213977.040 **Angle from Horizontal:** 90° **Surface Elevation:** 43.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 1.50m (Length) by 3.00m (Width) **Contractor:** RemX Australia
Date Excavated: 12/3/24 **Logged By:** ES **Checked By:** BP

Excavation				Sampling & Testing		RL (m AHD)	Depth (m)	Material Description						
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows (3 6 9 12)			Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Unstable	▽	ES 0.00 m	4	43.0	0.0	TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular, dark grey; trace fines. (Topsoil)	D	Uc	D	0.00 m: PID - 2.0ppm
										0.10m				
				ES 0.25 m	3			Quaternary Dune Deposits (QDD)		SAND (SP): fine to coarse grained, rounded to sub-angular, quartz; pale grey; trace silty fines. (aeolian)			MD	
					2								Ls to MD	
				ES 0.50 m	2	42.5	0.5				M			0.50 m: PID - 2.5ppm
					1									
				ES 0.75 m	2									
					2									
				ES 1.00 m	1	42.0	1.0				W		D	1.00 m: PID - 5.6ppm
					2									
					2									
				ES 1.25 m	3									
					4									
					4									
					4									
				ES 1.50 m	6	41.5	1.5						VD	
					10									
				ES 1.75 m	25							Wk		
					22									
					30					1.95m				
						41.0	2.0			2.00m SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz and lithics; pale grey, mottled dark brown. (aeolian)		We		
				ES 2.00 m Bs 2.00 m	35					TERMINATED AT 2.00 m Practical Refusal (side wall collapse)				
					Refusal 40	40.5	2.5							

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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TEST PIT - PHOTO SHEET

Test Pit No. TP08

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP08: Downhole view

TP08: Core tray 0.0 - 2.0

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP09

Job No: 304501017 **Sheet:** 1 of 1

Position: E343986.000 N6214241.000 **Angle from Horizontal:** 90° **Surface Elevation:** 46.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 1.00m (Length) by 3.00m (Width) **Contractor:** RemX Australia
Date Excavated: 12/3/24 **Logged By:** ES **Checked By:** BP

Excavation				Sampling & Testing				Material Description							
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows 3 6 9 12	RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Unstable	▽	ES 0.00 m	2	46.0	0.0	TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular, dark grey. (Topsoil).	D	Uc	Ls to MD	0.00 m: PID - 2.0 ppm
				ES 0.25 m	2					SAND (SP): fine to medium grained, rounded to angular, quartz; pale grey, mottled pale brown. (aeolian)				
				ES 0.50 m	2	45.5	0.5	Quaternary Dune Deposits (QDD)						0.50 m: PID - 5.6 ppm
				ES 0.75 m	1									
				ES 1.00 m	2	45.0	1.0							1.00 m: PID - 6.7ppm
				ES 1.25 m	2								MD	
					3								D	
					4					1.40m				
				ES 1.50 m Bs 1.50 m	refusal 25	44.5	1.5			SAND (SP): fine to medium grained, sub-rounded to sub-angular, quartz and iron oxide; pale yellow and stained dark brown. (aeolian) 1.50m	M to W		VD	
										TERMINATED AT 1.50 m Practical Refusal (side wall collapse)				
						44.0	2.0							
						43.5	2.5							

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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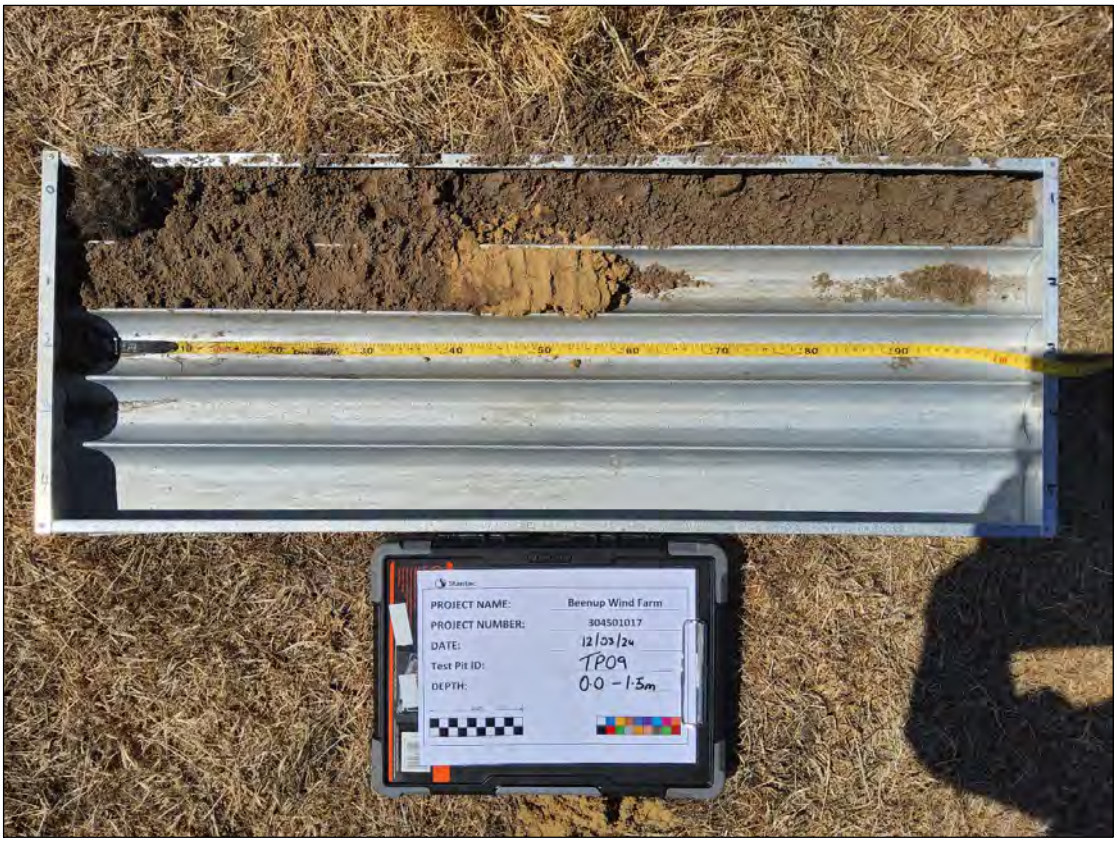
TEST PIT - PHOTO SHEET

Test Pit No. TP09

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP09: Downhole



TP09: Core tray 0.0- 1.5

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP10

Job No: 304501017 **Sheet:** 1 of 1

Position: E345034.000 N6214318.000 **Angle from Horizontal:** 90° **Surface Elevation:** 39.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 3.00m (Length) by 1.00m (Width) **Contractor:** RemX Australia
Date Excavated: 12/3/24 **Logged By:** ES **Checked By:** BP

Excavation				Sampling & Testing		RL (m AHD)	Depth (m)	Material Description						
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows (3 6 9 12)			Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Unstable	Not Encountered	ES 0.00 m DUP 0.00 m TRIP 0.00 m	6			TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular, dark grey; trace fines. (Topsoil)	D	Uc	D	0.00 m: PID - 6.9ppm
				ES 0.25 m	4 4 4 4					0.10m SAND (SP): fine to coarse grained, rounded to sub-angular, quartz; pale grey; trace silty fines; dark grey. (aeolian)				
				ES 0.50 m	4 4 4 4	38.5	0.5	Quaternary Dune Deposits (QDD)						0.50 m: PID - 4.3ppm
				ES 0.75 m	5 4								MD	
				Bs 1.00 m ES 1.00 m Bs 1.00 m	2 3 2 3	38.0	1.0							1.00 m: PID - 2.5ppm
	VH				3 3					1.10m				
					4 refusal 4			D		FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust).	M	We	M	
										1.20m TERMINATED AT 1.20 m Refusal on rock				
						37.5	1.5							
						37.0	2.0							
						36.5	2.5							

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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TEST PIT - PHOTO SHEET

Test Pit No. TP10

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP10: 0.0 - 1.2

TP10: Downhole view

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP11

Job No: 304501017 **Sheet:** 1 of 1

Position: E341041.000 N6211370.000 **Angle from Horizontal:** 90° **Surface Elevation:** 28.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 2.50m (Length) by 1.00m (Width) **Contractor:** RemX Australia
Date Excavated: 14/3/24 **Logged By:** ES **Checked By:** BP

Excavation				Sampling & Testing				Material Description						
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows (3 6 9 12)	RL (m AHD)	Depth (m)	Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Unstable	Not Encountered	ES 0.00 m DUP 0.00 m TRIP 0.00 m	2			TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	Ls to MD	0.00 m: PID - 0.3ppm 0.01 m: had to move to new location due to spraying
										0.10m SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz with lithics; pale brown to brown. (aeolian)			D	
				ES 0.25 m	4 4 5									
				ES 0.50 m	5 6 6	27.5	0.5				M			0.50 m: PID - 3.6ppm
				ES 0.75 m	8 8 7									
				ES 1.00 m	5 4 5	27.0	1.0	Quaternary Dune Deposits (QDD)						1.00 m: PID - 4.3ppm
				ES 1.25 m	5 6 6									
				ES 1.50 m	4 6 8	26.5	1.5			1.70m SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz and lithics; brown to dark brown; pockets of organics. (aeolian).				
				ES 1.75 m	6 7 8									
				ES 2.00 m D 2.00 m	7 8 8	26.0	2.0			2.00m TERMINATED AT 2.00 m Practical Refusal (side wall collapse)				
					7 6 5	25.5	2.5							
					6									

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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TEST PIT - PHOTO SHEET

Test Pit No. TP11

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP11: Downhole

TP11: Coretray - 0.0 - 2.0m

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP12

Job No: 304501017 **Sheet:** 1 of 1

Position: E342786.000 N6210510.000 **Angle from Horizontal:** 90° **Surface Elevation:** 36.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 3.00m (Length) by 1.00m (Width) **Contractor:** RemX Australia
Date Excavated: 13/3/24 **Logged By:** ES **Checked By:** BP

Excavation: Method	Excavation: Resistance	Excavation: Stability	Water	Sampling & Testing: Sample or Field Test	Sampling & Testing: DCP TEST Blows (3 6 9 12)	RL (m AHD)	Depth (m)	Material Description: Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Stable	N.E	ES 0.00 m	2			TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	Ls	0.00 m: PID - 3.4ppm
	VH				Refusal 1	35.5	0.5	Q		0.10m 0.15m SAND (SP): fine to medium grained, rounded to angular, quartz; pale grey, mottled pale yellow-brown. (aeolian)		We	M	
						35.0	1.0	D		0.20m FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust).				
						34.5	1.5			TERMINATED AT 0.20 m Refusal on rock				
						34.0	2.0							
						33.5	2.5							

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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TEST PIT - PHOTO SHEET

Test Pit No. TP12

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP12: Downhole

TP12: Coretray - 0.0 - 0.2m

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP13

Job No: 304501017 **Sheet:** 1 of 1

Position: E343538.000 N6211851.000 **Angle from Horizontal:** 90° **Surface Elevation:** 39.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 3.00m (Length) by 1.00m (Width) **Contractor:** RemX Australia
Date Excavated: 13/3/24 **Logged By:** ES **Checked By:** BP

Excavation				Sampling & Testing		RL (m AHD)	Depth (m)	Material Description						
Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST Blows (3 6 9 12)			Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Unstable	Not Encountered	ES 0.00 m	2			TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	Ls to MD	0.00 m: PID - 0.7ppm
										0.10m				
				ES 0.25 m	1 3			Quaternary Dune Deposits (QDD)		SAND (SP): fine to medium grained, rounded to angular, quartz; pale grey, mottled dark grey. (aeolian)				
				ES 0.50 m	2 2	38.5	0.5						MD	0.50 m: PID - 2.9ppm
				ES 0.75 m	3 3 3									
				ES 1.00 m	3 3 3	38.0	1.0						D	1.00 m: PID- 4.2ppm
				ES 1.25 m	5 5 6								VD	
				ES 1.50 m Bs 1.50 m	8 10	37.5	1.5				M			
				ES 1.75 m	15 20 Refusing 15					1.70m				
								Duricrust		SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz and lithics; dark grey; pockets of organics. (aeolian)		Wk		
										2.00m				
				ES 2.00 m D 2.00 m		37.0	2.0			TERMINATED AT 2.00 m Practical Refusal (side wall collapse)				
						36.5	2.5							

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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TEST PIT - PHOTO SHEET

Test Pit No. TP13

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP13: Downhole

TP13: Corebox - 0.0 - 2.0

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP14

Job No: 304501017 **Sheet:** 1 of 1

Position: E344875.000 N6211256.000 **Angle from Horizontal:** 90° **Surface Elevation:** 38.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 3.00m (Length) by 1.00m (Width) **Contractor:** RemX Australia
Date Excavated: 13/3/24 **Logged By:** ES **Checked By:** BP

Excavation			Water	Sampling & Testing		RL (m AHD)	Depth (m)	Material Description						
Method	Resistance	Stability		Sample or Field Test	DCP TEST Blows (3 6 9 12)			Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Stable	Not Encountered	ASS 0.00 m	3			TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	MD to D	0.00 m: PID - 2.5ppm
										0.10m				
				ES 0.25 m	5			QDD		SAND (SP): fine to medium grained, rounded to angular, quartz; pale grey, mottled pale brown. (aeolian)				
					Refusal 4					0.35m				
	VH							D	F	0.40m FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust).		We	M	
						37.5	0.5			TERMINATED AT 0.40 m Refusal on rock				
						37.0	1.0							
						36.5	1.5							
						36.0	2.0							
						35.5	2.5							

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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TEST PIT - PHOTO SHEET

Test Pit No. TP14

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP14: Downhole

TP14: Corebox - 0.0 - 0.4

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP15

Job No: 304501017 **Sheet:** 1 of 1

Position: E341697.000 N6209876.000 **Angle from Horizontal:** 90° **Surface Elevation:** 28.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 3.00m (Length) by 1.00m (Width) **Contractor:** RemX Australia
Date Excavated: 13/3/24 **Logged By:** ES **Checked By:** BP

Excavation			Water	Sampling & Testing		RL (m AHD)	Depth (m)	Material Description						
Method	Resistance	Stability		Sample or Field Test	DCP TEST Blows 3 6 9 12			Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Stable	Not Encountered	ES 0.00 m	2			TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	Ls to MD	0.00 m: PID - 0.5ppm
									0.10m					
				ES 0.25 m	3			Quaternary Dune Deposits (QDD)		SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz and iron oxide; dark yellow, stained dark orange. (aeolian)			MD to D	
					3						M			
				ES 0.50 m	5	27.5	0.5							0.50 m: PID - 1.5ppm
					4									
					4									
				ES 0.75 m	5									
					6									
	VH				Refusal on coffee rock				0.95m					
				Bs 1.00 m ES 1.00 m		27.0	1.0	D	F 1.00m	FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust).		We	M	1.00 m: PID - 2.9ppm
										TERMINATED AT 1.00 m Refusal on rock				
						26.5	1.5							
						26.0	2.0							
						25.5	2.5							

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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TEST PIT - PHOTO SHEET

Test Pit No. TP15

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP15: Downhole

TP15: Coretray - 0.0 - 1.0m

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP16

Job No: 304501017 **Sheet:** 1 of 1

Position: E342673.000 N6209242.000 **Angle from Horizontal:** 90° **Surface Elevation:** 30.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 1.50m (Length) by 1.00m (Width) **Contractor:** RemX Australia
Date Excavated: 13/3/24 **Logged By:** ES **Checked By:** BP

Excavation			Water	Sampling & Testing		RL (m AHD)	Depth (m)	Material Description						
Method	Resistance	Stability		Sample or Field Test	DCP TEST Blows 3 6 9 12			Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Stable	N.E	ES 0.00 m DUP 0.00 m TRIP 0.00 m				TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	VD	0.00 m: PID - 0.6ppm
	VH				Refusal on coffee rock			D		0.10m 0.15m FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust). TERMINATED AT 0.15 m Refusal on rock		We	M	
						29.5	0.5							
						29.0	1.0							
						28.5	1.5							
						28.0	2.0							
						27.5	2.5							

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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Stantec

TEST PIT - PHOTO SHEET

Test Pit No. TP16

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP16: Downhole

TP16: Coretray - 0.0 - 0.15m

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP17

Job No: 304501017 **Sheet:** 1 of 1

Position: E343812.000 N6209922.000 **Angle from Horizontal:** 90° **Surface Elevation:** 37.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 3.00m (Length) by 1.00m (Width) **Contractor:** RemX Australia
Date Excavated: 13/3/24 **Logged By:** ES **Checked By:** BP

Excavation			Water	Sampling & Testing		RL (m AHD)	Depth (m)	Material Description						
Method	Resistance	Stability		Sample or Field Test	DCP TEST Blows 3 6 9 12			Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Stable	Not Encountered	ES 0.00 m	Refusal 2 2			TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	Ls to MD	0.00 m: PID - 0.6ppm
				ES 0.25 m				QDD		0.10m SAND (SP): fine to medium grained, rounded to angular, quartz; pale grey, mottled dark grey. (aeolian)			VD	
	VH							D		0.45m 0.50m FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust).		We	M	
				ES 0.50 m		36.5	0.5			TERMINATED AT 0.50 m Refusal on rock				0.50 m: PID - 1.6ppm
						36.0	1.0							
						35.5	1.5							
						35.0	2.0							
						34.5	2.5							

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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TEST PIT - PHOTO SHEET

Test Pit No. TP17

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP17: Downhole

TP17: Coretray - 0.0. - 0.5m

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP18

Job No: 304501017 **Sheet:** 1 of 1

Position: E343477.000 N6208439.000 **Angle from Horizontal:** 90° **Surface Elevation:** 33.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 2.00m (Length) by 1.00m (Width) **Contractor:** RemX Australia
Date Excavated: 14/3/24 **Logged By:** ES **Checked By:** BP

Excavation			Water	Sampling & Testing		RL (m AHD)	Depth (m)	Material Description						
Method	Resistance	Stability		Sample or Field Test	DCP TEST Blows (3 6 9 12)			Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Stable	N.E	ES 0.00 m				TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	VD	0.00 m: PID - 1.0ppm
	VH				Refusal			D	F	0.10m / 0.15m FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust). TERMINATED AT 0.15 m Refusal on rock		We	M	
						32.5	0.5							
						32.0	1.0							
						31.5	1.5							
						31.0	2.0							
						30.5	2.5							

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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TEST PIT - PHOTO SHEET

Test Pit No. TP18

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP18: Downhole

TP18: Coretray - 0.0 - 0.15m

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP19

Job No: 304501017 **Sheet:** 1 of 1

Position: E343836.000 N6207845.000 **Angle from Horizontal:** 90° **Surface Elevation:** 35.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 3.00m (Length) by 1.00m (Width) **Contractor:** RemX Australia
Date Excavated: 14/3/24 **Logged By:** ES **Checked By:** BP

Excavation			Water	Sampling & Testing		RL (m AHD)	Depth (m)	Material Description						
Method	Resistance	Stability		Sample or Field Test	DCP TEST Blows (3 6 9 12)			Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Stable	Not Encountered	ES 0.00 m	4			QDTS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	D	0.00 m: PID - 0.7ppm
				ES 0.25 m	5 6 6					SAND (SP): fine to medium grained, rounded to angular; pale grey, mottled dark grey. (aeolian)	M			
				ES 0.50 m	8	34.5	0.5			0.55m				0.50 m: PID - 2.3ppm
	VH				8 8 Refusal 4			Q	F	0.60m FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust). TERMINATED AT 0.60 m Refusal on rock		We	M	
						34.0	1.0							
						33.5	1.5							
						33.0	2.0							
						32.5	2.5							

Quaternary Dune Deposits (QDTS)

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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TEST PIT - PHOTO SHEET

Test Pit No. TP19

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP19: Downhole

TP19: Coretray - 0.0 - 0.6m

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TEST PIT LOG SHEET

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River

Hole No: TP20

Job No: 304501017 **Sheet:** 1 of 1

Position: E345245.000 N6209951.000 **Angle from Horizontal:** 90° **Surface Elevation:** 33.000 m AHD
Machine Type: Backhoe **Excavation Method:** 600mm Toothed Trenching Bucket
Excavation Dimensions: 3.00m (Length) by 1.00m (Width) **Contractor:** RemX Australia
Date Excavated: 13/3/24 **Logged By:** ES **Checked By:** BP

Excavation			Water	Sampling & Testing		RL (m AHD)	Depth (m)	Material Description						
Method	Resistance	Stability		Sample or Field Test	DCP TEST Blows (3 6 9 12)			Geology	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Cementation / Weathering	Consistency / Relative Density	STRUCTURE & Other Observations
BH	VE	Stable	Not Encountered	ES 0.00 m DUP 0.00 m TRIP 0.00 m	2			TS		TOPSOIL: SAND: fine to medium grained, sub-rounded to sub-angular; dark grey; trace fines. (Topsoil)	D	Uc	Ls to MD	0.00 m: PID - 0.1ppm
				ES 0.25 m	3 5 6					0.10m SAND (SP): fine to coarse grained, sub-rounded to sub-angular, quartz; pale yellow stained orange-brown. (aeolian)				
				ES 0.50 m	6 6	32.5	0.5	QDD					MD	0.50 m: PID - 1.7ppm
				ES 0.75 m	6 6									
	VH				6			D		0.85m FERRICRETE: fine grained; dark orange brown; massive; variably cemented comprising soil and rock strength fragments. (DI duricrust).		We	M	
				ES 1.00 m	Refusal on concrete	32.0	1.0			TERMINATED AT 0.90 m Refusal on rock				
						31.5	1.5							
						31.0	2.0							
						30.5	2.5							

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
Bs - Bulk disturbed sample
D - Disturbed sample
E - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
Hd - Hard

RELATIVE DENSITY
VLs - Very Loose
Ls - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

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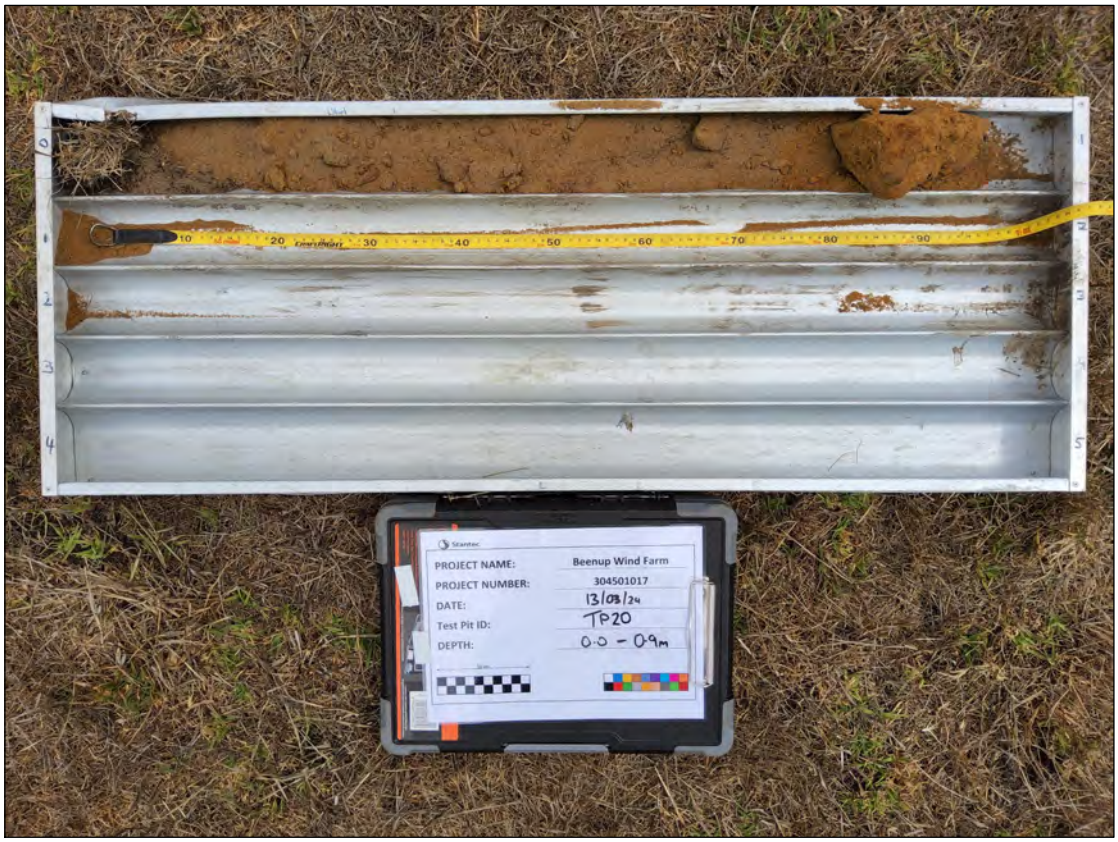
TEST PIT - PHOTO SHEET

Test Pit No. TP20

Client: Synergy RED
Project: Beenup Windfarm Project - Preliminary Geotechnical Investigation
Location: Shire of Augusta Margaret River
Job No: 304501017

TP20: Downhole



TP20: Corebox - 0.0 - 0.9m

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CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM1-W-S01

Job No: 304501017 **Sheet:** 1 of 2

Position: E340844.970 N6215378.790 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 35.140 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 12/3/24 **Date Completed:** 12/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description							Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP	N/A		35.0	0.5	Quaternary Dune Deposits		SAND (SP): fine to medium-grained; sub-rounded to sub-angular; quartz; pale brown, mottled orange-brown; trace silt, non-plastic; trace rootlets to 0.2m depth. (Aeolian)	Uc						0.00: Stickup: 0.5m		WM1-W-S01
			34.5	1.0			1.00m									
			34.0	1.5			Clayey SAND (SC): fine to medium-grained; sub-rounded to sub-angular; quartz & iron oxide; grey, mottled yellow-brown; clay, low plasticity. (Aeolian)									
			33.5	2.0												
			33.0	2.5			2.50m									
			32.5	3.0	Leederville Formation		Sandy CLAY (Cl): medium plasticity; grey; sand, fine to medium grained, sub-rounded to angular, quartz & lithics. (Residual)	Wk							▽	
			32.0	3.5			3.50m									
			31.5				Organic CLAY (OH): medium to high plasticity; dark grey to black; trace sand, fine-grained, quartz & lithics. (Residual).									
							4.00m									

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM1-W-S01

Job No: 304501017 **Sheet:** 2 of 2

Position: E340844.970 N6215378.790 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 35.140 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 12/3/24 **Date Completed:** 12/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description						Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP			31.0	4.5	Leederville Formation		Organic CLAY (OH): high plasticity; black. (Residual)	Wk								
			30.5	5.0												
			30.0	5.5												
			29.5	6.0												
			29.0	6.5												
			28.5	7.0			7.00m									
							TERMINATED AT 7.00 m Target depth Soil Logging									
			28.0	7.5												
			27.5													

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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2023_03_16_STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06.GLB Log STANTEC PERTH - HYBRID LOG - 05/03/2024 XBEENUP HYDRO LOGS.GPJ <<DrawingFile>> 30/05/2024 17:00 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

