VICTORIAN PLANNING AUTHORITY

OFFICER SOUTH EMPLOYMENT PRECINCT

SODIC/DISPERSIVE SOIL AND ACID SULFATE SOIL INVESTIGATION

SEPTEMBER 2021

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Officer South Employment Precinct
Sodic/Dispersive Soil and Acid Sulfate Soil Investigation

Victorian Planning Authority

WSP
Level 15, 28 Freshwater Place
Southbank VIC 3006

Tel: +61 3 9861 1111
Fax: +61 3 9861 1144
wsp.com

REV	DATE	DETAILS
A	25 June 2021	Draft for client and stakeholder comment
B	23 September 2021	Final incorporating VPA comment

	NAME	DATE	SIGNATURE
Prepared by:	Evan Lishmund Shane Giliam	23 September 2021	
Reviewed by:	Colin McKay Richard Kaser	23 September 2021	
Approved by:	Clinton Smiljanic	23 September 2021	

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EXECUTIVE SUMMARY

WSP Australia Pty Limited (WSP) was engaged by the Victorian Planning Authority (VPA) in April 2021 to undertake a sodic/dispersive soils and acid sulfate soils assessment to inform precinct planning being undertaken by VPA at the Officer South Employment Precinct, at Officer South, Victoria (precinct/site).

The objectives of the works were to investigate sodic/dispersive and acid sulfate soils within the Officer South Employment Precinct, map their position, identify their severity and the associated implications for planned future development, in order to assist and inform the VPA precinct structure planning for Officer South Employment Precinct.

The scope of works undertaken to achieve the assessment objectives comprised: a Site walkover and preparation of a Sampling Analysis and Quality Plan to identify any additional areas of concern; soil investigation works to assess for sodic/dispersive and acid sulfate soils from 45 soil boreholes; analysis and interpretation of soil testing (including this report); and, opportunistic installation of a preliminary groundwater monitoring network (three monitoring wells) to provide an indication of groundwater depth, pH and TDS (including provision of a factual summary of monitoring well installation, water levels and field water quality indicators).

The drilling of bores was conducted with a 4WD-vehicle mounted drill rig between 19 and 21 May 2021, and on 24 March 2021. Mechanical drilling was undertaken using push tube drilling techniques, and a combination of hand auger, push tube and solid flight augers (groundwater monitoring wells).

Seven (7) soil profiles were encountered during the assessment works. Predominantly the soil profile was topsoil overlying a silty horizon layer (sometimes) overlying a clay subsoil (varying colour) which overlaid a sand layer (sometimes, commencing from depths of between 1.5 and 2.8 m). While the soil profiles encountered did not match exactly mapped soil type extent, it was considered that broadly the soil mapping and field results were complementary.

SODIC/DISPERSIVE SOILS

Visual evidence of the presence of sodic/dispersive soils was observed throughout the precinct during the site walkover on 27 April 2021. This consisted of erosion, pitting, water pooling, dribble patterns, and cloudy water in some dams.

Laboratory testing for exchangeable sodium percentage indicated that sodicity varied particularly in the upper 0.5 metres of the soil profile, however samples from 1.0 m and deeper, consistently reported sodic soils ranging from “strongly sodic” to “very strongly sodic”. Overall, variability was consistent across all profiles, with the ranges overlapping at all depths. Note that while sodic soils are generally dispersive, not all sodic soils disperse and not all dispersive soils are sodic.

Emerson tests show majority of soil samples have Emerson Class 2, which is to say the majority of samples show some dispersion of air dried crumbs (2) while some samples show dispersion only when remoulded (3). While the Emerson Class tests gives a guide to the potential for a soil to disperse, it should be noted that certain chemical characteristics, such as the presence of high soluble aluminium and salinity may result in a low Emerson Class Number, when in actual fact the soil may have a high tendency to dispersion.

The presence and severity of dispersive soils can vary over short distances and so the testing represents the information at the sampling location and depth only – care should be taken if inferring dispersive potential of soils in between sampling locations.

Based on the range of exchangeable sodium percentage (predominantly strongly to very strongly sodic) and dispersivity results (Emerson class predominantly 2) reported across the depth profile (up to 3.0 mBGL) and across the precinct, it should be assumed that all soils within the precinct are potentially dispersive and strongly (to very strongly) sodic, unless testing at a higher sampling density is undertaken to prove otherwise.

ACID SULFATE SOILS

Possible indicators of the presence of acid sulfate soils was observed throughout the precinct during the site walkover on 27 April 2021. This consisted of reeds (visible in select areas of the precinct, particularly along watercourses), possible iron-stained sand (observed in deep wheel ruts between Lecky Road and Cardinia Creek), and waterlogged soils and swampy areas (observed from Stephens Road and Officer South Road). No other potential indicators of acid sulfate soil occurrence were noted during the site inspection, (e.g. milky discharge, stressed vegetation, concrete corrosion, mid to dark grey to dark greenish-grey coloured soils or sediments, offensive odours).

No evidence of the presence of acid sulfate soils was observed in the subsurface during intrusive soil investigation works. Stained and/or odorous soils were not observed during sample collection. Neither marine nor swampy deposits were observed in the soil profiles encountered, and mottling was observed in all soil profiles (to the depth assessed), indicating that the soil profile has been exposed to periodic oxidising conditions.

The results of the initial screening analysis suggested actual acid sulfate soil may be present (3 samples) and a majority of samples reported a reaction to peroxide oxidation indicative that potential acid sulfate soil may be present (61 samples).

A total of 22 selected soil samples from 6 soil bore locations (see Figure 3, Appendix A) representing the most likely locations where AASS/PASS may be present were further analysed for chromium reducible sulfur.

The chromium reducible sulfur content of the soil (representing the risk of additional acidification potential as a result of sulfide oxidation) was low, in all cases below the action criteria (0.03 %S). The net acidity was less than the action criteria in 10 of the 22 tests. Where the threshold was met or exceeded this was largely due to the total actual acidity concentration rather than through oxidation of sulfides. This result indicates that the soil is naturally acidic, and has limited acid generating potential. The elevated reaction rates are likely attributable to the presence of organic material in soil samples, as well as small amounts of chromium reducible sulfur present in soil samples (below action levels).

While some boggy ground and traces of sulphides were identified, the shallow water table was generally >3.0m below the surface, indicating that oxidation has likely already occurred in the soil profile (to 3.0mBGL) during dry periods (further corroborated by mottled colour of the soil profiles).

Given that pH at the Site remains predominantly above the action criteria (pH_{field}), this supports that the reported trace sulfide content is not sufficient to greatly further affect soil acidity. As the assessment did not report evidence that acid sulfate soils were present (in assessed areas to the maximum depth of assessment, 3 mbgs), it is considered that the likelihood of encountering acid sulfate soils at the precinct is low.

VULNERABILITY ASSESSMENT

The precinct presented a **low risk of vulnerability to the presence and associated impact of acid sulfate soils**. Acidity observed in soils was considered likely to be driven by a weak, less corrosive organic acid or very low traces of as-yet unoxidized sulphides within the vadose zone. Consideration may need to be made in relation to selection of building materials and sensitive plant species in the context of naturally acidic soils.

The precinct is vulnerable to soil dispersion, which can lead to the development of tunnel and surface erosion resulting in an increased risk of damage to buildings and service infrastructure as a result of the undermining of foundations and/or slumping and collapse of ground into voids and cavities that have been formed (see Figure 5 and Figure 6, Appendix A). Dispersion can also create environmental hazards such as reduced water quality.

Precinct planning should incorporate management and mitigation measures to reduce the risks to the Officer South Employment precinct (during and after development) from dispersion. Management and mitigation measures can include treatment of soils, assessment, excavation management, design controls and non-structural control measures.

RECOMMENDATIONS FOR FURTHER ASSESSMENT

WSP has undertaken an assessment to support VPA's Strategic Planning for the Office South Precinct. With reference to acid sulfate soils, sodic and dispersive soils, it was considered that the assessment undertaken was sufficient to support Strategic Planning Requirements. Further, the assessment is considered sufficient to assist the Statutory Planning

Authority's (Council) decision making with regards to future Statutory Planning approvals, including the development of Planning Permit conditions to manage risk associated with acid sulfate soils, sodic and dispersive soils. Further assessment by a project proponent may be warranted in relation to management of site/development specific risk.

1 PURPOSE AND OBJECTIVES

WSP Australia Pty Limited (WSP) was engaged by the Victorian Planning Authority (VPA) in April 2021 to undertake a sodic/dispersive soils and acid sulfate soils assessment at the Officer South Employment Precinct, at Officer South, Victoria (precinct/site).

A precinct figure is provided as Figure 1, Appendix A

1.1 PURPOSE

The purpose of the works was to assist VPA in understanding the presence and extent of sodic/dispersive and acid sulfate soils within the precinct to inform the precinct structure planning being undertaken and provide **options for their management in a property development context.**

1.2 OBJECTIVES

The objectives of the works were to:

- Investigate sodic/dispersive and acid sulfate soils within the Officer South Employment Precinct, map their position, identify their severity and the associated implications for planned future development.
- Assist and inform the VPA precinct structure planning for Officer South Employment Precinct.

2 BACKGROUND

2.1 LITERATURE REVIEW

Information included in the literature review (Table 2.1 below) is based on information sourced from both VPA and key stakeholders (refer to Section 2.2).

The precinct plan is presented in Figure 1, Appendix A.

Findings of the previous assessments detailed below have been represented in Figure 2 (soil types and risk of dispersion) and Figure 2 (acid sulfate soil risk), Appendix A.

Table 2.1 Literature Review

SITE AREA	Site Area: 1,069 ha
SITE LAYOUT	The precinct is bounded by Cardinia Creek to the west, Princes Freeway to the north, Lower Gum Scrub Creek to the east, and the urban growth boundary to the south (in part formed by Patterson Road).
CURRENT SITE USE	Predominantly agricultural land, with some residential properties. A BP service station (Officer Inbound) is present in the north of the site adjacent south of the Princes Freeway.
SITE HISTORY	**Historical summary (Aurecon, 2020)**: The precinct has been largely used for agricultural purposes until present day. A racetrack and associated sheds / buildings were constructed in the north-east of the precinct between 1974 and 1985. A gas pipeline easement was added in an east-west direction between 1991 and 2004. The Princes Freeway adjacent to the northern boundary of the precinct was constructed in the late 2000's. The service station in the north of the precinct was constructed in 2013.
ENVIRONMENTAL REGULATORY LISTINGS	Not listed as holding any operational licences issued by EPA Victoria, subject to notices, or listed as a notified or regulated contaminated site.
POTENTIAL FOR ENVIRONMENTAL ISSUES	**Potential for issues:** Potential for erosion along Cardinia Creek due to presence of sodosols, which are expected to exhibit dispersive properties. Acid sulfate soils (ASS) potentially present at site, particularly along Cardinia Creek, and an area in the south of site. Potential for contamination associated with the service station in the north of the precinct. However, it was reported by Aurecon (2020) that given this service station is less than ten years old, it is likely that it was constructed to meet modern environmental and engineering standards, with adequate monitoring in place. A review of the Atlas of Australian Acid Sulfate Soils (Australian Soil Resource Information System, 2013) shows that there is a low probability (very low confidence) to extremely low probability (very low confidence) for the occurrence of ASS to occur across the precinct, with the exception of two localised areas in the north-west of the precinct (waterbodies along Cardinia Creek) where there is a high probability (very low confidence) for the occurrence of ASS. Macmillan, M.J. (1997) undertook a land capability study of the Cardinia Shire, and concluded that the Officer South Precinct had a low to very low susceptibility and incidence of water and wind erosion, moderate susceptibility of salting and acidification, and moderate to low incidence of salting. The Department of Natural Resources and Environment (2002) performed a salinity risk assessment in the Cardinia area. It showed that the northern area of the precinct was

	mapped as having a depth to water table of 0-2 m, and 2-5 m in the southern area, and high risk of salinity due to low permeability and shallow groundwater. **Visual observations:** Aurecon (2020) observed visual indicators of dispersive soils throughout the precinct. These included: soil prone to becoming water-logged and boggy, slow water infiltration, and erosion of the banks along Cardinia Creek (evident from deep channels, undercutting of profile, and cracks forming in dry areas). Aurecon (2020) also noted that a review of available aerial imagery indicated the presence of marshes or wetlands, which are reportedly a strong indicator of ASS. Areas of the precinct inspected contained reed growth and localized areas of pooled or stagnant water, and organic odours were noted in the southern area of Cardinia Creek.
UNDERGROUND SERVICES	The precinct has various underground services and utilities existing, including: stormwater drainage (swale drains and connecting pipes), potable water (along Officer South Road), sewer (along the northern boundary of the precinct, including a pump station in the north of the precinct, west of Officer South Road), telecommunications (including a major Telstra fibre optic cable along Lecky Road between Officer South Road and Soldiers Road), high pressure gas pipelines (along Lecky Road and adjacent to Officer South Road in private property), and the T1 Morwell-Dandenong 450 mm high pressure gas pipeline (running west-east through the precinct within a 20.1 m wide easement. Additionally, there are three overhead transmission lines running east-west in the south of the precinct within a 146.30 m wide easement.
ENVIRONMENTAL PLANNING	The following overlays apply to parts of the precinct: — Development Contributions Plan — Environmental Significance — Floodway — Heritage — Incorporated Plan – Schedule 2 — Infrastructure Contributions — Land Subject to Inundation — Public Acquisition — Special Controls It is noted that should the service station be redeveloped into a more sensitive use (i.e. residential), it is likely that an environmental audit would be required.
RECOMMENDATIONS	Further investigation into dispersive soils and ASS should be performed via intrusive sampling using test pits or boreholes. Soils should be laboratory tested for: — Dispersive soil behaviour (Exchangeable Sodium Percentage, Emerson Crumb) — Acid sulfate soils (field testing, SPOCAS, Chromium Suite) — Salinity (EC) Investigations should be conducted as development progresses. However, acid sulfate soil testing should be performed in medium and high-risk areas (i.e. along Cardinia Creek and in the south of the site).
ADDITIONAL REFERENCES	Atlas of Australian Acid Sulfate Soils, Australian Soil Resource Information System, last updated April 18, 2013 – accessed online: https://www.asris.csiro.au/themes/AcidSulfateSoils.html

2.2 STAKEHOLDER INPUT

Contact was made with key stakeholders by WSP in the week starting 26 April 2021. This comprised notification of the planned assessment works and providing stakeholders an opportunity to provide comments/input. Details of feedback received from each stakeholder is provided below.

APA Group

WSP was advised by Peter Dawson of APA Group that there were no new pipelines proposed for the precinct that he was aware of. APA Group's main concern was regarding the existing pipeline and associated easement and ensuring that WSP's proposed drilling works would not encroach the easement.

AusNet

Did not provide any feedback.

Cardinia Shire Council

Cardinia Shire Council provided WSP with the following documents for review:

- Cardinia Shire Council (September 2015) Integrated Water Management Plan 2015-25
- Macmillan, M.J. et al (February 1997) A Land Capability Study of the Cardinia Shire – Technical Report No. 29
- The State of Victoria, Department of Natural Resources and Environment (September 2002) Identification and assessment of salinity risk in the growth corridor area of Cardinia Shire
- SKM (June 2005) Melbourne 2030: Casey-Cardinia Growth Area – Shallow Watertable Constraints on Urban Development

Major Road Projects Victoria

Major Road Projects Victoria indicated that the information gathered would be useful, and they would be interested in receiving the results. They had no comments on the program.

It is understood that planning has been undertaken to extend Thompsons Road from Clyde North east through the precinct.

Melbourne Water

Melbourne Water plans were provided by VPA and show that drainage pipelines are proposed in various areas across the precinct. A linear waterway/wetland system is proposed to run along Officer South Road adjacent east. Soil boreholes along this road alignment were situated approximately 30 m from the centreline of the road where possible to target this proposed infrastructure.

Feedback received from Melbourne Water included suggestions to position two soil borehole locations to target proposed assets:

- A soil bore at the southern end of Officer South Road was positioned to the west of the road to target a proposed future asset; and
- A soil bore to the north of Lecky Road along Gum Scrub Creek was positioned on the eastern side of the creek to target a proposed alternate location for the 'Lecky Road Retarding Basin'.

Melbourne Water also indicated that they were interested in obtaining more information regarding groundwater levels and salinity within the precinct. As such, three groundwater monitoring wells were advanced by WSP along the Officer South Road alignment.

South East Water

South East Water provided plans showing proposed locations of water, recycled water and sewer assets within the precinct. They also indicated that where there are proposed pumping stations for the precinct, they were interested in positioning deeper soil boreholes. Plans provided show that there is a pumping station proposed for the south-eastern corner of the precinct.

2.3 SITE INSPECTION OBSERVATIONS

A site inspection was completed by WSP on 27 April 2021 prior to intrusive soil sampling works. Site observations were mainly focussed on evidence of sodic/dispersive soils and acid sulfate soils. Although the site inspection was limited to areas of public access, the following observations were made (refer also to the attached photologs in Appendix B):

- A large fill embankment was present at the northern end of Officer South Rd, likely due to freeway works, or construction of the service station.
- The precinct was relatively flat, with short grasses, and livestock.
- No large unvegetated areas were observed (e.g. cropping or vegetation removal).
- Significant water pooling was present across the site, both on gravel roads and on farm lots. It is noted that the walkover occurred after a rain event. This resulted in boggy conditions when traversing the site.
- Various farm dams were located in many of the lots.
- The southern boundary was lined with small to large trees, fencing, and bound by a gravel unsealed road.
- The western boundary was bound by Cardinia Creek, with very high vegetation, fallen trees, large trees, hilly conditions and was very difficult to access by foot during the site walkover.
- The eastern boundary was bound by various housing estates, and low grasses.
- The northern boundary was bound by the Princes Freeway, with a service station and three dams present between the Princes Freeway and Handford Lane.
- The dirt track on the west side of Lecky Road was undriveable during the inspection, with high surface water, boggy conditions, and overgrown vegetation.

2.3.1 SODIC/DISPERSIVE SOILS

A site walkover was undertaken on 27 April 2021 by a Geotechnical Engineer to identify features of Sodic Soils. The following features were observed:

- Evidence of erosion was present on the banks on tributaries of the Cardinia Creek, off the west side of Officer South Road;
- Some potential pitting of soil was noted above a service on Patterson road;
- Basalt beaching was observed on a drain on Officer South Road, likely to reduce erosion;
- Across the site, water pooling was significant in many of the lots;
- Dribble pattern was seen above a telecom service on Handford Lane (refer Photo 2.1 below);
- Waters in two of the three northern dams off Handford Lane (within the service station) were noted to be very cloudy;
- Although difficult to access, viewpoints of Cardinia Creek showed dribble patterns on soil around the area (refer Photo 2.2 below);

- Dams in the west of the precinct, just outside the boundary, were observed to be relatively clear, and without sediment.

Photo 2.1 Dribble pattern above telecom service on Handford Lane

Photo 2.2 Dribble pattern on soil near Cardinia Creek

2.3.2 ACID SULFATE SOILS

- Reeds were visible in select areas of the precinct, particularly along watercourses.
- Possible iron-stained sand was observed in deep wheel ruts between Lecky Road and Cardinia Creek.
- Waterlogged soils and swampy areas were observed from Stephens Road and Officer South Road.
- No other potential indicators of acid sulfate soil occurrence were noted during the site inspection, (e.g. milky discharge, stressed vegetation, concrete corrosion, mid to dark grey to dark greenish-grey coloured soils or sediments, offensive odours).

3 SCOPE OF WORKS

3.1 GENERAL SCOPE OF WORKS

The scope proposed to achieve the assessment objectives identified in Section 1.2 the following was undertaken:

1. Preparation of a Sampling Analysis and Quality Plan to identify any additional areas of concern.
2. Soil investigation works to assess for sodic/dispersive and acid sulfate soils from 45 soil boreholes.
3. Analysis and interpretation of soil testing and provision of a report detailing the findings.
4. Opportunistic installation of a preliminary groundwater monitoring network* (three monitoring wells) to investigate groundwater depth, pH and TDS.
5. Preparation of a factual summary of monitoring well installation, water levels and EC/pH (field indication), and borelogs including GPS coordinates.

*: The groundwater assessment was intended to provide limited/indicative inference regarding specified parameters and was in no way intended to represent a detailed assessment of groundwater conditions within the precinct.

The scope of works is detailed further in the following sections.

3.2 SOIL ASSESSMENT

To assess for the presence of sodic/dispersive and acid sulfate soils across the precinct, the following works were:

- Drilling of 45 soil bores in an approximate grid pattern to a maximum depth of 3.0 m. The depth of soil bores (either 2.0 m or 3.0 m) is indicated on Figure 1, Appendix A.

Positioning of bores and their target depths was based on proposed locations and depths of planned drainage and sewer infrastructure (stakeholders), as well as areas of concern (literature review, site inspection). Deeper bores were positioned along the creeks, proposed wetlands along Officer South Road, sewer pumping station, and other areas of proposed underground drainage pipelines. A selection of boreholes targeted the following areas within the precinct (where practicable):

- Areas with potential for medium-high risk of acid sulfate soil occurrence (i.e. along Cardinia Creek and an area in the south of the precinct);
- areas with potential for medium-high risk of dispersive soils;
- land immediately east (and within 50 m) of Officer South Road, where there is a linear waterway/wetland system proposed. Bores were positioned approximately 30 m from the road; and
- areas where waterlogged soils were observed during the site inspection.

The soil sampling locations are shown on Figure 1, Appendix A.

Soil samples were submitted to NATA accredited laboratories for analysis. The number of soil samples submitted, and specific laboratory analysis are summarised in the Table 3.1.

Table 3.1 Laboratory Analysis

MATRIX	PRIMARY	DUPLICATES/ TRIPLICATES	ANALYSIS
Soil	53	4	Emerson Class Dispersion Testing
	53	4	Exchangeable Sodium Percentage (ESP)
	98	6	pH – Field (pH_{field})
	98	6	pH – Field Oxidised (pH_{fox})
	22	2	Chromium Reducible Sulfur (CRS) Suite
	1	0	Suspension Peroxide Oxidation Combined Acidity (SPOCAS) Suite

3.3 GROUNDWATER ASSESSMENT

- Installation of three groundwater monitoring bores was performed in a N-S direction along Officer South Road (licenced, with flush mount gatic covers and star picket markers) to target a proposed Melbourne Water drainage system.
- Development of wells on the day of installation (where water was present).
- Pole-mounted dGPS (+/- 25mm position accuracy) coordinates for each groundwater well.
- Measurement of groundwater level and collection of field water quality parameters after installation.

It is noted that levels and water quality parameters were collected on the day of installation (where water was present) and/or after three or four days as an indicative assessment of water levels. It is considered that more reliable results would involve subsequent sampling and/or purging once monitoring wells have acclimated to the aquifer.

4 METHODOLOGY

4.1 FIELDWORK

4.1.1 SOIL INVESTIGATION

The general soil sampling methodology for sodic/dispersive and acid sulfate soil sampling is summarised in Table 4.2.