Stantec

CORE BOX - PHOTO SHEET Hole ID: WM1-W-S01

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017

WM1-W-S01: 0 - 7m, Boxes 1

2023_03_16_STANTEC PERTH GEOTECH LIBRARY - UPDATE 2024-03-06.GLB GrfcText CORE BOX PHOTO 2 PHOTOS PER PAGE BEENUP HYDRO LOGS.GPJ <<DrawingFile>> 30/05/2024 15:27

Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM1-W-S02

Job No: 304501017 **Sheet:** 1 of 2

Position: E341131.110 N6215376.110 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 36.350 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 12/3/24 **Date Completed:** 12/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description							Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP	N/A		36.0 35.5 35.0 34.5 34.0 33.5 33.0 32.5	0.5 1.0 1.5 2.0 2.5 3.0 3.5	Quaternary Dune Deposits Leederville Formation		SAND (SP): fine to medium-grained; sub-rounded to sub-angular; quartz; dark brown to grey; trace silt, non-plastic; trace rootlets to 0.8m depth (Aeolian). 2.00m Clayey SAND (SC): fine to coarse-grained; sub-rounded to sub-angular; quartz; grey; clay, low to medium-plasticity. (Residual)	Uc						0.00: Stickup: 0.65m	Whilst Drilling	WM1-W-S02

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

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Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM1-W-S02

Job No: 304501017 **Sheet:** 2 of 2

Position: E341131.110 N6215376.110 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 36.350 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 12/3/24 **Date Completed:** 12/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description							Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP			32.0	4.5	Leederville Formation		Clayey SAND (SC): fine to coarse-grained; sub-rounded to sub-angular; quartz; grey; clay, low to medium-plasticity. (Residual) *(continued)*	Uc								
							4.20m Sandy CLAY (Cl): medium plasticity; dark grey; sand, fine to course-grained, sub-rounded to angular, quartz & lithics. (Residual)									
			31.5	5.0			4.50m Clayey SAND (SC): fine to coarse-grained; sub-rounded to sub-angular; quartz & lithics; grey; clay, high-plasticity. (Residual)									
			31.0	5.5												
			30.5	6.0												
			30.0	6.5												
			29.5	7.0			7.00m TERMINATED AT 7.00 m Target depth Soil Logging									
			29.0	7.5												
			28.5													

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

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CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM2-W-S01

Job No: 304501017 **Sheet:** 1 of 2

Position: E343226.910 N6208201.060 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 28.920 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 13/3/24 **Date Completed:** 13/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description							Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP	N/A		28.5	0.5	Quaternary Dune Deposits		SAND (SP): fine to medium-grained; sub-rounded to rounded; quartz; grey; trace silt, non-plastic; trace rootlets to 0.1m depth. (Aeolian)	Uc						0.00: Stickup: 0.6m		WM2-W-S01
							0.80m									
			28.0	1.0			Clayey SAND (SC): fine to medium-grained; sub-angular to sub-rounded; quartz; pale brown; trace clayey fines, low plasticity. (Aeolian)									
			27.5	1.5			1.80m									
			27.0	2.0	Dll Duricrust		FERRICRETE: fine to coarse grained; sub-rounded to angular clasts, quartz & iron oxide; red-brown. (Duricrust).									
							2.20m									
			26.5	2.5	Quaternary Dune Deposits		SAND (SP): fine to medium-grained; sub-rounded to rounded; quartz & organics; black; with clay, low-plasticity. (Aeolian)	Wk							Whilst Drilling	
			26.0	3.0												
			25.5	3.5												
			25.0													

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DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM2-W-S01

Job No: 304501017 **Sheet:** 2 of 2

Position: E343226.910 N6208201.060 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 28.920 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 13/3/24 **Date Completed:** 13/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description							Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP			24.5	4.5			SAND (SP): fine to medium-grained; sub-rounded to rounded; quartz & organics; black; with clay, low-plasticity. (Aeolian) *(continued)*	Wk								
							4.30m									
							Sandy CLAY (Cl): medium plasticity; dark brown to dark grey; sand, fine to medium-grained, sub-rounded to rounded, quartz & organics. (Alluvial).	Uc								
							4.50m									
							TERMINATED AT 4.50 m Target Water Contact Soil Logging									
			24.0	5.0												
			23.5	5.5												
			23.0	6.0												
			22.5	6.5												
			22.0	7.0												
			21.5	7.5												
			21.0													

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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CORE BOX - PHOTO SHEET Hole ID: WM2-W-S01

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017

WM2-W-S01: 0 - 4.5m

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CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM2-W-S02

Job No: 304501017 **Sheet:** 1 of 2

Position: E342827.500 N6208156.170 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 27.450 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 12/3/24 **Date Completed:** 12/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description							Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP	N/A		27.0	0.5	Quaternary Dune Deposits		SAND (SP): fine to medium-grained; sub-rounded to sub-angular; quartz; brown; trace silt, non-plastic; trace rootlets to 0.1m depth. (Aeolian)	Uc						0.00: Stickup: 0.6m		WM2-W-S02
							0.80m									
			26.5	1.0	DII Duricrust		FERRICRETE: fine to coarse grained; sub-rounded to angular clasts, quartz & iron oxide; red-brown. (Duricrust).									
			26.0	1.5												
			25.5	2.0												
							2.30m									
			25.0	2.5	Quaternary Dune Deposits		Clayey SAND (SC): fine to medium-grained; sub-rounded to rounded; quartz; mottled white-brown to grey; clay, low plasticity. (Aeolian)	Wk								
							2.90m									
			24.5	3.0			Clayey SAND (SC): fine to medium-grained; sub-rounded to rounded; quartz & organics; dark grey to black; clay, low plasticity. (Aeolian)								Whilst Drilling	
			24.0	3.5												
			23.5													

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

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Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM2-W-S02

Job No: 304501017 **Sheet:** 2 of 2

Position: E342827.500 N6208156.170 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 27.450 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 12/3/24 **Date Completed:** 12/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description						Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP			23.0	4.5	Quaternary Dune Deposits		Clayey SAND (SC): fine to medium-grained; sub-rounded to rounded; quartz & organics; dark grey to black; clay, low plasticity. (Aeolian) *(continued)*	Wk / Uc							
			22.5	5.0											
			22.0	5.5											
			21.5	6.0			6.00m								
							TERMINATED AT 6.00 m Target depth Soil Logging								
			21.0	6.5											
			20.5	7.0											
			20.0	7.5											
			19.5												

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
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- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
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- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

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Stantec

CORE BOX - PHOTO SHEET Hole ID: WM2-W-S02

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017

WM2-W-S02: 0 - 6m

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Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM3-N-S01

Job No: 304501017 **Sheet:** 1 of 1

Position: E343246.590 N6211039.500 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 33.840 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 14/3/24 **Date Completed:** 14/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description								Defect Description			
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP	N/A		33.5	0.5	Quaternary Dune Deposits		SAND (SP): fine to medium-grained; sub-angular to rounded; quartz; grey; trace silt, non-plastic; trace rootlets to 0.1m. (Aeolian)	Uc						0.00: Stickup: 0.6m		WM3-N-S01
			33.0	1.0			1.00m									
			32.5	1.5			SAND (SP): fine to medium-grained; sub-angular to rounded; quartz; dark brown; with silt/clay, low plasticity. (Aeolian) From 1.4m... mottled orange-brown									
			32.0	2.0			1.80m Clayey SAND (SC): fine to medium-grained, sub-rounded to sub-angular; quartz & organics; black; clay, low plasticity. (Laucustrine) 2.00m	Wk								
			31.5	2.5			TERMINATED AT 2.00 m Refusal Soil Logging								Whilst Drilling	
			31.0	3.0												
			30.5	3.5												
			30.0													

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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Stantec

CORE BOX - PHOTO SHEET Hole ID: WM3-N-S01

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017

WM3-N-S01: 0 - 2m

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Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM3-N-S02 (A)

Job No: 304501017 **Sheet:** 1 of 1

Position: E343265.730 N6211102.080 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 33.710 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 14/3/24 **Date Completed:** 14/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description							Defect Description			
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level
DPP	N/A		33.5	0.5	QDD		SAND (SP): fine to medium grained; sub-angular to sub-rounded; quartz; yellow, mottled orange; trace silt, non-plastic; trace rootlets to 0.1m depth. (Aeolian)	Uc							
							0.20m								
					DII		FERRICRETE: fine to coarse grained; sub-rounded to angular clasts, quartz & iron oxide; red-brown. (Duricrust).							0.40: Well Install	
							0.40m								
			33.0	1.0			TERMINATED AT 0.40 m Refusal Soil Logging							NO WELL INSTALLATION DEPTH TOO SHALLOW	
			32.5	1.5											
			32.0	2.0											
			31.5	2.5											
			31.0	3.0											
			30.5	3.5											
			30.0												

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

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CORE BOX - PHOTO SHEET Hole ID: WM3-N-S02 (A)

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017

WM3-N-S02 (A): 0 - 0.4m

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Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM3-N-S02 (B)

Job No: 304501017 **Sheet:** 1 of 1

Position: E343265.730 N6211102.080 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 33.710 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 14/3/24 **Date Completed:** 14/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description							Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP / AD/V	N/A		33.5	0	QDD		Clayey SAND (SC): fine to medium-grained; sub-rounded to sub-angular; quartz; orange-brown; trace clay, low to medium plasticity. (Aeolian)	Uc						0.00: Stickup: 0.6m		WM3-N-S02
				0.30m												
			33.0	0.5	DI - DII Duricrust		FERRICRETE: fine to coarse grained; sub-rounded to angular clasts, quartz & iron oxide; red-brown. (Duricrust).									
				1.00m												
				1.0			TERMINATED AT 1.00 m Refusal Soil Logging									
			32.5	1.5												
			32.0	2.0												
			31.5	2.5												
			31.0	3.0												
			30.5	3.5												
			30.0													

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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CORE BOX - PHOTO SHEET

Hole ID: WM3-N-S02 (B)

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017

WM3-N-S02 (B): 0 - 1m

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CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM3-N-S03

Job No: 304501017 **Sheet:** 1 of 1

Position: E343304.400 N6211216.990 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 34.000 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 14/3/24 **Date Completed:** 14/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description							Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP	N/A		33.5	0.5			SAND (SP): medium to fine-grained; sub-angular to sub-rounded; quartz; pale grey to grey; trace silt, non-plastic; trace rootlets to 0.1m. (Aeolian)	Uc						0.00: Stickup: 0.6m		WM3-N-S03
							0.50m SAND (SP): fine to medium-grained; sub-angular to sub-rounded; quartz; pale brown; with clayey fines; low plasticity. (Aeolian)									
			33.0	1.0			1.40m									
			32.5	1.5			1.50m Clayey SAND (SC): fine to medium-grained; sub-angular to sub-rounded; quartz; brown to red brown; clay, low to medium plasticity. (Aeolian)	Wk								
							Clayey SAND (SC): fine to medium-grained; sub-angular to sub-rounded; quartz & organics; dark brown; clay, medium plasticity. (Aeolian)								Whilst Drilling	
			32.0	2.0												
			31.5	2.5												
			31.0	3.0			3.00m TERMINATED AT 3.00 m Target depth Soil Logging									
			30.5	3.5												

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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CORE BOX - PHOTO SHEET Hole ID: WM3-N-S03

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017

WM3-N-S03: 0 - 3m

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CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM3-N-S04

Job No: 304501017 **Sheet:** 1 of 1

Position: E343223.940 N6211480.060 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 34.790 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 14/3/24 **Date Completed:** 14/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description						Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP	N/A		34.5	0.5			SAND (SP): fine to medium-grained; sub-rounded to sub-angular; quartz; pale grey; trace silt, non-plastic; trace rootlets to 0.1m depth. (Aeolian)	Uc						0.00: Stickup: 0.6m		WM3-N-S04
			34.0	1.0												
			33.5	1.5			1.50m									
			33.0				Clayey SAND (SC): fine to medium-grained; sub-rounded to sub-angular; quartz & organics; dark brown; silty/clayey fines, low to medium plasticity. (Aeolian)	Wk							Whilst Drilling	
							1.90m									
			32.5	2.0			TERMINATED AT 1.90 m Refusal Soil Logging									
			32.0	2.5												
			31.5	3.0												
			31.0	3.5												

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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CORE BOX - PHOTO SHEET Hole ID: WM3-N-S04

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017

WM3-N-S04: 0 - 1.9m

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CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM3-W-S01

Job No: 304501017 **Sheet:** 1 of 1

Position: E343118.740 N6210924.010 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 33.670 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 14/3/24 **Date Completed:** 14/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description								Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP	N/A		33.5	0.5			SAND (SP): fine to medium-grained; sub-rounded to sub-angular; quartz; dark brown to grey; trace silt, non-plastic; trace rootlets to 0.6m depth (Aeolian).	Uc						0.00: Stickup: 0.6m		WM3-W-S01
			33.0				0.80m									
				1.0			FERRICRETE: fine to coarse grained; sub-rounded to angular clasts, quartz & iron oxide; red-brown. (Duricrust).	Wk								
							1.00m									
			32.5	1.5			TERMINATED AT 1.00 m Refusal Soil Logging									
			32.0	2.0												
			31.5	2.5												
			31.0	3.0												
			30.5	3.5												
			30.0													

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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Stantec

CORE BOX - PHOTO SHEET Hole ID: WM3-W-S01

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017

WM3-W-S01: 0 - 1m

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Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM3-W-S02 (A)

Job No: 304501017 **Sheet:** 1 of 1

Position: E343059.020 N6210916.440 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 33.340 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 13/3/24 **Date Completed:** 13/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description								Defect Description			
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP	N/A		33.0	0.5			SAND (SP): fine to medium-grained; sub-angular to sub-rounded; quartz and ferricrete fragments; orange-brown. (Aeolian)	Uc						0.00: Stickup: 0.6m		WM3-W-S02a
			32.5	1.0			0.30m FERRICRETE: fine to coarse grained; sub-rounded to angular clasts, quartz & iron oxide; red-brown. (Duricrust). 1.00m									
			32.0	1.5			TERMINATED AT 1.00 m Target depth Soil Logging									
			31.5	2.0												
			31.0	2.5												
			30.5	3.0												
			30.0	3.5												
			29.5													

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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Stantec

CORE BOX - PHOTO SHEET Hole ID: WM3-W-S02 (A)

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017

WM3-W-S02 (A): 0 - 1m

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Stantec

CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM3-W-S02 (B)

Job No: 304501017 **Sheet:** 1 of 1

Position: E343058.710 N6210917.830 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 33.350 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 13/3/24 **Date Completed:** 13/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description							Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP	N/A		33.0	0.0			SAND (SP): fine to medium-grained; sub-angular to sub-rounded; quartz; greay; trace silt, non-plastic; trace rootlets to 0.1m depth. (Aeolian)	Uc						0.00: Stickup: 0.6m		WM3-W-S02b
			32.5	1.0			1.00m									
			32.0	1.5			SAND (SP): fine to medium-grained; sub-angular to rounded; quartz; pale to dark orange-brown; with silty fines, low plasticity. (Aeolian)									
			31.5	2.0												
			31.0	2.5			2.50m								Whilst Drilling	
			30.5	3.0			Clayey SAND (SC): fine to medium-grained; sub-angular to sub-rounded; quartz; grey; clay, low to medium plasticity. (Aeolian).	Wk								
							3.00m									
			30.0	3.5			TERMINATED AT 3.00 m Target depth Soil Logging									
			29.5													

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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CORE BOX - PHOTO SHEET

Hole ID: WM3-W-S02 (B)

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017

WM3-W-S02 (B): 0 - 3m

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CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM3-W-S03

Job No: 304501017 **Sheet:** 1 of 1

Position: E342987.260 N6210892.360 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 33.870 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 13/3/24 **Date Completed:** 13/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description								Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP	N/A		33.5	0.5			SAND (SP): fine to medium-grained; sub-angular to sub-rounded; quartz; greay; trace silt, non-plastic. (Aeolian)	Uc						0.00: Stickup: 0.6m		WM3-W-S03
							0.60m									
			33.0	1.0			FERRICRETE: fine to coarse grained; sub-rounded to angular clasts, quartz & iron oxide; red-brown. (Duricrust).									
							1.00m									
			32.5	1.5			TERMINATED AT 1.00 m Target depth Soil Logging									
			32.0	2.0												
			31.5	2.5												
			31.0	3.0												
			30.5	3.5												
			30.0													

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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CORE BOX - PHOTO SHEET Hole ID: WM3-W-S03

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017

WM3-W-S03: 0 - 1m

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CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM3-W-S04

Job No: 304501017 **Sheet:** 1 of 1

Position: E342901.620 N6210922.540 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 33.140 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 13/3/24 **Date Completed:** 13/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description								Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP	N/A		33.0	0.0			SAND (SP): fine to medium-grained, sub-rounded to sub-angular, quartz; grey; trace silt, non-plastic; rootlets to 0.1m depth (Aeolian).	Uc						0.00: Stickup: 0.6m	Whilst Drilling	WM3-W-S04
			32.5	0.5			0.80m									
AD/V			32.0	1.0			FERRICRETE: fine to coarse grained; sub-rounded to angular clasts, quartz & iron oxide; red-brown. (Duricrust).									
			31.5	1.5			1.80m									
							SAND (SP): fine to medium-grained; sub-rounded to sub-angular, quartz & organics; black; with silt, non-plastic. (Aeolian)	Wk								
				2.0			2.00m									
			31.0				TERMINATED AT 2.00 m Target depth Soil Logging									
			30.5	2.5												
			30.0	3.0												
			29.5	3.5												

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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CORE BOX - PHOTO SHEET Hole ID: WM3-W-S04

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017

WM3-W-S04: 0 - 2m

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CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM3-W-S05

Job No: 304501017 **Sheet:** 1 of 2

Position: E342692.990 N6210889.200 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 32.500 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 13/3/24 **Date Completed:** 13/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description							Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP	N/A		32.0	0.5			SAND (SP): fine to medium-grained, subangular to rounded; quartz; dark brown to grey; trace silt, non-plastic; trace rootlets <0.1m. (Aeolian)	Uc						0.00: Stickup: 0.6m		WM3-W-S05
			31.5	1.0												
			31.0	1.5			1.60m SAND (SP): fine to medium-grained; sub-angular to rounded; quartz &organics; dark brown-black; with silt and clay, low plasticity. (Aeolian)									
			30.5	2.0			2.30m									
			30.0	2.5			Clayey SAND (SC): fine to medium-grained, sub-angular to sub-rounded, quartz; brown; trace silt, low to medium plasticity. (Aeolian)	Wk							Whilst Drilling	
			29.5	3.0												
			29.0	3.5												

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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CORE LOG SHEET

Client: Synergy RED
Project: Beenup Wind Farm Project
Location: Shire of Augusta Margaret River

Hole No: WM3-W-S05

Job No: 304501017 **Sheet:** 2 of 2

Position: E342692.990 N6210889.200 50 MGA94 **Angle from Horizontal:** 90° **Surface Elevation:** 32.500 m AHD

Rig Type: Geoprobe 7822dt **Mounting:** Light Vehicle **Contractor:** National Geotech

Data Started: 13/3/24 **Date Completed:** 13/3/24 **Logged By:** NM **Checked By:**

Drilling					Material Description							Defect Description				
Method	Casing	Core Run	RL (m AHD)	Depth (m)	Geology	Graphic Log	LITHOLOGY	Weathering / Cementation	Strength / Density / Consistency	Sample or Field Test	TCR (%)	RQD (%)	Average Natural Defect Spacing (mm) 20 60 200 600 2000	Observations / Description of Defects	Water Level	Monitoring Well Details
DPP			28.0	4.5			Clayey SAND (SC): fine to medium-grained, sub-angular to sub-rounded, quartz; brown; trace silt, low to medium plasticity. (Aeolian) *(continued)*	Wk								
							4.30m SAND (SP): fine to medium-grained, sub-angular to sub-rounded, quartz & organics; dark brown-black; trace silt, non-plastic. (Aeolian)	Uc								
							4.50m TERMINATED AT 4.50 m Target Water Contact Soil Logging									
			27.5	5.0												
			27.0	5.5												
			26.5	6.0												
			26.0	6.5												
			25.5	7.0												
			25.0	7.5												

DRILLING
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller
- PQ Rotary core (85mm)
- HQ Rotary core (63.5mm)
- NMLC Rotary core (51.94mm)
- DT Diatube concrete coring
- PT Push tube
- PS Percussion sampling
- SON Sonic drilling
- AH Air hammer

WATER
- Water Level on date shown
- water inflow
- water outflow

ROCK QUALITY DESCRIPTIONS
- RQD Rock Quality Designation (%)
- TCR Total Core Recovery (%)

ROCK STRENGTH
- EH Extremly High
- VH Very High
- H High
- M Medium
- L Low
- VL Very Low

ROCK WEATHERING
- FR Fresh
- SW Slightly Weathered
- MW Moderately Weathered
- HW Highly Weathered
- XW Extremly Weathered

DEFECT TYPE
- J Joint
- P Parting
- SM Seam
- SZ Sheared zone
- FL Foliation
- V Vein
- CSM Crushed Seam
- FZ Fracture Zone
- HB Handing Break
- DB Drilling Break

PLANARITY
- PL Planar
- IR Irregular
- CU Curved
- DIS Discontinuous
- ST Stepped
- UN Undulose

ROUGHNESS
- VR Very Rough
- RO Rough
- SO Smooth
- SL Slockensided
- POL Polished

COATING
- CN Clean
- STN Stained
- VN Veneer (thin or patchy)
- CT Coating (up to 1mm)

INFILL MATERIALS
- X Carbonaceus
- MU Unidentified minteral
- MS Secondary mineral
- KT Chlorite
- CA Calcite
- Fe Iron Oxide
- Qz Quartz

Refer to explanatory notes for details of abbreviations and basis of descriptions

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Stantec

CORE BOX - PHOTO SHEET Hole ID: WM3-W-S05

Client: Synergy Australia
Project: Beenup Wind Farm
Location: Beenup, WM-01

Job No: 304501017

WM3-W-S05: 0 - 4.5m

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Appendix D – Tables

Table A Acid Sulfate Soils

Definitions:
- (No Guideline), --- not tested, LOR (Limit of Reporting), Reaction Vigour (1 =Slight, 2 = Moderate, 3 = Strong, 4 = Extreme), mht (mol H+/tonne)

Notes

denotes less than the limit of reporting
Field test value indicative of AASS
Field test value indicative of PASS
Denotes sample exceeds DWER Action Criteria of 0.03 (%S) or 18 mol H+ / tonne, for excavations of >1,000 tonnes

Location	Date	Depth (mbgl)	Soil Description	Trigger	Field Tests				Acidity Trail						SPOS		SNAS		Net Acidity		ANC	
					pH-F	pH-FOX	pH Δ	Reaction	pH KCl	pH Ox	TAA		TPA		SPOS		SNAS		TAA+SPOS+ SNAS		ANCE	
				Units	pH		-	-	pH		%S	mht	%S	mht	%S	mht	%S	mht	%S	mht	%S	mht
				ASS	<4	<4			-		0.03	18	0.03	18	0.03	18	0.03	18	0.03	18	-	-
				LOR	0.1	0.1	0.1	-	0.1	0.1	0.005	2	0.02	2	0.005	2	0.005	2	0.005	2	0.02	2
WM01	26/02/2024	0.00	SAND: fine to coarse grained, dark black brown mottled; with silt		5.2	3.9	1.3	2	5.4	3.0	0.018	11	<0.02	<2	0.019	12	---	---	0.038	24	---	---
WM01	26/02/2024	0.25			5.2	3.9	1.3	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	0.50			5.5	3.7	1.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	0.75			5.5	3.5	2.0	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	1.00			5.4	3.5	1.9	2	5.2	3.4	0.017	11	<0.02	<2	0.009	6	---	---	0.026	16	---	---
WM01	26/02/2024	1.25			5.3	3.6	1.7	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	1.50			5.2	3.9	1.3	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	1.75			5.3	3.0	2.3	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	2.00			5.2	2.9	2.3	2	5.3	3.7	0.014	9	0.050	31	0.037	23	---	---	0.051	32	---	---
WM01	26/02/2024	2.25			5.4	2.9	2.5	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	2.50			5.9	3.4	2.5	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	2.75			5.7	3.3	2.4	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	3.00			5.9	3.0	2.9	2	5.0	4.3	0.014	9	0.030	19	0.008	5	---	---	0.022	14	---	---
WM01	26/02/2024	3.25			5.8	3.1	2.7	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	3.50			6.2	2.7	3.5	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	3.75			6.2	2.5	3.7	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	4.00			6.1	2.6	3.5	2	5.2	4.6	0.011	7	0.110	69	0.087	54	---	---	0.098	61	---	---
WM01	26/02/2024	4.25			6.0	2.6	3.4	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	4.50			6.2	2.5	3.7	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	4.75			6.3	2.2	4.1	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	5.00			6.3	2.4	3.9	2	4.9	2.9	0.027	17	0.270	168	0.200	125	---	---	0.220	137	---	---
WM01	26/02/2024	5.25			6.1	2.4	3.7	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	5.50			6.3	2.3	4.0	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	5.75	Sandy CLAY: pale grey and dark grey;		6.3	1.9	4.4	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	6.00			6.0	2.3	3.7	4	5.2	2.7	0.010	6	0.250	156	0.210	131	---	---	0.220	137	---	---
WM01	26/02/2024	6.25			6.1	2.3	3.8	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	6.50			6.1	2.4	3.7	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	6.75			6.1	2.4	3.7	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	7.00			6.1	2.3	3.8	4	5.2	2.9	0.011	7	0.200	125	0.150	94	---	---	0.170	106	---	---
WM01	26/02/2024	7.25			6.7	2.3	4.4	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	7.50			6.3	2.2	4.1	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	7.75			6.3	2.4	3.9	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	8.00			6.4	2.4	4.0	4	5.1	3.2	0.016	10	0.180	112	0.130	81	---	---	0.150	94	---	---
WM01	26/02/2024	8.25			6.4	2.3	4.1	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	8.50			6.3	2.1	4.2	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	8.75			6.1	2.3	3.8	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	9.00			6.2	2.5	3.7	4	5.0	3.2	0.033	21	0.290	181	0.140	87	---	---	0.180	112	---	---
WM01	26/02/2024	9.25			6.4	2.3	4.1	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	9.50			5.8	2.3	3.5	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	9.75			6.0	2.3	3.7	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM01	26/02/2024	10.00			5.4	2.3	3.1	4	5.2	2.4	0.016	10	0.530	331	0.530	331	---	---	0.550	343	---	---
WM02	27/02/2024	0.00	SAND: dark black brown mottled; with silt.		5.5	3.6	1.9	2	7.3	3.4	<0.003	<2	<0.02	<2	0.025	16	---	---	<0.02	<2	---	---
WM02	27/02/2024	0.25			6.0	3.2	2.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	0.50	SAND: fine to medium grained, pale grey brown		6.4	4.0	2.4	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	0.75			6.3	4.1	2.2	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	1.00			6.4	4.5	1.9	2	5.3	4.2	0.011	7	0.030	19	0.010	6	---	---	0.021	13	---	---
WM02	27/02/2024	1.25			5.7	4.7	1.0	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	1.50			6.9	4.4	2.5	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	1.75	FERRICRETE: fine to coarse grained, dark orange brown to red-brown;		5.7	4.3	1.4	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	2.00			6.2	5.0	1.2	2	6.1	6.3	0.009	6	< 0.02	<2	0.012	7	---	---	0.022	14	---	---
WM02	27/02/2024	2.25			7.2	3.2	4.0	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	2.50			6.9	4.4	2.5	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	2.75			5.7	4.3	1.4	2	5.1	2.8	0.010	6	0.150	94	0.099	62	---	---	0.110	69	---	---
WM02	27/02/2024	3.00			6.2	5.0	1.2	2	5.0	2.9	0.019	12	0.200	125	0.120	75	---	---	0.140	87	---	---
WM02	27/02/2024	3.25			7.2	3.2	4.0	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	3.50			6.6	3.2	3.4	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	3.75			6.1	2.7	3.4	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	4.00			7.2	2.8	4.4	4	5.2	2.6	0.021	13	0.390	243	0.270	168	---	---	0.290	181	---	---
WM02	27/02/2024	4.25			5.8	3.1	2.7	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	4.50			5.7	3.2	2.5	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	4.75			5.8	2.9	2.9	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	5.00			5.2	2.9	2.3	4	4.7	2.3	0.054	34	0.810	505	0.650	405	---	---	0.700	437	---	---
WM02	27/02/2024	5.25			5.5	3.1	2.4	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	5.50			5.4	3.2	2.2	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	5.75	SAND: fine to medium grained, rich in organics; dark brown to grey;		6.5	2.8	3.7	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	6.00			6.5	2.7	3.8	4	4.9	2.2	0.030	19	0.640	399	0.570	356	---	---	0.600	374	---	---
WM02	27/02/2024	6.25			5.7	2.4	3.3	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	6.50			6.0	2.9	3.1	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	6.75			4.6	2.5	2.1	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	7.00			7.7	2.5	5.2	4	5.0	2.4	0.017	11	0.320	200	0.270	168	---	---	0.290	181	---	---
WM02	27/02/2024	7.25			4.5	2.3	2.2	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	7.50			4.8	2.3	2.5	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	7.75			5.0	2.7	2.3	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	8.00			4.8	2.6	2.2	4	4.6	2.1	0.041	26	0.540	337	0.440	274	---	---	0.480	299	---	---
WM02	27/02/2024	8.25			6.1	2.3	3.8	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	8.50			5.3	2.7	2.6	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	8.75			4.9	2.7	2.2	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	9.00			5.0	2.8	2.2	4	4.4	1.9	0.180	112	2.200	1372	1.900	1185	0.023	11	2.100	1310	---	---
WM02	27/02/2024	9.25	Sandy CLAY: pale grey and dark grey; sand, fine to medium grained,		5.2	2.6	2.6	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	9.50			4.9	3.0	1.9	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	9.75			5.2	2.9	2.3	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM02	27/02/2024	10.00			4.8	2.9	1.9	4	4.6	2.2	0.120	75	1.400	873	1.300	811	---	---	1.400	873	---	---
WM03	28/02/2024	0.00	SAND: fine to coarse grained, organics; dark black & mottled brown;		5.6	3.1	2.5	3	5.2	2.5	0.048	30	1.200	748	0.086	54	---	---	0.130	81	---	---
WM03	28/02/2024	0.25	SAND: fine to medium grained, pale grey-brown		6.8	4.0	2.8	2	5.1	3.7	0.050	31	0.320	200	0.150	94	---	---	0.200	125	---	---
WM03	28/02/2024	0.50			6.2	4.3	1.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	0.75			5.5	4.6	0.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	1.00			5.2	4.4	0.8	2	5.7	4.8	0.026	16	0.060	37	0.012	7	---	---	0.039	24	---	---
WM03	28/02/2024	1.25			5.3	4.7	0.6	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	2.00	FERRICRETE: fine to coarse grained, dark orange brown to red-brown		5.2	4.6	0.6	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	2.25			5.5	4.4	1.1	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	2.50			5.7	4.6	1.1	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	2.75			5.5	4.7	0.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	3.00			5.8	4.1	1.7	2	5.8	4.1	0.018	11	0.090	56	0.046	29	---	---	0.064	40	---	---
WM03	28/02/2024	3.25			6.1	3.3	2.8	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	3.50			6.7	3.0	3.7	4	4.7	2.7	0.033	21	0.330	206	0.230	143	<0.005	<2	0.260	162	---	---
WM03	28/02/2024	3.75			6.2	3.1	3.1	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	4.00			7.3	2.7	4.6	4	4.7	2.6	0.041	26	0.450	281	0.350	218	---	---	0.390	243	---	---
WM03	28/02/2024	4.25			6.7	3.0	3.7	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	4.50	SAND: fine to medium grained,rich in organics; dark brown mottled orange; trace silty fines.		6.6	3.1	3.5	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	4.75			7.1	3.2	3.9	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	5.00			7.2	3.2	4.0	4	5.6	3.8	0.014	9	0.160	100	0.110	69	---	---	0.130	81	---	---
WM03	28/02/2024	5.25			7.8	2.5	5.3	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	5.50			7.7	2.5	5.2	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	5.75			7.7	2.5	5.2	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	6.00			7.9	2.5	5.4	4	5.0	2.6	0.016	10	0.240	150	0.180	112	---	---	0.200	125	---	---
WM03	28/02/2024	6.25			7.0	2.9	4.1	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	6.50			5.4	3.1	2.3	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	6.75			4.9	2.8	2.1	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	7.00			6.4	3.7	2.7	4	4.7	3.0	0.160	100	1.400	873	0.860	536	---	---	1.000	624	---	---
WM03	28/02/2024	7.25			5.2	3.1	2.1	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	7.50			5.6	2.9	2.7	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	7.75			5.0	2.9	2.1	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	8.00	SAND: fine to medium grained, subrounded to sub-angular, dark grey, mottled black.		4.7	3.4	1.3	4	4.5	2.6	0.140	87	1.100	686	0.760	474	---	---	0.900	561	---	---
WM03	28/02/2024	8.25			6.6	3.2	3.4	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	8.50			6.6	3.2	3.4	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	8.75			6.7	3.2	3.5	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	9.00			6.2	3.2	3.0	4	4.7	2.7	0.055	34	0.610	380	0.440	274	---	---	0.500	312	---	---
WM03	28/02/2024	9.25			5.5	2.9	2.6	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	9.50			5.5	3.0	2.5	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	9.75			6.4	3.0	3.4	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WM03	28/02/2024	10.00			5.6	3.2	2.4	4	4.7	2.7	0.060	37	0.690	430	0.500	312	---	---	0.560	349	---	---

Location	Date	Depth (mbgl)	Soil Description	Trigger	Field Tests				Acidity Trail						SPOS		SNAS		Net Acidity		ANC	
					pH-F	pH-FOX	pH Δ	Reaction	pH KCl	pH Ox	TAA		TPA		SPOS		SNAS		TAA+SPOS+ SNAS		ANCE	
				Units	pH		-	-	pH		%S	mht	%S	mht	%S	mht	%S	mht	%S	mht	%S	mht
				ASS	<4	<4			-		0.03	18	0.03	18	0.03	18	0.03	18	0.03	18	-	-
				LOR	0.1	0.1	0.1	-	0.1	0.1	0.005	2	0.02	2	0.005	2	0.005	2	0.005	2	0.02	2
TP01	14/03/2024	0.00	SAND: fine to medium grained, dark grey		4.6	3.1	1.5	2	4.6	2.9	0.075	47	0.130	81	0.024	15	---	---	0.098	61	---	---
TP01	14/03/2024	0.25	SAND: fine to coarse grained, pale grey with dark grey; trace fines		4.6	3.2	1.4	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP01	14/03/2024	0.75			4.8	3.7	1.1	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP01	14/03/2024	1.00			4.8	3.8	1.0	2	5.1	3.5	0.014	9	<0.02	<2	<0.005	<2	---	---	<0.02	<2	---	---
TP01	14/03/2024	1.25			4.6	3.8	0.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP01	14/03/2024	1.50			4.5	3.8	0.7	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP01	14/03/2024	1.75			4.7	3.6	1.1	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP01	14/03/2024	2.00	SAND: fine to coarse grained, dark grey/brown; trace fines		4.7	3.5	1.2	2	4.7	2.6	0.060	37	0.100	62	0.037	23	---	---	0.097	60	---	---
TP02	14/03/2024	0.00	SAND: fine to medium grained, dark grey		4.8	3.4	1.4	2	5.0	2.7	0.034	21	0.030	19	0.024	15	---	---	0.058	36	---	---
TP02	14/03/2024	0.25	SAND: fine to coarse grained, dark grey; trace fines		4.8	3.9	0.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP02	14/03/2024	0.50			4.8	3.9	0.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP02	14/03/2024	0.75			4.8	3.9	0.9	2	5.1	3.7	0.034	21	0.030	19	0.009	6	---	---	0.043	27	---	---
TP02	14/03/2024	1.00	FERRICRETE: dark orange brown		4.8	3.9	0.9	2	4.8	4.2	0.076	47	0.140	87	0.013	8	---	---	0.089	56	---	---
TP03	12/03/2024	0.00	Gravelly SAND: Fine to Coarse, white sand;		6.4	5.1	1.3	2	6.9	6.5	<0.003	<2	<0.02	<2	0.018	11	---	---	<0.02	<2	---	---
TP03	12/03/2024	0.25	SAND: fine to medium grained, pale grey, mottled pale brown		6.5	5.1	1.4	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP03	12/03/2024	1.00			5.8	3.5	2.3	2	5.6	4.6	0.005	3	<0.02	<2	<0.005	<2	---	---	<0.02	<2	---	---
TP04	12/03/2024	0.00	Gravelly SAND: fine to coarse grained, grey sand		5.4	3.2	2.2	2	5.2	5.7	0.028	17	<0.02	<2	0.030	19	---	---	0.059	37	---	---
TP04	12/03/2024	0.50	SAND: fine to medium grained, pale grey mottled pale brown		6.1	3.9	2.2	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP04	12/03/2024	1.00	SAND: fine to medium grained, white		6.1	4.2	1.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP04	12/03/2024	1.25			6.1	4.6	1.5	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP04	12/03/2024	1.75			5.7	3.9	1.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP05	13/03/2024	0.00	SAND: fine to medium grained, dark grey; trace silty fines.		5.6	2.7	2.9	2	5.3	6.2	0.022	14	<0.02	<2	0.054	34	---	---	0.076	47	---	---
TP05	13/03/2024	0.25			6.0	3.1	2.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP05	13/03/2024	0.50			6.0	3.9	2.1	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP05	13/03/2024	0.75			6.2	4.2	2.0	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP06	13/03/2024	0.00	SAND: fine to medium grained, dark grey		5.0	3.9	1.1	2	4.8	2.5	0.058	36	<0.02	<2	0.050	31	---	---	0.110	69	---	---
TP06	13/03/2024	0.25	SAND: fine to medium grained, pale grey, mottled pale brown		4.9	4.1	0.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP06	13/03/2024	0.50			4.9	4.4	0.5	2	5.6	3.9	0.006	4	<0.02	<2	<0.005	<2	---	---	<0.02	<2	---	---
TP07	14/03/2024	0.00	SAND: fine to medium grained, dark grey		6.0	5.0	1.0	2	6.3	3.0	0.004	2	<0.02	<2	0.065	41	---	---	0.069	43	---	---
TP07	14/03/2024	0.25	SAND: fine to coarse grained, pale grey; trace silty fines.		6.0	5.1	0.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP07	14/03/2024	0.50			6.2	5.2	1.0	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP07	14/03/2024	0.75			6.3	5.4	0.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP07	14/03/2024	1.00	SAND: fine to coarse grained, dark grey, mottled dark brown; pockets of organics		6.7	5.7	1.0	2	6.0	4.4	<0.003	<2	<0.02	<2	<0.005	<2	---	---	<0.02	<2	---	---
TP07	14/03/2024	1.25			6.7	5.6	1.1	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP07	14/03/2024	1.50			6.0	2.2	3.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP08	12/03/2024	0.00	SAND: fine to medium grained, dark grey		5.0	3.8	1.2	2	5.4	2.9	0.013	8	<0.02	<2	0.023	14	---	---	0.035	22	---	---
TP08	12/03/2024	0.25	SAND: fine to coarse grained, pale grey; trace silty fines.		5.3	4.6	0.7	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP08	12/03/2024	0.50			5.2	4.3	0.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP08	12/03/2024	0.75			5.3	4.4	0.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP08	12/03/2024	1.00			6.1	4.6	1.5	2	5.5	3.6	0.009	6	<0.02	<2	0.014	9	---	---	0.023	14	---	---
TP08	12/03/2024	1.25			6.3	4.8	1.5	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP08	12/03/2024	1.50			5.2	4.4	0.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP08	12/03/2024	1.75			5.9	4.4	1.5	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP08	12/03/2024	2.00	SAND: fine to coarse grained, dark grey, mottled dark brown;		5.0	2.8	2.2	2	5.5	3.8	0.015	9	0.050	31	0.059	37	---	---	0.074	46	---	---
TP09	12/03/2024	0.00	SAND: fine to medium grained, dark grey		5.1	4.2	0.9	2	5.4	2.9	0.032	20	<0.02	<2	0.059	37	---	---	0.091	57	---	---
TP09	12/03/2024	0.25	SAND: fine to medium grained, pale grey, mottled pale brown		5.1	4.4	0.7	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP09	12/03/2024	1.00			5.6	4.9	0.7	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP09	12/03/2024	1.50	SAND: fine to medium grained, pale yellow and stained dark brown.		6.0	5.2	0.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP10	12/03/2024	0.00	SAND: fine to medium grained, dark grey		6.0	4.0	2.0	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP10	12/03/2024	1.00			6.1	4.1	2.0	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP11	14/03/2024	0.00	SAND: fine to medium grained, dark grey		5.9	3.8	2.1	2	5.9	3.0	0.007	4	<0.02	<2	0.042	26	---	---	0.049	31	---	---
TP11	14/03/2024	0.25	SAND: fine to coarse grained, pale brown to brown		6.1	4.0	2.1	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP11	14/03/2024	0.50			6.0	3.7	2.3	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP11	14/03/2024	0.75			6.5	5.1	1.4	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP11	14/03/2024	1.00			6.6	5.2	1.4	2	6.3	4.8	<0.003	<2	<0.02	<2	0.006	4	---	---	<0.02	<2	---	---
TP11	14/03/2024	1.25			6.2	4.3	1.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP11	14/03/2024	1.50			6.3	4.3	2.0	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP11	14/03/2024	1.75	SAND: fine to coarse grained, brown to dark brown; pockets of organics.		5.9	3.1	2.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP11	14/03/2024	2.00			5.3	3.4	1.9	4	5.0	3.3	0.049	31	0.410	256	0.210	131	---	---	0.260	162	---	---
TP12	13/03/2024	0.00	SAND: fine to medium grained, dark grey		6.0	4.1	1.9	2	6.0	6.2	0.007	4	<0.02	<2	0.032	20	---	---	0.039	24	---	---
TP13	13/03/2024	0.00	SAND: fine to medium grained, dark grey		5.9	5.0	0.9	2	6.7	3.2	<0.003	<2	<0.02	<2	0.080	50	---	---	0.027	17	---	---
TP13	13/03/2024	0.25	SAND: fine to medium grained, pale grey, mottled dark grey		4.7	4.0	0.7	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP13	13/03/2024	0.50			4.6	4.3	0.3	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP13	13/03/2024	0.75			4.7	4.2	0.5	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP13	13/03/2024	1.00			4.7	4.2	0.5	2	5.4	3.3	0.006	4	<0.02	<2	<0.005	<2	---	---	<0.02	<2	---	---
TP13	13/03/2024	1.25			4.7	4.1	0.6	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP13	13/03/2024	1.50			4.7	4.2	0.5	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP13	13/03/2024	1.75	SAND: fine to coarse grained, dark brown; pockets of organics.		4.8	3.9	0.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP13	13/03/2024	2.00			4.8	3.6	1.2	2	4.3	2.2	0.170	106	0.490	306	0.110	69	0.006	3	0.290	181	---	---
TP14	13/03/2024	0.00	SAND: fine to medium grained, dark grey		5.5	3.5	2.0	2	5.2	2.7	0.023	14	<0.02	<2	0.049	31	---	---	0.072	45	---	---
TP14	13/03/2024	0.25	SAND: fine to medium grained, pale grey, mottled dark grey		5.8	3.7	2.1	2	5.4	3.1	0.009	6	<0.02	<2	0.012	7	---	---	0.021	13	---	---
TP15	13/03/2024	0.00	SAND: fine to medium grained, dark grey		5.3	3.5	1.8	2	5.3	2.9	0.022	14	<0.02	<2	0.043	27	---	---	0.065	41	---	---
TP15	13/03/2024	0.25	SAND (SP): fine to coarse grained, dark yellow, stained dark orange.		5.6	4.1	1.5	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP15	13/03/2024	0.50			5.7	4.8	0.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP15	13/03/2024	0.75			5.9	5.0	0.9	2	5.8	4.1	0.006	4	<0.02	<2	<0.005	<2	---	---	<0.02	<2	---	---
TP15	13/03/2024	1.00	FERRICRETE: fine grained; dark orange/brown;		6.2	5.1	1.1	2	6.1	4.3	0.005	3	<0.02	<2	0.007	4	---	---	<0.02	<2	---	---
TP16	13/03/2024	0.00	SAND: fine to medium grained, dark grey		5.8	3.0	2.8	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP17	13/03/2024	0.00	SAND: fine to medium grained, dark grey		5.3	2.8	2.5	2	5.4	3.0	0.018	11	<0.02	<2	0.034	21	---	---	0.053	33	---	---
TP17	13/03/2024	0.25	SAND: fine to medium grained, pale grey, mottled dark grey		5.3	3.1	2.2	2	5.3	3.5	0.009	6	<0.02	<2	<0.005	<2	---	---	<0.02	<2	---	---
TP17	13/03/2024	0.50	FERRICRETE: fine grained; dark orange brown;		5.3	3.1	2.2	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP18	13/03/2024	0.00	SAND: fine to medium grained, dark grey		5.9	3.8	2.1	2	5.4	3.9	0.018	11	<0.02	<2	0.021	13	---	---	0.039	24	---	---
TP19	14/03/2024	0.00	SAND: fine to medium grained, dark grey		6.5	5.0	1.5	2	7.1	3.2	<0.003	<2	<0.02	<2	0.042	26	---	---	0.042	26	---	---
TP19	14/03/2024	0.25	SAND: fine to medium grained, pale grey, mottled dark grey		5.2	4.3	0.9	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP19	14/03/2024	0.50			5.2	4.7	0.5	2	5.9	3.1	0.004	2	<0.02	<2	0.007	4	---	---	<0.02	<2	---	---
TP20	13/03/2024	0.00	SAND: fine to medium grained, dark grey		5.2	4.6	0.6	2	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Table B Groundwater Quality Laboratory Results

Definitions:
PWG (Freshwater Guidelines) for slightly - moderately disturbed systems, LIWG (Long Term Irrigation Water Guidelines), Dewatering trigger values DWER ASS Guideline Series (2015), NPUG (Non-potable groundwater use), LDWG - Livestock Drinking Water Guidelines
- (No Guideline), — not tested, LOR (Limit of Reporting),

Notes:
Guideline values have been adopted from the following guidance documentation:
- *Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes* (DWER 2015b)
- *Assessment and Management of Contaminated Sites* (DWER 2021)
- *Freshwater and Marine Water Quality Guidelines* (ANZG, 2023)
-ANZECC/ARMCANZ 2000 Freshwater and Marine WQ Guidelines Chapter 3 SW wetland environments - Table 3.3.6
All results expressed as mg/L except for pH (pH units), ratios (unitless), Redox mV (mili Volts) and EC (µS/cm)
Denotes less than LOR