Table 4.1 Soil investigation methodology

ITEM	DESCRIPTION
Service location	Soil borehole locations were cleared prior to commencement by an appropriately qualified service locater, particularly boreholes along (or in close proximity to) road reserves. A WSP ground penetration permit was prepared for the site.
Drilling of boreholes	The drilling of bores was conducted with a 4wd mounted drill rig between 19 and 21 May 2021, and on 24 March 2021. Mechanical drilling was undertaken using push tube drilling techniques, and a combination of hand auger, push tube and solid flight augers (groundwater monitoring wells).
Logging	Stratigraphy and other relevant information observed during drilling (e.g. in situ testing, and any groundwater inflow or levels) was recorded by appropriately qualified personnel. Logging of soils was undertaken in accordance with AS1726-1993 Geotechnical Site Investigations and the Unified Soil Classification System (USCS). Borehole logs are presented in Appendix C.
Soil sampling	Up to five soil samples per soil bore were analysed. Soil samples were collected at the following depth intervals; — 0.1 mBGL — 0.5 mBGL — 1.0 mBGL and every 1.0 m interval thereafter to the maximum depth of 2.0 or 3.0 m Samples were kept in laboratory supplied jars and resealable bags and kept in ice cooled esky while on-site and when in transit to the laboratory. Further, 104 samples were subject to a field acid sulfate soil test as per EPA Victoria (2009) Publication 655.1 – Acid Sulfate Soil and Rock.
Quality control	Duplicate samples were collected in the field at the rate of 1 in 20 primary samples for possible analysis by the primary laboratories.
Laboratory analysis	Australian Laboratory Services (ALS) Group is the nominated primary laboratory, and Eurofins Pty Ltd and Ground Science Pty Ltd are the nominated secondary laboratories respectively. All laboratories are accredited by the National Associated of Testing Authorities (NATA).

4.1.2 GROUNDWATER INVESTIGATION

A total of three groundwater monitoring wells (MW01 to MW03) were installed during the fieldworks outlined in Section 4.1.1 by conversion of soil bores using solid flight auger to the target depth.

All groundwater monitoring wells were constructed with 50 mm, class 18 threaded, flush-jointed polyvinyl chloride (PVC) screen and casing. No organic solvents or glues were used during construction or installation of the monitoring wells.

A filter pack comprising clean graded sands and/or gravels of suitable size (1–2 mm average grain size, silica material) to provide sufficient inflow of groundwater was installed within the annular space between the bore and the well casing. The filter pack extended from the base of the screened interval to 1.0 m above the termination of the slotted casing.

In order to minimise the likelihood of surface water or perched groundwater infiltrating the aquifer, a bentonite plug, comprising pelleted or granulated bentonite, was placed above the filter pack to a thickness of 1.0 m. Concrete was used to complete the well to the ground surface and installed as a groundwater well with a gatic cover and star picket to mark the location

Groundwater monitoring wells containing water were developed following installation to remove fines from the well and to allow the flow of a representative groundwater into the well for subsequent sampling.

Development was undertaken using a bailer. This was done by purging a minimum of three well volumes and/or until the well was purged dry.

Monitoring wells were surveyed to Australian Height Datum (AHD) and Map Grid of Australia (MGA) co-ordinates using a high-resolution GPS.

Field parameters (pH, dissolved oxygen, conductivity, redox potential and temperature) were recorded during the sampling event using a water quality meter, calibrated prior to use. The groundwater was visually assessed for turbidity and evidence of contamination such as odour or unusual discoloration.

Groundwater well construction details are presented in Table 5.2.

Table 4.2 Groundwater monitoring well construction details

WELL ID	INSTALLATION DATE	EASTING	NORTHING	TOTAL DEPTH (mBTOC)	TOP OF CASING (mAHD)	SCREEN INTERVAL (mBTOC)
MW01 (BH17)	21/05/2021	360157.55	5874086.09	5.10	29.545	2.10 – 5.10
MW02 (BH19)	20/05/2021	359971.20	5782936.88	5.10	26.290	2.10 – 5.10
MW03 (BH21)	20/05/2021	359768.0*	5781837.3*	7.10	22.8*	4.10 – 7.10

Position details collected using WSP's RTK dGPS (accuracy +/- 25mm), MGA Zone 55, AHD.

'*' Position details inferred across from accurate reading 5m to the west – interference due to trees

4.2 ASSESSMENT CRITERIA

4.2.1 SODIC/DISPERSIVE SOILS

Sodic soils are clay soils which contain exchangeable sodium between the clay platelets. When a sodic soil comes into contact with non-saline water or rainwater, water molecules are drawn in-between the clay platelets resulting in swelling of the clay and, often, the detachment of clay platelets into the water making the water cloudy in a process called dispersion. Dispersion can lead to the development of tunnel and surface erosion resulting in an increased risk of damage to buildings and service infrastructure as a result of the undermining of foundations and/or slumping and collapse of ground into voids and cavities that have been formed. Dispersion can also create environmental hazards such as reduced water quality.

The sodium content in a soil (sodicity) is commonly categorised on the basis of Exchangeable Sodium Percentage (ESP) after Rengasamy and Churchman, 1999 and Northcote and Skene,1972.

Table 4.3 Soil sodicity based on exchangeable sodium percentage

DESCRIPTION	EXCHANGEABLE SODIUM PERCENTAGE (ESP)
Non-sodic or low-sodic	< 6%
Sodic	6 -15%
Strongly sodic	15-25%
Very strongly sodic	>25%

Note that while sodic soils are generally dispersive, not all sodic soils disperse and not all dispersive soils are sodic. Evidence of historical dispersion at a site may be identified in the field while dispersion potential can be assessed using field and/or laboratory testing.

A common laboratory test to predict dispersive behaviour in soils is the Emerson soil crumb test (AS 1289.3.8.1-2017). Soils are divided into 7 classes (with an additional class for soil containing calcium rich minerals) based on their coherence in water. The test was developed by Emerson in 1967, and updated in 2002 (Emerson, 2002).

Figure 4.1 below shows the Emerson classes. Emerson Class 1 and 2 are considered susceptible to tunnel erosion (DPIPWE, 2009).

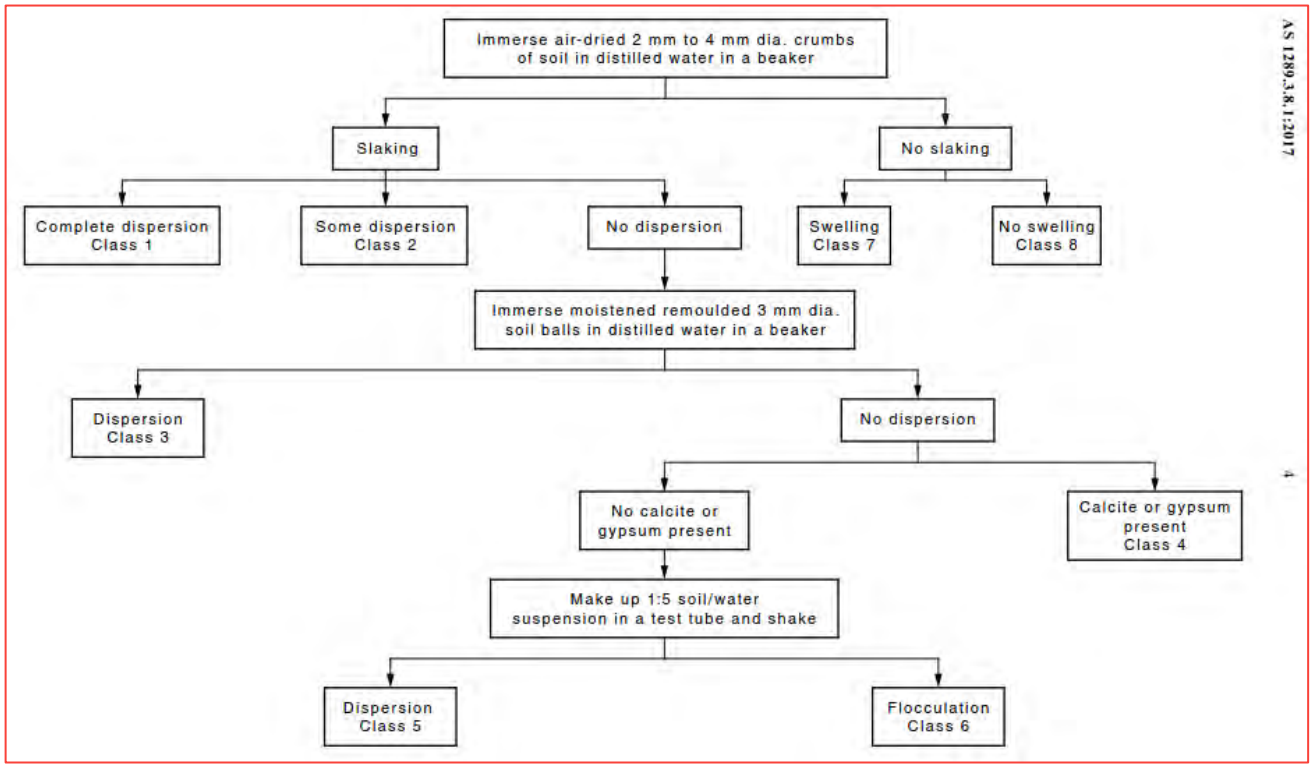

Figure 4.1 Emerson soil classes (extract from AS1289.3.8.9:2017)

4.2.2 ACID SULFATE SOILS

Field pH (pH_F) and field pH peroxide (pH_{FOX}) tests have been developed to enable rapid assessment of the likelihood of acid sulfate soils and in general accordance with EPA Victoria Acid Sulfate Soil and Rock Publication 655.1 (EPA Vic 2009), as detailed below:

- pH_F – measure of soil pH of a soil water paste
- pH_{FOX} – measure of soil pH after rapid oxidation with hydrogen peroxide (H2O2)

- Effervescence of reaction rate – a visual measure of the vigorousness of the oxidation reaction rate where: 1 = slight; 2 = moderate; 3 = high and 4 = extreme.

Interpretation of the results and action criteria required are summarised in Table 4.4.

Table 4.4 Interpretation of field pH results

pH_F	pH_{FOX}	ΔpH	REACTION RATE	ACTION REQUIRED
≥ 5.0	≥ 5.0	≤ 2.0	1-2	If no other field indicators or ASS risk indicators are present, no further action required
> 4.0 and < 5.0	> 3.0 and < 5.0	> 2.0	≥ 2	PASS may be present, further assessment is required
≤ 4.0	≤ 3.0	> 2.0	≥ 2	AASS or PASS are likely to be present, further assessment is required

Also in accordance with Acid Sulfate Soil and Rock 655.1 (EPA Vic 2009) the assessment criteria adopted for ASS are the Texture-Based ASS Action Criteria based on net acidity. The assessment criteria are provided in Table 4.5. It is noted that the action criteria themselves are not designed to identify acid sulfate as such, triggering the action criteria requires preparation of an acid sulfate soil management plan that should consider the risk and management approach.

Table 4.5 Texture-based ASS Action Criteria

TYPE OF MATERIAL		NET ACIDITY CRITERIA (1-1,000 tonnes)		NET ACIDITY CRITERIA (>1,000 tonnes)	
Soil Texture	Approx. Clay Content	(%S) (oven-dry basis)	(mol H+/tonne) (oven dry basis)	(%S) (oven-dry basis)	(mol H+/tonne) (oven dry basis)
Sands to loamy sands	<5%	0.03	18	0.03	18
Sandy loams to light clays	5-40%	0.06	36	**0.03**	**18**
Medium to heavy clays and silty clays	>40%	0.1	62	0.03	18

Note: values highlighted and in **bold** are the criteria applied for the project area (refer to below discussions).

Given this assessment is to inform Precinct Planning, and given the size of the precinct (>1,000 Ha), the total volume of soil to be excavated/disturbed remains unknown and is assumed to exceed 1,000 tonnes.

Based on a review of the borehole logs, samples submitted for CRS analysis ranged from silt to clay with occasional sands, therefore soil was assumed to be sandy loams to light clays.

Criteria adopted for ASS assessment is highlighted in Table 4.5, i.e. 0.03%S and 18 mol H+/tonne for net acidity.

5 RESULTS AND DISCUSSION

5.1 SUBSURFACE CONDITIONS

Intrusive soil sampling was carried out between 19 and 21 May 2021, and on 24 March 2021 (refer Section 4.1.1). A total of 45 boreholes were advanced across the precinct. Detailed logs of soil boreholes were recorded and are presented in Appendix C.

Seven (7) soil profiles were encountered during the assessment works. These are spatially presented in Figure 4 in Appendix A, and visually presented as generalised profile logs incorporating field observations and laboratory results, presented in Appendix B.

A summary of the soil profiles encountered is presented in Table 5.1 below.

Table 5.1 Soil profiles encountered in the Officer South Employment Precinct

PROFILE CODE	COLOUR OF CLAY	SAND LAYER AT DEPTH	SILT BELOW TOPSOIL	LOCATIONS MAPPED TO SOIL PROFILE (N=45)
B-cl-n	Brown (with mottles)	No	No	BH02, BH03, BH07, BH22, BH31, BH36, BH45 (n=8)
B-cl-y			Yes	BH15, BH24, BH26 (n=3)
B-sd-n		Yes	No	BH01, BH11, BH29, BH41 (n=4)
G-cl-n	Grey (with mottles)	No	No	BH04, BH05, BH06, BH08, BH12, BH13, BH16, BH17, BH21, BH23, BH28, BH35, BH37, BH38, BH39, BH42, BH43, BH44 (n=18)
G-cl-y			Yes	BH09, BH10, BH14, BH18, BH19, BH20, BH30, BH32 (n=8)
G-sd-n		Yes	No	BH25, BH27, BH40 (n=3)
G-sd-y			Yes	BH33, BH34 (n=2)

The following field observations were made during soil sampling:

- The soil bores were predominantly located within grassed areas, mostly within paddocks, but also within road reserves and among agricultural infrastructure.
- Predominantly the soil profile was topsoil overlying a silty horizon layer (sometimes) overlying a clay subsoil (varying colour) which overlaid a sand layer (sometimes, commencing from depths of between 1.5 and 2.8 m). The extent of the silty horizon and underlying sand is indicated on Figure 4, Appendix A
- Topsoil thickness varied across the precinct and was up to 0.9 m thick at borehole BH09.
- Fill soil was only encountered at the following boreholes:
  - BH04: advanced within the Handford Lane road reserve;
  - BH12: anecdotal evidence indicated that sandy fill had been imported to site for a horse training track; and
  - BH38: advanced in the vicinity of road and drainage infrastructure under development at the Officer South Road – Princes Freeway interchange.

- Clay was observed to be brown or grey, with orange mottling throughout.
- Orange-red clays were encountered at borehole BH15 from a depth of 1.5 m.
- No odours or other visual indicators for the presence of acid sulfate soils were observed during sample collection.

Figure 2 and Figure 3, Appendix A, show the mapped soil types and acid sulfate soil risk in the precinct, predominantly brown sodosols, but also grey kurosols and grey dermosols. The soil profiles encountered did not match exactly mapped locations, however it was considered that broadly the soil mapping and field results were complementary.

5.2 SODIC/DISPERSIVE SOILS

5.2.1 FIELD OBSERVATIONS

As noted in Section 2.3.1, evidence of the presence of sodic/dispersive soils was observed throughout the precinct by a Geotechnical Engineer during the site walkover on 27 April 2021. This consisted of erosion, pitting, water pooling, dribble patterns, and cloudy water in some dams.

Intrusive soil investigation works showed that beneath topsoil in the precinct, the soil was predominantly clay, with a silty horizon present beneath the topsoil in select locations, and sand at selected locations from 1.5 m depth onwards.

The soil profiles were separated by colour and the presence/absence of silt and sand (see 5.1 above), and the potential for dispersivity and sodicity were investigated further by laboratory analysis.

5.2.2 LABORATORY ANALYTICAL RESULTS

Samples were taken from soil bore location as shown in Figure 1 Appendix A, from a range of depths from 0.1 – 3.0, and selected samples were submitted for laboratory testing for ESP and Emerson Class testing.

Laboratory analytical results are provided in Table 1 Appendix D. Copies of laboratory certificates of analysis and chain of custody documentation are provided in Appendix E.

Table 5.2 below summarises samples submitted and results of Emerson Class and exchangeable sodium percentage analysis.

Table 5.2 Summary of sample results – Emerson Class and Exchangeable Sodium Percentage

SAMPLE DEPTH (MBGL)	EXCHANGEABLE SODIUM	EMERSON CLASS
0.1 (n=5)	3.7 – 23.8	2 (n=5)
0.5 (n=14)	4.6 – 25.5	2 (n=12), 3 (n=2)
1.0 (n=16)	13.5 – 30.0	2 (n=16)
2.0 (n=14)	13.3 – 33.3	2 (n=12), 3 (n=2)
3.0 (n=4)	16.1 – 31.2	2 (n=4)

The laboratory testing shows sodic to very strongly sodic soils are present across the precinct, with exchangeable sodium percentage ranging from 3.7% – 33.3%. A plot of exchangeable sodium percentage against sample depth is provided in Figure 5.1 below.

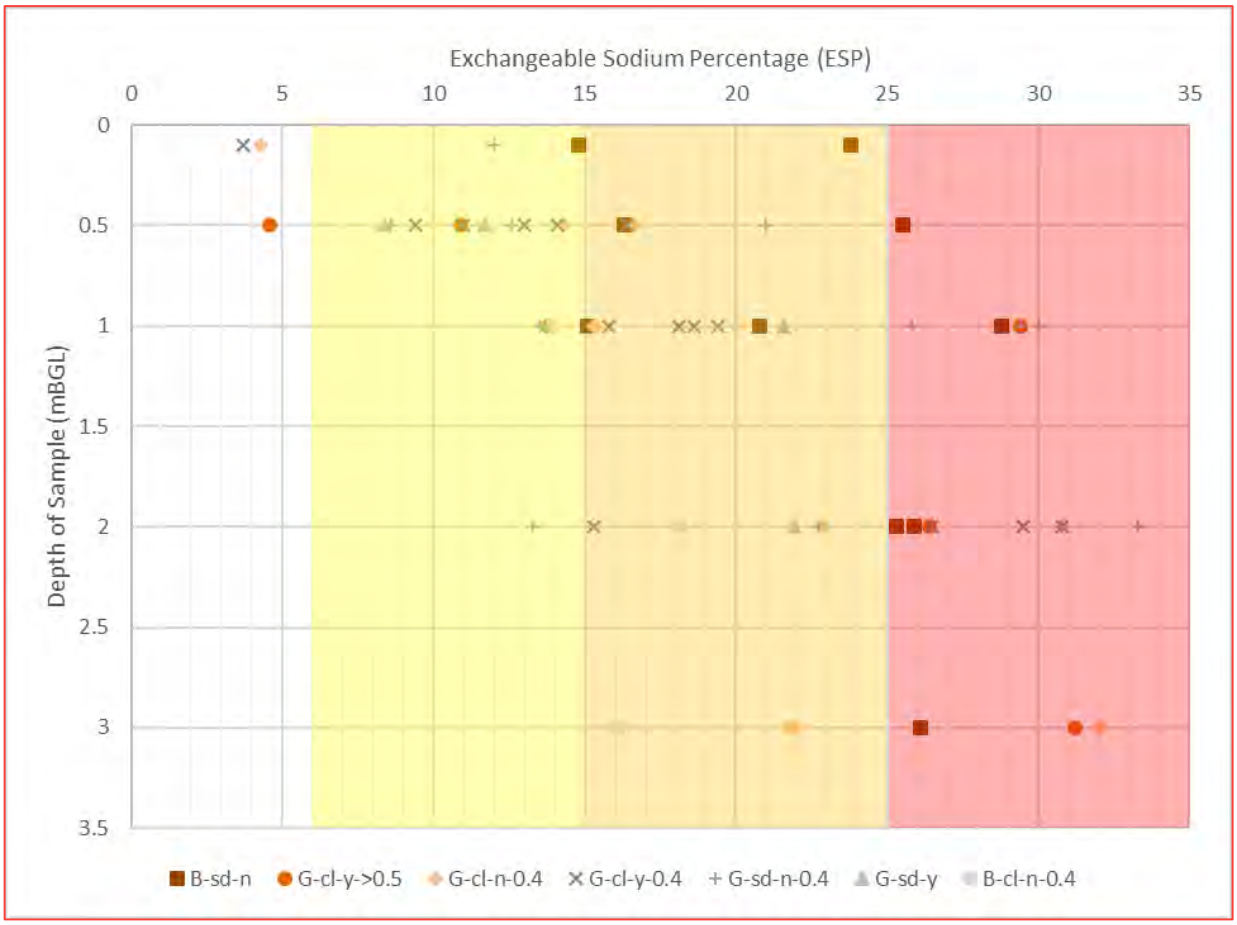

Figure 5.1 Exchangeable sodium percentage vs. sample depth (profile separated, colours show so sodicity)

It can be seen that sodicity varies particularly in the upper 0.5 metres of the soil profile, however from 1.0 m and deeper, sodicity is consistently "strongly sodic" to "very strongly sodic". Overall, variability was consistent across all profiles, with the ranges overlapping at all depths.

Note that while sodic soils are generally dispersive, not all sodic soils disperse and not all dispersive soils are sodic. Evidence of historical dispersion at a site may be identified in the field while dispersion potential can be assessed using field and/or laboratory testing. It is also important to understand that the risk of erosion relates to the soils dispersivity, and in addition landscape features such as the slope, catchment and vegetative cover.

Emerson tests show majority of soil samples have Emerson Class 2, which is to say the majority of samples show some dispersion of air dried crumbs (2) while some samples show dispersion only when remoulded (3).

While the Emerson Class tests gives a guide to the potential for a soil to disperse, it should be noted that certain chemical characteristics, such as the presence of high soluble aluminium and salinity may result in a low Emerson Class Number, when in actual fact the soil may have a high tendency to dispersion.

Figure 4 Appendix A shows the indicative soil profiles encountered across the precinct.

It should be noted that the presence and severity of dispersive soils can vary over short distances and so the testing represents the information at the sampling location and depth only – care should be taken when inferring dispersive potential of soils in between sampling locations.

It should be noted that no testing has been done below 3 metres. Additional testing may be required if excavation is proposed at a depth greater than 3.0 m.

Given the range or results found, it should be assumed that all soils within the precinct are potentially dispersive and strongly (to very strongly) sodic, unless testing at a higher sampling density is undertaken to prove otherwise.

Heat maps (Figure 5 and Figure 6, Appendix A) were prepared based on sodicity and dispersivity for shallow (up to 0.5 metres deep) and deeper (0.5-3 m) soils across the precinct using available laboratory data. The data was interpolated and averaged across the soil profiles where individual results were not available. Topography was not considered. The heat maps are presented as a precinct scale representation of erosion vulnerability based on the available data, and should be interpreted in consideration of the limitations of the investigation.