Sample ID	Date	Event	Trigger	Dissolved Metals & Metalloids										Total Metals		Field Parameters					Acid Sulfate Soil Parameters						ASS Ratios		Cations				Nutrients					
				Aluminium	Arsenic	Cadmium	Chromium	Iron	Manganese	Nickel	Selenium	Zinc		Total Aluminium	Total Iron	pH	E.C	Redox	DO	Groundwater Elevation	Total Acidity (CaCO3)	Total Alkalinity (CaCO3)	TDS	TSS	Sulfate	Chloride	Acidity: Alkalinity	Sulfate: Chloride	Calcium	Magnesium	Potassium	Sodium	Total P	Reactive P	Total N	TKN	Total Ammonia (NH_3-N + NH_4-N)	NO_x-N
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	pH units	µS/cm	mV	mg/L	mAHD	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	-	-	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
			FWG	0.055[a]	0.013	0.0002	0.001	-	1.9	0.011	0.005	0.008		-	0.3	7.0-8.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.065	0.03	1.5	-	2.57	0.1
			NPUG	0.2	0.1	0.02	0.5	0.3	5	0.2	0.1	3		-	0.3	-	-	-	-	-	-	-	-	-	1000	250	-	-	-	-	-	-	-	-	-	-	0.41	-
			LIWG	5	0.1	0.01	0.1	0.2	0.2	0.2	0.02	2		-	0.2	-	2300	-	-	-	-	-	1500	-	-	710	-	-	-	-	-	-	-	-	5	-	-	-
			LDWG	5	0.5	0.01	1.0	-	-	0.15	0.02	20		5	-	-	-	-	-	-	-	-	2500	-	1000	-	-	-	1000	2000	-	-	-	-	-	-	-	400
			ASS	1	-	-	-	-	-	-	-	-		-	-	<6	-	-	-	-	>40	-	-	-	-	-	>1	>0.5	-	-	-	-	-	-	-	-	-	-
			LOR	0.01	0.001	0.0001	0.001	0.05	0.005	0.001	0.001	0.005		0.1	0.02	0.01	10	1	0.01	0.01	1	1	10	5	1	1	-	-	1	1	1	1	0.01	0.005	0.1	0.1	0.01	0.01
Leederville Aquifer																																					
WM01	04/17/2024	Baseline		0.020	<0.001	<0.0001	0.004	2.62	---	---	---	---		---	---	5.38	266	15	0.06	33.79	---	---	---	---	---	---	---	---	---	5	7	---	0.04	---	0.3	0.3	---	<0.01
WM01	23/07/2024	Baseline		0.030	<0.001	<0.0001	<0.001	2.58	0.09	0.002	<0.01	<0.005		---	---	5.34	295	107	0.21	34.66	---	11	185	---	6	84	---	0.07	2	6	8.0	43	0.03	<0.01	0.6	0.6	0.150	<0.01
WM01	26/09/2024	Baseline		<0.01	<0.001	<0.0001	<0.001	0.06	0.06	0.005	<0.01	0.0090		---	---	5.67	317	156	1.63	35.52	---	24	189	---	5	100	---	0.05	8	6	7.0	43	<0.01	<0.01	0.3	0.1	<0.01	0.180
WM01	20/01/2025	Baseline		<0.01	<0.001	<0.0001	<0.001	<0.05	0.08	0.002	<0.01	<0.005		---	---	5.11	308	11	0.18	34.48	---	11	178	---	7	72	---	0.10	2	6	7.0	42	0.04	<0.01	0.3	0.3	0.140	<0.01
WM02	17/04/2024	Baseline		0.010	0.0020	<0.0001	---	11.40	---	---	---	---		---	---	6.06	528	6	0.10	27.48	---	---	---	---	---	---	---	---	---	9	5.0	---	0.10	---	0.3	0.3	---	<0.01
WM02	23/07/2024	Baseline		<0.01	<0.001	<0.0001	<0.001	14.90	0.20	<0.001	<0.01	<0.005		---	---	5.92	623	19	0.41	28.50	---	16	332	---	15	202	---	0.07	2	12	6.0	97	0.04	<0.01	0.2	0.2	0.110	<0.01
WM02	26/09/2024	Baseline		<0.01	<0.001	<0.0001	<0.001	3.11	0.22	<0.001	<0.01	<0.005		---	---	5.86	617	17	1.04	28.03	---	17	322	---	11	197	---	0.06	3	12	6.0	94	0.03	<0.01	0.2	0.2	0.080	<0.01
WM02	21/01/2025	Baseline		<0.01	<0.001	<0.0001	<0.001	<0.05	0.21	<0.001	<0.01	<0.005		---	---	5.94	633	31	0.08	27.68	---	21	310	---	9	207	---	0.04	2	12	6.0	95	0.04	<0.01	0.2	0.2	0.090	<0.01
WM03	17/04/2024	Baseline		0.050	<0.001	<0.0001	---	6.48	---	---	---	---		---	---	6.08	450	6	0.22	30.57	---	---	---	---	---	---	---	---	---	8	3.0	---	0.06	---	0.3	0.3	---	<0.01
WM03	24/07/2024	Baseline		0.010	<0.001	<0.0001	<0.001	2.94	0.61	0.008	<0.01	0.0130		---	---	6.15	434	71	2.89	32.09	---	30	234	---	9	128	---	0.07	5	8	4.0	68	0.01	<0.01	0.5	0.4	0.170	0.090
WM03	27/09/2024	Baseline		<0.01	<0.001	<0.0001	<0.001	6.76	0.33	0.004	<0.01	0.0080		---	---	5.79	419	53	0.93	31.84	---	26	225	---	7	148	---	0.05	3	8	3.0	62	<0.01	<0.01	0.3	0.3	0.150	<0.01
WM03	21/01/2025	Baseline		<0.01	<0.001	<0.0001	<0.001	<0.05	0.43	0.012	<0.01	0.0210		---	---	6.19	473	169	0.59	30.98	---	34	240	---	15	142	---	0.11	9	8	4.0	69	0.02	<0.01	0.6	0.2	0.030	0.360
Superficial Aquifer																																					
WM01-W-S01	17/04/2024	Baseline		<0.01	0.0030	<0.0001	---	7.16	---	---	---	---		---	---	5.93	354	-14	1.05	32.17	---	---	---	---	---	---	---	---	---	8	4.0	---	0.93	---	2.3	2.3	---	<0.01
WM01-W-S01	23/07/2024	Baseline		0.010	<0.001	<0.0001	<0.001	0.07	0.32	0.003	<0.01	0.0300		---	---	4.57	370	284	0.79	32.84	---	<1	245	---	41	93	---	0.44	4	8	4.0	53	<0.01	<0.01	0.2	0.2	<0.01	0.040
WM01-W-S01	26/09/2024	Baseline		<0.01	<0.001	<0.0001	<0.001	<0.05	0.21	0.002	<0.01	0.0210		---	---	4.61	323	317	0.81	34.23	---	<1	186	---	43	91	---	0.47	4	7	3.0	47	<0.01	<0.01	0.1	0.1	<0.01	<0.01
WM01-W-S01	20/01/2025	Baseline		0.040	<0.001	<0.0001	<0.001	<0.05	0.44	0.004	<0.01	0.0120		---	---	5.17	343	168	6.60	32.99	---	<1	173	---	40	59	---	0.68	3	6	2.0	42	<0.01	<0.01	0.2	0.2	0.030	0.010
WM01-W-S02	17/04/2024	Baseline		0.030	<0.001	<0.0001	---	17.80	---	---	---	---		---	---	6.42	341	-161	0.17	33.20	---	---	---	---	---	---	---	---	---	12	6.0	---	0.28	---	1.1	1.1	---	0.010
WM01-W-S02	25/07/2024	Baseline		0.070	0.0020	<0.0001	<0.001	4.19	0.05	<0.001	<0.01	<0.005		---	---	5.51	296	27	1.03	33.52	---	5	688	---	4	92	---	0.04	1	6	5.0	46	1.06	<0.01	2.8	2.8	0.080	<0.01
WM01-W-S02	26/09/2024	Baseline		0.040	<0.001	<0.0001	<0.001	0.58	0.05	<0.001	<0.01	<0.005		---	---	5.22	413	47	0.87	35.32	---	<1	234	---	36	123	---	0.29	4	11	4.0	51	<0.01	<0.01	0.4	0.4	0.150	<0.01
WM01-W-S02	20/01/2025	Baseline		0.040	<0.001	<0.0001	<0.001	<0.05	0.03	<0.001	<0.01	<0.005		---	---	4.97	413	-64	0.19	34.10	---	<1	222	---	34	83	---	0.41	3	10	4.0	53	<0.01	<0.01	0.3	0.3	0.140	<0.05
WM02-W-S01	17/04/2024	Baseline		0.100	<0.001	<0.0001	---	22.40	---	---	---	---		---	---	6.41	394	-135	0.11	27.58	---	---	---	---	---	---	---	---	---	7	14.0	---	0.04	---	2.1	2.1	---	<0.01
WM02-W-S01	23/07/2024	Baseline		0.090	<0.001	<0.0001	<0.001	6.05	0.13	<0.001	<0.01	<0.005		---	---	5.95	390	23	0.22	28.84	---	24	230	---	34	91	---	0.37	11	8	14.0	46	0.03	<0.01	1.6	1.6	0.850	0.020
WM02-W-S01	26/09/2024	Baseline		0.040	<0.001	<0.0001	<0.001	0.23	0.04	<0.001	<0.01	<0.005		---	---	5.62	395	71	0.58	28.25	---	17	212	---	35	104	---	0.34	14	8	12.0	39	<0.01	<0.01	1.7	1.7	1.150	<0.01
WM02-W-S01	21/01/2025	Baseline		0.130	<0.001	<0.0001	0.001	3.39	0.08	<0.001	<0.01	<0.005		---	---	6.00	430	-126	0.14	27.73	---	23	247	---	37	79	---	0.47	20	6	15.0	40	0.01	<0.01	1.7	1.7	0.760	0.020
WM02-W-S02	17/04/2024	Baseline		0.020	<0.001	<0.0001	---	30.20	---	---	---	---		---	---	6.42	545	-112	0.11	26.25	---	---	---	---	---	---	---	---	---	10	9.0	---	0.08	---	0.6	0.6	---	<0.01
WM02-W-S02	25/07/2024	Baseline		<0.01	<0.001	<0.0001	<0.001	0.20	0.14	<0.001	<0.01	<0.005		---	---	5.68	506	141	0.37	27.45	---	24	283	---	30	135	---	0.22	11	11	12.0	65	0.02	<0.01	0.7	0.6	0.250	0.130
WM02-W-S02	26/09/2024	Baseline		<0.01	<0.001	<0.0001	<0.001	<0.05	0.25	<0.001	<0.01	<0.005		---	---	5.85	543	49	0.43	26.76	---	34	280	---	15	166	---	0.09	9	12	8.0	75	0.02	<0.01	0.3	0.3	0.110	0.010
WM02-W-S02	21/01/2025	Baseline		<0.01	<0.001	<0.0001	<0.001	<0.05	0.27	<0.001	<0.01	<0.005		---	---	6.24	571	-99	0.19	26.22	---	35	285	---	3	175	---	0.02	4	10	6.0	86	0.34	<0.01	0.8	0.8	0.060	<0.01
WM03-N-S03	17/04/2024	Baseline		0.340	0.0020	<0.0001	---	11.00	---	---	---	---		---	---	5.51	376	51	0.86	32.65	---	---	---	---	---	---	---	---	---	8	3.0	---	0.02	---	1.3	1.2	---	0.140
WM03-N-S03	24/07/2024	Baseline		0.360	<0.001	<0.0001	<0.001	2.70	0.05	<0.001	<0.01	<0.005		---	---	4.58	747	265	0.55	33.82	---	<1	442	---	86	180	---	0.48	34	18	18.0	70	0.04	<0.01	9.0	3.0	0.700	5.97
WM03-N-S03	27/09/2024	Baseline		2.240	0.0060	<0.0001	0.004	15.30	0.12	0.002	<0.01	<0.005		---	---	5.87	892	5	0.57	33.71	---	59	618	---	74	209	---	0.35	18	10	36.0	67	0.28	0.12	42.0	41.9	35.100	0.070
WM03-N-S03	21/01/2025	Baseline		0.340	<0.001	<0.0001	<0.001	2.88	0.02	<0.001	<0.01	<0.005		---	---	5.63	639	-92	0.10	33.01	---	<1	307	---	38	163	---	0.23	17	9	6.0	59	0.19	<0.01	2.8	2.8	1.020	<0.01
WM03-W-S02B	17/04/2024	Baseline		<0.01	<0.001	<0.0001	---	17.40	---	---	---	---		---	---	6.08	2740	-39	0.31	32.04	---	---	---	---	---	---	---	---	---	54	27.0	---	0.03	---	0.6	0.6	---	0.010
WM03-W-S02B	24/07/2024	Baseline		1.020	<0.001	<0.0001	0.001	17.50	0.29	0.002	<0.01	<0.005		---	---	5.63	943	61	0.25	33.46	---	4	714	---	63	287	---	0.22	10	18	57.0	119	0.16	0.05	4.6	4.6	0.510	<0.01
WM03-W-S02B	27/09/2024	Baseline		0.780	<0.001	<0.0001	<0.001	13.00	0.19	0.001	<0.01	<0.005		---	---	5.52	1200	55	0.49	33.42	---	10	822	---	109	320	---	0.34	12	24	79.0	137	0.68	0.32	5.3	5.3	0.440	0.020
WM03-W-S02B	21/01/2025	Baseline		1.240	0.0010	<0.0001	0.002	22.80	0.14	0.001	<0.01	<0.005		---	---	5.80	1100	-21	0.07	32.30	---	15	792	---	74	307	---	0.24	12	21	69.0	122	0.54	0.31	6.4	6.4	0.500	<0.05

Table C Surface Water Quality Laboratory Results

Definitions:
FWG (Freshwater Guidelines) for slightly - moderately disturbed systems, LIWG (Long Term Irrigation Water Guidelines), Dewatering trigger values DWER ASS Guideline Series (2015), NPUG (Non-potable groundwater use), LDWG - Livestock Drinking Water Guidelines
- (No Guideline), --- not tested, LOR (Limit of Reporting),

Notes:
Guideline values have been adopted from the following guidance documentation:
- *Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes* (DWER 2015b)
- *Assessment and Management of Contaminated Sites* (DWER 2021)
- *Freshwater and Marine Water Quality Guidelines* (ANZG, 2023)
-ANZECC/ARMCANZ 2000 Freshwater and Marine WQ Guidelines Chapter 3 SW wetland environments - Table 3.3.6
All results expressed as mg/L except for pH (pH units), ratios (unitless), Redox mV (mili Volts) and EC (µS/cm)

Denotes less than LOR

Sample ID	Date	Event	Trigger	Dissolved Metals & Metalloids										Total Metals		Field Parameters				Acid Sulfate Soil Parameters							ASS Ratios		Cations				Nutrients					
				Aluminium	Arsenic	Cadmium	Chromium	Iron	Manganese	Nickel	Selenium	Zinc	Total Aluminium	Total Iron	pH	E.C	Redox	DO	Total Acidity (CaCO3)	Total Alkalinity (CaCO3)	TDS	TSS	Turbidity	Sulfate	Chloride	Acidity: Alkalinity	Sulfate: Chloride	Calcium	Magnesium	Potassium	Sodium	Total P	Reactive P	Total N	TKN	Total Ammonia (NH_3-N + NH_4-N)	NO_x-N
	Units			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pH units	µS/cm	mV	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	mg/L	mg/L	-	-	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	FWG			0.055	0.013	0.0002	0.001	-	1.9	0.011	0.005	0.008	-	0.3	7.0-8.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.065	0.03	1.5	-	2.57	0.1
	NPUG			0.2	0.1	0.02	0.5	0.3	5	0.2	0.1	3	-	0.3	-	-	-	-	-	-	-	-	-	1000	250	-	-	-	-	-	-	-	-	-	-	0.41	-
	LIWG			5	0.1	0.01	0.1	0.2	0.2	0.2	0.02	2	-	0.2	-	2300	-	-	-	-	1500	-	-	-	710	-	-	-	-	-	-	-	-	5	-	-	-
	LDWG			5	0.5	0.01	1.0	-	-	0.15	0.02	20	5	-	-	-	-	-	-	-	2500	-	-	1000	-	-	-	1000	2000	-	-	-	-	-	-	-	400
	ASS			1	-	-	-	-	-	-	-	-	-	-	<6	-	-	-	>40	-	-	-	-	-	-	>1	>0.5	-	-	-	-	-	-	-	-	-	-
	LOR			0.01	0.001	0.0001	0.001	0.05	0.005	0.001	0.001	0.005	0.1	0.02	0.01	10	1	0.01	1	1	10	5	0.1	1	1	-	-	1	1	1	1	0.01	0.005	0.1	0.1	0.01	0.01
Creekline Discharge																																					
SW01	25/09/2024	Baseline		0.060	<0.001	<0.001	<0.001	2.03	<0.001	<0.001	<0.01	<0.005	---	---	7.25	445	53	8.96	---	175	269	---	34	<5	56	---	0.09	58	11	3	22	0.06	0.01	1.6	1.6	0.010	0.010
SW02	17/04/2024	Baseline		<0.01	<0.001	---	---	1.46	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	20	18.0	---	0.16	---	7.2	7.2	---	0.020
SW02	22/07/2024	Baseline		0.020	<0.001	---	---	2.82	---	---	---	---	---	---	6.86	828	-37	4.76	---	---	---	---	---	---	---	---	---	---	21	26.0	---	0.23	---	6.7	6.0	---	0.710
SW02	25/09/2024	Baseline		<0.01	<0.001	<0.001	<0.001	0.98	0.141	<0.001	<0.01	<0.005	---	---	7.31	1207	12	9.10	---	100	686	---	65	47	320	---	0.15	46	24	18.0	138	0.50	0.04	8.6	8.4	3.830	0.200
SW02	20/01/2025	Baseline		<0.01	<0.001	<0.001	<0.001	1.25	0.007	<0.001	<0.01	<0.005	---	---	7.37	1284	61	8.49	---	111	691	---	25	42	326	---	0.13	42	20	28.0	142	0.36	<0.01	8.0	8.0	4.610	<0.01
SW03	22/07/2024	Baseline		0.040	<0.001	---	---	0.28	---	---	---	---	---	---	7.17	438	39	6.75	---	---	---	---	---	---	---	---	---	---	9	9.0	---	0.06	---	1.3	1.3	---	0.020
SW03	25/09/2024	Baseline		0.070	<0.001	<0.001	<0.001	1.39	0.002	<0.001	<0.01	<0.005	---	---	6.85	727	52	7.51	---	72	440	---	110	47	190	---	0.25	38	10	16.0	82	0.68	0.02	6.0	6.0	0.040	0.020
SW04	22/07/2024	Baseline		0.120	<0.001	---	---	0.45	---	---	---	---	---	---	6.39	441	22	4.26	---	---	---	---	---	---	---	---	---	---	8	9.0	---	0.10	---	2.2	2.2	---	<0.01
SW04	25/09/2024	Baseline		0.140	<0.001	<0.001	<0.001	8.63	0.011	<0.001	<0.01	<0.005	---	---	7.45	557	62	8.29	---	55	367	---	21	12	145	---	0.08	27	10	4.0	58	0.54	0.33	3.2	3.2	0.030	<0.01
SW05	22/07/2024	Baseline		0.050	0.0010	---	---	1.34	---	---	---	---	---	---	6.84	645	6	4.85	---	---	---	---	---	---	---	---	---	---	13	25.0	---	0.22	---	5.0	3.8	---	1.230
SW05	25/09/2024	Baseline		0.010	0.0010	<0.001	<0.001	2.20	0.177	<0.001	<0.01	<0.005	---	---	7.32	943	-9	7.64	---	165	570	---	180	24	207	---	0.12	44	15	42.0	97	6.23	0.09	12.6	12.6	0.370	0.010
Wetland																																					
WM01-WL	23/07/2024	Baseline		0.600	<0.001	---	---	0.12	---	---	---	---	---	---	6.12	256	108	4.75	---	---	---	---	---	---	---	---	---	---	---	<1	4.0	---	0.43	---	3.5	3.5	---	0.030
WM01-WL	26/09/2024	Baseline		0.760	<0.001	0.001	<0.001	0.34	0.022	<0.001	<0.01	<0.005	---	---	6.15	290	89	4.88	---	17	214	---	18	<10	86	---	0.12	4	5	8.0	38	0.31	0.15	3.6	3.6	0.500	0.010
WM02-WL	23/07/2024	Baseline		0.030	<0.001	---	---	0.16	---	---	---	---	---	---	6.75	997	49	8.48	---	---	---	---	---	---	---	---	---	---	---	18	12.0	---	0.17	---	2.7	2.7	---	0.040
WM02-WL	26/09/2024	Baseline		0.060	<0.001	<0.001	<0.001	2.07	0.023	<0.001	<0.01	<0.005	---	---	7.33	427	15	11.42	---	60	266	---	55	7	103	---	0.07	24	10	7.0	45	0.59	0.09	8.0	8.0	0.030	<0.01
WM02-WL	21/01/2025	Baseline		0.050	0.0020	<0.001	<0.001	2.35	0.018	<0.001	<0.01	<0.005	---	---	6.40	1669	5	7.85	---	88	848	---	22	<5	407	---	0.01	34	23	29.0	192	0.79	0.11	7.3	7.3	0.200	<0.01
WM03-WL	24/07/2024	Baseline		0.360	0.0010	---	---	0.93	---	---	---	---	---	---	6.12	775	49	3.12	---	---	---	---	---	---	---	---	---	---	---	23	22.0	---	1.75	---	3.9	3.8	---	0.110
WM03-WL	27/09/2024	Baseline		0.310	<0.001	<0.001	<0.001	0.86	0.009	<0.001	<0.01	<0.005	---	---	6.13	863	52	3.43	---	29	560	---	2	39	242	---	0.16	8	18	11.0	124	2.14	2.15	3.1	3.1	0.040	0.020
WM03-WL	21/01/2025	Baseline		1.470	0.0020	0.002	<0.001	6.30	0.078	<0.001	<0.01	0.0070	---	---	6.13	3415	25	6.37	---	66	2240	---	22	<50	942	---	0.05	24	54	46.0	542	6.53	6.10	12.5	12.4	0.060	0.070

Appendix E – Laboratory Documentation

Stantec Australia Pty Limited
6F 226,Adelaide Terrace
Perth
WA 6000

NATA Accredited
Accreditation Number 2377
Site Number 2370

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Brenton Petracca**

Report **1075587-S**
Project name BEENUP WIND FARM
Received Date Mar 05, 2024

Client Sample ID			**WM01-0.0**	**WM01-0.5**	**WM01-1.0**	**WM01-1.5**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**L24-Ma0013729**	**L24-Ma0013730**	**L24-Ma0013731**	**L24-Ma0013732**
Date Sampled			**Feb 26, 2024**	**Feb 26, 2024**	**Feb 26, 2024**	**Feb 26, 2024**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
BTEX						
4-Bromofluorobenzene (surr.)	1	%	82	104	57	83
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
OCOP in Soil						
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
alpha-BHC (HCH)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
beta-BHC (HCH)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
delta-BHC (HCH)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bifenthrin	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Bromophos Ethyl	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlorpyrifos	0.02	mg/kg	< 0.02	< 0.02	< 0.02	< 0.02
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p.p-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Client Sample ID			WM01-0.0	WM01-0.5	WM01-1.0	WM01-1.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013729	L24-Ma0013730	L24-Ma0013731	L24-Ma0013732
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
OCOP in Soil						
p.p-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p.p-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
o.p-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan Sulfate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor Epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene (HCB)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Lindane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Oxychlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethion	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Fenitrothion	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Malathion	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Trifluralin	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ammonia-N	10	mg/kg	36	37	38	36
Chromium (VI)	1	mg/kg	< 1	< 1	< 1	< 1
Filterable Reactive Phosphorus	1	mg/kg	7.9	< 1	< 1	< 1
Nitrate-N	1	mg/kg	1.6	1.3	1.2	< 1
Nitrite-N	1	mg/kg	1.6	1.3	1.2	< 1
NOx-N	1	mg/kg	1.6	1.4	1.2	< 1
Total Kjeldahl Nitrogen	10	mg/kg	370	680	280	40
Total Nitrogen	10	mg/kg	370	680	280	40
Phosphorus	1	mg/kg	19	27	4.5	3.4
Heavy Metals						
Arsenic	2	mg/kg	< 2	< 2	< 2	< 2
Beryllium	2	mg/kg	< 2	< 2	< 2	< 2
Boron	10	mg/kg	< 10	< 10	< 10	< 10
Cadmium	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Cobalt	5	mg/kg	< 5	< 5	< 5	< 5
Copper	1	mg/kg	< 1	< 1	< 1	< 1
Lead	1	mg/kg	5.2	4.6	7.8	6.1
Manganese	5	mg/kg	< 5	< 5	5.9	< 5
Mercury	0.02	mg/kg	< 0.02	< 0.02	0.02	< 0.02
Nickel	1	mg/kg	< 1	< 1	< 1	< 1
Selenium	2	mg/kg	< 2	< 2	< 2	< 2
Zinc	5	mg/kg	< 5	< 5	< 5	< 5
Sample Properties						
% Moisture	1	%	11	4.4	20	16

Client Sample ID			WM02-0.0	WM02-0.5	WM02-1.0	WM03-0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013733	L24-Ma0013734	L24-Ma0013735	L24-Ma0013737
Date Sampled			Feb 28, 2024	Feb 28, 2024	Feb 28, 2024	Feb 29, 2024
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	61	< 50	180
TRH C29-C36	50	mg/kg	< 50	68	< 50	190
TRH C10-C36 (Total)	50	mg/kg	< 50	129	< 50	370
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
BTEX						
4-Bromofluorobenzene (surr.)	1	%	99	90	97	116
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	110	< 100	310
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	100
TRH >C10-C40 (total)*	100	mg/kg	< 100	110	< 100	410
OCOP in Soil						
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
alpha-BHC (HCH)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
beta-BHC (HCH)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
delta-BHC (HCH)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bifenthrin	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Bromophos Ethyl	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlorpyrifos	0.02	mg/kg	< 0.02	< 0.02	< 0.02	< 0.02
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p.p-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p.p-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p.p-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
o.p-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan Sulfate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor Epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene (HCB)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Lindane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Oxychlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Client Sample ID			WM02-0.0	WM02-0.5	WM02-1.0	WM03-0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013733	L24-Ma0013734	L24-Ma0013735	L24-Ma0013737
Date Sampled			Feb 28, 2024	Feb 28, 2024	Feb 28, 2024	Feb 29, 2024
Test/Reference	LOR	Unit				
OCOP in Soil						
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethion	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Fenitrothion	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Malathion	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Trifluralin	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ammonia-N	10	mg/kg	37	36	39	52
Chromium (VI)	1	mg/kg	< 1	< 1	< 1	< 1
Filterable Reactive Phosphorus	1	mg/kg	< 1	< 1	< 1	1.1
Nitrate-N	1	mg/kg	15	13	2.2	< 1
Nitrite-N	1	mg/kg	15	13	2.2	< 1
NOx-N	1	mg/kg	< 1	< 1	2.4	< 1
Total Kjeldahl Nitrogen	10	mg/kg	1200	700	86	5200
Total Nitrogen	10	mg/kg	1200	700	88	5200
Phosphorus	1	mg/kg	190	45	5.3	610
Heavy Metals						
Arsenic	2	mg/kg	< 2	< 2	< 2	< 2
Beryllium	2	mg/kg	< 2	< 2	< 2	< 2
Boron	10	mg/kg	< 10	< 10	< 10	< 10
Cadmium	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1
Cobalt	5	mg/kg	< 5	< 5	< 5	< 5
Copper	1	mg/kg	2.9	< 1	< 1	6.5
Lead	1	mg/kg	< 1	< 1	< 1	4.1
Manganese	5	mg/kg	< 5	< 5	< 5	14
Mercury	0.02	mg/kg	0.03	0.03	0.03	0.05
Nickel	1	mg/kg	< 1	< 1	< 1	< 1
Selenium	2	mg/kg	< 2	< 2	< 2	< 2
Zinc	5	mg/kg	5.4	< 5	< 5	8.4
Sample Properties						
% Moisture	1	%	< 1	2.6	20	6.6

Client Sample ID			WM03-0.5	WM01-0.0	WM01-0.25	WM01-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013738	L24-Ma0013753	L24-Ma0013754	L24-Ma0013755
Date Sampled			Feb 29, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	-	-	-
TRH C10-C14	20	mg/kg	< 20	-	-	-
TRH C15-C28	50	mg/kg	< 50	-	-	-
TRH C29-C36	50	mg/kg	< 50	-	-	-
TRH C10-C36 (Total)	50	mg/kg	< 50	-	-	-
BTEX						
Benzene	0.1	mg/kg	< 0.1	-	-	-
Toluene	0.1	mg/kg	< 0.1	-	-	-
Ethylbenzene	0.1	mg/kg	< 0.1	-	-	-
m&p-Xylenes	0.2	mg/kg	< 0.2	-	-	-

Client Sample ID			WM03-0.5	WM01-0.0	WM01-0.25	WM01-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013738	L24-Ma0013753	L24-Ma0013754	L24-Ma0013755
Date Sampled			Feb 29, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
BTEX						
o-Xylene	0.1	mg/kg	< 0.1	-	-	-
Xylenes - Total*	0.3	mg/kg	< 0.3	-	-	-
BTEX						
4-Bromofluorobenzene (surr.)	1	%	79	-	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	-	-	-
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	-	-	-
TRH C6-C10	20	mg/kg	< 20	-	-	-
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	-	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	-	-	-
TRH >C16-C34	100	mg/kg	< 100	-	-	-
TRH >C34-C40	100	mg/kg	< 100	-	-	-
TRH >C10-C40 (total)*	100	mg/kg	< 100	-	-	-
OCOP in Soil						
Aldrin	0.01	mg/kg	< 0.01	-	-	-
alpha-BHC (HCH)	0.01	mg/kg	< 0.01	-	-	-
beta-BHC (HCH)	0.01	mg/kg	< 0.01	-	-	-
delta-BHC (HCH)	0.01	mg/kg	< 0.01	-	-	-
Bifenthrin	0.2	mg/kg	< 0.2	-	-	-
Bromophos Ethyl	0.05	mg/kg	< 0.05	-	-	-
Chlordane	0.01	mg/kg	< 0.01	-	-	-
Chlorpyrifos	0.02	mg/kg	< 0.02	-	-	-
Dieldrin	0.01	mg/kg	< 0.01	-	-	-
p.p-DDD	0.01	mg/kg	< 0.01	-	-	-
p.p-DDE	0.01	mg/kg	< 0.01	-	-	-
p.p-DDT	0.01	mg/kg	< 0.01	-	-	-
o.p-DDT	0.01	mg/kg	< 0.01	-	-	-
Endosulfan I	0.01	mg/kg	< 0.01	-	-	-
Endosulfan II	0.01	mg/kg	< 0.01	-	-	-
Endosulfan Sulfate	0.01	mg/kg	< 0.01	-	-	-
Endrin	0.01	mg/kg	< 0.01	-	-	-
Heptachlor	0.01	mg/kg	< 0.01	-	-	-
Heptachlor Epoxide	0.01	mg/kg	< 0.01	-	-	-
Hexachlorobenzene (HCB)	0.01	mg/kg	< 0.01	-	-	-
Lindane	0.01	mg/kg	< 0.01	-	-	-
Methoxychlor	0.2	mg/kg	< 0.2	-	-	-
Oxychlordane	0.01	mg/kg	< 0.01	-	-	-
Diazinon	0.2	mg/kg	< 0.2	-	-	-
Ethion	0.05	mg/kg	< 0.05	-	-	-
Fenitrothion	0.1	mg/kg	< 0.1	-	-	-
Malathion	0.1	mg/kg	< 0.1	-	-	-
Trifluralin	0.2	mg/kg	< 0.2	-	-	-
Ammonia-N	10	mg/kg	43	-	-	-
Chromium (VI)	1	mg/kg	< 1	-	-	-
Filterable Reactive Phosphorus	1	mg/kg	< 1	-	-	-
Nitrate-N	1	mg/kg	3.1	-	-	-

Client Sample ID			WM03-0.5	WM01-0.0	WM01-0.25	WM01-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013738	L24-Ma0013753	L24-Ma0013754	L24-Ma0013755
Date Sampled			Feb 29, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Nitrite-N	1	mg/kg	3.1	-	-	-
NOx-N	1	mg/kg	3.2	-	-	-
Total Kjeldahl Nitrogen	10	mg/kg	1100	-	-	-
Total Nitrogen	10	mg/kg	1100	-	-	-
Phosphorus	1	mg/kg	30	-	-	-
Heavy Metals						
Arsenic	2	mg/kg	11	-	-	-
Beryllium	2	mg/kg	< 2	-	-	-
Boron	10	mg/kg	< 10	-	-	-
Cadmium	0.1	mg/kg	< 0.1	-	-	-
Cobalt	5	mg/kg	< 5	-	-	-
Copper	1	mg/kg	< 1	-	-	-
Lead	1	mg/kg	20	-	-	-
Manganese	5	mg/kg	< 5	-	-	-
Mercury	0.02	mg/kg	0.05	-	-	-
Nickel	1	mg/kg	< 1	-	-	-
Selenium	2	mg/kg	< 2	-	-	-
Zinc	5	mg/kg	< 5	-	-	-
Sample Properties						
% Moisture	1	%	25	-	-	-
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	-	5.2	5.2	5.5
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	-	3.9	3.9	3.7
Reaction Ratings*[S05]	0	comment	-	2.0	2.0	2.0

Client Sample ID			WM01-0.75	WM01-1.0	WM01-1.25	WM01-1.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013756	L24-Ma0013757	L24-Ma0013758	L24-Ma0013759
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.5	5.4	5.3	5.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.5	3.5	3.6	3.9
Reaction Ratings*[S05]	0	comment	2.0	2.0	2.0	2.0

Client Sample ID			WM01-1.75	WM01-2.0	WM01-2.25	WM01-2.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013760	L24-Ma0013761	L24-Ma0013762	L24-Ma0013763
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.3	5.2	5.4	5.9
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.0	2.9	2.9	3.4
Reaction Ratings*[S05]	0	comment	2.0	2.0	2.0	2.0

Client Sample ID			WM01-2.75	WM01-3.0	WM01-3.25	WM01-3.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013764	L24-Ma0013765	L24-Ma0013766	L24-Ma0013767
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.7	5.9	5.8	6.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.3	3.0	3.1	2.7
Reaction Ratings*[S05]	0	comment	2.0	2.0	2.0	2.0

Client Sample ID			WM01-3.75	WM01-4.0	WM01-4.25	WM01-4.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013768	L24-Ma0013769	L24-Ma0013770	L24-Ma0013771
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.2	6.1	6.0	6.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.5	2.6	2.6	2.5
Reaction Ratings*[S05]	0	comment	2.0	2.0	2.0	2.0

Client Sample ID			WM01-4.75	WM01-5.0	WM01-5.25	WM01-5.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013772	L24-Ma0013773	L24-Ma0013774	L24-Ma0013775
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.3	6.3	6.1	6.3
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.2	2.4	2.4	2.3
Reaction Ratings*[S05]	0	comment	2.0	2.0	4.0	2.0

Client Sample ID			WM01-5.75	WM01-6.0	WM01-6.25	WM01-6.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013776	L24-Ma0013777	L24-Ma0013778	L24-Ma0013779
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.3	6.0	6.1	6.1
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	1.9	2.3	2.3	2.4
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM01-6.75	WM01-7.0	WM01-7.25	WM01-7.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013780	L24-Ma0013781	L24-Ma0013782	L24-Ma0013783
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.1	6.1	6.7	6.3
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.4	2.3	2.3	2.2
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM01-7.75	WM01-8.0	WM01-8.25	WM01-8.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013784	L24-Ma0013785	L24-Ma0013786	L24-Ma0013787
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.3	6.4	6.4	6.3
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.4	2.4	2.3	2.1
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM01-8.75	WM01-9.0	WM01-9.25	WM01-9.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013788	L24-Ma0013789	L24-Ma0013790	L24-Ma0013791
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.1	6.2	6.4	5.8
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.3	2.5	2.3	2.3
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM01-9.75	WM01-10.0	WM02-0.0	WM02-0.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013792	L24-Ma0013793	L24-Ma0013794	L24-Ma0013795
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.0	5.4	5.5	6.0
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.3	2.3	3.6	3.2
Reaction Ratings*[S05]	0	comment	4.0	4.0	2.0	2.0

Client Sample ID			WM02-0.5	WM02-0.75	WM02-1.0	WM02-1.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013796	L24-Ma0013797	L24-Ma0013798	L24-Ma0013799
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.4	6.3	6.4	5.7
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.0	4.1	4.5	4.7
Reaction Ratings*[S05]	0	comment	2.0	2.0	2.0	2.0

Client Sample ID			WM02-1.5	WM02-1.75	WM02-2.0	WM02-2.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013800	L24-Ma0013801	L24-Ma0013802	L24-Ma0013803
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.9	5.7	6.2	7.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.4	4.3	5.0	3.2
Reaction Ratings*[S05]	0	comment	2.0	2.0	2.0	2.0

Client Sample ID			WM02-2.5	WM02-2.75	WM02-3.0	WM02-3.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013804	L24-Ma0013805	L24-Ma0013806	L24-Ma0013807
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.9	7.6	7.2	6.5
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.4	2.6	2.8	2.8
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	3.0

Client Sample ID			WM02-3.50	WM02-3.75	WM02-4.0	WM02-4.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013808	L24-Ma0013809	L24-Ma0013810	L24-Ma0013811
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.6	6.1	7.2	5.8
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.2	2.7	2.8	3.1
Reaction Ratings*[S05]	0	comment	3.0	4.0	4.0	4.0

Client Sample ID			WM02-4.50	WM02-4.75	WM02-5.0	WM02-5.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013812	L24-Ma0013813	L24-Ma0013814	L24-Ma0013815
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.7	5.8	5.2	5.5
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.2	2.9	2.9	3.1
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM02-5.50	WM02-5.75	WM02-6.0	WM02-6.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013816	L24-Ma0013817	L24-Ma0013818	L24-Ma0013819
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.4	6.5	6.5	5.7
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.2	2.8	2.7	2.4
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM02-6.50	WM02-6.75	WM02-7.0	WM02-7.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013820	L24-Ma0013821	L24-Ma0013822	L24-Ma0013823
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.0	4.6	7.7	4.5
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.9	2.5	2.5	2.3
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM02-7.50	WM02-7.75	WM02-8.0	WM02-8.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013824	L24-Ma0013825	L24-Ma0013826	L24-Ma0013827
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	4.8	5.0	4.8	6.1
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.3	2.7	2.6	2.3
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM02-8.50	WM02-8.75	WM02-9.0	WM02-9.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013828	L24-Ma0013829	L24-Ma0013830	L24-Ma0013831
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.3	4.9	5.0	5.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.7	2.7	2.8	2.6
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM02-9.50	WM02-9.75	WM02-10.0	WM03-0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013832	L24-Ma0013833	L24-Ma0013834	L24-Ma0013835
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	4.9	5.2	4.8	5.6
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.0	2.9	2.9	3.1
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	3.0

Client Sample ID			WM03-0.25	WM03-0.5	WM03-0.75	WM03-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013836	L24-Ma0013837	L24-Ma0013838	L24-Ma0013839
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.8	6.2	5.5	5.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.0	4.3	4.6	4.4
Reaction Ratings*[S05]	0	comment	2.0	2.0	2.0	2.0

Client Sample ID			WM03-1.25	WM03-2.0	WM03-2.25	WM03-2.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013840	L24-Ma0013843	L24-Ma0013844	L24-Ma0013845
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.3	5.2	5.5	5.7
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.7	4.6	4.4	4.6
Reaction Ratings*[S05]	0	comment	2.0	2.0	2.0	2.0

Client Sample ID			WM03-2.75	WM03-3.0	WM03-3.25	WM03-3.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013846	L24-Ma0013847	L24-Ma0013848	L24-Ma0013849
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.5	5.8	6.1	6.7
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.7	4.1	3.3	3.0
Reaction Ratings*[S05]	0	comment	2.0	2.0	4.0	4.0

Client Sample ID			WM03-3.75	WM03-4.0	WM03-4.25	WM03-4.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013850	L24-Ma0013851	L24-Ma0013852	L24-Ma0013853
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.2	7.3	6.7	6.6
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.1	2.7	3.0	3.1
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM03-4.75	WM03-5.0	WM03-5.25	WM03-5.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013854	L24-Ma0013855	L24-Ma0013856	L24-Ma0013857
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	7.1	7.2	7.8	7.7
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.2	3.2	2.5	2.5
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM03-5.75	WM03-6.0	WM03-6.25	WM03-6.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013858	L24-Ma0013859	L24-Ma0013860	L24-Ma0013861
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	7.7	7.9	7.0	5.4
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.5	2.5	2.9	3.1
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM03-6.75	WM03-7.0	WM03-7.25	WM03-7.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013862	L24-Ma0013863	L24-Ma0013864	L24-Ma0013865
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	4.9	6.4	5.2	5.6
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.8	3.7	3.1	2.9
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM03-7.75	WM03-8.0	WM03-8.25	WM03-8.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013866	L24-Ma0013867	L24-Ma0013868	L24-Ma0013869
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.0	4.7	6.6	6.6
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.9	3.4	3.2	3.2
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM03-8.75	WM03-9.0	WM03-9.25	WM03-9.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013870	L24-Ma0013871	L24-Ma0013872	L24-Ma0013873
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.7	6.2	5.5	5.5
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.2	3.2	2.9	3.0
Reaction Ratings*[S05]	0	comment	4.0	4.0	4.0	4.0

Client Sample ID			WM03-9.75	WM03-10.0	Trip Blank
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013874	L24-Ma0013875	L24-Ma0013882
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 29, 2024
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	20	mg/kg	-	-	< 20
BTEX					
Benzene	0.1	mg/kg	-	-	< 0.1
Toluene	0.1	mg/kg	-	-	< 0.1
Ethylbenzene	0.1	mg/kg	-	-	< 0.1
m&p-Xylenes	0.2	mg/kg	-	-	< 0.2
o-Xylene	0.1	mg/kg	-	-	< 0.1
Xylenes - Total*	0.3	mg/kg	-	-	< 0.3
BTEX					
4-Bromofluorobenzene (surr.)	1	%	-	-	79
Naphthalene[N02]	0.5	mg/kg	-	-	< 0.5

Client Sample ID			WM03-9.75	WM03-10.0	Trip Blank
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24-Ma0013874	L24-Ma0013875	L24-Ma0013882
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 29, 2024
Test/Reference	LOR	Unit			
Acid Sulfate Soils Field pH Test					
pH-F (Field pH test)*	0.1	pH Units	6.4	5.6	-
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.0	3.2	-
Reaction Ratings*[S05]	0	comment	4.0	4.0	-
Total Recoverable Hydrocarbons					
TRH C6-C10	20	mg/kg	-	-	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	-	-	< 20

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Welshpool	Mar 08, 2024	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Welshpool	Mar 08, 2024	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Welshpool	Mar 08, 2024	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Welshpool	Mar 08, 2024	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
NEPM 2013 Metals : Metals M12	Welshpool	Mar 08, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
OCOP in Soil	Welshpool	Mar 09, 2024	14 Days
- Method: ARL003 - OCOP and PCB in Soil			
Ammonia-N	Welshpool	Mar 08, 2024	7 Days
- Method: ARL304 - Ammonia in Soil and Sediment by Discrete Analyser			
Chromium (VI)	Welshpool	Mar 08, 2024	28 Days
- Method: ARL051 - Hexavalent Chromium in Soil			
Filterable Reactive Phosphorus	Welshpool	Mar 08, 2024	7 Day
- Method: ARL120 - Filterable Reactive Phosphorus in Soil			
Nitrate-N	Welshpool	Mar 08, 2024	7 Days
- Method: ARL314 - NOx in Soil and Sediment by Discrete Analyser			
Nitrite-N	Welshpool	Mar 08, 2024	7 Days
- Method: ARL312 - Nitrite in Soil and Sediment by Discrete Analyser			
Phosphorus	Welshpool	Mar 08, 2024	7 Days
- Method: ARL401/403 - Metals in Soil and Sediment by ICPOES/MS			
Acid Sulfate Soils Field pH Test	Welshpool	Mar 06, 2024	7 Days
- Method: LTM-GEN-7060 Determination of field pH (pHF) and field pH peroxide (pHFOX) tests			
NOx-N	Welshpool	Mar 08, 2024	7 Days
- Method: ARL314 - NOx in Soil and Sediment by Discrete Analyser			
Total Kjeldahl Nitrogen	Welshpool	Mar 08, 2024	7 Days
- Method: ARL118 - Total Phosphorus and TKN in Soil and Biosolids			
Total Nitrogen	Welshpool	Mar 06, 2024	7 Days
- Method: ARL No. 330 - Persulfate Method for Simultaneous Determination of TN & TP			
Naphthalene	Welshpool	Mar 08, 2024	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons	Welshpool	Mar 07, 2024	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
% Moisture	Welshpool	Mar 06, 2024	14 Days
- Method: ARL135 Moisture in Solids			

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Project Name: BEENUP WIND FARM

Order No.:
Report #: 1075587
Phone: 0458 839 200
Fax:

Received: Mar 5, 2024 10:56 AM
Due: Mar 12, 2024
Priority: 5 Day
Contact Name: Brenton Petracca

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail						Ammonia-N	CANCELLED	Chromium (VI)	Chromium (VI)	Filterable Reactive Phosphorus	HOLD	Nitrate-N	Nitrite-N	Phosphorus	Acid Sulfate Soils Field pH Test	Moisture Set	BTEXN and Volatile TRH	Eurofins Suite B6A	Asbestos in Soils (ASC NEPM 2013)	OCOP in Soil	OCOP in Water	Total Nitrogen	Eurofins Suite B19E
Perth Laboratory - NATA # 2377 Site # 2370						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																		
1	WM01-0.0	Feb 26, 2024		Soil	L24-Ma0013729	X			X	X		X	X	X		X		X		X		X	
2	WM01-0.5	Feb 26, 2024		Soil	L24-Ma0013730	X			X	X		X	X	X		X		X		X		X	
3	WM01-1.0	Feb 26, 2024		Soil	L24-Ma0013731	X			X	X		X	X	X		X		X		X		X	
4	WM01-1.5	Feb 26, 2024		Soil	L24-Ma0013732	X			X	X		X	X	X		X		X		X		X	
5	WM02-0.0	Feb 28, 2024		Soil	L24-Ma0013733	X			X	X		X	X	X		X		X		X		X	
6	WM02-0.5	Feb 28, 2024		Soil	L24-Ma0013734	X			X	X		X	X	X		X		X		X		X	
7	WM02-1.0	Feb 28, 2024		Soil	L24-Ma0013735	X			X	X		X	X	X		X		X		X		X	
8	WM03-0.0	Feb 29, 2024		Soil	L24-Ma0013737	X			X	X		X	X	X		X		X		X		X	
9	WM03-0.5	Feb 29, 2024		Soil	L24-Ma0013738	X			X	X		X	X	X		X		X		X		X	
10	WM01-0.0	Feb 26, 2024		Soil	L24-Ma0013741														X				
11	WM01-0.5	Feb 26, 2024		Soil	L24-Ma0013742														X				
12	WM01-1.0	Feb 26, 2024		Soil	L24-Ma0013743														X				
13	WM01-1.5	Feb 26, 2024		Soil	L24-Ma0013744														X				
14	WM02-0.0	Feb 28, 2024		Soil	L24-Ma0013745														X				

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Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226,Adelaide Terrace
Perth
WA 6000

Project Name: BEENUP WIND FARM

Order No.:
Report #: 1075587
Phone: 0458 839 200
Fax:

Received: Mar 5, 2024 10:56 AM
Due: Mar 12, 2024
Priority: 5 Day
Contact Name: Brenton Petracca

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail						Ammonia-N	CANCELLED	Chromium (VI)	Chromium (VI)	Filterable Reactive Phosphorus	HOLD	Nitrate-N	Nitrite-N	Phosphorus	Acid Sulfate Soils Field pH Test	Moisture Set	BTEXN and Volatile TRH	Eurofins Suite B6A	Asbestos in Soils (ASC NEPM 2013)	OCOP in Soil	OCOP in Water	Total Nitrogen	Eurofins Suite B19E
Perth Laboratory - NATA # 2377 Site # 2370						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																							
15	WM02-0.5	Feb 28, 2024		Soil	L24-Ma0013746														X				
16	WM02-1.0	Feb 28, 2024		Soil	L24-Ma0013747														X				
17	WM02-1.5	Feb 28, 2024		Soil	L24-Ma0013748														X				
18	WM03-0.0	Feb 29, 2024		Soil	L24-Ma0013749														X				
19	WM03-0.5	Feb 29, 2024		Soil	L24-Ma0013750														X				
20	WM03-1.0	Feb 29, 2024		Soil	L24-Ma0013751														X				
21	WM03-1.5	Feb 29, 2024		Soil	L24-Ma0013752														X				
22	WM01-0.0	Feb 26, 2024		Soil	L24-Ma0013753										X								
23	WM01-0.25	Feb 26, 2024		Soil	L24-Ma0013754										X								
24	WM01-0.5	Feb 26, 2024		Soil	L24-Ma0013755										X								
25	WM01-0.75	Feb 26, 2024		Soil	L24-Ma0013756										X								
26	WM01-1.0	Feb 26, 2024		Soil	L24-Ma0013757										X								
27	WM01-1.25	Feb 26, 2024		Soil	L24-Ma0013758										X								
28	WM01-1.5	Feb 26, 2024		Soil	L24-Ma0013759										X								
29	WM01-1.75	Feb 26, 2024		Soil	L24-Ma0013760										X								

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Perth Laboratory - NATA # 2377 Site # 2370						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																							
30	WM01-2.0	Feb 26, 2024		Soil	L24-Ma0013761										X								
31	WM01-2.25	Feb 26, 2024		Soil	L24-Ma0013762										X								
32	WM01-2.5	Feb 26, 2024		Soil	L24-Ma0013763										X								
33	WM01-2.75	Feb 26, 2024		Soil	L24-Ma0013764										X								
34	WM01-3.0	Feb 26, 2024		Soil	L24-Ma0013765										X								
35	WM01-3.25	Feb 26, 2024		Soil	L24-Ma0013766										X								
36	WM01-3.50	Feb 26, 2024		Soil	L24-Ma0013767										X								
37	WM01-3.75	Feb 26, 2024		Soil	L24-Ma0013768										X								
38	WM01-4.0	Feb 26, 2024		Soil	L24-Ma0013769										X								
39	WM01-4.25	Feb 26, 2024		Soil	L24-Ma0013770										X								
40	WM01-4.50	Feb 26, 2024		Soil	L24-Ma0013771										X								
41	WM01-4.75	Feb 26, 2024		Soil	L24-Ma0013772										X								
42	WM01-5.0	Feb 26, 2024		Soil	L24-Ma0013773										X								
43	WM01-5.25	Feb 26, 2024		Soil	L24-Ma0013774										X								
44	WM01-5.50	Feb 26, 2024		Soil	L24-Ma0013775										X								

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Perth Laboratory - NATA # 2377 Site # 2370						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																							
45	WM01-5.75	Feb 26, 2024		Soil	L24-Ma0013776										X								
46	WM01-6.0	Feb 26, 2024		Soil	L24-Ma0013777										X								
47	WM01-6.25	Feb 26, 2024		Soil	L24-Ma0013778										X								
48	WM01-6.50	Feb 26, 2024		Soil	L24-Ma0013779										X								
49	WM01-6.75	Feb 26, 2024		Soil	L24-Ma0013780										X								
50	WM01-7.0	Feb 26, 2024		Soil	L24-Ma0013781										X								
51	WM01-7.25	Feb 26, 2024		Soil	L24-Ma0013782										X								
52	WM01-7.50	Feb 26, 2024		Soil	L24-Ma0013783										X								
53	WM01-7.75	Feb 26, 2024		Soil	L24-Ma0013784										X								
54	WM01-8.0	Feb 26, 2024		Soil	L24-Ma0013785										X								
55	WM01-8.25	Feb 26, 2024		Soil	L24-Ma0013786										X								
56	WM01-8.50	Feb 26, 2024		Soil	L24-Ma0013787										X								
57	WM01-8.75	Feb 26, 2024		Soil	L24-Ma0013788										X								
58	WM01-9.0	Feb 26, 2024		Soil	L24-Ma0013789										X								
59	WM01-9.25	Feb 26, 2024		Soil	L24-Ma0013790										X								

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Perth Laboratory - NATA # 2377 Site # 2370						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																							
60	WM01-9.50	Feb 26, 2024		Soil	L24-Ma0013791										X								
61	WM01-9.75	Feb 26, 2024		Soil	L24-Ma0013792										X								
62	WM01-10.0	Feb 26, 2024		Soil	L24-Ma0013793										X								
63	WM02-0.0	Feb 26, 2024		Soil	L24-Ma0013794										X								
64	WM02-0.25	Feb 26, 2024		Soil	L24-Ma0013795										X								
65	WM02-0.5	Feb 26, 2024		Soil	L24-Ma0013796										X								
66	WM02-0.75	Feb 26, 2024		Soil	L24-Ma0013797										X								
67	WM02-1.0	Feb 26, 2024		Soil	L24-Ma0013798										X								
68	WM02-1.25	Feb 26, 2024		Soil	L24-Ma0013799										X								
69	WM02-1.5	Feb 26, 2024		Soil	L24-Ma0013800										X								
70	WM02-1.75	Feb 26, 2024		Soil	L24-Ma0013801										X								
71	WM02-2.0	Feb 26, 2024		Soil	L24-Ma0013802										X								
72	WM02-2.25	Feb 26, 2024		Soil	L24-Ma0013803										X								
73	WM02-2.5	Feb 26, 2024		Soil	L24-Ma0013804										X								
74	WM02-2.75	Feb 26, 2024		Soil	L24-Ma0013805										X								

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Perth Laboratory - NATA # 2377 Site # 2370						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																							
75	WM02-3.0	Feb 26, 2024		Soil	L24-Ma0013806										X								
76	WM02-3.25	Feb 26, 2024		Soil	L24-Ma0013807										X								
77	WM02-3.50	Feb 26, 2024		Soil	L24-Ma0013808										X								
78	WM02-3.75	Feb 26, 2024		Soil	L24-Ma0013809										X								
79	WM02-4.0	Feb 26, 2024		Soil	L24-Ma0013810										X								
80	WM02-4.25	Feb 26, 2024		Soil	L24-Ma0013811										X								
81	WM02-4.50	Feb 26, 2024		Soil	L24-Ma0013812										X								
82	WM02-4.75	Feb 26, 2024		Soil	L24-Ma0013813										X								
83	WM02-5.0	Feb 26, 2024		Soil	L24-Ma0013814										X								
84	WM02-5.25	Feb 26, 2024		Soil	L24-Ma0013815										X								
85	WM02-5.50	Feb 26, 2024		Soil	L24-Ma0013816										X								
86	WM02-5.75	Feb 26, 2024		Soil	L24-Ma0013817										X								
87	WM02-6.0	Feb 26, 2024		Soil	L24-Ma0013818										X								
88	WM02-6.25	Feb 26, 2024		Soil	L24-Ma0013819										X								
89	WM02-6.50	Feb 26, 2024		Soil	L24-Ma0013820										X								

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Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226,Adelaide Terrace
Perth
WA 6000

Project Name: BEENUP WIND FARM

Order No.:
Report #: 1075587
Phone: 0458 839 200
Fax:

Received: Mar 5, 2024 10:56 AM
Due: Mar 12, 2024
Priority: 5 Day
Contact Name: Brenton Petracca

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail						Ammonia-N	CANCELLED	Chromium (VI)	Chromium (VI)	Filterable Reactive Phosphorus	HOLD	Nitrate-N	Nitrite-N	Phosphorus	Acid Sulfate Soils Field pH Test	Moisture Set	BTEXN and Volatile TRH	Eurofins Suite B6A	Asbestos in Soils (ASC NEPM 2013)	OCOP in Soil	OCOP in Water	Total Nitrogen	Eurofins Suite B19E
Perth Laboratory - NATA # 2377 Site # 2370						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																							
90	WM02-6.75	Feb 26, 2024		Soil	L24-Ma0013821										X								
91	WM02-7.0	Feb 26, 2024		Soil	L24-Ma0013822										X								
92	WM02-7.25	Feb 26, 2024		Soil	L24-Ma0013823										X								
93	WM02-7.50	Feb 26, 2024		Soil	L24-Ma0013824										X								
94	WM02-7.75	Feb 26, 2024		Soil	L24-Ma0013825										X								
95	WM02-8.0	Feb 26, 2024		Soil	L24-Ma0013826										X								
96	WM02-8.25	Feb 26, 2024		Soil	L24-Ma0013827										X								
97	WM02-8.50	Feb 26, 2024		Soil	L24-Ma0013828										X								
98	WM02-8.75	Feb 26, 2024		Soil	L24-Ma0013829										X								
99	WM02-9.0	Feb 26, 2024		Soil	L24-Ma0013830										X								
100	WM02-9.25	Feb 26, 2024		Soil	L24-Ma0013831										X								
101	WM02-9.50	Feb 26, 2024		Soil	L24-Ma0013832										X								
102	WM02-9.75	Feb 26, 2024		Soil	L24-Ma0013833										X								
103	WM02-10.0	Feb 26, 2024		Soil	L24-Ma0013834										X								
104	WM03-0.0	Feb 26, 2024		Soil	L24-Ma0013835										X								

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Perth Laboratory - NATA # 2377 Site # 2370						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																							
105	WM03-0.25	Feb 26, 2024		Soil	L24-Ma0013836										X								
106	WM03-0.5	Feb 26, 2024		Soil	L24-Ma0013837										X								
107	WM03-0.75	Feb 26, 2024		Soil	L24-Ma0013838										X								
108	WM03-1.0	Feb 26, 2024		Soil	L24-Ma0013839										X								
109	WM03-1.25	Feb 26, 2024		Soil	L24-Ma0013840										X								
110	WM03-2.0	Feb 26, 2024		Soil	L24-Ma0013843										X								
111	WM03-2.25	Feb 26, 2024		Soil	L24-Ma0013844										X								
112	WM03-2.5	Feb 26, 2024		Soil	L24-Ma0013845										X								
113	WM03-2.75	Feb 26, 2024		Soil	L24-Ma0013846										X								
114	WM03-3.0	Feb 26, 2024		Soil	L24-Ma0013847										X								
115	WM03-3.25	Feb 26, 2024		Soil	L24-Ma0013848										X								
116	WM03-3.50	Feb 26, 2024		Soil	L24-Ma0013849										X								
117	WM03-3.75	Feb 26, 2024		Soil	L24-Ma0013850										X								
118	WM03-4.0	Feb 26, 2024		Soil	L24-Ma0013851										X								
119	WM03-4.25	Feb 26, 2024		Soil	L24-Ma0013852										X								

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Perth Laboratory - NATA # 2377 Site # 2370						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																							
120	WM03-4.50	Feb 26, 2024		Soil	L24-Ma0013853										X								
121	WM03-4.75	Feb 26, 2024		Soil	L24-Ma0013854										X								
122	WM03-5.0	Feb 26, 2024		Soil	L24-Ma0013855										X								
123	WM03-5.25	Feb 26, 2024		Soil	L24-Ma0013856										X								
124	WM03-5.50	Feb 26, 2024		Soil	L24-Ma0013857										X								
125	WM03-5.75	Feb 26, 2024		Soil	L24-Ma0013858										X								
126	WM03-6.0	Feb 26, 2024		Soil	L24-Ma0013859										X								
127	WM03-6.25	Feb 26, 2024		Soil	L24-Ma0013860										X								
128	WM03-6.50	Feb 26, 2024		Soil	L24-Ma0013861										X								
129	WM03-6.75	Feb 26, 2024		Soil	L24-Ma0013862										X								
130	WM03-7.0	Feb 26, 2024		Soil	L24-Ma0013863										X								
131	WM03-7.25	Feb 26, 2024		Soil	L24-Ma0013864										X								
132	WM03-7.50	Feb 26, 2024		Soil	L24-Ma0013865										X								
133	WM03-7.75	Feb 26, 2024		Soil	L24-Ma0013866										X								
134	WM03-8.0	Feb 26, 2024		Soil	L24-Ma0013867										X								