5.3 ACID SULFATE SOILS

5.3.1 FIELD OBSERVATIONS

As noted in Section 2.3.2, possible indicators of the presence of acid sulfate soils was observed throughout the precinct during the site walkover on 27 April 2021. This consisted of the following:

- Reeds were visible in select areas of the precinct, particularly along watercourses.
- Possible iron-stained sand was observed in deep wheel ruts between Lecky Road and Cardinia Creek.
- Waterlogged soils and swampy areas were observed from Stephens Road and Officer South Road.
- No other potential indicators of acid sulfate soil occurrence were noted during the site inspection, (e.g. milky discharge, stressed vegetation, concrete corrosion, mid to dark grey to dark greenish-grey coloured soils or sediments, offensive odours).

No evidence of the presence of acid sulfate soils was observed in the subsurface during intrusive soil investigation works. Stained and/or odorous soils were not observed during sample collection. Neither marine nor swampy deposits were observed in the soil profiles encountered (see Section 5.1 above).

Mottling was observed in all soil profiles (to the depth assessed), indicating that the soil profile has been exposed to periodic oxidising conditions.

5.3.2 FIELD PH (PH_F) AND FIELD PH PEROXIDE (PH_{FOX}) TESTS

Analysis of field pH (pH_F) and field pH after oxidation (pH_{FOX}) was carried out on 98 primary samples from 20 locations to provide an indication of the acid generating potential of the soils beneath the proposed project area. The sample locations were selected based on the soil profile encountered and across a vertical profile to ensure representative coverage across the precinct. The analysis results of pH_F and pH_{FOX} are presented in Table D1, Appendix D, and a summary is provided in Table 5.3 below.

Table 5.3 Summary of field pH peroxide testing results

SAMPLE DEPTH (MBGL)	pH_F (RANGE)	pH_{FOX} (RANGE)	$\Delta pH = pH_{FOX}-pH_F$ (RANGE)	REACTION RATE (RANGE)	INDICATIVE OF ACTUAL OR POTENTIAL ASS	*CRS (%S) (RANGE)*
0.1 (n=20)	5.1 – 7.3	**2.3** – 5.5	1.6 – **4.4**	1 – **4**	Yes	*<0.005 – 0.021*
0.5 (n=20)	5.2 – 8.1	**3.3** – 5.3	1.4 – **3.5**	1 – **4**	Yes	*<0.005 – 0.014*
1.0 (n=20)	5.2 – 7.9	**2.8** – 6.2	0.9 – **2.7**	1 – **3**	Yes	*<0.005 – 0.011*
2.0 (n=20)	**4.9** – 7.8	**3.6** – 6.6	0.6 – **2.1**	1 – **3**	Yes	*0.006 – 0.014*
3.0 (n=18)	**4.7** – 8.0	**3.4** – 8.0	0 – **2.2**	1 – **4**	Yes	*0.008 – 0.016*

Laboratory analysis certificates and chain of custody documentation are presented in Appendix E.

The results of the initial screening analysis are summarised as follows:

- 3 of the 98 primary samples have field pH results of <5 pH units, indicative that ASS may be present, and further assessment is required.
- 10 of the 98 primary samples reported a pH_{FOX} result below 3 pH units, a reaction to hydrogen peroxide indicative that PASS is likely to be present.
- 51 of the 98 primary samples reported a pH_{FOX} result between 3 and 5 pH units, a reaction to hydrogen peroxide, indicative that PASS may be present.
- 13 primary samples reported a change in pH (ΔpH) greater than 2 pH units indicative that PASS may be present.
- 42 of the 98 primary samples reported a reaction rate greater than 2 indicating PASS may be present. A review of the borehole logs indicated no evidence of shell fragments, and clay was mottled throughout the precinct, indicating oxidation had occurred.

5.3.3 CHROMIUM REDUCIBLE SULFUR

Due to the widespread slightly to moderately acidic pH readings across the project area, and the number of soil profiles (7) encountered across the precinct, 22 selected soil samples (plus 3 quality assurance samples) from 6 soil bore locations representing the most likely locations where AASS/PASS may be present were further analysed for CRS to confirm the presence of potential acidity based on their pH_F and pH_{FOX} results. The 6 locations are shown on Figure 3, Appendix A. The results of CRS analysis, summarised by soil texture and depth, are presented in Table 5.4 below, and within the laboratory analysis certificates and chain of custody documentation which are presented within Appendix E.

Table 5.4 Results of CRS analysis

LOCATION	DEPTH (m)	SOIL PROFILE AND TYPE	ACID GENERATING CAPACITY (%S)					
			TAA	CRS	NET ACIDITY	NET ACIDITY (ex ANC)	LIMING RATE (kg $CaCO_3$/T)	ACID GENERATING
BH03 (B-cl-n-0.4)	0.1	Topsoil	0.02	0.010	**0.04**	0.04	2	No
	0.1*		0.03	0.017	**0.04**	0.04	2	No
BH11 (B-sd-n-0.4)	0.1	Topsoil	0.05	0.011	**0.06**	0.06	3	No
	0.5	Brown clay	0.05	0.007	**0.06**	0.06	3	No
	1.0	Brown clay	0.07	0.011	**0.08**	0.08	4	No
	2.0	Brown clay	0.02	0.010	**0.04**	0.04	2	No
	3.0	Sandy silt	<0.02	0.010	<0.02	<0.02	<1	No
BH28 (G-cl-n-<0.3)	0.1	Topsoil	0.02	0.021	**0.04**	0.04	2	No
	0.5	Grey clay	0.02	<0.005	0.02	0.02	1	No
	1.0	Grey clay	0.03	0.007	**0.04**	0.04	2	No
	2.0	Grey clay	0.03	0.008	0.03	0.03	2	No
	3.0	Grey clay	0.03	0.008	**0.04**	0.04	2	No
BH33 (G-sd-y-0.4)	0.1	Topsoil	<0.02	0.008	<0.02	<0.02	<1	No
	0.5	Silt	<0.02	0.014	0.02	0.02	1	No
	0.5**		<0.02	-	<0.02	<0.02	<1	No
	1.0	Grey clay	<0.02	0.009	<0.02	<0.02	<1	No

LOCATION	DEPTH (m)	SOIL PROFILE AND TYPE	ACID GENERATING CAPACITY (%S)					
			TAA	CRS	NET ACIDITY	NET ACIDITY (ex ANC)	LIMING RATE (kg $CaCO_3$/T)	ACID GENERATING
	2.0	Grey clay	<0.02	0.014	0.03	0.03	1	No
BH41 (B-sd-n-0.4)	0.5	Brown clay	<0.02	0.010	0.02	0.02	<1	No
	1.0	Brown clay	<0.02	<0.005	<0.02	<0.02	<1	No
	3.0	Sand	<0.02	0.008	<0.02	<0.02	<1	No
BH44 (G-cl-n-<0.3)	0.1	Topsoil	0.02	0.014	**0.04**	0.04	2	No
	1.0	Grey clay	0.02	0.011	**0.04**	0.04	2	No
	2.0	Grey clay	0.02	0.006	0.03	0.03	1	No
	3.0	Grey clay	<0.02	0.016	0.03	0.03	1	No

Notes: TAA – Titratable Actual Acidity; CRS – Chromium reducible sulfur; ANC – Acid Neutralising Capacity, * Blind Duplicate results, ** SPOCAS duplicate sample

The following points are noted regarding the CRS analysis:

- The chromium reducible sulfur content of the soil (representing the risk of additional acidification potential as a result of sulfide oxidation) was low, in all cases below the action criteria (0.03 %S).
- The soil sample selected for SPOCAS confirmation analysis showed good agreement with CRS suite results.
- The net acidity (which is the sum of the TAA and the CRS) was less than the action criteria in 10 of the 22 tests. Where the threshold was met or exceeded this was largely due to the TAA concentration rather than through oxidation of sulfides. This result indicates that the soil is naturally acidic, and has limited acid generating potential.[1]
- The elevated reaction rates are likely attributable to the presence of organic material in soil samples, as well as small amounts of chromium reducible sulfur present in soil samples (below action levels).
- The results are corroborated by the field observations which showed the water table was generally not present to the depth of sampling (though some wet soil was encountered, standing water levels were observed at 3.3 metres below ground level – see Section 5.5 below) and the soils were observed to be mottled in colour, which indicates an oxidised soil – not consistent with PASS.

[1] While the acidity appears be naturally present, we do note that a trace of sulfide acidity was detected, indicating that sulphides are present in trace quantities in the soil. The geological formation of the sediments has been interpreted as alluvial (i.e. not marine) which decreases the likelihood of ASS formation, however it is noted that the foothills to the north (up-gradient) are of marine origin (Silurian age micaceous quartz siltstone), and therefore it is possible that minor sulfide inclusions are sourced from erosion of this geological formation. Drainage of the Koo-Wee-Rup swamp (circa 1890's) may have influenced soil conditions at the precinct.

5.4 QUALITY ASSURANCE AND QUALITY CONTROL TESTING

A summary of the quality assurance and quality control (QA/QC) protocols followed for the collection and analysis of soil and groundwater samples be obtained as part of the assessment program are presented in Table 5.5 below. A review of QA methods and QC data was undertaken and indicated appropriate data reliability for the purpose of this assessment.

Table 5.5 Summary of QA/QC Protocols

ITEM	DESCRIPTION	COMMENT
General	Work will be undertaken following WSP's standard field procedures, which are based on industry accepted standard practice.	-
Calibration	All measurement equipment will be serviced and calibrated as per the manufacturer requirements and calibration certificates retained.	Calibration record for water quality meter is provided in Appendix F.
Equipment decontamination	Sampling equipment will be decontaminated after the collection of each soil sample by washing with Decon 90® detergent followed by water-only decontamination.	Cross-contamination risk was considered to be low based on soil sampling technique and analytes (non-contamination related). Given that the assessment did not consider analytes indicative of contamination, the analysis of rinsate blanks and trip blanks as indicators of cross contamination was not considered warranted.
Sample handling	All soil samples will be stored in chilled eskies after collection and during transport by courier to the laboratory. Prior to delivery to the laboratory, a chain of custody form (COC) will be completed. The COC will be signed and accompany the samples. Upon receipt by the laboratory, COC and/or samples receipt notices will be returned to confirm the receipt, condition of samples and specified analysis	Samples were stored on ice in cooled esky and sent to the laboratory daily.
Transport	Samples will be stored in a cooled esky and transported to the laboratory. To ensure the integrity of the samples from collection to receipt by the analytical laboratory, soil samples will be sent by courier to the laboratories under 'chain of custody', describing sample preservation, and transport duration.	Samples were stored on ice in cooled esky and sent to the laboratory daily to ensure integrity of samples and reliability of data (e.g. to avoid oxidation of ASS samples).
QC samples	Field QC samples will be analysed as follows: — intra-laboratory duplicate samples at a rate of 1 in 20 primary samples — inter-laboratory duplicate samples at a rate of 1 in 20 primary samples. Laboratory QC sample analysis primarily included duplicate analysis and method blanks. No surrogate spike recovery analysis was required due to absence of contaminant analysis.	A summary of field duplicate sample RPD results is presented as Table 3 in Appendix D. A summary of laboratory QC data is presented in laboratory reports in Appendix E. Both field and laboratory QC data quality was considered acceptable for the purpose of this assessment.

ITEM	DESCRIPTION	COMMENT
Laboratory analysis	The laboratories selected will meet WSP in-house compliance requirements under the respective ISO 9001 QA programs. They will perform their own internal QA/QC programs and will use appropriate detection limits for the analyses to be undertaken.	NATA accredited laboratory analytical certificates are presented in Appendix E. Laboratory QA/QC was considered acceptable for this assessment.
Holding Times	Holding times are the maximum permissible elapsed time in days from the collection of the sample to its extraction and/or analysis. All extraction and analyses should be completed within standard guidelines.	No holding time exceedances were reported.
QA/QC Conclusion	The QA/QC indicators should either all comply with the required standards or show no variations that would have a significant effect on the quality of the data.	Natural sample heterogeneity was considered to account for any variations observed (i.e. elevated RPD results). Field QC indicated no variations considered to have an impact on the findings of the investigation were detected. Laboratory QC data was considered acceptable for the purpose of this assessment. A review of QA methods and QC data was undertaken and indicated appropriate data reliability for the purpose of this assessment.

5.5 GROUNDWATER CONDITIONS

The indicative groundwater conditions at the site are summarised in Table 5.6. It is noted that groundwater gauging occurred shortly after installation within clayey soils, and measured water levels may vary with time.

Additional groundwater gauging results (summarised below) and a calibration certificate for the water quality meter used during the gauging of monitoring wells are presented in Appendix F.

Table 5.6 Summary of groundwater conditions

DEPTH TO GROUNDWATER	The measured depth to groundwater (where encountered) ranged from 3.30 (MW02) to 3.39 (MW01) metres below ground level (mBGL). Groundwater was not encountered in MW03 (gauged on 20 and 24 May 2021), which was installed to a depth of 7.10 mBGL, and is located in the south of the precinct. It is noted that water was not encountered in MW01 on the day of installation (21 May 2021). The well was re-gauged on 24 May 2021 and water was encountered.
OBSERVATIONS	No odours were observed during drilling of groundwater wells and in the groundwater collected for water quality parameters.
GROUNDWATER OCCURRENCE	Groundwater was encountered within yellow-brown clay.
GRADIENT AND GROUNDWATER FLOW DIRECTION	Based on the groundwater gauging data and RTK dGPS survey of surface levels, the groundwater at the site has been inferred to flow towards the south / south-east, in the direction of Cardinia Creek and Western Port Bay. This is similar to the topography which slopes broadly towards the south. Inferred standing water levels (mAHD): — MW01: 26.16 mAHD at time of gauging.

	— MW02: 22.99 mAHD at time of gauging. — MW03: Dry at time of gauging. SWL inferred to be <15.7 mAHD. — It is noted that more detailed analysis of groundwater flow dynamics within the precinct may report flow patterns that differ to the preliminary inference provided in this report.
GROUNDWATER QUALITY PARAMETERS	— Indicative electrical conductivity for the monitoring wells was between 12,210 µS/cm (MW01) and 12,463 µS/cm (MW02). — pH was measured as at a level of 6.19 (MW01) and 6.09 (MW02) indicating that the regional groundwater is slightly acidic. — Dissolved oxygen was measured as 5.11 mg/L at MW02 and was below the instrument's level of sensitivity at MW01. — Field reduction/oxidation potential (Ag/AgCl probe) was measured as 167.2 mV at (MW01) and 154.0 mV at (MW02). Water quality parameters are provided in Table F1, Appendix F.
VISUAL AND OLFACTORY OBSERVATIONS	Groundwater was noted to be clear, not turbid, and did not have any discernible odours.

The elevated EC recorded is indicative that regional shallow groundwater has high salinity. This is consistent with findings published elsewhere for the region.

The absence of shallow groundwater towards the south of the precinct is consistent with published information indicating a transition to the deeper regional aquifer from the shallow groundwater associated with the clay soils in the precinct.

Based on preliminary groundwater investigations, it was considered that groundwater may be encountered during construction works, particularly in the north of the precinct within deeper excavations (e.g. service installation). Additionally, groundwater encountered by WSP was noted to be of high salinity, and slightly acidic.

No further inference can be made to aquifer properties based on the limited nature of the investigation, and further assessment would be required to ascertain potential inflow rates and potential impact on proposed infrastructure.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 EXTENT OF SODIC/DISPERSIVE SOILS AT THE PRECINCT

Based on the range of exchangeable sodium percentage (predominantly strongly to very strongly sodic) and dispersivity results (Emerson class predominantly 2) reported across the depth profile (up to 3.0 mBGL) and across the precinct, it should be assumed that all soils within the precinct are potentially dispersive and strongly (to very strongly) sodic, unless testing at a higher sampling density is undertaken to prove otherwise.

Depending on adopted construction methods, preventive measures may be required during construction, which should be confirmed during design and monitored and verified during construction.

6.2 EXTENT OF ACID SULFATE SOILS AT THE PRECINCT

Possible indicators of the presence of acid sulfate soils were observed throughout the precinct during the site walkover on 27 April 2021. This consisted of reeds (visible in select areas of the precinct, particularly along watercourses), possible iron-stained sand (observed in deep wheel ruts between Lecky Road and Cardinia Creek), and waterlogged soils and swampy areas (observed from Stephens Road and Officer South Road). No other potential indicators of acid sulfate soil occurrence were noted during the site inspection, (e.g. milky discharge, stressed vegetation, concrete corrosion, mid to dark grey to dark greenish-grey coloured soils or sediments, offensive odours).

No evidence of the presence of acid sulfate soils was observed in the subsurface during intrusive soil investigation works. Stained and/or odorous soils were not observed during sample collection. Neither marine nor swampy deposits were observed in the soil profiles encountered, and mottling was observed in all soil profiles (to the depth assessed), indicating that the soil profile has been exposed to periodic oxidising conditions.

The results of the initial screening analysis suggested actual acid sulfate soil may be present (3 samples) and a majority of samples reported a reaction to peroxide oxidation indicative that potential acid sulfate soil may be present (61 samples).

A total of 22 selected soil samples from 6 soil bore locations representing the most likely locations where AASS/PASS may be present were further analysed for chromium reducible sulfur.

The chromium reducible sulfur content of the soil (representing the risk of additional acidification potential as a result of sulfide oxidation) was low, in all cases below the action criteria (0.03 %S). The net acidity was less than the action criteria in 10 of the 22 tests. Where the threshold was met or exceeded this was largely due to the total actual acidity concentration rather than through oxidation of sulfides. This result indicates that the soil is naturally acidic, and has limited acid generating potential. The elevated reaction rates are likely attributable to the presence of organic material in soil samples, as well as small amounts of chromium reducible sulfur present in soil samples (below action levels).

While some boggy ground and traces of sulphides were identified, the shallow water table was generally >3.0m below the surface, indicating that oxidation has likely already occurred in the soil profile (to 3.0mBGL) during dry periods (further corroborated by mottled colour of the soil profiles).

The assessment findings at the Site align with the classification of the precinct within the Atlas of Australian Acid Sulfate Soils compiled by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) (low likelihood of occurrence, low confidence).

Investigation of the areas identified as having elevated risk of the presence of acid sulfate soils by Aurecon (2020) were subject to sampling and analysis. It is considered no soils able to be affected considerably by the oxidation of sulfides were present in these areas.

Given that pH at the Site remains predominantly above the action criteria (pH_{field}), this supports that the reported trace sulfide content is not sufficient to greatly further affect soil acidity. As the assessment did not report evidence that acid sulfate soils were present (in assessed areas to the maximum depth of assessment, 3 mbgs), it is considered that the likelihood of encountering acid sulfate soils at the precinct is low.

6.3 VULNERABILITY ASSESSMENT

Both published data and the assessment undertaken indicated a low risk of acid sulfate soils being present within the precinct. The intrusive assessment extended to maximum of approximately 3 mBGL including surficial and intrusive observations and laboratory analyses, which were consistent with published data for the area. On the basis of the assessment undertaken, it was considered that the precinct presented a low risk of vulnerability to the presence and associated impact of acid sulfate soils. It is acknowledged that acidic soils were observed to be present within the precinct, but likely to be driven by a weak, less corrosive organic acid or very low traces of as-yet unoxidized sulphides within the vadose zone. Consideration may need to be made in relation to selection of building materials and sensitive plant species in the context of naturally acidic soils.

Sodic and dispersive soils are present at the Site. Therefore, the precinct is vulnerable to dispersion, which can lead to the development of tunnel and surface erosion resulting in an increased risk of damage to buildings and service infrastructure as a result of the undermining of foundations and/or slumping and collapse of ground into voids and cavities that have been formed. Dispersion can also create environmental hazards such as reduced water quality. Figure 5 and Figure 6, Appendix A, present a precinct scale indication of erosion vulnerability, based on sodicity and dispersivity for shallow (up to 0.5 metres deep) and deeper (0.5 – 3m) soils across the precinct using available laboratory data. Topography was not considered for these figures. The data was interpolated and averaged across the soil profiles. The heat maps are subject to the limitations of the investigation (see Section 6.5 below) but indicate areas across the precinct of higher vulnerability to erosion, particularly in deep soils (0.5 – 3m), but also in shallow soils (up to 0.5 m deep).

Therefore, precinct planning should incorporate management and mitigation measures for sodic/dispersive soils as identified in Section 6.4 below.

6.4 MANAGEMENT RECOMMENDATIONS

The following management recommendations are made to address the vulnerability of the precinct to dispersion of soils. No acid sulfate soils were identified during the assessment to a maximum depth of investigation of 3.0 mBGL.

6.4.1 POTENTIAL TREATMENTS

Soil compaction reduces dispersion potential. Compaction of clays should be specified to be close to the maximum dry density and at a moisture content 1% to 2% above Optimum Moisture Content to reduce tunnel erosion potential.

In areas where the proposed development is susceptible to dispersion (e.g. steep batter slopes), soils may need to be treated using chemical amelioration. Gypsum, for example, is effective in reducing the dispersion potential of soils. Gypsum increases the electrolyte concentration in the soil and displaces sodium with calcium in the clay structure.

6.4.2 POTENTIAL MANAGEMENT OPTIONS AND CONTROL MEASURES

Risks associated with dispersive soil sites can be managed through ground investigation and a combination of design and construction management.

Because the presence and severity of sodic and dispersive soils can vary over short distances, more detailed investigations may be required in specific areas depending on the susceptibility to dispersion.

Developments with excavations extending to depths of greater than 3.0 m may also require additional testing since no samples were recovered from depths below 3.0 m.

6.4.3 POTENTIAL INFRASTRUCTURE DESIGN AND CONSTRUCTION APPROACHES RELATED TO PUBLIC AND PRIVATE REALMS

In almost all cases, tunnel and surface erosion results from the surface disturbance of soil allowing rainwater or stormwater to come into contact with dispersible subsoils. Changes to hydrology, including concentrating flow in culverts, runoff from hardstand areas, ponding of rainfall and land contouring increases the risk of tunnel erosion. Typical activities that increase the risk of exposing dispersive subsoils to rainfall and stormwater include:

- the removal of topsoil;
- soil excavation and ground profiling;
- trenching and supply of services;
- road and culvert construction; and
- the construction of dams and detention basins.

6.4.3.1 EARTHWORKS DESIGN

Some of the risks presented by a potentially dispersive site can be managed through earthworks design.

The risk of dispersion can be reduced by minimising the extent and depth of areas of cut within areas of potentially dispersive soils and instead designing these areas to be at grade or in fill.

Areas of potentially dispersive soil which are designed to be in cut should be designed with surface protection to create separation and protection of the underlying soils from surface and rainwater. Surface protection may be provided through specification of 150 mm thick of non-dispersive topsoil, erosion protection geotextiles and/or hard surfacing. Topsoiled areas should be re-vegetated, ideally with a mix of vegetation types.