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Perth Laboratory - NATA # 2377 Site # 2370						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																							
135	WM03-8.25	Feb 26, 2024		Soil	L24-Ma0013868										X								
136	WM03-8.50	Feb 26, 2024		Soil	L24-Ma0013869										X								
137	WM03-8.75	Feb 26, 2024		Soil	L24-Ma0013870										X								
138	WM03-9.0	Feb 26, 2024		Soil	L24-Ma0013871										X								
139	WM03-9.25	Feb 26, 2024		Soil	L24-Ma0013872										X								
140	WM03-9.50	Feb 26, 2024		Soil	L24-Ma0013873										X								
141	WM03-9.75	Feb 26, 2024		Soil	L24-Ma0013874										X								
142	WM03-10.0	Feb 26, 2024		Soil	L24-Ma0013875										X								
143	WM01-QC1	Feb 26, 2024		Water	L24-Ma0013876			X										X			X		X
144	WM02-QC1	Feb 28, 2024		Water	L24-Ma0013877			X										X			X		X
145	WM03-QC1	Feb 29, 2024		Water	L24-Ma0013878			X										X			X		X
146	WM02-QC2	Feb 29, 2024		Soil	L24-Ma0013879		X																
147	WM03-QC3	Feb 29, 2024		Soil	L24-Ma0013880		X																
148	Sample 1	Feb 29, 2024		Water	L24-Ma0013881						X												
149	Trip Blank	Feb 29, 2024		Soil	L24-Ma0013882												X						
						9	2	3	9	9	1	9	9	9	121	9	1	12	12	9	3	9	3

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Perth Laboratory - NATA # 2377 Site # 2370	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																		
Test Counts	9	2	3	9	9	1	9	9	9	121	9	1	12	12	9	3	9	3

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit	**Colour:** Pt-Co Units	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 70 – 130%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
OCOP in Soil							
Aldrin	mg/kg	< 0.01			0.01	Pass	
alpha-BHC (HCH)	mg/kg	< 0.01			0.01	Pass	
beta-BHC (HCH)	mg/kg	< 0.01			0.01	Pass	
delta-BHC (HCH)	mg/kg	< 0.01			0.01	Pass	
Bifenthrin	mg/kg	< 0.2			0.2	Pass	
Bromophos Ethyl	mg/kg	< 0.05			0.05	Pass	
Chlordane	mg/kg	< 0.01			0.01	Pass	
Chlorpyrifos	mg/kg	< 0.02			0.02	Pass	
Dieldrin	mg/kg	< 0.01			0.01	Pass	
p.p-DDD	mg/kg	< 0.01			0.01	Pass	
p.p-DDE	mg/kg	< 0.01			0.01	Pass	
p.p-DDT	mg/kg	< 0.01			0.01	Pass	
o.p-DDT	mg/kg	< 0.01			0.01	Pass	
Endosulfan I	mg/kg	< 0.01			0.01	Pass	
Endosulfan II	mg/kg	< 0.01			0.01	Pass	
Endosulfan Sulfate	mg/kg	< 0.01			0.01	Pass	
Endrin	mg/kg	< 0.01			0.01	Pass	
Heptachlor	mg/kg	< 0.01			0.01	Pass	
Heptachlor Epoxide	mg/kg	< 0.01			0.01	Pass	
Hexachlorobenzene (HCB)	mg/kg	< 0.01			0.01	Pass	
Lindane	mg/kg	< 0.01			0.01	Pass	
Methoxychlor	mg/kg	< 0.2			0.2	Pass	
Oxychlordane	mg/kg	< 0.01			0.01	Pass	
Diazinon	mg/kg	< 0.2			0.2	Pass	
Ethion	mg/kg	< 0.05			0.05	Pass	
Fenitrothion	mg/kg	< 0.1			0.1	Pass	
Malathion	mg/kg	< 0.1			0.1	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Trifluralin	mg/kg	< 0.2			0.2	Pass	
Method Blank							
Ammonia-N	mg/kg	< 10			10	Pass	
Chromium (VI)	mg/kg	< 1			1	Pass	
Filterable Reactive Phosphorus	mg/kg	< 1			1	Pass	
Nitrate-N	mg/kg	< 1			1	Pass	
Nitrite-N	mg/kg	< 1			1	Pass	
NOx-N	mg/kg	< 1			1	Pass	
Total Kjeldahl Nitrogen	mg/kg	< 10			10	Pass	
Phosphorus	mg/kg	< 1			1	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Beryllium	mg/kg	< 2			2	Pass	
Boron	mg/kg	< 10			10	Pass	
Cadmium	mg/kg	< 0.1			0.1	Pass	
Cobalt	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 1			1	Pass	
Lead	mg/kg	< 1			1	Pass	
Manganese	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.02			0.02	Pass	
Nickel	mg/kg	< 1			1	Pass	
Selenium	mg/kg	< 2			2	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	105			70-130	Pass	
TRH C10-C14	%	97			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	100			70-130	Pass	
Toluene	%	108			70-130	Pass	
Ethylbenzene	%	104			70-130	Pass	
m&p-Xylenes	%	106			70-130	Pass	
o-Xylene	%	101			70-130	Pass	
Xylenes - Total*	%	104			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	105			70-130	Pass	
TRH C6-C10	%	107			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	110			70-130	Pass	
LCS - % Recovery							
OCOP in Soil							
Aldrin	%	85			60-120	Pass	
Dieldrin	%	107			60-120	Pass	
p.p-DDT	%	117			60-120	Pass	
Endrin	%	86			60-120	Pass	
Heptachlor	%	83			60-120	Pass	
Lindane	%	99			60-120	Pass	
LCS - % Recovery							
Phosphorus	%	105			80-120	Pass	
LCS - % Recovery							

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Heavy Metals									
Arsenic			%	114			80-120	Pass	
Beryllium			%	88			80-120	Pass	
Boron			%	87			80-120	Pass	
Cadmium			%	92			80-120	Pass	
Cobalt			%	90			80-120	Pass	
Copper			%	94			80-120	Pass	
Lead			%	89			80-120	Pass	
Manganese			%	88			80-120	Pass	
Mercury			%	94			80-120	Pass	
Nickel			%	89			80-120	Pass	
Selenium			%	96			80-120	Pass	
Zinc			%	88			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	L24-Ma0017035	NCP	%	107			70-130	Pass	
TRH C10-C14	L24-Ma0012765	NCP	%	114			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	L24-Ma0017035	NCP	%	102			70-130	Pass	
Toluene	L24-Ma0017035	NCP	%	99			70-130	Pass	
Ethylbenzene	L24-Ma0017035	NCP	%	107			70-130	Pass	
m&p-Xylenes	L24-Ma0017035	NCP	%	103			70-130	Pass	
o-Xylene	L24-Ma0017035	NCP	%	109			70-130	Pass	
Xylenes - Total*	L24-Ma0017035	NCP	%	105			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	L24-Ma0017035	NCP	%	104			70-130	Pass	
TRH C6-C10	L24-Ma0017035	NCP	%	102			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	L24-Ma0012765	NCP	%	108			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Beryllium	L24-Ma0013735	CP	%	85			75-125	Pass	
Boron	L24-Ma0013735	CP	%	79			75-125	Pass	
Cadmium	L24-Ma0013735	CP	%	89			75-125	Pass	
Cobalt	L24-Ma0013735	CP	%	90			75-125	Pass	
Copper	L24-Ma0013735	CP	%	89			75-125	Pass	
Lead	L24-Ma0013735	CP	%	90			75-125	Pass	
Manganese	L24-Ma0013735	CP	%	89			75-125	Pass	
Mercury	L24-Ma0013735	CP	%	91			75-125	Pass	
Nickel	L24-Ma0013735	CP	%	88			75-125	Pass	
Zinc	L24-Ma0013735	CP	%	89			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	L24-Ma0017034	NCP	mg/kg	< 20	< 20	<1	30%	Pass	

Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	L24-Ma0017034	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	L24-Ma0017034	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	L24-Ma0017034	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	L24-Ma0017034	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	L24-Ma0017034	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	L24-Ma0017034	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	L24-Ma0017034	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	L24-Ma0017034	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
OCOP in Soil				Result 1	Result 2	RPD			
Aldrin	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
alpha-BHC (HCH)	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
beta-BHC (HCH)	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
delta-BHC (HCH)	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Bifenthrin	L24-Ma0013729	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bromophos Ethyl	L24-Ma0013729	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Chlordane	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Chlorpyrifos	L24-Ma0013729	CP	mg/kg	< 0.02	< 0.02	<1	30%	Pass	
Dieldrin	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
p.p-DDD	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
p.p-DDE	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
p.p-DDT	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
o.p-DDT	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan I	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan II	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan Sulfate	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor Epoxide	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Hexachlorobenzene (HCB)	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Lindane	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Methoxychlor	L24-Ma0013729	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Oxychlordane	L24-Ma0013729	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Diazinon	L24-Ma0013729	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	L24-Ma0013729	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Fenitrothion	L24-Ma0013729	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Malathion	L24-Ma0013729	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Trifluralin	L24-Ma0013729	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Total Kjeldahl Nitrogen	L24-Ma0013729	CP	mg/kg	370	430	14	20%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Selenium	L24-Ma0015257	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	L24-Ma0013733	CP	%	< 1	< 1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Phosphorus	L24-Ma0013734	CP	mg/kg	45	43	4.6	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	L24-Ma0013734	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Beryllium	L24-Ma0013734	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Boron	L24-Ma0013734	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Cadmium	L24-Ma0013734	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Cobalt	L24-Ma0013734	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Copper	L24-Ma0013734	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Lead	L24-Ma0013734	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Manganese	L24-Ma0013734	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Nickel	L24-Ma0013734	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Zinc	L24-Ma0013734	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	L24-Ma0013737	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	L24-Ma0013737	CP	mg/kg	180	220	19	30%	Pass	
TRH C29-C36	L24-Ma0013737	CP	mg/kg	190	200	7.9	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	L24-Ma0013737	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	L24-Ma0013737	CP	mg/kg	310	350	12	30%	Pass	
TRH >C34-C40	L24-Ma0013737	CP	mg/kg	100	120	16	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia-N	L24-Ma0013738	CP	mg/kg	43	44	<1	20%	Pass	
Filterable Reactive Phosphorus	L24-Ma0013738	CP	mg/kg	< 1	< 1	<1	20%	Pass	
Nitrate-N	L24-Ma0013738	CP	mg/kg	3.1	3.4	8.2	20%	Pass	
Nitrite-N	L24-Ma0013738	CP	mg/kg	3.1	3.4	8.2	20%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013753	CP	pH Units	5.2	5.1	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013753	CP	comment	2.0	2.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013763	CP	pH Units	5.9	5.8	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013763	CP	comment	2.0	2.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013773	CP	pH Units	6.3	6.3	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013773	CP	comment	2.0	2.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013783	CP	pH Units	6.3	6.2	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013783	CP	comment	4.0	4.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013793	CP	pH Units	5.4	5.4	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013793	CP	comment	4.0	4.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013803	CP	pH Units	7.2	7.0	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013803	CP	comment	2.0	2.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013813	CP	pH Units	5.8	5.8	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013813	CP	comment	4.0	4.0	pass	30%	Pass	

Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013823	CP	pH Units	4.5	4.4	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013823	CP	comment	4.0	4.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013833	CP	pH Units	5.2	5.0	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013833	CP	comment	4.0	4.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013843	CP	pH Units	5.2	5.2	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013843	CP	comment	2.0	2.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013855	CP	pH Units	7.2	7.1	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013855	CP	comment	4.0	4.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013865	CP	pH Units	5.6	5.6	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013865	CP	comment	4.0	4.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	L24-Ma0013875	CP	pH Units	5.6	5.9	pass	20%	Pass	
Reaction Ratings*	L24-Ma0013875	CP	comment	4.0	4.0	pass	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
Q05	The matrix spike concentration is less than five times the background concentration in the sample - therefore the spike recovery cannot be determined
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.
S05	Field Screen uses the following fizz rating to classify the rate the samples reacted to the peroxide: 1.0; No reaction to slight. 2.0; Moderate reaction. 3.0; Strong reaction with persistent froth. 4.0; Extreme reaction.

Authorised by:

Elden Garrett	Analytical Services Manager
Douglas Todd	Senior Analyst-Metal
Douglas Todd	Senior Analyst-Sample Properties
John Horwood	Senior Analyst-Volatile
Kim Rodgers	Senior Analyst-Sample Properties
Lauren Killin	Senior Analyst-Inorganic
Patrick Patfield	Senior Analyst-Organic
Patrick Patfield	Senior Analyst-Volatile
Paul Nottle	Senior Analyst-Organic
Rhys Thomas	Senior Analyst-Asbestos
Sam Becker	Senior Analyst-Inorganic
Sean Sangster	Senior Analyst-Metal

Kim Rodgers
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request

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Stantec Australia Pty Limited
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NATA Accredited
Accreditation Number 1261
Site Number 20794

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Edvinder Singh**

Report **1084676-S**
Project name BEENYUP WIND FARM
Received Date Apr 03, 2024

Client Sample ID			**WM01 - 0.0**	**WM01 - 1.0**	**WM01 - 10.0**	**WM01 - 2.0**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**L24-Ap0011899**	**L24-Ap0011900**	**L24-Ap0011901**	**L24-Ap0011902**
Date Sampled			**Feb 26, 2024**	**Feb 26, 2024**	**Feb 26, 2024**	**Feb 26, 2024**
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.4	5.2	5.2	5.3
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	11	10	10	8.6
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.018	0.017	0.016	0.014
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	1.8	1.2	26	2.4
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	23	16	340	32
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.038	0.026	0.55	0.051
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	3.0	3.4	2.4	3.7
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	< 0.02	< 0.02	0.53	0.05
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	< 2	< 2	330	32
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	< 2	< 2	320	23
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	< 0.02	0.52	0.04
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	< 0.005	< 0.005	0.014	0.006
Peroxide Extractable Sulfur	0.005	% S	0.019	0.009	0.54	0.043
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.019	0.009	0.53	0.037
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	12	5.6	330	23
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.030	0.010	< 0.005	< 0.005
Calcium - Peroxide	0.005	% Ca	0.033	0.012	0.007	< 0.005
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	0.007	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	0.006	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	3.4	< 0.005

Client Sample ID			WM01 - 0.0	WM01 - 1.0	WM01 - 10.0	WM01 - 2.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011899	L24-Ap0011900	L24-Ap0011901	L24-Ap0011902
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	< 0.005	0.006	0.010
Magnesium - Peroxide	0.005	% Mg	< 0.005	< 0.005	0.009	0.011
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	23	16	340	32
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.04	0.03	0.55	0.05
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	1.8	1.2	26	2.4
Extraneous Material						
<2mm Fraction	0.005	g	68	54	15	83
>2mm Fraction	0.005	g	0.72	0.48	0.63	1.5
Analysed Material	0.1	%	99	99	96	98
Extraneous Material	0.1	%	1.1	0.9	3.9	1.7

Client Sample ID			WM01 - 3.0	WM01 - 4.0	WM01 - 5.0	WM01 - 6.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011903	L24-Ap0011904	L24-Ap0011905	L24-Ap0011906
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.0	5.2	4.9	5.2
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	8.5	6.8	17	6.2
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.014	0.011	0.027	0.010
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	1.0	4.6	10	10
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	14	61	140	130
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.022	0.098	0.22	0.22
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	4.3	3.2	2.9	2.7
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.03	0.11	0.27	0.25
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	19	66	170	160
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	10	60	150	150
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	0.10	0.24	0.24
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.006	< 0.005	0.021	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.014	0.087	0.22	0.21
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.008	0.087	0.20	0.21
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	5.0	54	120	130

Client Sample ID			WM01 - 3.0	WM01 - 4.0	WM01 - 5.0	WM01 - 6.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011903	L24-Ap0011904	L24-Ap0011905	L24-Ap0011906
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 26, 2024
Test/Reference	LOR	Unit				
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Peroxide	0.005	% Ca	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	0.018	0.010	0.010	0.008
Magnesium - Peroxide	0.005	% Mg	0.018	0.011	0.012	0.009
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	14	61	140	130
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.02	0.10	0.22	0.22
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	1.0	4.6	10	10
Extraneous Material						
<2mm Fraction	0.005	g	69	73	22	61
>2mm Fraction	0.005	g	6.5	4.3	< 0.005	3.9
Analysed Material	0.1	%	91	94	100	94
Extraneous Material	0.1	%	8.6	5.6	< 0.1	6.0

Client Sample ID			WM01 - 7.0	WM01 - 8.0	WM01 - 9.0	WM02 - 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011907	L24-Ap0011908	L24-Ap0011909	L24-Ap0011910
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 28, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.2	5.1	5.0	7.3
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	6.6	9.8	20	< 2
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.011	0.016	0.033	< 0.003
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	7.7	7.0	8.3	< 1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	100	94	110	< 10
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.17	0.15	0.18	< 0.02

Client Sample ID			WM01 - 7.0	WM01 - 8.0	WM01 - 9.0	WM02 - 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011907	L24-Ap0011908	L24-Ap0011909	L24-Ap0011910
Date Sampled			Feb 26, 2024	Feb 26, 2024	Feb 26, 2024	Feb 28, 2024
Test/Reference	LOR	Unit				
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	2.9	3.2	3.2	3.4
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.20	0.18	0.29	< 0.02
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	130	110	180	< 2
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	120	100	160	< 2
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.19	0.16	0.26	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	< 0.005	< 0.005	< 0.005	0.007
Peroxide Extractable Sulfur	0.005	% S	0.15	0.13	0.14	0.032
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.15	0.13	0.14	0.025
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	97	84	90	16
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	< 0.005	< 0.005	0.010	0.12
Calcium - Peroxide	0.005	% Ca	< 0.005	< 0.005	0.011	0.14
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	< 0.005	0.018
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	0.014
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	8.9
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	0.009	0.012	0.029	0.008
Magnesium - Peroxide	0.005	% Mg	0.011	0.014	0.031	0.009
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	100	94	110	< 10
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.17	0.15	0.18	< 0.02
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	7.7	7.0	8.3	< 1
Extraneous Material						
<2mm Fraction	0.005	g	48	25	26	76
>2mm Fraction	0.005	g	< 0.005	< 0.005	< 0.005	5.9
Analysed Material	0.1	%	100	100	100	93
Extraneous Material	0.1	%	< 0.1	< 0.1	< 0.1	7.2

Client Sample ID			WM02 - 1.0	WM02 - 10.0	WM02 - 2.0	WM02 - 2.75
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011911	L24-Ap0011912	L24-Ap0011913	L24-Ap0011914
Date Sampled			Feb 28, 2024	Feb 28, 2024	Feb 28, 2024	Feb 28, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.3	4.6	6.1	5.1
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	7.0	76	5.8	6.5
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.011	0.12	0.009	0.010
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	1.0	67	1.0	5.1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	13	900	13	0.11
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.021	1.4	0.022	68
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	4.2	2.2	6.3	2.8
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.03	1.4	< 0.02	0.15
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	18	900	7.0	94
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	11	820	< 2	87
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	1.3	< 0.02	0.14
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.008	0.093	0.024	0.017
Peroxide Extractable Sulfur	0.005	% S	0.018	1.4	0.037	0.12
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.010	1.3	0.012	0.099
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	6.3	820	7.7	62
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.007	0.027	0.007	0.016
Calcium - Peroxide	0.005	% Ca	0.008	0.11	0.008	0.019
Calcium - Acid Reacted	0.005	% Ca	< 0.005	0.083	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	0.066	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	41	< 0.005	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	0.026	< 0.005	< 0.005
Magnesium - Peroxide	0.005	% Mg	< 0.005	0.033	< 0.005	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	0.007	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	0.009	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	5.5	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	13	900	13	68
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.02	1.4	0.02	0.11
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	< 1	67	1.0	5.1

Client Sample ID			WM02 - 1.0	WM02 - 10.0	WM02 - 2.0	WM02 - 2.75
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011911	L24-Ap0011912	L24-Ap0011913	L24-Ap0011914
Date Sampled			Feb 28, 2024	Feb 28, 2024	Feb 28, 2024	Feb 28, 2024
Test/Reference	LOR	Unit				
Extraneous Material						
<2mm Fraction	0.005	g	15	10	22	67
>2mm Fraction	0.005	g	< 0.005	< 0.005	1.8	< 0.005
Analysed Material	0.1	%	100	100	92	100
Extraneous Material	0.1	%	< 0.1	< 0.1	7.5	< 0.1

Client Sample ID			WM02 - 3.0	WM02 - 4.0	WM02 - 5.0	WM02 - 6.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011915	L24-Ap0011916	L24-Ap0011917	L24-Ap0011918
Date Sampled			Feb 28, 2024	Feb 28, 2024	Feb 28, 2024	Feb 28, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.0	5.2	4.7	4.9
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	12	13	33	19
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.019	0.021	0.054	0.030
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	6.5	14	33	28
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	87	180	440	370
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.14	0.29	0.70	0.60
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	2.9	2.6	2.3	2.2
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.20	0.39	0.81	0.64
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	120	240	510	400
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	110	230	470	380
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.18	0.37	0.76	0.61
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.007	0.006	0.030	0.019
Peroxide Extractable Sulfur	0.005	% S	0.13	0.28	0.68	0.59
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.12	0.27	0.65	0.57
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	75	170	410	360
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.006	0.018	0.006	0.012
Calcium - Peroxide	0.005	% Ca	0.008	0.020	0.007	0.013
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005

Client Sample ID			WM02 - 3.0	WM02 - 4.0	WM02 - 5.0	WM02 - 6.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011915	L24-Ap0011916	L24-Ap0011917	L24-Ap0011918
Date Sampled			Feb 28, 2024	Feb 28, 2024	Feb 28, 2024	Feb 28, 2024
Test/Reference	LOR	Unit				
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	0.005	< 0.005	< 0.005
Magnesium - Peroxide	0.005	% Mg	< 0.005	0.006	0.005	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	0.007	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	4.4	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	87	180	440	370
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.14	0.29	0.70	0.60
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	6.5	14	33	28
Extraneous Material						
<2mm Fraction	0.005	g	16	28	22	11
>2mm Fraction	0.005	g	< 0.005	< 0.005	< 0.005	< 0.005
Analysed Material	0.1	%	100	100	100	100
Extraneous Material	0.1	%	< 0.1	< 0.1	< 0.1	< 0.1

Client Sample ID			WM02 - 7.0	WM02 - 8.0	WM02 - 9.0	WM03 - 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011919	L24-Ap0011920	L24-Ap0011921	L24-Ap0011922
Date Sampled			Feb 28, 2024	Feb 28, 2024	Feb 28, 2024	Feb 29, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.0	4.6	4.4	5.2
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	11	26	110	30
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.017	0.041	0.18	0.048
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	13	23	98	6.3
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	180	300	1300	84
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.29	0.48	2.1	0.13
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	2.4	2.1	1.9	2.5
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.32	0.54	2.2	1.2
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	200	340	1400	720
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	190	310	1300	690
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.30	0.50	2.0	1.1
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.011	0.031	0.13	0.006
Peroxide Extractable Sulfur	0.005	% S	0.28	0.47	2.0	0.092
HCl Extractable Sulfur	0.005	% S	N/A	N/A	0.14	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.27	0.44	1.9	0.086
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	170	270	1200	54

Client Sample ID			WM02 - 7.0	WM02 - 8.0	WM02 - 9.0	WM03 - 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011919	L24-Ap0011920	L24-Ap0011921	L24-Ap0011922
Date Sampled			Feb 28, 2024	Feb 28, 2024	Feb 28, 2024	Feb 29, 2024
Test/Reference	LOR	Unit				
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	0.023	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	0.017	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	11	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.011	0.007	0.021	0.19
Calcium - Peroxide	0.005	% Ca	0.012	0.008	0.030	0.21
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	0.009	0.027
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	0.007	0.021
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	4.5	13
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	0.007	0.030	0.021
Magnesium - Peroxide	0.005	% Mg	< 0.005	0.008	0.033	0.023
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	180	300	1300	84
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.29	0.48	2.1	0.13
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	13	23	98	6.3
Extraneous Material						
<2mm Fraction	0.005	g	12	13	15	110
>2mm Fraction	0.005	g	< 0.005	< 0.005	< 0.005	2.0
Analysed Material	0.1	%	100	100	100	98
Extraneous Material	0.1	%	< 0.1	< 0.1	< 0.1	1.7

Client Sample ID			WM03 - 0.25	WM03 - 1.0	WM03 - 10.0	WM03 - 3.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011923	L24-Ap0011924	L24-Ap0011925	L24-Ap0011926
Date Sampled			Feb 29, 2024	Feb 29, 2024	Feb 29, 2024	Feb 29, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.1	5.7	4.7	5.8
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	31	16	37	11
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.050	0.026	0.060	0.018
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	9.6	1.8	26	3.0
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	130	24	350	40
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.20	0.039	0.56	0.064

Client Sample ID			WM03 - 0.25	WM03 - 1.0	WM03 - 10.0	WM03 - 3.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011923	L24-Ap0011924	L24-Ap0011925	L24-Ap0011926
Date Sampled			Feb 29, 2024	Feb 29, 2024	Feb 29, 2024	Feb 29, 2024
Test/Reference	LOR	Unit				
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	3.7	4.8	2.7	4.1
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.32	0.06	0.69	0.09
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	200	35	430	55
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	170	18	390	44
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.27	0.03	0.63	0.07
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.016	0.071	0.021	0.024
Peroxide Extractable Sulfur	0.005	% S	0.17	0.083	0.52	0.070
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.15	0.012	0.50	0.046
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	96	7.7	310	29
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.072	0.012	0.007	< 0.005
Calcium - Peroxide	0.005	% Ca	0.076	0.014	0.009	< 0.005
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	0.011	< 0.005	< 0.005	< 0.005
Magnesium - Peroxide	0.005	% Mg	0.012	< 0.005	0.005	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	0.007	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	4.2	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	130	24	350	40
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.20	0.04	0.56	0.06
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	9.6	1.8	26	3.0
Extraneous Material						
<2mm Fraction	0.005	g	10	36	33	31
>2mm Fraction	0.005	g	< 0.005	12	< 0.005	2.0
Analysed Material	0.1	%	100	75	100	94
Extraneous Material	0.1	%	< 0.1	25	< 0.1	6.1

Client Sample ID			WM03 - 3.50	WM03 - 5.0	WM03 - 6.0	WM03 - 7.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011927	L24-Ap0011928	L24-Ap0011929	L24-Ap0011930
Date Sampled			Feb 29, 2024	Feb 29, 2024	Feb 29, 2024	Feb 29, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	4.7	5.6	5.0	4.7
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	20	8.9	9.8	100
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.033	0.014	0.016	0.16
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	12	6.0	9.2	48
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	160	80	120	640
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.26	0.13	0.20	1.0
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	2.7	3.8	2.6	3.0
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.33	0.16	0.24	1.4
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	210	100	150	860
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	190	92	140	760
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.30	0.15	0.22	1.2
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.007	0.011	0.008	0.037
Peroxide Extractable Sulfur	0.005	% S	0.24	0.13	0.19	0.90
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.23	0.11	0.18	0.86
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	140	71	110	540
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.007	0.016	0.010	0.013
Calcium - Peroxide	0.005	% Ca	0.008	0.018	0.011	0.014
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	< 0.005	< 0.005	0.009
Magnesium - Peroxide	0.005	% Mg	< 0.005	< 0.005	< 0.005	0.009
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	160	80	120	640
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.26	0.13	0.20	1.0
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	12	6.0	9.2	48