Areas of fill should be filled with non-dispersive soils unless the dispersive soils are designed by a geotechnical engineer to be encapsulated within non-dispersive soils.

Clearance of vegetation should be avoided on slopes with existing grades steeper than 20% which are to be retained.

The design of final site grades should aim to minimise slope gradients in areas of potentially dispersive soils in order to reduce the potential for dispersion as a result of flowing surface water. Final slopes in dispersive soils to be protected by topsoil and revegetation should be designed at gradients of less than 20% unless specifically designed in consultation with a geotechnical engineer.

6.4.3.2 UTILITY AND DRAINAGE DESIGN

Give preference to design of at-ground or above-ground utilities which avoid the need for trenching through areas of potentially dispersive soils. Any trenching that is required for services should be designed to avoid long runs down slope which could increase the chances of tunnel erosion occurring.

Trench sand blocks and barriers should be considered to reduce the potential for tunnel erosion along trenched utilities on slopes as proposed by Richley (Richley L R, 2000) in conjunction with chemical amelioration and/or precisely engineered compaction as necessary.

Consideration should be given to mounding trench backfill to avoid settling backfill creating sumps which will pond and channel surface water into the trench. Trench backfill above pipes, culverts and drains should include a cap of non-dispersive soils.

Drainage design should avoid use of table drains, trenched pipes and culverts in areas containing dispersive soils. Captured runoff should instead be dissipated using diversion mounds constructed of non-dispersive soil and spread over

as wide an area as possible and/or discharged into relatively erosion resistant areas such as garden beds mixed with gypsum, existing well vegetated areas with ample topsoil and stony elevated areas.

Runoff from areas of dispersive soils should not be designed to discharge directly to waterways or stormwater drains where it may adversely water quality. Rainwater tanks may be used to capture runoff from roofs and buildings and pipe overflow to relatively erosion resistant areas.

6.4.3.3 INFRASTUCTURE DESIGN

The construction of roads in areas of dispersive soil has the potential to increase the risk of surface or tunnel erosion. Cuttings are at risk of surface erosion, while embankments of dispersive soils are at risk of tunnel erosion, especially in areas of culverts and drains. In dispersive areas, roads should be designed without the need for cuttings and with fill consisting of non-dispersive soils.

Buildings are best located away from areas of dispersive soils or constructed on pier and post foundations to avoid disturbance of the soils below.

Construction of sewage and grey water disposal systems in dispersive subsoils presents a risk of tunnel erosion and should be avoided.

Dams and detention basins should be sited on and constructed of non-dispersive soils unless specifically designed by a geotechnical engineer.

6.4.4 POTENTIAL NON-STRUCTURAL CONTROL MEASURES

A construction management plan should be prepared in advance of the start of construction identified the hazards associated with dispersive soils and construction practices to mitigate their impact.

Sediment and erosion controls should be installed prior to the commencement of any works and maintained throughout the course of construction until disturbed areas have been revegetated/ established.

The amount of time land is exposed should be minimised though staged development and/or staged working where possible. Particular care should be taken to avoid allowing soils to desiccate and crack, since these soils are then vulnerable to tunnel erosion after heavy rainfall.

Soil compaction should be verified through geotechnical supervision and field and laboratory testing.

Stockpiling of dispersive soil should be avoided where possible. Stockpiles should be protected from surface and rainwater.

Earthworks surfaces should be shaped to avoid ponding of surface water and discharged to relatively erosion resistant areas (e.g. garden beds mixed with gypsum, existing well vegetated areas with ample topsoil and stony elevated areas) away from dispersive soils.

Exposed dispersive subsoils should be protected as soon as possible to protect them from rainfall and surface water.

Runoff from areas of dispersive soils should not be discharged directly to waterways or stormwater drains.

Topsoil should not be removed or land re-profiled unless this forms part of the final earthworks design.

6.5 ASSUMPTIONS AND LIMITATIONS OF THE INVESTIGATION

The following specific assumptions and limitations apply to this assessment. This report should also be read in consideration of the Limitations presented in Section 7 below.

- **Variability:** It should be noted that the presence and severity of dispersive soils can vary over short distances and so the testing represents the information at the sampling location and depth only – care should be taken if inferring dispersive potential of soils in between sampling locations.
- **Limited investigation depth:** No testing has been done below 3 metres. Additional testing may be required if excavation is proposed at a depth greater than 3.0 m.
- **Subsurface conditions are time dependent:** Subsurface conditions may be modified by changing natural forces or man-made influences. Our investigation report is based on conditions which existed at the time of subsurface exploration.
- **Limited number of investigation locations:** In making an assessment of a site from a limited number of boreholes or test pits there is the possibility that variations may occur between test locations. Site exploration identifies specific subsurface conditions only at those points from which samples have been taken. The risk that variations will not be detected can be reduced by increasing the frequency of test locations; however, this often does not result in any overall cost savings for the project. The investigation program undertaken is a professional estimate of the scope of investigation required to provide a general profile of the subsurface conditions. The data derived from the site investigation program and subsequent laboratory testing are extrapolated across the site to form an inferred geological model and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. Despite investigation the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies.

6.6 RECOMMENDATIONS FOR FURTHER ASSESSMENT

WSP has undertaken an assessment to support VPA's Strategic Planning for the Officer South Precinct. With reference to acid sulfate soils, sodic and dispersive soils, it was considered that the assessment undertaken was sufficient to support Strategic Planning Requirements. Further, the assessment is considered sufficient to assist the Statutory Planning Authority's (Council) decision making with regards to future Statutory Planning approvals, including the development of Planning Permit conditions to manage risk associated with acid sulfate soils, sodic and dispersive soils. Further assessment by a project proponent may be warranted in relation to management of site/development specific risk.

7 LIMITATIONS

This Report is provided by WSP Australia Pty Limited (WSP) for Victorian Planning Authority (Client) in response to specific instructions from the Client and in accordance with WSP's proposal dated 12 March 2021 and agreement with the Client dated 14 April 2021 (Agreement).

7.1 PERMITTED PURPOSE

This Report is provided by WSP for the purpose described in the Agreement and no responsibility is accepted by WSP for the use of the Report in whole or in part, for any other purpose (Permitted Purpose).

7.2 QUALIFICATIONS AND ASSUMPTIONS

The services undertaken by WSP in preparing this Report were limited to those specifically detailed in the Report and are subject to the scope, qualifications, assumptions and limitations set out in the Report or otherwise communicated to the Client.

Except as otherwise stated in the Report and to the extent that statements, opinions, facts, conclusion and / or recommendations in the Report (Conclusions) are based in whole or in part on information provided by the Client and other parties identified in the report (Information), those Conclusions are based on assumptions by WSP of the reliability, adequacy, accuracy and completeness of the Information and have not been verified. WSP accepts no responsibility for the Information.

The Conclusions are reflective of the current Site conditions and cannot be regarded as absolute without further extensive intrusive investigations, outside the scope of the services set out in the Agreement and are indicative of the environmental condition of the Site at the time of preparing the Report. As a general principle, vertical and horizontal soil or groundwater conditions are not uniform. No monitoring, common or intrusive testing or sampling technique can eliminate the possibility that monitoring or testing results or samples taken, are not totally representative of soil and / or groundwater conditions encountered at the Site. It should also be recognised that Site conditions, including subsurface conditions can change with time due to the presence and concentration of contaminants, changing natural forces and man-made influences.

Within the limitations imposed by the scope of the services undertaken by WSP, the monitoring, testing (intrusive or otherwise), sampling for the preparation of this Report has been undertaken and performed in a professional manner in accordance with generally accepted practices, using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

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APPENDIX A

FIGURES

PS124554
Sodic/Dispersive and
Acid Sulfate Soil Assessment,
Officer South Employment Precinct.
Victorian Planning Authority.

Figure 1: Borehole Location

Legend

- Address Points
- BH28 Borehole Location (3 m deep)
- BH28 Borehole Location (2 m deep)
- Nominated Groundwater Well Location (Under Review)
- Road
- Cadastre
- Precinct Boundary

0 0.5 1 km

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

1:20,000 Date: 01-Jun-21

Data sources: - DELWP 2021, Nearmap 12/03/2021

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Sodic/Dispersive and
Acid Sulfate Soil Assessment,
Officer South Employment Precinct.
Victorian Planning Authority.

Figure 2: Mapped Soil Types

Legend

- Address Points
- Borehole Location
- Nominated Groundwater Well Location (Under Review)
- Cadastre
- Precinct Boundary

Dispersive Soil Erosion Risk

- High
- Medium
- Low

VIC Soil Type

- Brown Chromosols
- Grey Demosols
- Grey Kurosols
- Grey Sodosols
- Brown Sodosols

0 0.5 1 km

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

1:20,000 Date: 01-Jun-21

Data sources: - DELWP 2021, Nearmap 12/03/2021

PS124554
Sodic/Dispersive and
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Victorian Planning Authority.

Figure 3: Acid Sulfate Soil tests and mapped occurrence

Note: On the basis of the assessment undertaken, it was considered that the precinct presented a low risk of vulnerability to the presence and associated impact of acid sulfate soils.

Legend

- Address Points
- Borehole
  Locations where pH(fox) testing was performed
- Nominated Groundwater Well
- BH23 Locations Where Chromium Reducible Sulfur (CRS) Testing Was Performed
- Cadastre
- Precinct Boundary

NatASS (Aus Soils Classification) Probability of occurence of Acid Sulfate Soils

- A - High (>70%)
- B - Low (6 - 70%)
- C - Extremely Low (1 - 5%)

Acid Sulfate Soil Risk

- High
- Medium
- Low

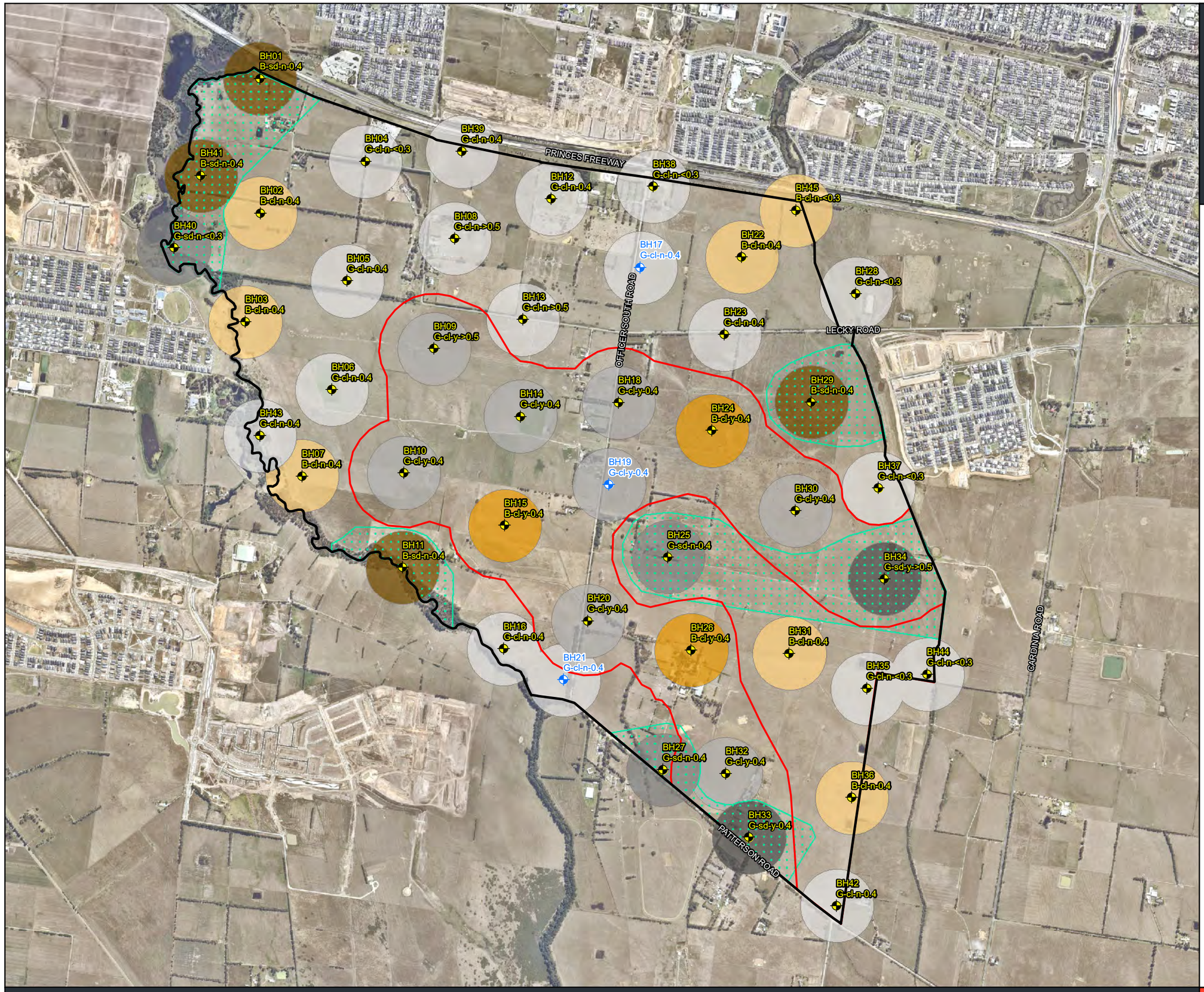
0 0.5 1 km

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

1:20,000 Date: 17/09/2021

Data sources: - DELWP 2021, Nearmap 12/03/2021



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Sodic/Dispersive and
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Officer South Employment Precinct.
Victorian Planning Authority.

Figure 4: Inferred Soil Profile

Legend

- Borehole Location
- Groundwater Well Location
- Lateral extent (inferred) of silty horizon overlying clay profile
- Lateral extent (inferred) of encountered sand strata below clay profile
- Precinct Boundary

Soil Classification (200m Buffer - visual)

- Brown clay colour, with sand at depth and no slit layer below topsoil
- Brown clay colour, no sand at depth and with slit layer below topsoil
- Brown clay colour, no sand at depth and no slit layer below topsoil
- Grey clay colour, with sand at depth and with slit layer below topsoil
- Grey clay colour, with sand at depth and no slit layer below topsoil
- Grey clay colour, no sand at depth and with slit layer below topsoil
- Grey clay colour, no sand at depth and no slit layer below topsoil

0 0.5 1 km

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

1:20,000 Date: 04-Jun-21

Data sources: - DELWP 2021, Nearmap 12/03/2021

PS124554
Sodic/Dispersive and
Acid Sulfate Soil Assessment,
Officer South Employment Precinct.
Victorian Planning Authority.
Figure 5: Erosion Vulnerability Heat Map - Shallow Soils (up to 0.5m)

Legend

- Address Points
- Borehole Location
- Nominated Groundwater Well Location
- Cadastre
- Precinct Boundary

Vulnerability - Shallow Soils

- Higher
- Lower

IMPORTANT: This heat map was prepared for precinct level assessment, and includes averaged and interpolated data. Topography has not been considered.

This erosion vulnerability heat-map was generated based on interpolation of available laboratory data, taking into consideration sodicity and dispersivity of soils within 0.5 m of the surface.

Further assessment by a project proponent may be warranted in relation to management of site/development specific risk.

This heat map should NOT be used for any purpose without considering the limitations of the data-set:

Variability: It should be noted that the presence and severity of dispersive soils can vary over short distances and so the testing represents the information at the sampling location and depth only – care should be taken if inferring dispersive potential of soils in between sampling locations.

Limited investigation depth: No testing has been done below 3 metres. Additional testing may be required if excavation is proposed at a depth greater than 3.0 m.

Subsurface conditions are time dependent: Subsurface conditions may be modified by changing natural forces or man-made influences. Our investigation report is based on conditions which existed at the time of subsurface exploration.

Limited number of investigation locations: In making an assessment of a site from a limited number of boreholes or test pits there is the possibility that variations may occur between test locations. Site exploration identifies specific subsurface conditions only at those points from which samples have been taken. Despite investigation the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies.

0 0.5 1 km

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

1:20,000 Date: 17/09/2021

Data sources: - DELWP 2021, Nearmap 12/03/2021

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PS124554
Sodic/Dispersive and
Acid Sulfate Soil Assessment,
Officer South Employment Precinct.
Victorian Planning Authority.
Figure 6: Erosion Vulnerability Heat Map - Deep Soils (>0.5m - 3.0m)

Legend

- Address Points
- Borehole Location
- Nominated Groundwater Well Location
- Cadastre
- Precinct Boundary

Vulnerability - Deep Soils

- Higher
- Lower

IMPORTANT: This heat map was prepared for precinct level assessment, and includes averaged and interpolated data. Topography has not been considered.

This erosion vulnerability heat-map was generated based on interpolation of available laboratory data, taking into consideration sodicity and dispersivity of soils deeper than 0.5 m of the surface.

Further assessment by a project proponent may be warranted in relation to management of site/development specific risk.

This heat map should NOT be used for any purpose without considering the limitations of the data-set:

Variability: It should be noted that the presence and severity of dispersive soils can vary over short distances and so the testing represents the information at the sampling location and depth only – care should be taken if inferring dispersive potential of soils in between sampling locations.

Limited investigation depth: No testing has been done below 3 metres. Additional testing may be required if excavation is proposed at a depth greater than 3.0 m.

Subsurface conditions are time dependent: Subsurface conditions may be modified by changing natural forces or man-made influences. Our investigation report is based on conditions which existed at the time of subsurface exploration.

Limited number of investigation locations: In making an assessment of a site from a limited number of boreholes or test pits there is the possibility that variations may occur between test locations. Site exploration identifies specific subsurface conditions only at those points from which samples have been taken. Despite investigation the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies.

0 0.5 1 km

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

1:20,000 Date: 17/09/2021

Data sources: - DELWP 2021, Nearmap 12/03/2021

APPENDIX B

PHOTOGRAPHS

PROFILE 1: Brown clays - no sand - no silt					
BH02, BH03, BH07, BH22, BH31, BH36, BH45		**Lithology**	**Dispersive Soils**		**Acid Sulfate Soils**
Depth (m)			Emerson Class	ESP (%)	
0.0		Topsoil	2	14.8	Field pH 6.2 pH(ox) 2.3 - 4.4 Reaction Rate 3 - 4 Net Acidity 0.04 - 0.06%
0.5		Sandy CLAY	2	9.4 - 25.5	Field pH 5.9 - 6.2 pH(ox) 4.3 - 4.5 Reaction Rate 2 - 4
1.0		Silty CLAY	2	18.1 - 28.8	Field pH 6.0 - 7.2 pH(ox) 4.6 - 6.0 Reaction Rate 2
1.5					
2.0			2	15.3	Field pH 6.5 - 7.8 pH(ox) 5.6 - 8.0 Reaction Rate 2 -4

PROFILE 2: Brown clays - no sand - with silt				
BH15, BH24, BH26	**Lithology**	**Dispersive Soils**		**Acid Sulfate Soils**
Depth (m)		Emerson Class	ESP (%)	
0.0	Topsoil	N/A	N/A	N/A
0.5	SILT	2	8.6 - 14.1	N/A
1.0	Silty CLAY	2	19.4 - 25.8	N/A
2.0		2 - 3	29.5 - 30.8	N/A

PROFILE 3: Brown clays - with sand - no silt					
BH01, BH11, BH29, BH41		**Lithology**	**Dispersive Soils**		**Acid Sulfate Soils**
Depth (m)			Emerson Class	ESP (%)	
0.0		Topsoil	N/A	N/A	Field pH 5.4 - 7.3 pH(ox) 2.7 - 5.5 Reaction Rate 1 - 3 Net Acidity 0.06%
0.5		Silty CLAY	2 - 3	4.6 - 16.3	Field pH 5.2 - 8.1 pH(ox) 3.5 - 5.0 Reaction Rate 1 - 3 Net Acidity 0.02 - 0.06%
1.0			2 - 2	13.8 - 15.1	Field pH 5.2 - 6.8 pH(ox) 2.8 - 5.0 Reaction Rate 1 - 3 Net Acidity <0.02 - 0.08%
1.5					
2.0		Sandy SILT	2 - 2	25.3 - 26.4	Field pH 5.7 - 7.5 pH(ox) 3.6 - 5.6 Reaction Rate 1 - 2 Net Acidity 0.04%
3.0			2 - 2	26.1 - 31.2	Field pH 6.5 - 8.0 pH(ox) 5.3 - 5.8 Reaction Rate 1 - 2 Net Acidity <0.02%

PROFILE 4: Grey clays - no sand - no silt

BH04, BH05, BH06, BH08, BH12, BH13, BH16, BH17, BH21, BH23, BH28, BH35, BH37, BH38, BH39, BH42, BH43, BH44

Depth (m)		Lithology	Dispersive Soils: Emerson Class	Dispersive Soils: ESP (%)	Acid Sulfate Soils
0.0		Topsoil	2	4.3 - 23.8	Field pH 5.2 - 5.8 pH(ox) 2.8 - 3.5 Reaction Rate 1 - 3 Net Acidity 0.04%S
0.5		Silty CLAY	2	13 - 21	Field pH 5.2 - 6.1 pH(ox) 3.6 - 4.3 Reaction Rate 2 Net Acidity 0.02%
1.0			2	18.6 - 30	Field pH 6.0 - 7.4 pH(ox) 4.9 - 5.7 Reaction Rate 1 - 2 Net Acidity 0.04%
1.5					
2.0			2	30.8 - 33.3	Field pH 6.5 - 7.5 pH(ox) 5.6 - 5.7 Reaction Rate 1 - 2 Net Acidity 0.03%
3.0			N/A	N/A	Field pH 6.4 - 7.7 pH(ox) 5.7 - 6.0 Reaction Rate 1 - 2 Net Acidity 0.03% - 0.04%

PROFILE 5: Grey clays - no sand - no silt					
BH09, BH10, BH14, BH18, BH19, BH20, BH30, BH32		**Lithology**	**Dispersive Soils**		**Acid Sulfate Soils**
Depth (m)			Emerson Class	ESP (%)	
0.0		Topsoil	2	14.8	Field pH 6.2 pH(ox) 2.3 - 4.4 Reaction Rate 3 - 4
0.5		SILT	2	9.4 - 25.5	Field pH 5.9 - 6.2 pH(ox) 4.3 - 4.5 Reaction Rate 2 - 4
1.0		Silty CLAY	2	18.1 - 28.8	Field pH 6.0 - 7.2 pH(ox) 4.6 - 6.0 Reaction Rate 2
1.5					
2.0			2	15.3	Field pH 6.5 - 7.8 pH(ox) 5.6 - 8.0 Reaction Rate 2 -4
3.0					

PROFILE 6: Grey clays - with sand - no silt					
BH25, BH27, BH40		**Lithology**	**Dispersive Soils**		**Acid Sulfate Soils**
Depth (m)			Emerson Class	ESP (%)	
0.0		Topsoil	2	3.7	Field pH 5.9 - 7.2 pH(ox) 2.6 - 6.9 Reaction Rate 3
0.5		Silty CLAY	2	16.4	Field pH 6.2 - 6.9 pH(ox) 4.5 - 5.0 Reaction Rate 2
1.0			2	29.4	Field pH 6.2 - 7.9 pH(ox) 4.9 - 6.2 Reaction Rate 1 - 2
1.5		SAND			
2.0			2	22.7	Field pH 6.6 - 7.7 pH(ox) 5.5 - 6.6 Reaction Rate 1 - 3

PROFILE 7: Grey clays - with sand - with silt					
BH33, BH34		**Lithology**	**Dispersive Soils**		**Acid Sulfate Soils**
Depth (m)			Emerson Class	ESP (%)	
0.0		Topsoil	N/A	N/A	Field pH 5.9 - 6.0 pH(ox) 3.8 - 4.1 Reaction Rate 3 - 4 Net Acidity <0.02%
0.5		SILT	2	8.4	Field pH 6.0 - 7.5 pH(ox) 3.7 - 5.3 Reaction Rate 3 - 4 Net Acidity 0.02%
1.0		Silty CLAY	2	21.6	Field pH 7.1 - 7.2 pH(ox) 5.0 - 5.4 Reaction Rate 2 Net Acidity <0.02%
1.5					
2.0			2	21.9	Field pH 5.6 - 6.0 pH(ox) 4.4 - 4.8 Reaction Rate 1 - 2 Net Acidity 0.03%
3.0		Clayey SAND	N/A	N/A	Field pH 6.2 - 7.2 pH(ox) 5.0 - 5.8 Reaction Rate 1

wsp	**PHOTOGRAPHIC LOG – Sodic Soil Photographs (Appendix B)**

Client Name	**Site Location**	**Project No.**
Victorian Planning Authority	Officer South Employment Precinct	PS124554

Photo No.	**Date**	
Point10_SSP008	27 Apr 2021	

Description

Erosion on bank of tributary of Cardinia Creek, on Officer South Road.

Photo No.	**Date**	
Point14_Photo 1	27 Apr 2021	

Description

Potential signs of soil pocketing above a service on Patterson Road.

	PHOTOGRAPHIC LOG – Sodic Soil Photographs (Appendix B)	
Client Name Victorian Planning Authority	**Site Location** Officer South Employment Precinct	**Project No.** PS124554

Photo No.	**Date**
Point16_SSP013	27 Apr 2021

Description

Basalt beaching on a drain to avoid erosion, on Officer South Road.

Photo No.	**Date**
Point21_SSPH017	27 Apr 2021

Description

Water logging on farmers lots, on Officer South Road.

wsp	**PHOTOGRAPHIC LOG – Sodic Soil Photographs (Appendix B)**

Client Name	**Site Location**	**Project No.**
Victorian Planning Authority	Officer South Employment Precinct	PS124554

Photo No.	**Date**
Point22_SSP018	27 Apr 2021

Description

Erosion of bank on east side of Officer South Road.

Photo No.	**Date**
Point29_Photo 5	27 Apr 2021

Description

Erosion seen from west end of Lecky Road on dam.

	PHOTOGRAPHIC LOG – Sodic Soil Photographs (Appendix B)	
Client Name Victorian Planning Authority	**Site Location** Officer South Employment Precinct	**Project No.** PS124554

Photo No.	**Date**
Point32_SPH023	27 Apr 2021

Description

Water logging in ruts on west end of Lecky Road.

Photo No.	**Date**
Point39_SPH024	27 Apr 2021

Description

Dribble pattern above telecom service on Handford Lane.

wsp	**PHOTOGRAPHIC LOG – Sodic Soil Photographs (Appendix B)**

Client Name	**Site Location**	**Project No.**
Victorian Planning Authority	Officer South Employment Precinct	PS124554

Photo No.	**Date**
Point49_SPH029	27 Apr 2021

Description

Stormwater treatment dam with sedimented water on north boundary of site, behind service station.

Photo No.	**Date**
Point58_Photo 1	27 Apr 2021

Description

Dribble pattern on soil near Cardinia Creek.

wsp	**PHOTOGRAPHIC LOG – Sodic Soil Photographs (Appendix B)**

Client Name	**Site Location**	**Project No.**
Victorian Planning Authority	Officer South Employment Precinct	PS124554

Photo No.	**Date**
Point61_Photo 2	27 Apr 2021

Description

Dam north west of site, with no visible sign of discolouration.

wsp	**PHOTOGRAPHIC LOG – Acid Sulfate Soil Photographs (Appendix B)**	
Client Name Victorian Planning Authority	**Site Location** Officer South Employment Precinct	**Project No.** PS124554

Photo No.	**Date**
Point13_ASP001	27 April 2021

Description

Patterson Road:

Looking north from Patterson Road in the area where there has been 'medium' potential for the occurrence of acid sulfate soils mapped.

Unable to access the site. However, there didn't appear to be any visual indicators of acid sulfate soils, other than potentially swampy conditions.

Photo No.	**Date**
Point64_ASP002	27 April 2021

Description

Officer South Road:

Looking east from the entrance of Jesmond Dene Stud.

Potential reeds were visible in the background.

wsp	**PHOTOGRAPHIC LOG – Acid Sulfate Soil Photographs (Appendix B)**	
Client Name Victorian Planning Authority	**Site Location** Officer South Employment Precinct	**Project No.** PS124554

Photo No.	**Date**
Point66_ASP004	27 April 2021

Description

Officer South Road:

Looking west from Officer South Road.

Waterlogged soil was observed in this area.

Photo No.	**Date**
Point67_ASP005	27 April 2021

Description

Track west of Lecky Road:

Access track to Cardinia Creek west of Lecky Road.

Red sand was observed in deep wheel ruts along the track.

wsp	**PHOTOGRAPHIC LOG – Acid Sulfate Soil Photographs (Appendix B)**	
Client Name Victorian Planning Authority	**Site Location** Officer South Employment Precinct	**Project No.** PS124554

Photo No.	**Date**
Point68_ASP006	27 April 2021

Description

Stephens Road:

Looking west from halfway along Stephens Road.

Reeds were visible in a watercourse.

Photo No.	**Date**
Point70_ASP007	27 April 2021

Description

Stephens Road:

Looking east from halfway along Stephens Road.

Soil was potentially waterlogged and frogs were audible.

wsp	**PHOTOGRAPHIC LOG – Acid Sulfate Soil Photographs (Appendix B)**

Client Name	**Site Location**	**Project No.**
Victorian Planning Authority	Officer South Employment Precinct	PS124554

Photo No.	**Date**
Point72_ASP009	27 April 2021

Description

Officer South Road:

Looking north from Officer South Road, just south of the Princes Freeway.

Swampy conditions were observed.

Photo No.	**Date**
Point74_ASP011	27 April 2021

Description

Cardinia Creek:

Looking north from an access track to the west of Cardinia Creek in the north of the precinct.

Reeds present on the banks of the creek and the adjacent overflow dams.

APPENDIX C

BOREHOLE LOGS AND BORE CONSTRUCTION LICENCES (GROUNDWATER)

Explanatory Notes - Engineering Logs

Engineering logs have been prepared in accordance with AS1726:2017 “Geotechnical Site Investigations” and as defined below.

DRILLING/EXCAVATION METHODS

Symbol	Term
CC	Concrete Coring
AS	Auger Screwing
EX	Excavation
HA	Hand Auger
NMLC/HMLC	Diamond Core –triple tube
NQ/HQ/PQ	Diamond Core – wireline
PC	Percussion
PCB	Poly Carbonised Diamond Bit
PT	Push Tube
RAB	Rotary Air Blast
RC	Reverse Circulation
S	Sonic drill
VB	Vibrocoring
WB	Washbore with blade
WR	Washbore with roller (tricone)

SUPPORT

C Casing
M Drill mud
Nil No support

WATER

Partial water loss Water inflow

Complete water loss

Water level at date shown

NFGWO No Free Groundwater Observed
The observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave in of the borehole/test pit.

NFGWE No Free Groundwater Encountered
The borehole/test pit was dry soon after excavation. Inflow may have been observed had the borehole/test pit been left open for a longer period.

FIELD TEST (Soil borehole and test pit logs)

DM Dilatometer test
HB Hammer bounce
OT Other test (eg. plate load test)
PE Permeability test
PM Pressuremeter test
PP Pocket penetrometer
SPT Standard penetration test
SV Shear vane test

SAMPLE (Soil borehole and test pit logs)

B Bulk disturbed sample
D Disturbed sample
PT Push tube
SPT SPT sample
U50 Undisturbed sample in 50mm diameter tube
U75 Undisturbed sample in 75mm diameter tube

GRAPHIC LOG – Page 03

TOTAL CORE RECOVERY (Rock logs only)

$$TCR\ (\%) = \frac{\text{Length of core recovered}}{\text{Length of core run}} \times 100$$

ROCK QUALITY DESIGNATION (Rock logs only)

$$RQD\ (\%) = \frac{\sum \text{Length of sound core pieces} > 100\text{mm}}{\text{Length of core run}} \times 100$$

GROUP SYMBOL (Soil borehole and test pit logs)

Soils are classified to reflect their primary and significant secondary component/characteristic using the classification symbols described in AS1726-2017, summarised as follows.

Symbol	Major division	Typical names
GW, GP	GRAVEL	Gravel & gravel-sand mixtures, little/no fines
GM		Gravel-silt & gravel-sand-silt mixtures
GC		Gravel-clay & gravel-sand-clay mixtures
SW, SP	SAND	Sand & gravel-sand mixtures, little/no
SM		Sand-silt mixtures
SC		Sand-clay mixtures
ML	SILT & CLAY (low & medium plasticity)	Inorganic silt/clayey fine sand or silt
CL, CI		Inorganic clay, gravelly clay, sandy clay
OL		Organic silt
MH	SILT & CLAY (high plasticity)	Inorganic silt
CH		Inorganic clay, high plasticity
OH		Organic clay, med-high plasticity, organic silt
Pt	Highly organic soil	Peat, highly organic soil

FIELD DESCRIPTION

Soil and rock materials described to AS1726-2017. The description of percentage of cobbles and boulders in a soil may be limited by sample size.

MOISTURE CONDITION

Coarse grained soils and rocks
Dry (D), Moist (M) or Wet (W).
Estimated based on appearance and feel.

Cohesive soils

MC<PL	Moist, dry of plastic limit
MC≈PL	Moist, near plastic limit
MC>PL	Moist, wet of plastic limit
MC≈LL	Wet, near liquid limit
MC>LL	Wet, wet of liquid limit

Estimated based on judgement

COHESIVE SOILS - CONSISTENCY

The consistency of a cohesive soil is assessed by tactile means or field measurement of undrained shear strength.

A Hand Penetrometer may be used in the field or the laboratory to provide approximate assessment of unconfined compressive strength of cohesive soils (kPa) as follows:

Strength	Symbol	Indicative undrained shear strength (kPa)	Hand Penetrometer Reading (kPa)
Very Soft	VS	≤ 12	< 25
Soft	S	>12 and ≤ 25	25 to 50
Firm	F	> 25 and ≤ 50	50 to 100
Stiff	St	>50 and ≤ 100	100 to 200
Very Stiff	VSt	> 100 and ≤ 200	200 to 400
Hard	H	>200	> 400
Friable	Fr	-	-

COHESIONLESS SOILS - RELATIVE DENSITY

Relative density terms are used to describe silty and sandy material, and these are usually based on resistance to drilling penetration or the Standard Penetration Test (SPT) ‘N’ values.

The Standard Penetration Test (SPT) is carried out in accordance with AS 1289, 6.3.1. For completed tests the number of blows required to drive the split spoon sampler 300 mm is recorded as the N value. For incomplete tests the number of blows and the penetration beyond the seating depth of 150 mm are recorded. If the 150 mm seating penetration is not achieved the number of blows to achieve the measured penetration is recorded. SPT correlations may be subject to corrections for overburden pressure and equipment type.

Term	Symbol	Density Index	N Value (blows /0.3 m)	DCP (blows/100 mm)
Very Loose	VL	0 to 15	0 to 4	0 to 1
Loose	L	15 to 35	4 to 10	1 to 2
Medium Dense	MD	35 to 65	10 to 30	2 to 5
Dense	D	65 to 85	30 to 50	5 to 10
Very Dense	VD	>85	>50	>10

SOIL STRUCTURE

Soil structure is described to AS 1726-2017 if visible and present.

SOIL / ROCK ORIGIN

The geological origin of the soil or rock is presented as an interpretation of the geological and geomorphological setting. Origin cannot be deduced on the basis of material appearance and properties alone and is therefore limited by the availability of supporting geological information

ROCK MATERIAL WEATHERING

Rock weathering is described mainly using the following abbreviations and definitions used in AS1726.

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

If differentiation between highly and moderately weathered rock is not practicable, then Distinctly Weathered (DW) is used as defined in AS1726:2017.

INFERRED ROCK STRENGTH

Rock strength is inferred based on field assessment, Point Load Index(AS4133.4.1) or Uniaxial Compressive Strength (AS 4133.4.2.1) as follows:

Term	Symbol	UCS (MPa)	Point Load Index $Is_{(50)}$ (MPa)
Very Low	VL	0.6 to 2	0.03 to 0.1
Low	L	2 to 6	0.1 to 0.3
Medium	M	6 to 20	0.3 to 1
High	H	20 to 60	1 to 3
Very High	VH	60 to 200	3 to 10
Extremely High	EH	>200	>10

● Diametral Point Load Index test

■ Axial Point Load Index test

DEFECT SPACING/BEDDING SPACING (Rock)

Measured at right angles to defects of same set or bedding.

Term	Defect Spacing	Bedding
Extremely closely spaced	<6 mm 6 to 20 mm	Thinly Laminated Laminated
Very closely spaced	20 to 60 mm	Very Thin
Closely spaced	0.06 to 0.2 m	Thin
Moderately widely spaced	0.2 to 0.6 m	Medium
Widely spaced	0.6 to 2 m	Thick
Very widely spaced	>2 m	Very Thick

DEFECT DESCRIPTION (Rock)

Symbol	Term	Symbol	Term
Bg	Bedding	DB	Drill Break
Pt	Parting	Se	Seam
Cn	Contact	SZ	Sheared Zone
Bd	Boundary	CZ	Crushed Zone
Jt	Joint	F	Fault
Fo	Foliation	Vn	Vein
C	Cleavage		

DEFECT ORIENTATION (Rock)

Dip measured relative to the horizontal plane in vertical boreholes and relative to core axis in inclined boreholes.

DEFECT ROUGHNESS AND SHAPE (Rock)

Roughness	Description	Roughness	Description
Sm	Smooth	Po	Polished
Ro	Rough	Sl	Slickensided
VRo	Very Rough		
Shape	**Description**	**Shape**	**Description**
Pl	Planar	Cu	Curved
Un	Undulating	Vu	Vuggy
Ir	Irregular	St	Stepped

COATING OR INFILLING (Rock)

Abbreviation	Description	Abbreviation	Description
Cln	Clean	Co	Coal
Cg	Coating	Cr	Crushed rock
In	infill	Fe	Limonite/ironstone
Sn	Stain	Fl	Feldspar
Vr	Veneer	Gp	Gypsum
Ca	Calcite	Mn	Manganese
Ch	Chlorite	Py	Pyrite
Cl	Clay	Qz	Quartz

Graphic Symbols — Soils and Rocks

Typical symbols for soils and rocks are as follows. Combinations of these symbols may be used to indicate mixed materials such as clayey sand.

SOIL SYMBOLS

Main components


CLAY


SILT


SAND


GRAVEL


BOULDERS / COBBLES


TOPSOIL


PEAT

Minor components


CLAYEY


SILTY


SANDY


GRAVELLY

OTHER MATERIAL SYMBOLS


FILL


BITUMEN


CONCRETE

ROCK SYMBOLS

Sedimentary Rocks


SANDSTONE


SILTSTONE


CLAYSTONE, MUDSTONE


SHALE


COAL


LIMESTONE


CONGLOMERATE

Igneous rocks


GRANITE


BASALT


UNDIFERENTIATED IGNEOUS

Metamorphic rocks


SLATE, PHYLLITE, SCHIST


GNEISS


QUARTZITE

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH01

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**19/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**19/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 358093.7204 N 5785139.252**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Sandy CLAY, low plasticity, dark brown, slightly moist, rootlets.			BH01-0.1
				0.50		J		CL	Sandy CLAY: Medium plasticity, light brown, slightly moist.			BH01-0.5
				-1		J						BH01-1.0
				2.00 -2		J		CL	Clayey SAND: Fine-medium, yellow-brown, moist.			BH01-2.0
		NO SEEPAGE				J						BH01-3.0
				-3					END OF BOREHOLE AT 3.00 m			

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH02

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**19/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**19/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 358097.5269 N 5784404.709**

Borehole Information							Field Material Description				
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Sandy CLAY, low plasticity, dark brown, slightly moist, rootlets.			BH02-0.1
				0.30				CL	Sandy CLAY: Medium plasticity, yellow-brown, slightly moist.			
						J						BH02-0.5
				1.00 -1		J		CL	Silty CLAY: Medium plasticity, yellow-brown, slightly moist.			BH02-1.0
		NCWO				J						BH02-2.0
				-2					END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH03

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**21/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**21/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 358013.4117 N 5783810.635**

Borehole Information							Field Material Description				
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0.00		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH03-0.1 DUP07-210521 DUP08-210521
				0.50		J		CL	Silty CLAY: Low plasticity, light brown, slightly moist.			BH03-0.5
				1.00 -1		J		CL	Medium plasticity, grey.			BH03-1.0
				1.50				CL	High plasticity, orange mottle.			
				-2		J						BH03-2.0
				2.50				CL	Sand inclusions.			
		NO SEEPAGE		-3		J						BH03-3.0
									END OF BOREHOLE AT 3.00 m			

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH04

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**19/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**19/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 358668.9879 N 5784687.435**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST H / FB VL L MD D VD)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			FILL: Gravelly CLAY, low plasticity, dark brown, slightly moist.			BH04-0.1
				0.40		J		CL	Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist, trace sand.			BH04-0.5
				-1		J						BH04-1.0
		NO WATER		-2		J						BH04-2.0
									END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH05

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**19/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**19/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 358569.9532 N 5784034.826**

Borehole Information							Field Material Description				
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH05-0.1
				0.50		J		CL	Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist.			BH05-0.5
				-1		J						BH05-1.0
		NO WATER		-2		J						BH05-2.0
									END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH06

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**21/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**21/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 358485.8378 N 5783440.752**

Borehole Information							Field Material Description				
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH06-0.1
				0.50		J		CL	Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist.			BH06-0.5
				-1		J						BH06-1.0
		WCO		-2		J						BH06-2.0
									END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH07

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**21/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**21/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 358323.379 N 5782968.994**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH07-0.1
				0.30				CL	Silty CLAY: Low plasticity, brown with orange mottle, slightly moist.			
						J						BH07-0.5
				-1		J						BH07-1.0
				1.20				CL	Medium plasticity.			
				-2		J						BH07-2.0
		NO SEEPAGE				J						BH07-3.0
				-3					END OF BOREHOLE AT 3.00 m			

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH08

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**19/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**19/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 359156.8409 N 5784265.074**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST H / FB VL L MD D VD)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT						J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH08-0.1
						J						BH08-0.5
			0.80					CL	Silty CLAY: Low plasticity, grey with orange mottle, slightly moist.			
				-1		J						BH08-1.0
		NFCWO				J						BH08-2.0
				-2					END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH09

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**21/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**21/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 359043.6523 N 5783663.944**

Borehole Information							Field Material Description				
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT						J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH09-0.1
						J						BH09-0.5
				0.90					Clayey SAND: Medium, brown, wet.			
				-1		J						BH09-1.0
				1.30				CL	Silty CLAY: High plasticity, grey with orange mottle, slightly moist.			
		WCO		-2		J						BH09-2.0
									END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH10

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**21/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**21/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 358879.2277 N 5782985.927**

Borehole Information							Field Material Description				
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH10-0.1
				0.30				ML	SILT: Low plasticity, light brown, slightly moist.			
				0.50		J		CL	Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist.			BH10-0.5
				-1		J						BH10-1.0
				1.50				CL	High plasticity.			
		NO WATER		-2		J						BH10-2.0
									END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH11

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**21/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**21/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 358872.0558 N 5782470.065**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (FB VL L MD D VD / VS S F ST VST H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH11-0.1
				0.30				CL	Silty CLAY: Low plasticity, pale brown-orange, slightly moist.			BH11-0.5
				-1		J						BH11-1.0
				-2		J						BH11-2.0
				2.20					Sandy SILT: Firm, pale grey-orange, slightly moist.			
		NONE		-3		J						BH11-3.0
									END OF BOREHOLE AT 3.00 m			

BOREHOLE ENVIRONMENTAL LOG

BOREHOLE NO.

BH12

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**19/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**19/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 359683.1074 N 5784481.726**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0					FILL: Gravelly SAND, fine, yellow-brown, moist.			No samples collected. Fill understood to be imported sand for horse training area.
				0.50		J			TOPSOIL: Sandy CLAY, low plasticity, dark brown, slightly moist.			BH12-0.5
				1.00 -1		J		CL	Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist.			BH12-1.0
		NCWO				J						BH12-2.0
				-2					END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH13

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**19/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**19/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 359529.1422 N 5783824.151**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			FILL: Gravelly CLAY, low plasticity, dark brown, moist.			BH13-0.1
				0.70				CL	Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist.			
				-1		J						BH13-1.0
				-2		J						BH13-2.0
		NO SEEPAGE		-3		J						BH13-3.0
									END OF BOREHOLE AT 3.00 m			

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH14

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**21/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**21/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 359515.0588 N 5783294.858**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH14-0.1
				0.50		J		ML	SILT: Low plasticity, light brown, slightly moist.			BH14-0.5
				0.70				CL	Silty CLAY: Medium plasticity, dark grey with orange mottle, slightly moist.			
				-1		J						BH14-1.0
		WCO		-2		J						BH14-2.0
									END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH15

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**21/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**21/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 359429.4419 N 5782700.181**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0.00		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH15-0.1
				0.50		J			SILT: Soft, grey, slightly moist.			BH15-0.5
				0.90		J		CL	Silty CLAY: Medium plasticity, brown with orange mottle, slightly moist.			BH15-1.0
				-1								
				1.50		J		CL	Orange-red clays.			BH15-2.0
		WO		-2					END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH16

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**20/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**20/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 359423.6433 N 5782025.673**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, moist.			BH16-0.1
				0.50		J		CL	Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist.			~~BH16-0.5~~
				-1		J		CL	Yellow sand inclusions.			BH16-1.0
								CL	High plasticity, grey.			
				-2		J		CL	Dark clays.			BH16-2.0
		NO SEEPAGE				J						BH16-3.0
				-3					END OF BOREHOLE AT 3.00 m			

BOREHOLE ENVIRONMENTAL LOG

BOREHOLE NO.