Client Sample ID			WM03 - 3.50	WM03 - 5.0	WM03 - 6.0	WM03 - 7.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011927	L24-Ap0011928	L24-Ap0011929	L24-Ap0011930
Date Sampled			Feb 29, 2024	Feb 29, 2024	Feb 29, 2024	Feb 29, 2024
Test/Reference	LOR	Unit				
Extraneous Material						
<2mm Fraction	0.005	g	71	12	15	38
>2mm Fraction	0.005	g	< 0.005	< 0.005	< 0.005	< 0.005
Analysed Material	0.1	%	100	100	100	100
Extraneous Material	0.1	%	< 0.1	< 0.1	< 0.1	< 0.1

Client Sample ID			WM03 - 8.0	WM03 - 9.0	WM03 - 4.0
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011931	L24-Ap0011932	L24-Ap0011933
Date Sampled			Feb 29, 2024	Feb 29, 2024	Feb 29, 2024
Test/Reference	LOR	Unit			
Actual Acidity (NLM-3.2)					
pH-KCL (NLM-3.1)	0.1	pH Units	4.5	4.7	4.7
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	89	35	26
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.14	0.055	0.041
SPOCAS Suite - WA (Excluding ANC)					
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	42	23	18
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	560	310	240
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.90	0.50	0.39
Potential Acidity - Titratable Peroxide					
pH-OX	0.1	pH Units	2.6	2.7	2.6
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	1.1	0.61	0.45
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	680	380	280
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	590	350	260
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.95	0.55	0.41
Extractable Sulfur					
Sulfur - KCl Extractable	0.005	% S	0.073	0.028	0.017
Peroxide Extractable Sulfur	0.005	% S	0.83	0.47	0.37
HCl Extractable Sulfur	0.005	% S	0.071	N/A	N/A
Potential Acidity (SPOS)					
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.76	0.44	0.35
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	470	280	220
Retained Acidity (S-NAS)					
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	< 0.005	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	< 0.005	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	< 2	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0
Extractable Calcium					
Calcium - KCl Extractable	0.005	% Ca	< 0.005	0.007	0.006
Calcium - Peroxide	0.005	% Ca	0.006	0.008	0.008
Calcium - Acid Reacted	0.005	% Ca	0.006	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	2.9	< 0.005	< 0.005

Client Sample ID			WM03 - 8.0	WM03 - 9.0	WM03 - 4.0
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011931	L24-Ap0011932	L24-Ap0011933
Date Sampled			Feb 29, 2024	Feb 29, 2024	Feb 29, 2024
Test/Reference	LOR	Unit			
Extractable Magnesium					
Magnesium - KCl Extractable	0.005	% Mg	0.005	< 0.005	< 0.005
Magnesium - Peroxide	0.005	% Mg	0.005	< 0.005	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)					
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)					
ANC Fineness Factor		factor	1.5	1.5	1.5
Net Acidity (Including ANC)					
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	560	310	240
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.90	0.50	0.39
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	42	23	18
Extraneous Material					
<2mm Fraction	0.005	g	55	40	16
>2mm Fraction	0.005	g	< 0.005	< 0.005	< 0.005
Analysed Material	0.1	%	100	100	100
Extraneous Material	0.1	%	< 0.1	< 0.1	< 0.1

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
SPOCAS Suite - WA (Excluding ANC)			
SPOCAS Suite - WA (Excluding ANC)	Brisbane	Apr 10, 2024	6 Week
- Method: LTM-GEN-7050			
Extraneous Material	Brisbane	Apr 10, 2024	6 Week
- Method: LTM-GEN-7050/7070			

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Perth
WA 6000

Project Name: BEENYUP WIND FARM

Order No.:
Report #: 1084676
Phone: 0458 839 200
Fax:

Received: Apr 3, 2024 5:46 PM
Due: Apr 11, 2024
Priority: 5 Day
Contact Name: Edvinder Singh

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail						SPOCAS Suite - WA (Excluding ANC)	Moisture Set
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	WM01 - 0.0	Feb 26, 2024		Soil	L24-Ap0011899	X	X
2	WM01 - 1.0	Feb 26, 2024		Soil	L24-Ap0011900	X	X
3	WM01 - 10.0	Feb 26, 2024		Soil	L24-Ap0011901	X	X
4	WM01 - 2.0	Feb 26, 2024		Soil	L24-Ap0011902	X	X
5	WM01 - 3.0	Feb 26, 2024		Soil	L24-Ap0011903	X	X
6	WM01 - 4.0	Feb 26, 2024		Soil	L24-Ap0011904	X	X
7	WM01 - 5.0	Feb 26, 2024		Soil	L24-Ap0011905	X	X
8	WM01 - 6.0	Feb 26, 2024		Soil	L24-Ap0011906	X	X
9	WM01 - 7.0	Feb 26, 2024		Soil	L24-Ap0011907	X	X
10	WM01 - 8.0	Feb 26, 2024		Soil	L24-Ap0011908	X	X
11	WM01 - 9.0	Feb 26, 2024		Soil	L24-Ap0011909	X	X
12	WM02 - 0.0	Feb 28, 2024		Soil	L24-Ap0011910	X	X
13	WM02 - 1.0	Feb 28, 2024		Soil	L24-Ap0011911	X	X
14	WM02 - 10.0	Feb 28, 2024		Soil	L24-Ap0011912	X	X

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Brisbane Laboratory - NATA # 1261 Site # 20794						X	X
15	WM02 - 2.0	Feb 28, 2024		Soil	L24-Ap0011913	X	X
16	WM02 - 2.75	Feb 28, 2024		Soil	L24-Ap0011914	X	X
17	WM02 - 3.0	Feb 28, 2024		Soil	L24-Ap0011915	X	X
18	WM02 - 4.0	Feb 28, 2024		Soil	L24-Ap0011916	X	X
19	WM02 - 5.0	Feb 28, 2024		Soil	L24-Ap0011917	X	X
20	WM02 - 6.0	Feb 28, 2024		Soil	L24-Ap0011918	X	X
21	WM02 - 7.0	Feb 28, 2024		Soil	L24-Ap0011919	X	X
22	WM02 - 8.0	Feb 28, 2024		Soil	L24-Ap0011920	X	X
23	WM02 - 9.0	Feb 28, 2024		Soil	L24-Ap0011921	X	X
24	WM03 - 0.0	Feb 29, 2024		Soil	L24-Ap0011922	X	X
25	WM03 - 0.25	Feb 29, 2024		Soil	L24-Ap0011923	X	X
26	WM03 - 1.0	Feb 29, 2024		Soil	L24-Ap0011924	X	X
27	WM03 - 10.0	Feb 29, 2024		Soil	L24-Ap0011925	X	X
28	WM03 - 3.0	Feb 29, 2024		Soil	L24-Ap0011926	X	X
29	WM03 - 3.50	Feb 29, 2024		Soil	L24-Ap0011927	X	X
30	WM03 - 5.0	Feb 29, 2024		Soil	L24-Ap0011928	X	X

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Sample Detail						SPOCAS Suite - WA (Excluding ANC)	Moisture Set
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X
31	WM03 - 6.0	Feb 29, 2024		Soil	L24-Ap0011929	X	X
32	WM03 - 7.0	Feb 29, 2024		Soil	L24-Ap0011930	X	X
33	WM03 - 8.0	Feb 29, 2024		Soil	L24-Ap0011931	X	X
34	WM03 - 9.0	Feb 29, 2024		Soil	L24-Ap0011932	X	X
35	WM03 - 4.0	Feb 29, 2024		Soil	L24-Ap0011933	X	X
Test Counts						35	35

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Actual Acidity (NLM-3.2)							
pH-KCL (NLM-3.1)	%	99			80-120	Pass	
Titratable Actual Acidity (NLM-3.2)	%	95			80-120	Pass	
LCS - % Recovery							
Extractable Sulfur							
HCl Extractable Sulfur	%	108			80-120	Pass	
LCS - % Recovery							
Actual Acidity (NLM-3.2)							
pH-KCL (NLM-3.1)	%	99			80-120	Pass	
Titratable Actual Acidity (NLM-3.2)	%	95			80-120	Pass	
LCS - % Recovery							
Extractable Sulfur							
HCl Extractable Sulfur	%	108			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD			
pH-KCL (NLM-3.1)	L24-Ap0011903	CP	pH Units	5.0	5.1	2.1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011903	CP	mol H+/t	8.5	7.0	19	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011903	CP	% pyrite S	0.014	0.011	19	30%	Pass	
Duplicate									
Potential Acidity - Titratable Peroxide				Result 1	Result 2	RPD			
pH-OX	L24-Ap0011903	CP	pH Units	4.3	4.3	<1	20%	Pass	
Titratable Peroxide Acidity (s-TPA)	L24-Ap0011903	CP	% pyrite S	0.03	0.03	<1	30%	Pass	
Titratable Peroxide Acidity (a-TPA)	L24-Ap0011903	CP	mol H+/t	19	19	<1	20%	Pass	
Duplicate									
Extractable Sulfur				Result 1	Result 2	RPD			
Sulfur - KCl Extractable	L24-Ap0011903	CP	% S	0.006	0.005	14	30%	Pass	
Peroxide Extractable Sulfur	L24-Ap0011903	CP	% S	0.014	0.013	7.7	20%	Pass	
Duplicate									
Potential Acidity (SPOS)				Result 1	Result 2	RPD			
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011903	CP	% S	0.008	0.008	3.6	30%	Pass	
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011903	CP	mol H+/t	5.0	4.9	3.6	30%	Pass	
Duplicate									
Extractable Calcium				Result 1	Result 2	RPD			
Calcium - KCl Extractable	L24-Ap0011903	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Peroxide	L24-Ap0011903	CP	% Ca	< 0.005	< 0.005	<1	20%	Pass	
Calcium - Acid Reacted	L24-Ap0011903	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (s-aCa)	L24-Ap0011903	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (a-aCa)	L24-Ap0011903	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Extractable Magnesium				Result 1	Result 2	RPD			
Magnesium - KCl Extractable	L24-Ap0011903	CP	% Mg	0.018	0.018	<1	30%	Pass	
Magnesium - Peroxide	L24-Ap0011903	CP	% Mg	0.018	0.018	2.8	20%	Pass	
Magnesium - Acid Reacted	L24-Ap0011903	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011903	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011903	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD			
ANC Fineness Factor	L24-Ap0011903	CP	factor	1.5	1.5	<1	30%	Pass	

Duplicate									
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD			
pH-KCL (NLM-3.1)	L24-Ap0011913	CP	pH Units	6.1	6.1	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011913	CP	mol H+/t	5.8	5.8	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011913	CP	% pyrite S	0.009	0.009	<1	30%	Pass	
Duplicate									
Potential Acidity - Titratable Peroxide				Result 1	Result 2	RPD			
pH-OX	L24-Ap0011913	CP	pH Units	6.3	6.3	<1	20%	Pass	
Titratable Peroxide Acidity (s-TPA)	L24-Ap0011913	CP	% pyrite S	< 0.02	< 0.02	<1	30%	Pass	
Titratable Peroxide Acidity (a-TPA)	L24-Ap0011913	CP	mol H+/t	7.0	6.8	<1	20%	Pass	
Duplicate									
Extractable Sulfur				Result 1	Result 2	RPD			
Sulfur - KCl Extractable	L24-Ap0011913	CP	% S	0.024	0.025	2.0	30%	Pass	
Peroxide Extractable Sulfur	L24-Ap0011913	CP	% S	0.037	0.036	2.8	20%	Pass	
Duplicate									
Potential Acidity (SPOS)				Result 1	Result 2	RPD			
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011913	CP	% S	0.012	0.011	13	30%	Pass	
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011913	CP	mol H+/t	7.7	6.8	13	30%	Pass	
Duplicate									
Extractable Calcium				Result 1	Result 2	RPD			
Calcium - KCl Extractable	L24-Ap0011913	CP	% Ca	0.007	0.007	3.7	30%	Pass	
Calcium - Peroxide	L24-Ap0011913	CP	% Ca	0.008	0.008	2.0	20%	Pass	
Calcium - Acid Reacted	L24-Ap0011913	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (s-aCa)	L24-Ap0011913	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (a-aCa)	L24-Ap0011913	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Extractable Magnesium				Result 1	Result 2	RPD			
Magnesium - KCl Extractable	L24-Ap0011913	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Peroxide	L24-Ap0011913	CP	% Mg	< 0.005	< 0.005	<1	20%	Pass	
Magnesium - Acid Reacted	L24-Ap0011913	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011913	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011913	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD			
ANC Fineness Factor	L24-Ap0011913	CP	factor	1.5	1.5	<1	30%	Pass	
Duplicate									
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD			
pH-KCL (NLM-3.1)	L24-Ap0011924	CP	pH Units	5.7	5.7	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011924	CP	mol H+/t	16	15	10	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011924	CP	% pyrite S	0.026	0.024	10	30%	Pass	
Duplicate									
Potential Acidity - Titratable Peroxide				Result 1	Result 2	RPD			
pH-OX	L24-Ap0011924	CP	pH Units	4.8	4.8	1.2	20%	Pass	
Titratable Peroxide Acidity (s-TPA)	L24-Ap0011924	CP	% pyrite S	0.06	0.05	4.2	30%	Pass	
Titratable Peroxide Acidity (a-TPA)	L24-Ap0011924	CP	mol H+/t	35	33	4.2	20%	Pass	
Duplicate									
Extractable Sulfur				Result 1	Result 2	RPD			
Sulfur - KCl Extractable	L24-Ap0011924	CP	% S	0.071	0.070	<1	30%	Pass	
Peroxide Extractable Sulfur	L24-Ap0011924	CP	% S	0.083	0.082	1.8	20%	Pass	
Duplicate									
Potential Acidity (SPOS)				Result 1	Result 2	RPD			
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011924	CP	% S	0.012	0.012	6.8	30%	Pass	
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011924	CP	mol H+/t	7.7	7.2	6.8	30%	Pass	

Duplicate									
Extractable Calcium				Result 1	Result 2	RPD			
Calcium - KCl Extractable	L24-Ap0011924	CP	% Ca	0.012	0.012	1.8	30%	Pass	
Calcium - Peroxide	L24-Ap0011924	CP	% Ca	0.014	0.013	5.9	20%	Pass	
Calcium - Acid Reacted	L24-Ap0011924	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (s-aCa)	L24-Ap0011924	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (a-aCa)	L24-Ap0011924	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Extractable Magnesium				Result 1	Result 2	RPD			
Magnesium - KCl Extractable	L24-Ap0011924	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Peroxide	L24-Ap0011924	CP	% Mg	< 0.005	< 0.005	<1	20%	Pass	
Magnesium - Acid Reacted	L24-Ap0011924	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011924	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011924	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD			
ANC Fineness Factor	L24-Ap0011924	CP	factor	1.5	1.5	<1	30%	Pass	
Duplicate									
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD			
pH-KCL (NLM-3.1)	L24-Ap0011933	CP	pH Units	4.7	4.7	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011933	CP	mol H+/t	26	25	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011933	CP	% pyrite S	0.041	0.041	<1	30%	Pass	
Duplicate									
Potential Acidity - Titratable Peroxide				Result 1	Result 2	RPD			
pH-OX	L24-Ap0011933	CP	pH Units	2.6	2.6	<1	20%	Pass	
Titratable Peroxide Acidity (s-TPA)	L24-Ap0011933	CP	% pyrite S	0.45	0.45	<1	30%	Pass	
Titratable Peroxide Acidity (a-TPA)	L24-Ap0011933	CP	mol H+/t	280	280	<1	20%	Pass	
Duplicate									
Extractable Sulfur				Result 1	Result 2	RPD			
Sulfur - KCl Extractable	L24-Ap0011933	CP	% S	0.017	0.017	1.4	30%	Pass	
Peroxide Extractable Sulfur	L24-Ap0011933	CP	% S	0.37	0.38	2.5	20%	Pass	
Duplicate									
Potential Acidity (SPOS)				Result 1	Result 2	RPD			
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011933	CP	% S	0.35	0.36	2.7	30%	Pass	
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011933	CP	mol H+/t	220	230	2.7	30%	Pass	
Duplicate									
Extractable Calcium				Result 1	Result 2	RPD			
Calcium - KCl Extractable	L24-Ap0011933	CP	% Ca	0.006	0.006	<1	30%	Pass	
Calcium - Peroxide	L24-Ap0011933	CP	% Ca	0.008	0.009	17	20%	Pass	
Calcium - Acid Reacted	L24-Ap0011933	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (s-aCa)	L24-Ap0011933	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (a-aCa)	L24-Ap0011933	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Extractable Magnesium				Result 1	Result 2	RPD			
Magnesium - KCl Extractable	L24-Ap0011933	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Peroxide	L24-Ap0011933	CP	% Mg	< 0.005	< 0.005	<1	20%	Pass	
Magnesium - Acid Reacted	L24-Ap0011933	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011933	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011933	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD			
ANC Fineness Factor	L24-Ap0011933	CP	factor	1.5	1.5	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
S02	Retained Acidity is Reported when the pHKCl is less than pH 4.5

Authorised by:

Elden Garrett	Analytical Services Manager
Jonathon Angell	Senior Analyst-SPOCAS

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Attention: **Edvinder Singh**

Report **1084649-S**
Project name BEENYUP WIND FARM
Received Date Apr 03, 2024

Client Sample ID			**TP01 - 0.0**	**TP01 - 1.0**	**TP01 - 2.0**	**TP02 - 0.0**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**L24-Ap0011751**	**L24-Ap0011752**	**L24-Ap0011753**	**L24-Ap0011754**
Date Sampled			**Mar 14, 2024**	**Mar 14, 2024**	**Mar 14, 2024**	**Mar 14, 2024**
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	4.6	5.1	4.7	5.0
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	47	8.9	38	21
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.075	0.014	0.060	0.034
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	4.6	< 1	4.5	2.7
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	61	< 10	61	36
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.098	< 0.02	0.097	0.058
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	2.9	3.5	2.6	2.7
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.13	< 0.02	0.10	0.03
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	84	4.8	63	16
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	37	< 2	25	< 2
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.06	< 0.02	0.04	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.008	< 0.005	< 0.005	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.031	< 0.005	0.037	0.024
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.024	< 0.005	0.037	0.024
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	15	< 2	23	15
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.021	< 0.005	0.008	0.041
Calcium - Peroxide	0.005	% Ca	0.027	< 0.005	0.011	0.050
Calcium - Acid Reacted	0.005	% Ca	0.006	< 0.005	< 0.005	0.009
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	0.007
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	2.8	< 0.005	< 0.005	4.4

Client Sample ID			TP01 - 0.0	TP01 - 1.0	TP01 - 2.0	TP02 - 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011751	L24-Ap0011752	L24-Ap0011753	L24-Ap0011754
Date Sampled			Mar 14, 2024	Mar 14, 2024	Mar 14, 2024	Mar 14, 2024
Test/Reference	LOR	Unit				
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	0.010	< 0.005	0.005	< 0.005
Magnesium - Peroxide	0.005	% Mg	0.011	< 0.005	0.006	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	61	< 10	61	36
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.10	< 0.02	0.10	0.06
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	4.6	< 1	4.5	2.7
Extraneous Material						
<2mm Fraction	0.005	g	91	200	160	170
>2mm Fraction	0.005	g	9.6	0.66	2.2	0.44
Analysed Material	0.1	%	91	100	99	100
Extraneous Material	0.1	%	9.5	0.3	1.3	0.3

Client Sample ID			TP02 - 0.75	TP02 - 1.0	TP03 - 0.0	TP03 - 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011755	L24-Ap0011756	L24-Ap0011757	L24-Ap0011758
Date Sampled			Mar 14, 2024	Mar 14, 2024	Mar 12, 2024	Mar 12, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.1	4.8	6.9	5.6
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	22	48	< 2	3.2
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.034	0.076	< 0.003	0.005
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	2.0	4.2	< 1	< 1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	27	56	< 10	< 10
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.043	0.089	< 0.02	< 0.02
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	3.7	4.2	6.5	4.6
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.03	0.14	< 0.02	< 0.02
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	20	85	< 2	< 2
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	< 2	38	< 2	< 2
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	0.06	< 0.02	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	< 0.005	< 0.005	0.005	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.009	0.013	0.024	< 0.005
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.009	0.013	0.018	< 0.005
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	5.5	8.0	12	< 2

Client Sample ID			TP02 - 0.75	TP02 - 1.0	TP03 - 0.0	TP03 - 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011755	L24-Ap0011756	L24-Ap0011757	L24-Ap0011758
Date Sampled			Mar 14, 2024	Mar 14, 2024	Mar 12, 2024	Mar 12, 2024
Test/Reference	LOR	Unit				
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.005	< 0.005	0.13	0.017
Calcium - Peroxide	0.005	% Ca	0.007	0.006	0.13	0.020
Calcium - Acid Reacted	0.005	% Ca	< 0.005	0.006	0.006	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	3.1	2.9	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	< 0.005	0.009	< 0.005
Magnesium - Peroxide	0.005	% Mg	< 0.005	< 0.005	0.006	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	27	56	< 10	< 10
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.04	0.09	< 0.02	< 0.02
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	2.0	4.2	< 1	< 1
Extraneous Material						
<2mm Fraction	0.005	g	150	240	150	150
>2mm Fraction	0.005	g	< 0.005	0.47	86	< 0.005
Analysed Material	0.1	%	100	100	64	100
Extraneous Material	0.1	%	< 0.1	0.2	36	< 0.1

Client Sample ID			TP04 - 0.0	TP05 - 0.0	TP06 - 0.0	TP06 - 0.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011759	L24-Ap0011760	L24-Ap0011761	L24-Ap0011762
Date Sampled			Mar 12, 2024	Mar 13, 2024	Mar 13, 2024	Mar 13, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.2	5.3	4.8	5.6
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	18	14	36	3.6
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.028	0.022	0.058	0.006
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	2.7	3.6	5.0	< 1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	37	48	67	< 10
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.059	0.076	0.11	< 0.02

Client Sample ID			TP04 - 0.0	TP05 - 0.0	TP06 - 0.0	TP06 - 0.50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011759	L24-Ap0011760	L24-Ap0011761	L24-Ap0011762
Date Sampled			Mar 12, 2024	Mar 13, 2024	Mar 13, 2024	Mar 13, 2024
Test/Reference	LOR	Unit				
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	5.7	6.2	2.5	3.9
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	< 0.02	< 0.02	< 0.02	< 0.02
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	< 2	< 2	< 2	< 2
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	< 2	< 2	< 2	< 2
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	< 0.02	< 0.02	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.030	0.054	0.050	< 0.005
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.030	0.054	0.050	< 0.005
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	19	34	31	< 2
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.082	0.10	0.099	0.012
Calcium - Peroxide	0.005	% Ca	0.063	0.046	0.11	0.014
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	0.007	0.007	0.012	< 0.005
Magnesium - Peroxide	0.005	% Mg	< 0.005	0.007	0.013	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	37	48	67	< 10
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.06	0.08	0.11	< 0.02
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	2.7	3.6	5.0	< 1
Extraneous Material						
<2mm Fraction	0.005	g	88	140	98	130
>2mm Fraction	0.005	g	37	3.5	1.1	0.53
Analysed Material	0.1	%	70	98	99	100
Extraneous Material	0.1	%	30	2.4	1.1	0.4

Client Sample ID			TP07 - 0.0	TP07 - 1.0	TP08 - 0.0	TP08 - 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011763	L24-Ap0011764	L24-Ap0011765	L24-Ap0011766
Date Sampled			Mar 14, 2024	Mar 14, 2024	Mar 12, 2024	Mar 12, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	6.3	6.0	5.4	5.5
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	2.4	< 2	7.9	5.7
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.004	< 0.003	0.013	0.009
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	3.2	< 1	1.7	1.1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	43	< 10	22	14
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.069	< 0.02	0.035	0.023
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	3.0	4.4	2.9	3.6
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	< 0.02	< 0.02	< 0.02	< 0.02
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	< 2	< 2	< 2	< 2
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	< 2	< 2	< 2	< 2
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	< 0.02	< 0.02	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.065	< 0.005	0.023	0.014
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.065	< 0.005	0.023	0.014
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	41	< 2	14	8.6
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.22	0.009	0.030	0.011
Calcium - Peroxide	0.005	% Ca	0.25	0.011	0.034	0.013
Calcium - Acid Reacted	0.005	% Ca	0.034	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	0.027	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	17	< 0.005	< 0.005	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	0.010	< 0.005	0.006	< 0.005
Magnesium - Peroxide	0.005	% Mg	0.010	< 0.005	0.007	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	43	< 10	22	14
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.07	< 0.02	0.04	0.02
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	3.2	< 1	1.7	1.1

Client Sample ID			TP07 - 0.0	TP07 - 1.0	TP08 - 0.0	TP08 - 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011763	L24-Ap0011764	L24-Ap0011765	L24-Ap0011766
Date Sampled			Mar 14, 2024	Mar 14, 2024	Mar 12, 2024	Mar 12, 2024
Test/Reference	LOR	Unit				
Extraneous Material						
<2mm Fraction	0.005	g	130	170	140	180
>2mm Fraction	0.005	g	0.62	0.35	0.10	0.42
Analysed Material	0.1	%	100	100	100	100
Extraneous Material	0.1	%	0.5	0.2	< 0.1	0.2

Client Sample ID			TP08 - 2.0	TP09 - 0.0	TP11 - 0.0	TP11 - 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011767	L24-Ap0011768	L24-Ap0011769	L24-Ap0011770
Date Sampled			Mar 12, 2024	Mar 12, 2024	Mar 14, 2024	Mar 14, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.5	5.4	5.9	6.3
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	9.5	20	4.3	< 2
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.015	0.032	0.007	< 0.003
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	3.5	4.3	2.3	< 1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	46	57	31	< 10
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.074	0.091	0.049	< 0.02
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	3.8	2.9	3.0	4.8
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.05	< 0.02	< 0.02	< 0.02
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	30	< 2	< 2	< 2
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	20	< 2	< 2	< 2
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.03	< 0.02	< 0.02	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.007	< 0.005	< 0.005	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.066	0.059	0.042	0.006
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.059	0.059	0.042	0.006
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	37	37	26	3.7
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.030	0.16	0.087	0.023
Calcium - Peroxide	0.005	% Ca	0.033	0.16	0.096	0.025
Calcium - Acid Reacted	0.005	% Ca	< 0.005	0.008	0.009	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	0.006	0.007	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	4.0	4.6	< 0.005