BH17 / MW01

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**21/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**21/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Driller:	**Matrix**	Surface RL:	**0**
Borehole Diameter:	**60 mm**	Driller Lic No:		Co-ords:	**E 360169.2921 N 5784108.668**

Borehole Information | **Field Material Description**

1 METHOD	2 SUPPORT	3 WATER	4 WELL CONSTRUCTION	5 RL(m) / DEPTH(m)	6 Field PID (ppm)	7 SAMPLE	8 GRAPHIC LOG	9/10 SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape,secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	Field pH	11 MOISTURE	12 RELATIVE DENSITY /CONSISTENCY (VS S F ST VST / FB VL L MD D VD H)	13 STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0.00		J		TOPSOIL: Silty CLAY, low plasticity, dark brown, moist.				BH17-0.1
				0.40		J		Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist.				BH17-0.5
				-1		J						BH17-1.0
				-2		J		High plasticity.				BH17-2.0
TC				-3		J		Low plasticity.				BH17-3.0 DUP09-210521 DUP10-210521
								Yellow-brown.				
				-4				Moist.				
				5.00 -5				END OF BOREHOLE AT 5.00 m				

This borehole log should be read in conjunction with WSP's accompanying standard notes.

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH18

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**19/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**19/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 360050.1194 N 5783369.601**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, moist.			BH18-0.1 DUP01-210519 DUP02-210519
				0.30					SAND: Medium, light brown, dry.			
						J						BH18-0.5
				0.70				CL	Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist.			
				-1		J						BH18-1.0
								CL	High plasticity.			
				-2		J						BH18-2.0
		NO WATER				J						BH18-3.0
				-3					END OF BOREHOLE AT 3.00 m			

BOREHOLE ENVIRONMENTAL LOG

BOREHOLE NO.

BH19 / MW02

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**20/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**20/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Driller:	**Matrix**	Surface RL:	**0**
Borehole Diameter:	**60 mm**	Driller Lic No:		Co-ords:	**E 359997.8344 N 5782922.794**

Borehole Information / Field Material Description

1 METHOD	2 SUPPORT	3 WATER	4 WELL CONSTRUCTION	5 RL(m) / DEPTH(m)	6 Field PID (ppm)	7 SAMPLE	8 GRAPHIC LOG	9/10 SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape,secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	Field pH	11 MOISTURE	12 RELATIVE DENSITY /CONSISTENCY (VS S F ST VST H / FB VL L MD D VD)	13 STRUCTURE AND ADDITIONAL OBSERVATIONS
HA				0.00		J		TOPSOIL: Silty CLAY, low plasticity, dark brown, moist.				BH19-0.1
				0.30		J		SILT: Soft, grey, slightly moist.				BH19-0.5 DUP05-210520 DUP06-210520
				0.80				Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist.				
PT				-1		J						BH19-1.0
				-2		J		High plasticity.				BH19-2.0
TC				-3		J						BH19-3.0
				-4				Soft, light brown, moist.				
				-4				Wet.				
				5.00 -5				END OF BOREHOLE AT 5.00 m				

This borehole log should be read in conjunction with WSP's accompanying standard notes.

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH20

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**20/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**20/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 359882.7917 N 5782179.43**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH20-0.1 DUP03-210519 DUP04-210519
				0.50		J			SILT: Soft, grey, slighly moist.			BH20-0.5
				0.80				CL	Silty CLAY: Medium plasticity, yellow-grey with brown mottle, slightly moist.			
				-1		J						BH20-1.0
				-2		J		CL	High plasticity, sand inclusions.			BH20-2.0
		NO SEEP				J						BH20-3.0
				-3					END OF BOREHOLE AT 3.00 m			

BOREHOLE ENVIRONMENTAL LOG

BOREHOLE NO.

BH21 / MW03

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**20/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**20/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Driller:	**Matrix**	Surface RL:	**0**
Borehole Diameter:	**60 mm**	Driller Lic No:		Co-ords:	**E 359750.6081 N 5781856.83**

Borehole Information | **Field Material Description**

1 METHOD	2 SUPPORT	3 WATER	4 WELL CONSTRUCTION	5 RL(m) / DEPTH(m)	6 Field PID (ppm)	7 SAMPLE	8 GRAPHIC LOG	9/10 SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape,secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	Field pH	11 MOISTURE	12 RELATIVE DENSITY /CONSISTENCY (VS S F ST VST H / FB VL L MD D VD)	13 STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J		TOPSOIL: Silty CLAY, low plasticity, dark brown, dry.				BH21-0.1
				0.50		J		Silty CLAY: Medium plasticity, grey, slightly moist.				BH21-0.5
				-1		J		With orange mottle.				BH21-1.0
				-2		J						BH21-2.0
TC				-3		J						BH21-3.0
				-4				High plasticity, soft, light brown.				
				-5								
				-6								
				7.00 -7				END OF BOREHOLE AT 7.00 m				

This borehole log should be read in conjunction with WSP's accompanying standard notes.

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH22

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**21/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**21/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 360721.3169 N 5784164.092**

Borehole Information							Field Material Description				
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH22-0.1
				0.50		J		CL	Silty CLAY: Medium plasticity, brown with orange mottle, slightly moist.			BH22-0.5
				-1		J						BH22-1.0
				1.50				CL	High plasiticity.			
		NO WATER		-2		J						BH22-2.0
									END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH23

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**19/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**19/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 360627.8072 N 5783741.898**

Borehole Information							Field Material Description				
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (FB VL L MD D VD / VS S F ST VST H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH23-0.1
				0.50		J		CL	Silty CLAY: Medium plasticity, grey with yellow mottle, slightly moist.			BH23-0.5
				-1		J						BH23-1.0
		NO WATER		-2		J						BH23-2.0
									END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH24

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**19/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**19/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 360559.1119 N 5783217.915**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST / FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH24-0.1
				0.50		J			SILT: Soft, grey, slightly moist.			BH24-0.5
				0.80				CL	Silty CLAY: Medium plasticity, brown-yellow, slightly moist.			
				-1		J						BH24-1.0
		NO WATER		-2		J						BH24-2.0
									END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH25

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**19/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**19/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 360319.7117 N 5782525.673**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH25-0.1
				0.50		J		CL	Silty CLAY: Low plasticity, grey-yellow, slightly moist, sand inclusions.			BH25-0.5
				-1		J						BH25-1.0
				1.50		J			SAND: Medium, grey-yellow, slightly moist.			BH25-2.0
		NO WATER		-2					END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH26

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**20/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**20/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 360446.7925 N 5782019.353**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST / FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH26-0.1
				0.50		J			SILT: Soft, light grey, slighly moist.			BH26-0.5
				0.70				CL	Silty CLAY: Medium plasticity, brown with yellow mottle, slightly moist.			
				-1		J						BH26-1.0
		NO WATER				J						BH26-2.0
				-2					END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH27

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**20/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**20/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 360291.5757 N 5781365.247**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH27-0.1
				0.40		J		CL	Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist.			BH27-0.5
				-1		J						BH27-1.0
				1.60		J			Clayey SAND: Medium, orange-grey, moist.			BH27-2.0
		NO WATER		-2					END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH28

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**24/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**24/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 361345.5765 N 5783965.121**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0.20		J			TOPSOIL: Silty CLAY, medium plasticity, dark brown, slightly moist, rootlets.			BH28-0.1
								CL	Silty CLAY: Medium plasticity, yellow-grey with brown mottle, slightly moist.			
				-1		J						BH28-0.5
						J		CL	High plasticity, sand inclusions.			BH28-1.0
				-2		J						BH28-2.0
								CL	Very high plasticity.			
		NONE		-3		J						BH28-3.0
									END OF BOREHOLE AT 3.00 m			

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH29

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**19/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**19/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 361100.8968 N 5783371.676**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH29-0.1
				0.50		J		CL	Silty CLAY: Low plasticity, brown-yellow, dry.			BH29-0.5
				-1		J						BH29-1.0
				-2		J						BH29-2.0
				2.60		J			Silty SAND: Fine, orange-grey, moist.			BH29-3.0
				-3					END OF BOREHOLE AT 3.00 m			

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BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH30

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**20/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**20/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 361014.7402 N 5782779.2**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0.00		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH30-0.1
				0.50		J			SILT: Soft, grey, slightly moist.			BH30-0.5
				0.90				CL	Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist.			
				-1		J						BH30-1.0
				-2		J		CL	Increased silt, soft.			BH30-2.0
				2.50				CL	Sandy CLAY: Medium plasticity, grey with orange mottle, slightly moist.			
		NONE OBS		-3		J						BH30-3.0
									END OF BOREHOLE AT 3.00 m			

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH31

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**24/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**24/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 360981.3322 N 5782000.728**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist, rootlets.			BH31-0.1
				0.30				CL	Silty CLAY: Low plasticity, brown, dry.			
						J						BH31-0.5
				-1		J		CL	Medium plasticity, orange mottle.			BH31-1.0
								CL	High plasticity, light brown with orange mottle.			
		NO WATER		-2		J						BH31-2.0
									END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH32

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**20/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**20/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 360635.9936 N 5781345.355**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST / FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH32-0.1
				0.50		J			SILT: Soft, pale grey, slightly moist.			BH32-0.5
				0.90				CL	Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist, sand inclusions.			BH32-1.0
				-1		J						
				-2		J		CL	Firm, high plasticity.			BH32-2.0
		NO SEEPAGE				J						BH32-3.0
				-3					END OF BOREHOLE AT 3.00 m			

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH33

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**20/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**20/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 360761.5843 N 5780997.257**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0.00		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH33-0.1
				0.50		J			SILT: Soft, pale grey, dry.			BH33-0.5
				0.80				CL	Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist.			
				-1		J						BH33-1.0
				-2		J						BH33-2.0
				2.50					Clayey SAND: Fine, yellow-grey, slighty moist.			
		NO SEEP		-3		J						BH33-3.0
									END OF BOREHOLE AT 3.00 m			

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH34

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**24/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**24/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 361501.3508 N 5782407.114**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST H / FB VL L MD D VD)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist, rootlets.			BH34-0.1
						J						BH34-0.5
				0.60				CL	Silty CLAY: Medium plasticity, brown with orange mottle, slightly moist.			
				-1		J		CL	High plasticity, light grey with orange mottle, trace sand.			BH34-1.0
				-2		J						BH34-2.0
				2.80					Clayey SAND: Fine-medium, light grey with orange mottle, moist.			
		NCOM		-3		J						BH34-3.0
									END OF BOREHOLE AT 3.00 m			

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH35

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**24/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**24/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 361405.9964 N 5781810.08**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0.20		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH35-0.1
						J		CL	Silty CLAY: Low plasticity, light grey with orange mottle, slightly moist, sand inclusions.			BH35-0.5
				-1		J		CL	Medium plasiticity, hard.			BH35-1.0
								CL	High plasticity.			
								CL	Sand inclusions, moist.			
		NO WATER		-2		J			END OF BOREHOLE AT 2.00 m			BH35-2.0
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH36

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**24/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**24/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 361322.4184 N 5781213.796**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist, rootlets.			BH36-0.1
				0.40				CL	Silty CLAY: Medium plasticity, dark brown, slightly moist.			BH36-0.5
				-1		J		CL	High plasiticity, light brown with orange mottle.			BH36-1.0
				-2		J		CL	Sand inclusions.			BH36-2.0
		NO WATER		-3		J			END OF BOREHOLE AT 3.00 m			BH36-3.0

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH37

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**24/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**24/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 361468.4953 N 5782903.018**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0.10		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist, rootlets.			BH37-0.1
								CL	Silty CLAY: Low plasticity, grey with orange mottle, dry.			
						J						BH37-0.5
				-1				CL	Medium plasticity.			
						J						BH37-1.0
								CL	Light grey with orange mottle, high plasticity.			
				-2		J						BH37-2.0
		NCOM				J						BH37-3.0
				-3					END OF BOREHOLE AT 3.00 m			

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH38

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**21/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**21/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 360239.5776 N 5784549.414**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			FILL: Silty CLAY, medium plasticity, light brown, moist, granitic gravels.			BH38-0.1
				0.50		J		CL	Silty CLAY: Medium plasticity, dark grey with orange mottle, slightly moist.			BH38-0.5
				-1		J						BH38-1.0
								CL	High plasticity.			
				-2		J						BH38-2.0
		NO SEEPAGE				J						BH38-3.0
				-3					END OF BOREHOLE AT 3.00 m			

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH39

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**19/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**19/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 359195.1147 N 5784741.668**

Borehole Information							Field Material Description				
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist.			BH39-0.1
				0.50		J		CL	Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist.			BH39-0.5
				-1		J						BH39-1.0
		NO WATER		-2		J						BH39-2.0
									END OF BOREHOLE AT 2.00 m			
				-3								

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH40

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**19/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**19/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 357624.402 N 5784214.317**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Clayey SAND, fine, dark brown, moist, rootlets.			BH40-0.1
				0.20				CL	Silty CLAY: Medium plasticity, grey-yellow, moist.			
						J						BH40-0.5
				-1		J						BH40-1.0
				1.70					Clayey SAND: Medium, grey with orange mottle, moist.			
				-2		J						BH40-2.0
		NO WATER				J						BH40-3.0
				-3					END OF BOREHOLE AT 3.00 m			

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH41

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**19/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**19/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 357770.3869 N 5784609.543**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Clayey SAND, fine, dark brown, moist, rootlets.			BH41-0.1
				0.50		J		CL	Silty CLAY: Medium plasticity, light brown, moist.			BH41-0.5
				-1		J						BH41-1.0
				1.90					Clayey SAND: Fine-medium, yellow-brown, moist.			
				-2		J						BH41-2.0
		NONE				J						BH41-3.0
				-3					END OF BOREHOLE AT 3.00 m			

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH42

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**24/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**24/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 361239.608 N 5780622.991**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist, rootlets.			BH42-0.1
				0.30				CL	Silty CLAY: Medium plasticity, light grey with orange mottle, slightly moist, trace sand.			BH42-0.5
				-1		J						BH42-1.0
						J		CL	High plasiticity.			BH42-2.0
		NONE		-2		J						BH42-3.0
				-3		J			END OF BOREHOLE AT 3.00 m			

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH43

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**21/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**21/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 358094.2572 N 5783190.885**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist, rootlets.			BH43-0.1
				0.50		J		CL	Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist.			BH43-0.5
				-1		J						BH43-1.0
								CL	High plasiticity.			
				-2		J						BH43-2.0
		NO SEEPAGE				J						BH43-3.0
				-3					END OF BOREHOLE AT 3.00 m			

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH44

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**24/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**24/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 361733.9224 N 5781886.937**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0.10		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist, rootlets.			BH44-0.1
								CL	Silty CLAY: Low plasticity, dark grey with orange mottle, slightly moist.			
						J						BH44-0.5
				-1		J						BH44-1.0
								CL	High plasiticity, light grey with mottle.			
				-2		J						BH44-2.0
		NO SEEPAGE				J						BH44-3.0
				-3					END OF BOREHOLE AT 3.00 m			

BOREHOLE NO.

BOREHOLE ENVIRONMENTAL LOG

BH45

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**21/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**21/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Hole Angle:	**90°**	Surface RL:	
Borehole Diameter:	**60 mm**	Bearing:	**---**	Co-ords:	**E 361017.9089 N 5784420.098**

Borehole Information							Field Material Description					
METHOD	SUPPORT	WATER	RL(m)	DEPTH(m)	FIELD TEST	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE	RELATIVE DENSITY / CONSISTENCY (VS S F ST VST FB VL L MD D VD H)	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0.20		J			TOPSOIL: Silty CLAY, low plasticity, dark brown, slightly moist, rootlets.			BH45-0.1
								CL	Silty CLAY: Low plasticity, brown with orange mottle, slightly moist.			
						J						BH45-0.5
				-1		J		CL	Medium plasticity.			BH45-1.0
								CL	High plasiticity.			
				-2		J						BH45-2.0
		▽						CL	Wet.			
						J						BH45-3.0
				-3					END OF BOREHOLE AT 3.00 m			

BOREHOLE ENVIRONMENTAL LOG

BOREHOLE NO.

BH17 / MW01

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**21/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**21/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Driller:	**Matrix**	Surface RL:	**0**
Borehole Diameter:	**60 mm**	Driller Lic No:		Co-ords:	**E 360169.2921 N 5784108.668**

Borehole Information | **Field Material Description**

1 METHOD	2 SUPPORT	3 WATER	4 WELL CONSTRUCTION	5 RL(m) / DEPTH(m)	6 Field PID (ppm)	7 SAMPLE	8 GRAPHIC LOG	9/10 SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape,secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	Field pH	11 MOISTURE	12 RELATIVE DENSITY /CONSISTENCY (VS S F ST VST / FB VL L MD D VD H)	13 STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0.00		J		TOPSOIL: Silty CLAY, low plasticity, dark brown, moist.				BH17-0.1
				0.40		J		Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist.				BH17-0.5
				-1		J						BH17-1.0
				-2		J		High plasticity.				BH17-2.0
TC				-3		J		Low plasticity.				BH17-3.0 DUP09-210521 DUP10-210521
								Yellow-brown.				
				-4				Moist.				
				5.00 -5				END OF BOREHOLE AT 5.00 m				

This borehole log should be read in conjunction with WSP's accompanying standard notes.

BOREHOLE ENVIRONMENTAL LOG

BOREHOLE NO.

BH19 / MW02

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**20/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**20/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Driller:	**Matrix**	Surface RL:	**0**
Borehole Diameter:	**60 mm**	Driller Lic No:		Co-ords:	**E 359997.8344 N 5782922.794**

Borehole Information / Field Material Description

1 METHOD	2 SUPPORT	3 WATER	4 WELL CONSTRUCTION	5 RL(m) / DEPTH(m)	6 Field PID (ppm)	7 SAMPLE	8 GRAPHIC LOG	9/10 SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape,secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	Field pH	11 MOISTURE	12 RELATIVE DENSITY /CONSISTENCY (VS S F ST VST H / FB VL L MD D VD)	13 STRUCTURE AND ADDITIONAL OBSERVATIONS
HA				0.00		J		TOPSOIL: Silty CLAY, low plasticity, dark brown, moist.				BH19-0.1
				0.30		J		SILT: Soft, grey, slightly moist.				BH19-0.5 DUP05-210520 DUP06-210520
				0.80				Silty CLAY: Medium plasticity, grey with orange mottle, slightly moist.				
PT				-1		J						BH19-1.0
				-2		J		High plasticity.				BH19-2.0
TC				-3		J						BH19-3.0
				-4				Soft, light brown, moist.				
				-4				Wet.				
				5.00 -5				END OF BOREHOLE AT 5.00 m				

This borehole log should be read in conjunction with WSP's accompanying standard notes.

BOREHOLE ENVIRONMENTAL LOG

BOREHOLE NO.

BH21 / MW03

SHEET 1 OF 1

Client:	**VPA**	Date Commenced:	**20/5/21**
Project:	**Sodic/Dispersive Soils and ASS Assessment**	Date Completed:	**20/5/21**
Borehole Location:	**Officer South Employment Precinct**	Recorded By:	**EL**
Project Number:	**PS124554**	Log Checked By:	**SG**

Drill Model/Mounting:	**Ezi-Probe**	Driller:	**Matrix**	Surface RL:	**0**
Borehole Diameter:	**60 mm**	Driller Lic No:		Co-ords:	**E 359750.6081 N 5781856.83**

Borehole Information | **Field Material Description**

1 METHOD	2 SUPPORT	3 WATER	4 WELL CONSTRUCTION	5 RL(m) / DEPTH(m)	6 Field PID (ppm)	7 SAMPLE	8 GRAPHIC LOG	9/10 SOIL/ROCK MATERIAL FIELD DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape,secondary components, minor constituents, moisture, relative density/consistency) (ROCK NAME; grain size, colour, weathering, strength, minor constituents)	Field pH	11 MOISTURE	12 RELATIVE DENSITY /CONSISTENCY (VS S F ST VST H / FB VL L MD D VD)	13 STRUCTURE AND ADDITIONAL OBSERVATIONS
PT				0		J		TOPSOIL: Silty CLAY, low plasticity, dark brown, dry.				BH21-0.1
				0.50		J		Silty CLAY: Medium plasticity, grey, slightly moist.				BH21-0.5
				-1		J		With orange mottle.				BH21-1.0
				-2		J						BH21-2.0
TC				-3		J						BH21-3.0
				-4				High plasticity, soft, light brown.				
				-5								
				-6								
				7.00 -7				END OF BOREHOLE AT 7.00 m				

This borehole log should be read in conjunction with WSP's accompanying standard notes.

Works Licence ID:

WLE081029

Printed on: 19 May 2021 11:08:59 am

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LICENCE TO CONSTRUCT WORKS

under Section 67 of the Water Act 1989

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This licence is not to be interpreted as an endorsement of the design and/or construction of any works (including dams). The Authority does not accept any responsibility or liability for any suits or actions arising from injury, loss, damage or death to person or property which may arise from the maintenance, existence or use of the works.

Each person named as a licence holder is responsible for ensuring all the conditions of this licence are complied with.

This licence authorises its holders to construct the described works, subject to the conditions.

Licence Holder(s)

VICTORIAN PLANNING AUTHORITY of LEVEL 25 35 COLLINS STREET MELBOURNE VIC 3000

Licence Contact Details

VICTORIAN PLANNING AUTHORITY	LEVEL 25 35 COLLINS STREET MELBOURNE VIC 3000

Licence Details

Expiry date	19 May 2022
Status	Active
Authority	Southern Rural Water
Name of waterway or aquifer	NA for construct/decommission
Water system	Koo Wee Rup (GMU)

Summary of Licensed Works

The details in this section are a summary only. They are subject to the conditions specified in this licence.

Works ID	*Works type*	*Use of water*
WRK126701	Bore	Observation

Description of Licensed Works

WORKS ID WRK126701

Works type	Bore
Works subtype	Drilled bore
Proposed maximum depth	50.000 metres

Works location

Easting	*Northing*	*Zone MGA*
359991.672	5782811.336	Zone 55

Land description

Volume 7721 Folio 063
Lot 1 of Plan TP128503W

Property address

345 OFFICER SOUTH ROAD, OFFICER SOUTH, VIC 3809

Related Instruments

Related entitlements	Nil
Related water-use entities	Nil

Application History

Reference	*Type*	*Status*	*Lodged date*	*Approved date*	*Recorded date*
WLI614932	Issue	Approved	19 May 2021	19 May 2021	

Conditions

Licence WLE081029 is subject to the following conditions:

Siting and construction

1 The bore(s) must be drilled at the location specified in the application approved by the Authority.

2 If after drilling the bore is considered unsatisfactory a replacement bore may be drilled on the land specified in the licence.

Preventing pollution

3 All earthworks must be carried out, and all drilling fluids and waters produced during construction and development must be disposed of, in ways that avoid contaminating native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.

4 Construction must stop immediately if the Authority reasonably believes that fuel, lubricant, drilling fluid, soil or water produced during construction and development is at risk of being spilled into native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.

5 The licence holder must construct and maintain bund walls, in accordance with the timeframe, specifications, guidelines or standards prescribed by the Authority, to prevent fuel, lubricant, drilling fluid, soil or water produced during construction and development from being spilled into native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.

Drilling licence and supervision requirements

6 The bore(s) must be constructed by, or under the direct supervision of, a driller licensed under the Water Act 1989 and endorsed as a Class 1, 2, or 3 driller, with appropriate endorsements.

7 If artesian pressure is expected or encountered, then a driller licensed under the Water Act 1989, and endorsed as a class 3 driller, must install casing in the bore(s) to a suitable depth, and in a suitable manner, to prevent its outbreak. A suitable valve must also be fitted to the bore.

Bore completion report

8 A Bore Completion Report must be submitted to the Authority within 28 working days of the bore(s) being completed.

Protecting water resources

9 No more than 1 bore(s) may be brought to final development under this licence.

10 At the completion of drilling and before the drilling rig leaves the site, all but 1 bore(s) must be decommissioned so as to eliminate physical hazards, conserve aquifer yield, prevent groundwater contamination and prevent the intermingling of desirable and undesirable waters.

11 The bore(s) must be located at least 30 metres from any authority's channel, reserve or easement unless authorised by the Authority.

Protecting water quality

12 Drilling must not exceed the maximum depth.

13 The bore(s) must be constructed so as to prevent aquifer contamination caused by vertical flow outside the casing.

14 If two or more aquifers are encountered, the bore(s) must be constructed to ensure that an impervious seal is made and maintained between each aquifer to prevent aquifer connection through vertical flow outside the casing; under no circumstances are two or more aquifers to be screened within the one bore or in any other manner to allow connection between them.

15 Boreheads must be constructed, to ensure that no flood water, surface runoff or potential subsurface contaminated soakage can enter the bore or bore annulus.

Protecting other water users

16 The diameter of the drill casing must not exceed 130 millimetres.

17 The bore(s) must be constructed so that water levels in the bore(s) can be measured by an airline, a piezometer or a method approved in writing by the Authority.

Fees and charges

18 The licence holder must, when requested by the Authority, pay all fees, costs and other charges under the Water Act 1989 in respect of this licence.

END OF COPY OF RECORD

Works Licence ID:

WLE081030

Printed on: 19 May 2021 11:19:17 am

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LICENCE TO CONSTRUCT WORKS

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Water used under this licence is not fit for any use that may involve human consumption, directly or indirectly, without first being properly treated.

This licence is not to be interpreted as an endorsement of the design and/or construction of any works (including dams). The Authority does not accept any responsibility or liability for any suits or actions arising from injury, loss, damage or death to person or property which may arise from the maintenance, existence or use of the works.

Each person named as a licence holder is responsible for ensuring all the conditions of this licence are complied with.

This licence authorises its holders to construct the described works, subject to the conditions.

Licence Holder(s)

VICTORIAN PLANNING AUTHORITY of LEVEL 25 35 COLLINS STREET MELBOURNE VIC 3000

Licence Contact Details

VICTORIAN PLANNING AUTHORITY	LEVEL 25 35 COLLINS STREET MELBOURNE VIC 3000

Licence Details

Expiry date	19 May 2022
Status	Active
Authority	Southern Rural Water
Name of waterway or aquifer	NA for construct/decommission
Water system	Koo Wee Rup (GMU)

Summary of Licensed Works

The details in this section are a summary only. They are subject to the conditions specified in this licence.

Works ID	*Works type*	*Use of water*
WRK126702	Bore	Observation

Description of Licensed Works

WORKS ID WRK126702

Works type	Bore
Works subtype	Drilled bore
Proposed maximum depth	50.000 metres

Works location

Easting	*Northing*	*Zone MGA*
359757.243	5781851.271	Zone 55

Land description

Volume 8695 Folio 978
Lot 1 of Plan TP370056R

Property address

OFFICER SOUTH ROAD, OFFICER SOUTH, VIC 3809

Related Instruments

Related entitlements	Nil
Related water-use entities	Nil

Application History

Reference	*Type*	*Status*	*Lodged date*	*Approved date*	*Recorded date*
WLI614933	Issue	Approved	19 May 2021	19 May 2021	

Conditions

Licence WLE081030 is subject to the following conditions:

Siting and construction

1 The bore(s) must be drilled at the location specified in the application approved by the Authority.

2 If after drilling the bore is considered unsatisfactory a replacement bore may be drilled on the land specified in the licence.

Preventing pollution

3 All earthworks must be carried out, and all drilling fluids and waters produced during construction and development must be disposed of, in ways that avoid contaminating native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.

4 Construction must stop immediately if the Authority reasonably believes that fuel, lubricant, drilling fluid, soil or water produced during construction and development is at risk of being spilled into native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.

5 The licence holder must construct and maintain bund walls, in accordance with the timeframe, specifications, guidelines or standards prescribed by the Authority, to prevent fuel, lubricant, drilling fluid, soil or water produced during construction and development from being spilled into native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.

Drilling licence and supervision requirements

6 The bore(s) must be constructed by, or under the direct supervision of, a driller licensed under the Water Act 1989 and endorsed as a Class 1, 2, or 3 driller, with appropriate endorsements.

7 If artesian pressure is expected or encountered, then a driller licensed under the Water Act 1989, and endorsed as a class 3 driller, must install casing in the bore(s) to a suitable depth, and in a suitable manner, to prevent its outbreak. A suitable valve must also be fitted to the bore.

Bore completion report

8 A Bore Completion Report must be submitted to the Authority within 28 working days of the bore(s) being completed.

Protecting water resources

9 No more than 1 bore(s) may be brought to final development under this licence.

10 At the completion of drilling and before the drilling rig leaves the site, all but 1 bore(s) must be decommissioned so as to eliminate physical hazards, conserve aquifer yield, prevent groundwater contamination and prevent the intermingling of desirable and undesirable waters.

11 The bore(s) must be located at least 30 metres from any authority's channel, reserve or easement unless authorised by the Authority.

Protecting water quality

12 Drilling must not exceed the maximum depth.

13 The bore(s) must be constructed so as to prevent aquifer contamination caused by vertical flow outside the casing.

14 If two or more aquifers are encountered, the bore(s) must be constructed to ensure that an impervious seal is made and maintained between each aquifer to prevent aquifer connection through vertical flow outside the casing; under no circumstances are two or more aquifers to be screened within the one bore or in any other manner to allow connection between them.

15 Boreheads must be constructed, to ensure that no flood water, surface runoff or potential subsurface contaminated soakage can enter the bore or bore annulus.

Protecting other water users

16 The diameter of the drill casing must not exceed 130 millimetres.

17 The bore(s) must be constructed so that water levels in the bore(s) can be measured by an airline, a piezometer or a method approved in writing by the Authority.

Fees and charges

18 The licence holder must, when requested by the Authority, pay all fees, costs and other charges under the Water Act 1989 in respect of this licence.

END OF COPY OF RECORD

Works Licence ID:

WLE081038

Printed on: 20 May 2021 1:58:33 pm

COPY OF RECORD IN THE VICTORIAN WATER REGISTER

LICENCE TO CONSTRUCT WORKS

under Section 67 of the Water Act 1989

The information in this copy of record is as recorded at the time of printing. Current information should be obtained by a search of the register. The State of Victoria does not warrant the accuracy or completeness of this information and accepts no responsibility for any subsequent release, publication or reproduction of this information.

This licence does not remove the need to apply for any authorisation or permission necessary under any other Act of Parliament with respect to anything authorised by the works licence.

Water used under this licence is not fit for any use that may involve human consumption, directly or indirectly, without first being properly treated.

This licence is not to be interpreted as an endorsement of the design and/or construction of any works (including dams). The Authority does not accept any responsibility or liability for any suits or actions arising from injury, loss, damage or death to person or property which may arise from the maintenance, existence or use of the works.

Each person named as a licence holder is responsible for ensuring all the conditions of this licence are complied with.

This licence authorises its holders to construct the described works, subject to the conditions.

Licence Holder(s)

VICTORIAN PLANNING AUTHORITY of LEVEL 25 35 COLLINS STREET MELBOURNE VIC 3000

Licence Contact Details

VICTORIAN PLANNING AUTHORITY	LEVEL 25 35 COLLINS STREET MELBOURNE VIC 3000

Licence Details

Expiry date	20 May 2022
Status	Active
Authority	Southern Rural Water
Name of waterway or aquifer	NA for construct/decommission
Water system	Koo Wee Rup (GMU)

Summary of Licensed Works

The details in this section are a summary only. They are subject to the conditions specified in this licence.

Works ID	*Works type*	*Use of water*
WRK126721	Bore	Observation

Description of Licensed Works

WORKS ID WRK126721

Works type	Bore
Works subtype	Drilled bore
Proposed maximum depth	50.000 metres

Works location

Easting	*Northing*	*Zone MGA*
360158.127	5784096.959	Zone 55

Land description

Volume 10276 Folio 986
CA 20 Parish of Pakenham

Property address

185 OFFICER SOUTH ROAD, OFFICER, VIC 3809

Related Instruments

Related entitlements	Nil
Related water-use entities	Nil

Application History

Reference	*Type*	*Status*	*Lodged date*	*Approved date*	*Recorded date*
WLI614939	Issue	Approved	20 May 2021	20 May 2021	

Conditions

Licence WLE081038 is subject to the following conditions:

Siting and construction

1 The bore(s) must be drilled at the location specified in the application approved by the Authority.

2 If after drilling the bore is considered unsatisfactory a replacement bore may be drilled on the land specified in the licence.

Preventing pollution

3 All earthworks must be carried out, and all drilling fluids and waters produced during construction and development must be disposed of, in ways that avoid contaminating native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.

4 Construction must stop immediately if the Authority reasonably believes that fuel, lubricant, drilling fluid, soil or water produced during construction and development is at risk of being spilled into native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.

5 The licence holder must construct and maintain bund walls, in accordance with the timeframe, specifications, guidelines or standards prescribed by the Authority, to prevent fuel, lubricant, drilling fluid, soil or water produced during construction and development from being spilled into native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.

Drilling licence and supervision requirements

6 The bore(s) must be constructed by, or under the direct supervision of, a driller licensed under the Water Act 1989 and endorsed as a Class 1, 2, or 3 driller, with appropriate endorsements.

7 If artesian pressure is expected or encountered, then a driller licensed under the Water Act 1989, and endorsed as a class 3 driller, must install casing in the bore(s) to a suitable depth, and in a suitable manner, to prevent its outbreak. A suitable valve must also be fitted to the bore.

Bore completion report

8 A Bore Completion Report must be submitted to the Authority within 28 working days of the bore(s) being completed.

Protecting water resources

9 No more than 1 bore(s) may be brought to final development under this licence.

10 At the completion of drilling and before the drilling rig leaves the site, all but 1 bore(s) must be decommissioned so as to eliminate physical hazards, conserve aquifer yield, prevent groundwater contamination and prevent the intermingling of desirable and undesirable waters.

11 The bore(s) must be located at least 30 metres from any authority's channel, reserve or easement unless authorised by the Authority.

Protecting water quality

12 Drilling must not exceed the maximum depth.

13 The bore(s) must be constructed so as to prevent aquifer contamination caused by vertical flow outside the casing.

14 If two or more aquifers are encountered, the bore(s) must be constructed to ensure that an impervious seal is made and maintained between each aquifer to prevent aquifer connection through vertical flow outside the casing; under no circumstances are two or more aquifers to be screened within the one bore or in any other manner to allow connection between them.

15 Boreheads must be constructed, to ensure that no flood water, surface runoff or potential subsurface contaminated soakage can enter the bore or bore annulus.

Protecting other water users

16 The diameter of the drill casing must not exceed 130 millimetres.

17 The bore(s) must be constructed so that water levels in the bore(s) can be measured by an airline, a piezometer or a method approved in writing by the Authority.

Fees and charges

18 The licence holder must, when requested by the Authority, pay all fees, costs and other charges under the Water Act 1989 in respect of this licence.

END OF COPY OF RECORD

APPENDIX D

RESULTS TABLES

								Acid Sulphate Soils - Field				Analysis Selection Process Comment			
								pH-F (Field pH test)*	pHFox	ΔpH (calculated)	Reaction Rate	Select for ASS analysis?	Soil profile	High organic surface	
								pH Unit	pH Unit	pH Unit					
EQL								0.1	0.1	0.1	1				
PASS may be present, further assessment is required								> 4.0 and < 5.0	> 3.0 and < 5.0	> 2.0	≥ 2		(see notes)		
AASS or PASS are likely to be present								≤ 4.0	≤ 3.0	> 2.0	≥ 2				
Site ID	**Location Code**	**Depth Avg**	**Field ID**	**Sample Code**	**Date**	**X Coord**	**Y Coord**								
Officer South	**BH01**	**0.1**	**BH01-0.1**	**EM2109285001**	**19/05/2021**	**358083**	**5785134**	5.7	3.5	2.2	2		B-sd-n-0.4		
Officer South	**BH01**	**0.5**	**BH01-0.5**	**EM2109285002**	**19/05/2021**	**358083**	**5785134**	6.5	4.9	1.6	1		B-sd-n-0.4		
Officer South	**BH01**	**1**	**BH01-1.0**	**EM2109285003**	**19/05/2021**	**358083**	**5785134**	6.8	5.0	1.8	1		B-sd-n-0.4		
Officer South	**BH01**	**2**	**BH01-2.0**	**EM2109285004**	**19/05/2021**	**358083**	**5785134**	6.6	4.8	1.8	1		B-sd-n-0.4		
Officer South	**BH01**	**3**	**BH01-3.0**	**EM2109285005**	**19/05/2021**	**358083**	**5785134**	7.0	5.3	1.7	2		B-sd-n-0.4		
1															
Officer South	**BH03**	**0.1**	**BH03-0.1**	**EM2109498010**	**21/05/2021**	**358013**	**5783811**	6.2	2.3	3.9	3	x	B-cl-n-0.4	x	Typical decreasing acidity with depth
Officer South	**BH03**	**0.1**	**DUP07-210521**	**EM2109498015**	**21/05/2021**	**358013**	**5783811**	6.2	3.0	3.2	3	x	B-cl-n-0.4		
Officer South	**BH03**	**0.1**	**DUP08-210521**	**M21-My47278**	**21/05/2021**	**358013**	**5783811**	6.9	2.5	4.4	3	x	B-cl-n-0.4		
Officer South	**BH03**	**0.5**	**BH03-0.5**	**EM2109498011**	**21/05/2021**	**358013**	**5783811**	6.2	4.3	1.9	2		B-cl-n-0.4		
Officer South	**BH03**	**1**	**BH03-1.0**	**EM2109498012**	**21/05/2021**	**358013**	**5783811**	7.2	5.5	1.7	2		B-cl-n-0.4		
Officer South	**BH03**	**2**	**BH03-2.0**	**EM2109498013**	**21/05/2021**	**358013**	**5783811**	7.8	5.8	2.0	2		B-cl-n-0.4		
Officer South	**BH03**	**3**	**BH03-3.0**	**EM2109498014**	**21/05/2021**	**358013**	**5783811**	7.8	8.0	-0.2	4		B-cl-n-0.4		
1															
Officer South	**BH11**	**0.1**	**BH11-0.1**	**EM2109498001**	**21/05/2021**	**358872**	**5782470**	5.4	2.8	2.6	3	x	B-sd-n-0.4	x	Organic layer at 1m. Only red zone below surface
Officer South	**BH11**	**0.5**	**BH11-0.5**	**EM2109498002**	**21/05/2021**	**358872**	**5782470**	5.2	3.5	1.7	2	x	B-sd-n-0.4		
Officer South	**BH11**	**1**	**BH11-1.0**	**EM2109498003**	**21/05/2021**	**358872**	**5782470**	5.2	2.8	2.4	3	x	B-sd-n-0.4		
Officer South	**BH11**	**2**	**BH11-2.0**	**EM2109498004**	**21/05/2021**	**358872**	**5782470**	5.7	3.6	2.1	2	x	B-sd-n-0.4		
Officer South	**BH11**	**3**	**BH11-3.0**	**EM2109498005**	**21/05/2021**	**358872**	**5782470**	8.0	5.8	2.2	1	x	B-sd-n-0.4		
1															
Officer South	**BH17**	**0.1**	**BH17-0.1**	**EM2109498016**	**21/05/2021**	**360169**	**5784109**	5.6	2.7	2.9	3		G-cl-n-0.4	x	
Officer South	**BH17**	**0.5**	**BH17-0.5**	**EM2109498017**	**21/05/2021**	**360169**	**5784109**	6.6	4.3	2.3	3		G-cl-n-0.4		
Officer South	**BH17**	**1**	**BH17-1.0**	**EM2109498018**	**21/05/2021**	**360169**	**5784109**	6.1	4.3	1.8	3		G-cl-n-0.4		
Officer South	**BH17**	**2**	**BH17-2.0**	**EM2109498019**	**21/05/2021**	**360169**	**5784109**	6.4	4.6	1.8	2		G-cl-n-0.4		
Officer South	**BH17**	**3**	**BH17-3.0**	**EM2109498020**	**21/05/2021**	**360169**	**5784109**	6.2	4.2	2.0	2		G-cl-n-0.4		
Officer South	**BH17**	**3**	**DUP09-210521**	**EM2109498021**	**21/05/2021**	**360169**	**5784109**	6.7	4.9	1.8	3		G-cl-n-0.4		
Officer South	**BH17**	**3**	**DUP10-210521**	**M21-My47279**	**21/05/2021**	**360169**	**5784109**	5.8	5.0	0.8	2		G-cl-n-0.4		
1															
Officer South	**BH18**	**0.1**	**BH18-0.1**	**EM2109285042**	**19/05/2021**	**360059**	**5783352**	5.4	3.0	2.4	3		G-cl-y-0.4	x	
Officer South	**BH18**	**0.5**	**BH18-0.5**	**EM2109285043**	**19/05/2021**	**360059**	**5783352**	5.4	4.0	1.4	2		G-cl-y-0.4		
Officer South	**BH18**	**1**	**BH18-1.0**	**EM2109285044**	**19/05/2021**	**360059**	**5783352**	6.1	5.2	0.9	2		G-cl-y-0.4		
Officer South	**BH18**	**2**	**BH18-2.0**	**EM2109285045**	**19/05/2021**	**360059**	**5783352**	6.5	5.6	0.9	1		G-cl-y-0.4		
Officer South	**BH18**	**3**	**BH18-3.0**	**EM2109285046**	**19/05/2021**	**360059**	**5783352**	6.4	5.7	0.7	1		G-cl-y-0.4		
1															
Officer South	**BH19**	**0.1**	**BH19-0.1**	**EM2109392031**	**20/05/2021**	**359998**	**5782923**	5.8	3.2	2.6	3		G-cl-y-0.4		
Officer South	**BH19**	**0.5**	**BH19-0.5**	**EM2109392032**	**20/05/2021**	**359998**	**5782923**	6.0	3.6	2.4	2		G-cl-y-0.4		
Officer South	**BH19**	**0.5**	**DUP05-210520**	**EM2109392041**	**20/05/2021**	**359998**	**5782923**	6.1	3.5	2.6	2		G-cl-y-0.4		
Officer South	**BH19**	**0.5**	**DUP06_210520**	**M21-My45986**	**20/05/2021**	**359998**	**5782923**	6.8	3.3	3.5	4		G-cl-y-0.4		
Officer South	**BH19**	**1**	**BH19-1.0**	**EM2109392033**	**20/05/2021**	**359998**	**5782923**	6.7	5.3	1.4	2		G-cl-y-0.4		
Officer South	**BH19**	**2**	**BH19-2.0**	**EM2109392034**	**20/05/2021**	**359998**	**5782923**	7.0	5.7	1.3	2		G-cl-y-0.4		
Officer South	**BH19**	**3**	**BH19-3.0**	**EM2109392035**	**20/05/2021**	**359998**	**5782923**	7.1	5.7	1.4	2		G-cl-y-0.4		
1															
Officer South	**BH25**	**0.1**	**BH25-0.1**	**EM2109285062**	**19/05/2021**	**360460**	**5782553**	5.9	2.6	3.3	3		G-sd-n-0.4	x	
Officer South	**BH25**	**0.5**	**BH25-0.5**	**EM2109285063**	**19/05/2021**	**360460**	**5782553**	6.2	4.5	1.7	2		G-sd-n-0.4		
Officer South	**BH25**	**1**	**BH25-1.0**	**EM2109285064**	**19/05/2021**	**360460**	**5782553**	6.2	4.9	1.3	1		G-sd-n-0.4		
Officer South	**BH25**	**2**	**BH25-2.0**	**EM2109285065**	**19/05/2021**	**360460**	**5782553**	6.6	5.5	1.1	1		G-sd-n-0.4		
1															
Officer South	**BH28**	**0.1**	**BH28-0.1**	**EM2109607034**	**24/05/2021**	**361346**	**5783965**	5.5	3.9	1.6	4	x	G-cl-n-<0.3		More acidic with depth
Officer South	**BH28**	**0.5**	**BH28-0.5**	**EM2109607035**	**24/05/2021**	**361346**	**5783965**	5.7	4.0	1.7	4	x	G-cl-n-<0.3		
Officer South	**BH28**	**1**	**BH28-1.0**	**EM2109607036**	**24/05/2021**	**361346**	**5783965**	5.8	4.1	1.7	2	x	G-cl-n-<0.3		
Officer South	**BH28**	**2**	**BH28-2.0**	**EM2109607037**	**24/05/2021**	**361346**	**5783965**	5.4	4.2	1.2	1	x	G-cl-n-<0.3		
Officer South	**BH28**	**3**	**BH28-3.0**	**EM2109607038**	**24/05/2021**	**361346**	**5783965**	4.8	3.4	1.4	1	x	G-cl-n-<0.3		
1															