Client Sample ID			TP08 - 2.0	TP09 - 0.0	TP11 - 0.0	TP11 - 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011767	L24-Ap0011768	L24-Ap0011769	L24-Ap0011770
Date Sampled			Mar 12, 2024	Mar 12, 2024	Mar 14, 2024	Mar 14, 2024
Test/Reference	LOR	Unit				
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	0.007	0.008	0.007	< 0.005
Magnesium - Peroxide	0.005	% Mg	0.008	0.007	0.008	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	46	57	31	< 10
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.07	0.09	0.05	< 0.02
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	3.5	4.3	2.3	< 1
Extraneous Material						
<2mm Fraction	0.005	g	190	82	130	140
>2mm Fraction	0.005	g	0.62	< 0.005	0.40	2.3
Analysed Material	0.1	%	100	100	100	98
Extraneous Material	0.1	%	0.3	< 0.1	0.3	1.6

Client Sample ID			TP11 - 2.0	TP12 - 0.0	TP13 - 0.0	TP13 - 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011771	L24-Ap0011772	L24-Ap0011773	L24-Ap0011774
Date Sampled			Mar 14, 2024	Mar 13, 2024	Mar 13, 2024	Mar 13, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.0	6.0	6.7	5.4
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	31	4.6	< 2	4.0
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.049	0.007	< 0.003	0.006
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	12	1.8	1.2	< 1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	160	24	17	< 10
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.26	0.039	0.027	< 0.02
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	3.3	6.2	3.2	3.3
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.41	< 0.02	< 0.02	< 0.02
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	260	< 2	< 2	< 2
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	230	< 2	< 2	< 2
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.36	< 0.02	< 0.02	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.006	< 0.005	< 0.005	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.22	0.032	0.080	< 0.005
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.21	0.032	0.080	< 0.005
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	130	20	50	< 2

Client Sample ID			TP11 - 2.0	TP12 - 0.0	TP13 - 0.0	TP13 - 1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011771	L24-Ap0011772	L24-Ap0011773	L24-Ap0011774
Date Sampled			Mar 14, 2024	Mar 13, 2024	Mar 13, 2024	Mar 13, 2024
Test/Reference	LOR	Unit				
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.014	0.11	0.35	0.007
Calcium - Peroxide	0.005	% Ca	0.016	0.060	0.43	0.008
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	0.072	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	0.058	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	36	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	< 0.005	0.031	< 0.005
Magnesium - Peroxide	0.005	% Mg	< 0.005	< 0.005	0.037	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	0.006	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	0.008	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	4.7	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	160	24	17	< 10
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.26	0.04	0.03	< 0.02
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	12	1.8	1.2	< 1
Extraneous Material						
<2mm Fraction	0.005	g	240	100	100	150
>2mm Fraction	0.005	g	4.4	< 0.005	1.5	0.70
Analysed Material	0.1	%	98	100	99	100
Extraneous Material	0.1	%	1.8	< 0.1	1.4	0.5

Client Sample ID			TP13 - 2.0	TP14 - 0.0	TP14 - 0.25	TP15 - 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011775	L24-Ap0011776	L24-Ap0011777	L24-Ap0011778
Date Sampled			Mar 13, 2024	Mar 13, 2024	Mar 13, 2024	Mar 13, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	4.3	5.2	5.4	5.3
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	110	14	5.5	14
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.17	0.023	0.009	0.022
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	13	3.4	< 1	3.0
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	180	45	13	40
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.29	0.072	0.021	0.065

Client Sample ID			TP13 - 2.0	TP14 - 0.0	TP14 - 0.25	TP15 - 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011775	L24-Ap0011776	L24-Ap0011777	L24-Ap0011778
Date Sampled			Mar 13, 2024	Mar 13, 2024	Mar 13, 2024	Mar 13, 2024
Test/Reference	LOR	Unit				
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	2.2	2.7	3.1	2.9
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	0.49	< 0.02	< 0.02	< 0.02
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	310	< 2	< 2	< 2
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	200	< 2	< 2	< 2
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	0.32	< 0.02	< 0.02	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	< 0.005	< 0.005	< 0.005	0.012
Peroxide Extractable Sulfur	0.005	% S	0.11	0.049	0.012	0.055
HCl Extractable Sulfur	0.005	% S	< 0.005	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.11	0.049	0.012	0.043
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	69	30	7.5	27
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	0.006	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	< 0.005	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	2.8	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.021	0.053	0.016	0.065
Calcium - Peroxide	0.005	% Ca	0.031	0.066	0.019	0.072
Calcium - Acid Reacted	0.005	% Ca	0.010	0.013	< 0.005	0.006
Calcium - Acid Reacted (s-aCa)	0.005	% S	0.008	0.011	< 0.005	0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	4.9	6.6	< 0.005	3.1
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	0.009	0.006	< 0.005	0.005
Magnesium - Peroxide	0.005	% Mg	0.010	0.007	< 0.005	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	180	45	13	40
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.29	0.07	0.02	0.07
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	13	3.4	< 1	3.0
Extraneous Material						
<2mm Fraction	0.005	g	160	160	160	150
>2mm Fraction	0.005	g	0.58	2.1	4.3	1.9
Analysed Material	0.1	%	100	99	97	99
Extraneous Material	0.1	%	0.4	1.3	2.6	1.3

Client Sample ID			TP15 - 0.75	TP15 - 1.0	TP17 - 0.0	TP17 - 0.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011779	L24-Ap0011780	L24-Ap0011781	L24-Ap0011782
Date Sampled			Mar 13, 2024	Mar 13, 2024	Mar 13, 2024	Mar 13, 2024
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	5.8	6.1	5.4	5.3
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	3.6	3.2	11	5.6
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.006	0.005	0.018	0.009
SPOCAS Suite - WA (Excluding ANC)						
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	< 1	< 1	2.5	< 1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	< 10	< 10	33	< 10
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	< 0.02	< 0.02	0.053	< 0.02
Potential Acidity - Titratable Peroxide						
pH-OX	0.1	pH Units	4.1	4.3	3.0	3.5
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	< 0.02	< 0.02	< 0.02	< 0.02
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	3.5	3.6	< 2	< 2
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	< 2	< 2	< 2	< 2
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	< 0.02	< 0.02	< 0.02
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	0.009	0.018	< 0.005	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.013	0.025	0.034	< 0.005
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Potential Acidity (SPOS)						
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	< 0.005	0.007	0.034	< 0.005
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	< 2	4.4	21	< 2
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Extractable Calcium						
Calcium - KCl Extractable	0.005	% Ca	0.006	0.007	0.036	< 0.005
Calcium - Peroxide	0.005	% Ca	0.007	0.008	0.038	< 0.005
Calcium - Acid Reacted	0.005	% Ca	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Extractable Magnesium						
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Peroxide	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)						
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)						
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	< 10	< 10	33	< 10
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	< 0.02	< 0.02	0.05	< 0.02
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	< 1	< 1	2.5	< 1

Client Sample ID			TP15 - 0.75	TP15 - 1.0	TP17 - 0.0	TP17 - 0.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011779	L24-Ap0011780	L24-Ap0011781	L24-Ap0011782
Date Sampled			Mar 13, 2024	Mar 13, 2024	Mar 13, 2024	Mar 13, 2024
Test/Reference	LOR	Unit				
Extraneous Material						
<2mm Fraction	0.005	g	140	150	150	160
>2mm Fraction	0.005	g	9.6	210	1.2	2.0
Analysed Material	0.1	%	94	41	99	99
Extraneous Material	0.1	%	6.3	59	0.8	1.2

Client Sample ID			TP18 - 0.0	TP19 - 0.0	TP19 - 0.50
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011783	L24-Ap0011784	L24-Ap0011785
Date Sampled			Mar 14, 2024	Mar 14, 2024	Mar 14, 2024
Test/Reference	LOR	Unit			
Actual Acidity (NLM-3.2)					
pH-KCL (NLM-3.1)	0.1	pH Units	5.4	7.1	5.9
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	11	< 2	2.4
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.018	< 0.003	0.004
SPOCAS Suite - WA (Excluding ANC)					
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	1.8	< 1	< 1
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	24	< 10	< 10
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	0.039	< 0.02	< 0.02
Potential Acidity - Titratable Peroxide					
pH-OX	0.1	pH Units	3.9	3.2	3.1
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	< 0.02	< 0.02	< 0.02
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	< 2	< 2	< 2
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	< 2	< 2	< 2
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	< 0.02	< 0.02
Extractable Sulfur					
Sulfur - KCl Extractable	0.005	% S	0.018	< 0.005	< 0.005
Peroxide Extractable Sulfur	0.005	% S	0.039	0.042	0.007
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A
Potential Acidity (SPOS)					
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.021	0.042	0.007
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	13	26	4.2
Retained Acidity (S-NAS)					
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0
Extractable Calcium					
Calcium - KCl Extractable	0.005	% Ca	0.026	0.26	0.031
Calcium - Peroxide	0.005	% Ca	0.030	0.30	0.034
Calcium - Acid Reacted	0.005	% Ca	< 0.005	0.046	< 0.005
Calcium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	0.037	< 0.005
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	23	< 0.005

Client Sample ID			TP18 - 0.0	TP19 - 0.0	TP19 - 0.50
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24-Ap0011783	L24-Ap0011784	L24-Ap0011785
Date Sampled			Mar 14, 2024	Mar 14, 2024	Mar 14, 2024
Test/Reference	LOR	Unit			
Extractable Magnesium					
Magnesium - KCl Extractable	0.005	% Mg	< 0.005	0.010	< 0.005
Magnesium - Peroxide	0.005	% Mg	< 0.005	0.011	< 0.005
Magnesium - Acid Reacted	0.005	% Mg	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (s-aCa)	0.005	% S	< 0.005	< 0.005	< 0.005
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	< 0.005	< 0.005	< 0.005
Acid Neutralising Capacity (ANCE)					
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)					
ANC Fineness Factor		factor	1.5	1.5	1.5
Net Acidity (Including ANC)					
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	24	< 10	< 10
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	0.04	< 0.02	< 0.02
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	1.8	< 1	< 1
Extraneous Material					
<2mm Fraction	0.005	g	140	110	140
>2mm Fraction	0.005	g	8.5	0.84	0.66
Analysed Material	0.1	%	94	99	100
Extraneous Material	0.1	%	5.8	0.7	0.5

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
SPOCAS Suite - WA (Excluding ANC)			
SPOCAS Suite - WA (Excluding ANC)	Brisbane	Apr 11, 2024	6 Week
- Method: LTM-GEN-7050			
Extraneous Material	Brisbane	Apr 11, 2024	6 Week
- Method: LTM-GEN-7050/7070			

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Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226,Adelaide Terrace
Perth
WA 6000

Project Name: BEENYUP WIND FARM

Order No.:
Report #: 1084649
Phone: 0458 839 200
Fax:

Received: Apr 3, 2024 5:46 PM
Due: Apr 11, 2024
Priority: 5 Day
Contact Name: Edvinder Singh

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail						SPOCAS Suite - WA (Excluding ANC)	Moisture Set
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	TP01 - 0.0	Mar 14, 2024		Soil	L24-Ap0011751	X	X
2	TP01 - 1.0	Mar 14, 2024		Soil	L24-Ap0011752	X	X
3	TP01 - 2.0	Mar 14, 2024		Soil	L24-Ap0011753	X	X
4	TP02 - 0.0	Mar 14, 2024		Soil	L24-Ap0011754	X	X
5	TP02 - 0.75	Mar 14, 2024		Soil	L24-Ap0011755	X	X
6	TP02 - 1.0	Mar 14, 2024		Soil	L24-Ap0011756	X	X
7	TP03 - 0.0	Mar 12, 2024		Soil	L24-Ap0011757	X	X
8	TP03 - 1.0	Mar 12, 2024		Soil	L24-Ap0011758	X	X
9	TP04 - 0.0	Mar 12, 2024		Soil	L24-Ap0011759	X	X
10	TP05 - 0.0	Mar 13, 2024		Soil	L24-Ap0011760	X	X
11	TP06 - 0.0	Mar 13, 2024		Soil	L24-Ap0011761	X	X
12	TP06 - 0.50	Mar 13, 2024		Soil	L24-Ap0011762	X	X
13	TP07 - 0.0	Mar 14, 2024		Soil	L24-Ap0011763	X	X
14	TP07 - 1.0	Mar 14, 2024		Soil	L24-Ap0011764	X	X

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Contact Name: Edvinder Singh

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail						SPOCAS Suite - WA (Excluding ANC)	Moisture Set
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X
15	TP08 - 0.0	Mar 12, 2024		Soil	L24-Ap0011765	X	X
16	TP08 - 1.0	Mar 12, 2024		Soil	L24-Ap0011766	X	X
17	TP08 - 2.0	Mar 12, 2024		Soil	L24-Ap0011767	X	X
18	TP09 - 0.0	Mar 12, 2024		Soil	L24-Ap0011768	X	X
19	TP11 - 0.0	Mar 14, 2024		Soil	L24-Ap0011769	X	X
20	TP11 - 1.0	Mar 14, 2024		Soil	L24-Ap0011770	X	X
21	TP11 - 2.0	Mar 14, 2024		Soil	L24-Ap0011771	X	X
22	TP12 - 0.0	Mar 13, 2024		Soil	L24-Ap0011772	X	X
23	TP13 - 0.0	Mar 13, 2024		Soil	L24-Ap0011773	X	X
24	TP13 - 1.0	Mar 13, 2024		Soil	L24-Ap0011774	X	X
25	TP13 - 2.0	Mar 13, 2024		Soil	L24-Ap0011775	X	X
26	TP14 - 0.0	Mar 13, 2024		Soil	L24-Ap0011776	X	X
27	TP14 - 0.25	Mar 13, 2024		Soil	L24-Ap0011777	X	X
28	TP15 - 0.0	Mar 13, 2024		Soil	L24-Ap0011778	X	X
29	TP15 - 0.75	Mar 13, 2024		Soil	L24-Ap0011779	X	X
30	TP15 - 1.0	Mar 13, 2024		Soil	L24-Ap0011780	X	X

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Received: Apr 3, 2024 5:46 PM
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Contact Name: Edvinder Singh

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail						SPOCAS Suite - WA (Excluding ANC)	Moisture Set
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X
31	TP17 - 0.0	Mar 13, 2024		Soil	L24-Ap0011781	X	X
32	TP17 - 0.25	Mar 13, 2024		Soil	L24-Ap0011782	X	X
33	TP18 - 0.0	Mar 14, 2024		Soil	L24-Ap0011783	X	X
34	TP19 - 0.0	Mar 14, 2024		Soil	L24-Ap0011784	X	X
35	TP19 - 0.50	Mar 14, 2024		Soil	L24-Ap0011785	X	X
Test Counts						35	35

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Actual Acidity (NLM-3.2)							
pH-KCL (NLM-3.1)	%	101			80-120	Pass	
Titratable Actual Acidity (NLM-3.2)	%	93			80-120	Pass	
LCS - % Recovery							
Actual Acidity (NLM-3.2)							
pH-KCL (NLM-3.1)	%	103			80-120	Pass	
Titratable Actual Acidity (NLM-3.2)	%	94			80-120	Pass	
LCS - % Recovery							
Extractable Sulfur							
HCl Extractable Sulfur	%	105			80-120	Pass	
LCS - % Recovery							
Actual Acidity (NLM-3.2)							
pH-KCL (NLM-3.1)	%	103			80-120	Pass	
Titratable Actual Acidity (NLM-3.2)	%	102			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD			
pH-KCL (NLM-3.1)	L24-Ap0011751	CP	pH Units	4.6	4.7	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011751	CP	mol H+/t	47	48	4.1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011751	CP	% pyrite S	0.075	0.078	4.1	30%	Pass	
Duplicate									
Potential Acidity - Titratable Peroxide				Result 1	Result 2	RPD			
pH-OX	L24-Ap0011751	CP	pH Units	2.9	2.9	<1	20%	Pass	
Titratable Peroxide Acidity (s-TPA)	L24-Ap0011751	CP	% pyrite S	0.13	0.14	2.4	30%	Pass	
Titratable Peroxide Acidity (a-TPA)	L24-Ap0011751	CP	mol H+/t	84	86	2.4	20%	Pass	
Duplicate									
Extractable Sulfur				Result 1	Result 2	RPD			
Sulfur - KCl Extractable	L24-Ap0011751	CP	% S	0.008	0.007	7.2	30%	Pass	
Peroxide Extractable Sulfur	L24-Ap0011751	CP	% S	0.031	0.031	2.6	20%	Pass	
Duplicate									
Potential Acidity (SPOS)				Result 1	Result 2	RPD			
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011751	CP	% S	0.024	0.024	1.3	30%	Pass	
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011751	CP	mol H+/t	15	15	1.3	30%	Pass	
Duplicate									
Extractable Calcium				Result 1	Result 2	RPD			
Calcium - KCl Extractable	L24-Ap0011751	CP	% Ca	0.021	0.021	<1	30%	Pass	
Calcium - Peroxide	L24-Ap0011751	CP	% Ca	0.027	0.026	1.3	20%	Pass	
Calcium - Acid Reacted	L24-Ap0011751	CP	% Ca	0.006	0.005	4.0	30%	Pass	
Calcium - Acid Reacted (s-aCa)	L24-Ap0011751	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (a-aCa)	L24-Ap0011751	CP	mol H+/t	2.8	2.6	4.0	30%	Pass	
Duplicate									
Extractable Magnesium				Result 1	Result 2	RPD			
Magnesium - KCl Extractable	L24-Ap0011751	CP	% Mg	0.010	0.010	2.3	30%	Pass	
Magnesium - Peroxide	L24-Ap0011751	CP	% Mg	0.011	0.011	1.8	20%	Pass	
Magnesium - Acid Reacted	L24-Ap0011751	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011751	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011751	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD			
ANC Fineness Factor	L24-Ap0011751	CP	factor	1.5	1.5	<1	30%	Pass	

Duplicate									
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD			
pH-KCL (NLM-3.1)	L24-Ap0011761	CP	pH Units	4.8	4.8	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011761	CP	mol H+/t	36	36	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011761	CP	% pyrite S	0.058	0.058	<1	30%	Pass	
Duplicate									
Potential Acidity - Titratable Peroxide				Result 1	Result 2	RPD			
pH-OX	L24-Ap0011761	CP	pH Units	2.5	2.5	<1	20%	Pass	
Titratable Peroxide Acidity (s-TPA)	L24-Ap0011761	CP	% pyrite S	< 0.02	< 0.02	<1	30%	Pass	
Titratable Peroxide Acidity (a-TPA)	L24-Ap0011761	CP	mol H+/t	< 2	< 2	<1	20%	Pass	
Duplicate									
Extractable Sulfur				Result 1	Result 2	RPD			
Sulfur - KCl Extractable	L24-Ap0011761	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Peroxide Extractable Sulfur	L24-Ap0011761	CP	% S	0.050	0.050	1.4	20%	Pass	
Duplicate									
Potential Acidity (SPOS)				Result 1	Result 2	RPD			
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011761	CP	% S	0.050	0.050	1.4	30%	Pass	
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011761	CP	mol H+/t	31	31	1.4	30%	Pass	
Duplicate									
Extractable Calcium				Result 1	Result 2	RPD			
Calcium - KCl Extractable	L24-Ap0011761	CP	% Ca	0.099	0.10	<1	30%	Pass	
Calcium - Peroxide	L24-Ap0011761	CP	% Ca	0.11	0.12	4.4	20%	Pass	
Calcium - Acid Reacted	L24-Ap0011761	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (s-aCa)	L24-Ap0011761	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (a-aCa)	L24-Ap0011761	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Extractable Magnesium				Result 1	Result 2	RPD			
Magnesium - KCl Extractable	L24-Ap0011761	CP	% Mg	0.012	0.012	<1	30%	Pass	
Magnesium - Peroxide	L24-Ap0011761	CP	% Mg	0.013	0.014	3.2	20%	Pass	
Magnesium - Acid Reacted	L24-Ap0011761	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011761	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011761	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD			
ANC Fineness Factor	L24-Ap0011761	CP	factor	1.5	1.5	<1	30%	Pass	
Duplicate									
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD			
pH-KCL (NLM-3.1)	L24-Ap0011765	CP	pH Units	5.4	5.3	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011765	CP	mol H+/t	7.9	8.4	6.8	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011765	CP	% pyrite S	0.013	0.013	6.8	30%	Pass	
Duplicate									
Potential Acidity - Titratable Peroxide				Result 1	Result 2	RPD			
pH-OX	L24-Ap0011765	CP	pH Units	2.9	2.9	<1	20%	Pass	
Titratable Peroxide Acidity (s-TPA)	L24-Ap0011765	CP	% pyrite S	< 0.02	< 0.02	<1	30%	Pass	
Titratable Peroxide Acidity (a-TPA)	L24-Ap0011765	CP	mol H+/t	< 2	< 2	<1	20%	Pass	
Duplicate									
Extractable Sulfur				Result 1	Result 2	RPD			
Sulfur - KCl Extractable	L24-Ap0011765	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Peroxide Extractable Sulfur	L24-Ap0011765	CP	% S	0.023	0.023	2.4	20%	Pass	
Duplicate									
Potential Acidity (SPOS)				Result 1	Result 2	RPD			
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011765	CP	% S	0.023	0.023	2.4	30%	Pass	
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011765	CP	mol H+/t	14	14	2.4	30%	Pass	

Duplicate									
Extractable Calcium				Result 1	Result 2	RPD			
Calcium - KCl Extractable	L24-Ap0011765	CP	% Ca	0.030	0.029	3.9	30%	Pass	
Calcium - Peroxide	L24-Ap0011765	CP	% Ca	0.034	0.033	1.3	20%	Pass	
Calcium - Acid Reacted	L24-Ap0011765	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (s-aCa)	L24-Ap0011765	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (a-aCa)	L24-Ap0011765	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Extractable Magnesium				Result 1	Result 2	RPD			
Magnesium - KCl Extractable	L24-Ap0011765	CP	% Mg	0.006	0.006	5.8	30%	Pass	
Magnesium - Peroxide	L24-Ap0011765	CP	% Mg	0.007	0.006	4.1	20%	Pass	
Magnesium - Acid Reacted	L24-Ap0011765	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011765	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011765	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD			
ANC Fineness Factor	L24-Ap0011765	CP	factor	1.5	1.5	<1	30%	Pass	
Duplicate									
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD			
pH-KCL (NLM-3.1)	L24-Ap0011770	CP	pH Units	6.3	6.3	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011770	CP	mol H+/t	< 2	< 2	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011770	CP	% pyrite S	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Potential Acidity - Titratable Peroxide				Result 1	Result 2	RPD			
pH-OX	L24-Ap0011770	CP	pH Units	4.8	4.7	<1	20%	Pass	
Titratable Peroxide Acidity (s-TPA)	L24-Ap0011770	CP	% pyrite S	< 0.02	< 0.02	<1	30%	Pass	
Titratable Peroxide Acidity (a-TPA)	L24-Ap0011770	CP	mol H+/t	< 2	< 2	<1	20%	Pass	
Duplicate									
Extractable Sulfur				Result 1	Result 2	RPD			
Sulfur - KCl Extractable	L24-Ap0011770	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Peroxide Extractable Sulfur	L24-Ap0011770	CP	% S	0.006	0.005	16	20%	Pass	
Duplicate									
Potential Acidity (SPOS)				Result 1	Result 2	RPD			
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011770	CP	% S	0.006	0.005	16	30%	Pass	
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011770	CP	mol H+/t	3.7	3.1	16	30%	Pass	
Duplicate									
Extractable Calcium				Result 1	Result 2	RPD			
Calcium - KCl Extractable	L24-Ap0011770	CP	% Ca	0.023	0.023	2.8	30%	Pass	
Calcium - Peroxide	L24-Ap0011770	CP	% Ca	0.025	0.025	2.5	20%	Pass	
Calcium - Acid Reacted	L24-Ap0011770	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (s-aCa)	L24-Ap0011770	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (a-aCa)	L24-Ap0011770	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Extractable Magnesium				Result 1	Result 2	RPD			
Magnesium - KCl Extractable	L24-Ap0011770	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Peroxide	L24-Ap0011770	CP	% Mg	< 0.005	< 0.005	<1	20%	Pass	
Magnesium - Acid Reacted	L24-Ap0011770	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011770	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011770	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD			
ANC Fineness Factor	L24-Ap0011770	CP	factor	1.5	1.5	<1	30%	Pass	

Duplicate									
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD			
pH-KCL (NLM-3.1)	L24-Ap0011779	CP	pH Units	5.8	5.8	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011779	CP	mol H+/t	3.6	3.7	2.3	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	L24-Ap0011779	CP	% pyrite S	0.006	0.006	2.3	30%	Pass	
Duplicate									
Potential Acidity - Titratable Peroxide				Result 1	Result 2	RPD			
pH-OX	L24-Ap0011779	CP	pH Units	4.1	4.2	<1	20%	Pass	
Titratable Peroxide Acidity (s-TPA)	L24-Ap0011779	CP	% pyrite S	< 0.02	< 0.02	<1	30%	Pass	
Titratable Peroxide Acidity (a-TPA)	L24-Ap0011779	CP	mol H+/t	3.5	3.2	<1	20%	Pass	
Duplicate									
Extractable Sulfur				Result 1	Result 2	RPD			
Sulfur - KCl Extractable	L24-Ap0011779	CP	% S	0.009	0.008	5.1	30%	Pass	
Peroxide Extractable Sulfur	L24-Ap0011779	CP	% S	0.013	0.014	6.2	20%	Pass	
Duplicate									
Potential Acidity (SPOS)				Result 1	Result 2	RPD			
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	L24-Ap0011779	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	L24-Ap0011779	CP	mol H+/t	< 2	< 2	<1	30%	Pass	
Duplicate									
Extractable Calcium				Result 1	Result 2	RPD			
Calcium - KCl Extractable	L24-Ap0011779	CP	% Ca	0.006	0.006	<1	30%	Pass	
Calcium - Peroxide	L24-Ap0011779	CP	% Ca	0.007	0.007	2.1	20%	Pass	
Calcium - Acid Reacted	L24-Ap0011779	CP	% Ca	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (s-aCa)	L24-Ap0011779	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Calcium - Acid Reacted (a-aCa)	L24-Ap0011779	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Extractable Magnesium				Result 1	Result 2	RPD			
Magnesium - KCl Extractable	L24-Ap0011779	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Peroxide	L24-Ap0011779	CP	% Mg	< 0.005	< 0.005	<1	20%	Pass	
Magnesium - Acid Reacted	L24-Ap0011779	CP	% Mg	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (s-aCa)	L24-Ap0011779	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (a-aCa)	L24-Ap0011779	CP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD			
ANC Fineness Factor	L24-Ap0011779	CP	factor	1.5	1.5	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
S02	Retained Acidity is Reported when the pHKCl is less than pH 4.5

Authorised by:

Elden Garrett	Analytical Services Manager
Jonathon Angell	Senior Analyst-SPOCAS

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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