								Acid Sulphate Soils - Field				Analysis Selection Process Comment			
								pH-F (Field pH test)*	pHFox	ΔpH (calculated)	Reaction Rate	Select for ASS analysis?	Soil profile	High organic surface	
								pH Unit	pH Unit	pH Unit					
EQL								0.1	0.1	0.1	1				
PASS may be present, further assessment is required								> 4.0 and < 5.0	> 3.0 and < 5.0	> 2.0	≥ 2		(see notes)		
AASS or PASS are likely to be present								≤ 4.0	≤ 3.0	> 2.0	≥ 2				
Site ID	**Location Code**	**Depth Avg**	**Field ID**	**Sample Code**	**Date**	**X Coord**	**Y Coord**								
Officer South	**BH29**	**0.1**	**BH29-0.1**	**EM2109285053**	**19/05/2021**	**361101**	**5783372**	5.9	2.7	3.2	3		B-sd-n-0.4	x	
Officer South	**BH29**	**0.5**	**BH29-0.5**	**EM2109285054**	**19/05/2021**	**361101**	**5783372**	6.2	3.7	2.5	3		B-sd-n-0.4		
Officer South	**BH29**	**1**	**BH29-1.0**	**EM2109285055**	**19/05/2021**	**361101**	**5783372**	6.2	4.7	1.5	3		B-sd-n-0.4		
Officer South	**BH29**	**2**	**BH29-2.0**	**EM2109285056**	**19/05/2021**	**361101**	**5783372**	6.2	5.6	0.6	1		B-sd-n-0.4		
Officer South	**BH29**	**3**	**BH29-3.0**	**EM2109285057**	**19/05/2021**	**361101**	**5783372**	6.5	5.8	0.7	2		B-sd-n-0.4		
1															
Officer South	**BH30**	**0.1**	**BH30-0.1**	**EM2109392001**	**20/05/2021**	**361015**	**5782779**	5.4	3.5	1.9	1		G-cl-y-0.4		
Officer South	**BH30**	**0.5**	**BH30-0.5**	**EM2109392002**	**20/05/2021**	**361015**	**5782779**	5.2	3.6	1.6	2		G-cl-y-0.4		
Officer South	**BH30**	**1**	**BH30-1.0**	**EM2109392003**	**20/05/2021**	**361015**	**5782779**	6.0	4.9	1.1	1		G-cl-y-0.4		
Officer South	**BH30**	**2**	**BH30-2.0**	**EM2109392004**	**20/05/2021**	**361015**	**5782779**	6.8	5.7	1.1	1		G-cl-y-0.4		
Officer South	**BH30**	**3**	**BH30-3.0**	**EM2109392005**	**20/05/2021**	**361015**	**5782779**	7.1	6.0	1.1	2		G-cl-y-0.4		
1															
Officer South	**BH32**	**0.1**	**BH32-0.1**	**EM2109392021**	**20/05/2021**	**360636**	**5781345**	5.2	2.8	2.4	3		G-cl-y-0.4	x	
Officer South	**BH32**	**0.5**	**BH32-0.5**	**EM2109392022**	**20/05/2021**	**360636**	**5781345**	6.1	4.3	1.8	2		G-cl-y-0.4		
Officer South	**BH32**	**1**	**BH32-1.0**	**EM2109392023**	**20/05/2021**	**360636**	**5781345**	7.4	5.7	1.7	1		G-cl-y-0.4		
Officer South	**BH32**	**2**	**BH32-2.0**	**EM2109392024**	**20/05/2021**	**360636**	**5781345**	7.5	5.6	1.9	1		G-cl-y-0.4		
Officer South	**BH32**	**3**	**BH32-3.0**	**EM2109392025**	**20/05/2021**	**360636**	**5781345**	7.7	5.7	2.0	1		G-cl-y-0.4		
1															
Officer South	**BH33**	**0.1**	**BH33-0.1**	**EM2109392026**	**20/05/2021**	**360762**	**5780997**	6.0	3.8	2.2	3	x	G-sd-y-0.4		Naturally acidic profile
Officer South	**BH33**	**0.5**	**BH33-0.5**	**EM2109392027**	**20/05/2021**	**360762**	**5780997**	6.0	3.7	2.3	3	x	G-sd-y-0.4		SPOCAS confirmation analysis with CRS
Officer South	**BH33**	**1**	**BH33-1.0**	**EM2109392028**	**20/05/2021**	**360762**	**5780997**	7.1	5.0	2.1	2	x	G-sd-y-0.4		
Officer South	**BH33**	**2**	**BH33-2.0**	**EM2109392029**	**20/05/2021**	**360762**	**5780997**	6.0	4.8	1.2	1	x	G-sd-y-0.4		
Officer South	**BH33**	**3**	**BH33-3.0**	**EM2109392030**	**20/05/2021**	**360762**	**5780997**	6.2	5.0	1.2	1		G-sd-y-0.4		
1															
Officer South	**BH34**	**0.1**	**BH34-0.1**	**EM2109607024**	**24/05/2021**	**361490**	**5782407**	5.9	4.1	1.8	4		G-sd-y->0.5		
Officer South	**BH34**	**0.5**	**BH34-0.5**	**EM2109607025**	**24/05/2021**	**361490**	**5782407**	7.5	5.3	2.2	4		G-sd-y->0.5		
Officer South	**BH34**	**1**	**BH34-1.0**	**EM2109607026**	**24/05/2021**	**361490**	**5782407**	7.2	5.4	1.8	2		G-sd-y->0.5		
Officer South	**BH34**	**2**	**BH34-2.0**	**EM2109607027**	**24/05/2021**	**361490**	**5782407**	5.6	4.4	1.2	2		G-sd-y->0.5		
Officer South	**BH34**	**3**	**BH34-3.0**	**EM2109607028**	**24/05/2021**	**361490**	**5782407**	7.2	5.8	1.4	1		G-sd-y->0.5		
1															
Officer South	**BH36**	**0.1**	**BH36-0.1**	**EM2109607006**	**24/05/2021**	**361322**	**5781214**	6.2	4.4	1.8	4		B-cl-n-0.4		
Officer South	**BH36**	**0.5**	**BH36-0.5**	**EM2109607007**	**24/05/2021**	**361322**	**5781214**	5.9	4.5	1.4	4		B-cl-n-0.4		
Officer South	**BH36**	**1**	**BH36-1.0**	**EM2109607008**	**24/05/2021**	**361322**	**5781214**	6.0	4.6	1.4	2		B-cl-n-0.4		
Officer South	**BH36**	**2**	**BH36-2.0**	**EM2109607009**	**24/05/2021**	**361322**	**5781214**	6.5	5.6	0.9	2		B-cl-n-0.4		
Officer South	**BH36**	**3**	**BH36-3.0**	**EM2109607010**	**24/05/2021**	**361322**	**5781214**	6.7	5.6	1.1	2		B-cl-n-0.4		
1															
Officer South	**BH39**	**0.1**	**BH39-0.1**	**EM2109285028**	**19/05/2021**	**359195**	**5784742**	5.1	2.5	2.6	3		G-cl-n-0.4	x	Most(?) acidic profile overall
Officer South	**BH39**	**0.5**	**BH39-0.5**	**EM2109285029**	**19/05/2021**	**359195**	**5784742**	5.5	4.1	1.4	3		G-cl-n-0.4		
Officer South	**BH39**	**1**	**BH39-1.0**	**EM2109285030**	**19/05/2021**	**359195**	**5784742**	5.3	3.9	1.4	2		G-cl-n-0.4		
Officer South	**BH39**	**2**	**BH39-2.0**	**EM2109285031**	**19/05/2021**	**359195**	**5784742**	5.5	4.2	1.3	1		G-cl-n-0.4		
1															
Officer South	**BH40**	**0.1**	**BH40-0.1**	**EM2109285015**	**19/05/2021**	**357624**	**5784214**	7.2	3.2	4.0	3		G-sd-n-<0.3		
Officer South	**BH40**	**0.5**	**BH40-0.5**	**EM2109285016**	**19/05/2021**	**357624**	**5784214**	6.9	5.0	1.9	2		G-sd-n-<0.3		
Officer South	**BH40**	**1**	**BH40-1.0**	**EM2109285017**	**19/05/2021**	**357624**	**5784214**	7.9	6.2	1.7	2		G-sd-n-<0.3		
Officer South	**BH40**	**2**	**BH40-2.0**	**EM2109285018**	**19/05/2021**	**357624**	**5784214**	7.7	6.6	1.1	3		G-sd-n-<0.3		
Officer South	**BH40**	**3**	**BH40-3.0**	**EM2109285019**	**19/05/2021**	**357624**	**5784214**	7.6	5.6	2.0	2		G-sd-n-<0.3		
1															

								Acid Sulphate Soils - Field				Analysis Selection Process Comment			
								pH-F (Field pH test)*	pHFox	ΔpH (calculated)	Reaction Rate	Select for ASS analysis?	Soil profile	High organic surface	
								pH Unit	pH Unit	pH Unit					
EQL								0.1	0.1	0.1	1				
PASS may be present, further assessment is required								> 4.0 and < 5.0	> 3.0 and < 5.0	> 2.0	≥ 2		(see notes)		
AASS or PASS are likely to be present								≤ 4.0	≤ 3.0	> 2.0	≥ 2				
Site ID	**Location Code**	**Depth Avg**	**Field ID**	**Sample Code**	**Date**	**X Coord**	**Y Coord**								
Officer South	**BH41**	**0.1**	**BH41-0.1**	**EM2109285006**	**19/05/2021**	**357747**	**5784680**	7.3	5.5	1.8	1		B-sd-n-0.4		
Officer South	**BH41**	**0.5**	**BH41-0.5**	**EM2109285007**	**19/05/2021**	**357747**	**5784680**	8.1	5.0	3.1	1	x	B-sd-n-0.4		
Officer South	**BH41**	**1**	**BH41-1.0**	**EM2109285008**	**19/05/2021**	**357747**	**5784680**	6.8	4.1	2.7	3	x	B-sd-n-0.4		
Officer South	**BH41**	**2**	**BH41-2.0**	**EM2109285009**	**19/05/2021**	**357747**	**5784680**	7.5	5.6	1.9	1		B-sd-n-0.4		
Officer South	**BH41**	**3**	**BH41-3.0**	**EM2109285010**	**19/05/2021**	**357747**	**5784680**	7.5	5.4	2.1	2	x	B-sd-n-0.4		
1															
Officer South	**BH42**	**0.1**	**BH42-0.1**	**EM2109607001**	**24/05/2021**	**361240**	**5780623**	5.7	4.1	1.6	4		G-cl-n-0.4		More acidic with depth
Officer South	**BH42**	**0.5**	**BH42-0.5**	**EM2109607002**	**24/05/2021**	**361240**	**5780623**	6.2	4.1	2.1	3		G-cl-n-0.4		
Officer South	**BH42**	**1**	**BH42-1.0**	**EM2109607003**	**24/05/2021**	**361240**	**5780623**	6.4	4.7	1.7	2		G-cl-n-0.4		
Officer South	**BH42**	**2**	**BH42-2.0**	**EM2109607004**	**24/05/2021**	**361240**	**5780623**	5.6	4.5	1.1	2		G-cl-n-0.4		
Officer South	**BH42**	**3**	**BH42-3.0**	**EM2109607005**	**24/05/2021**	**361240**	**5780623**	5.7	4.4	1.3	2		G-cl-n-0.4		
1															
Officer South	**BH43**	**0.1**	**BH43-0.1**	**EM2109498034**	**21/05/2021**	**358094**	**5783191**	5.5	2.5	3.0	3		G-cl-n-0.4	x	
Officer South	**BH43**	**0.5**	**BH43-0.5**	**EM2109498035**	**21/05/2021**	**358094**	**5783191**	6.4	4.1	2.3	2		G-cl-n-0.4		
Officer South	**BH43**	**1**	**BH43-1.0**	**EM2109498036**	**21/05/2021**	**358094**	**5783191**	7.0	4.3	2.7	2		G-cl-n-0.4		
Officer South	**BH43**	**2**	**BH43-2.0**	**EM2109498037**	**21/05/2021**	**358094**	**5783191**	7.1	5.2	1.9	1		G-cl-n-0.4		
Officer South	**BH43**	**3**	**BH43-3.0**	**EM2109498038**	**21/05/2021**	**358094**	**5783191**	7.3	5.6	1.7	1		G-cl-n-0.4		
1															
Officer South	**BH44**	**0.1**	**BH44-0.1**	**EM2109607015**	**24/05/2021**	**361734**	**5781887**	6.0	4.0	2.0	3	x	G-cl-n-<0.3		More acidic with depth
Officer South	**BH44**	**0.5**	**BH44-0.5**	**EM2109607016**	**24/05/2021**	**361734**	**5781887**	6.0	4.2	1.8	2		G-cl-n-<0.3		
Officer South	**BH44**	**1**	**BH44-1.0**	**EM2109607017**	**24/05/2021**	**361734**	**5781887**	5.3	3.7	1.6	2	x	G-cl-n-<0.3		
Officer South	**BH44**	**2**	**BH44-2.0**	**EM2109607018**	**24/05/2021**	**361734**	**5781887**	4.9	3.8	1.1	2	x	G-cl-n-<0.3		
Officer South	**BH44**	**3**	**BH44-3.0**	**EM2109607019**	**24/05/2021**	**361734**	**5781887**	4.7	3.8	0.9	2	x	G-cl-n-<0.3		

Statistics

Number of Results	**104**	**104**		**101**				
Minimum Detect	**4.7**	**2.3**		**1**				
Maximum Concentration	**8.1**	**8**		**4**				
Average Concentration *	**6.3**	**4.5**		**2.1**				
95% UCL (Student's-t) *	**6.459**	**4.658**		**2.297**				
% of Detects	**100**	**100**		**100**				
% of Non-Detects	**0**	**0**		**0**				

* A Non Detect Multiplier of 0.5 has been applied.

Soil Profile Notes:

G:	Grey colour
B:	Brown colour
cl:	Predominantly clay to depth
sd:	Sand layer encountered at depth
n:	No silt layer above clay
y:	Silt layer above clay
<#.#, #.#, >#.#:	Approximate depth of topsoil profile

							Soil Properties			Particle Size		Inorganics									
							% Moisture	Emerson Class Number	Texture	<2mm Fraction	>2mm Fraction	Analysed Material	Color (Munsell)	Conductivity (1:5 aqueous extract)	Exchangeable Calcium Percent_	Exchangeable Magnesium Percent_	Exchangeable Potassium Percent_	Exchangeable Sodium Percent	Extraneous Material	Exchangeable Calcium	Exchangeable Magnesium	Exchangeable Potassium
							%	-	-	G	G	%	-	µs/cm	%	%	%	%	%	meq/100g	meq/100g	meq/100g
EQL							1			0.005	0.005	0.1	-	10	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
Site ID	**Location Code**	**Soil Profile**	**Depth Avg**	**Field ID**	**Sample Code**	**Date**																
Officer South	BH01	B-sd-n-0.4	0.1	BH01-0.1	EM2109285001	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH01-0.5	EM2109285002	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602001	19/05/2021	-	2	#1 Sandy Clay Loam	-	-	-	#2 Grayish Brown (2.5Y 5/2)	-	18.5	62.6	2.6	16.3	-	1.9	6.6	0.3
			1	BH01-1.0	EM2109285003	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602002	19/05/2021	-	2	#3 Light Medium Clay	-	-	-	#4 Dark Grayish Brown (2.5Y 4/2)	-	18.2	63.9	2.8	15.1	-	2.5	8.8	0.4
			2	BH01-2.0	EM2109285004	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602003	19/05/2021	-	2	#5 Sandy Loam	-	-	-	#4 Dark Grayish Brown (2.5Y 4/2)	-	18.5	56.2	<0.2	25.3	-	0.6	1.9	<0.2
			3	BH01-3.0	EM2109285005	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602004	19/05/2021	-	2	#5 Sandy Loam	-	-	-	#6 Light Brownish Gray (2.5Y 6/2)	-	16.6	53.9	3.5	26.1	-	0.8	2.5	<0.2
	BH02	B-cl-n-0.4	0.1	BH02-0.1	EM2110602005	19/05/2021	-	2	#7 Clay Loam	-	-	-	#8 Light Olive Brown (2.5Y 5/3)	-	-	-	-	14.8	-	3.3	7.1	0.2
			0.5	BH02-0.5	EM2110602006	19/05/2021	-	2	#3 Light Medium Clay	-	-	-	#8 Light Olive Brown (2.5Y 5/3)	-	-	-	-	25.5	-	2.2	6.9	0.2
			1	BH02-1.0	EM2110602007	19/05/2021	-	2	#3 Light Medium Clay	-	-	-	#2 Grayish Brown (2.5Y 5/2)	-	15.6	54.2	1.4	28.8	-	2.7	9.5	0.2
	BH03	B-cl-n-0.4	0.1	BH03-0.1	EM2109498010	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602008	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				DUP07-210521	EM2109498015	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602068	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				DUP08-210521	M21-My47278	21/05/2021	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				DUP08_210520	M21-Jn04611	21/05/2021	18	-	-	200	<0.005	100	-	-	-	-	-	-	<0.1	-	-	-
			0.5	BH03-0.5	EM2109498011	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH03-1.0	EM2109498012	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH03-2.0	EM2109498013	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH03-3.0	EM2109498014	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH08	G-cl-n->0.5	1	BH08-1.0	EM2110602009	19/05/2021	-	2	#3 Light Medium Clay	-	-	-	#2 Grayish Brown (2.5Y 5/2)	-	-	-	-	20.8	-	1.7	7.6	0.2
			2	BH08-2.0	EM2110602010	19/05/2021	-	2	#3 Light Medium Clay	-	-	-	#6 Light Brownish Gray (2.5Y 6/2)	-	-	-	-	25.9	-	0.5	2.2	<0.1
	BH09	G-cl-y->0.5	0.1	BH09-0.1	EM2110602011	21/05/2021	-	2	#9 Light Clay	-	-	-	#4 Dark Grayish Brown (2.5Y 4/2)	-	-	-	-	23.8	-	0.8	1.6	0.2
			1	BH09-1.0	EM2110602013	21/05/2021	-	2	#9 Light Clay	-	-	-	#8 Light Olive Brown (2.5Y 5/3)	-	-	-	-	29.4	-	0.6	8.9	0.2
	BH11	B-sd-n-0.4	0.1	BH11-0.1	EM2109498001	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602014	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH11-0.5	EM2109498002	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602015	21/05/2021	-	3	#9 Light Clay	-	-	-	#10 Dark Olive Brown (2.5Y 3/3)	-	-	-	-	4.6	-	0.7	4.5	0.7
			1	BH11-1.0	EM2109498003	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602016	21/05/2021	-	2	#1 Sandy Clay Loam	-	-	-	#11 Light Olive Brown (2.5Y 5/4)	-	-	-	-	13.8	-	1.5	9.4	0.2
			2	BH11-2.0	EM2109498004	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602017	21/05/2021	-	2	#9 Light Clay	-	-	-	#12 Light Olive Brown (2.5Y 5/6)	-	-	-	-	26.4	-	0.9	5.4	0.2
			3	BH11-3.0	EM2109498005	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602018	21/05/2021	-	2	#9 Light Clay	-	-	-	#11 Light Olive Brown (2.5Y 5/4)	-	13.0	55.8	<0.2	31.2	-	0.6	2.6	<0.2
	BH17	G-cl-n-0.4	0.1	BH17-0.1	EM2109498016	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH17-0.5	EM2109498017	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602019	21/05/2021	-	2	#1 Sandy Clay Loam	-	-	-	#13 Grayish Brown (10YR 5/2)	-	-	-	-	10.9	-	1.1	1.7	<0.1
			1	BH17-1.0	EM2109498018	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602020	21/05/2021	-	2	#3 Light Medium Clay	-	-	-	#8 Light Olive Brown (2.5Y 5/3)	-	-	-	-	15.3	-	1.5	7.2	0.2
			2	BH17-2.0	EM2109498019	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602021	21/05/2021	-	2	#1 Sandy Clay Loam	-	-	-	#2 Grayish Brown (2.5Y 5/2)	-	-	-	-	22.9	-	0.6	4.0	<0.1
			3	BH17-3.0	EM2109498020	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602022	21/05/2021	-	2	#7 Clay Loam	-	-	-	#8 Light Olive Brown (2.5Y 5/3)	-	-	-	-	21.7	-	1.0	5.4	0.1
				DUP09-210521	EM2109498021	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602069	21/05/2021	-	2	#7 Clay Loam	-	-	-	#8 Light Olive Brown (2.5Y 5/3)	-	-	-	-	21.9	-	1.0	5.2	0.1
				DUP10-210521	M21-My47279	21/05/2021	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				DUP10_210520	M21-Jn04612	21/05/2021	17	2	-	-	-	-	-	290	-	-	-	32	-	-	-	-
	BH18	G-cl-y-0.4	0.1	BH18-0.1	EM2109285042	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH18-0.5	EM2109285043	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH18-1.0	EM2109285044	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH18-2.0	EM2109285045	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH18-3.0	EM2109285046	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH19	G-cl-y-0.4	0.1	BH19-0.1	EM2109392031	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602023	19/05/2021	-	2	#9 Light Clay	-	-	-	#14 Dark Grayish Brown (10YR 4/2)	-	-	-	-	4.3	-	4.3	4.8	1.0
			0.5	BH19-0.5	EM2109392032	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602024	19/05/2021	-	2	#5 Sandy Loam	-	-	-	#15 Dark Gray (10YR 4/1)	-	-	-	-	14.3	-	0.7	1.3	0.4
				DUP05-210520	EM2109392041	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602067	20/05/2021	-	2	#9 Light Clay	-	-	-	#16 Olive Brown (2.5Y 4/3)	-	-	-	-	16.6	-	0.6	1.4	0.5
				DUP06_210520	M21-Jn04610	20/05/2021	4.4	2	-	-	-	-	-	43	-	-	-	13	-	-	-	-
					M21-My45986	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH19-1.0	EM2109392033	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602025	19/05/2021	-	2	#1 Sandy Clay Loam	-	-	-	#8 Light Olive Brown (2.5Y 5/3)	-	-	-	-	18.6	-	0.8	4.7	0.2
			2	BH19-2.0	EM2109392034	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602026	19/05/2021	-	2	#1 Sandy Clay Loam	-	-	-	#11 Light Olive Brown (2.5Y 5/4)	-	10.0	57.8	1.3	30.8	-	1.4	8.0	<0.2

							Soil Properties			Particle Size		Inorganics									
							% Moisture	Emerson Class Number	Texture	<2mm Fraction	>2mm Fraction	Analysed Material	Color (Munsell)	Conductivity (1:5 aqueous extract)	Exchangeable Calcium Percent_	Exchangeable Magnesium Percent_	Exchangeable Potassium Percent_	Exchangeable Sodium Percent	Extraneous Material	Exchangeable Calcium	Exchangeable Magnesium	Exchangeable Potassium
							%	-	-	G	G	%	-	µs/cm	%	%	%	%	%	meq/100g	meq/100g	meq/100g
EQL							1			0.005	0.005	0.1		10	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
Site ID	**Location Code**	**Soil Profile**	**Depth Avg**	**Field ID**	**Sample Code**	**Date**																
			3	**BH19-3.0**	**EM2109392035**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH21	**G-cl-n-0.4**	**0.5**	**BH21-0.5**	**EM2110602027**	**19/05/2021**	-	3	#9 Light Clay	-	-	-	#4 Dark Grayish Brown (2.5Y 4/2)	-	-	-	-	11.0	-	0.5	7.2	0.2
			1	**BH21-1.0**	**EM2110602028**	**19/05/2021**	-	2	#3 Light Medium Clay	-	-	-	#2 Grayish Brown (2.5Y 5/2)	-	-	-	-	15.8	-	0.4	5.6	0.1
			2	**BH21-2.0**	**EM2110602029**	**19/05/2021**	-	2	#1 Sandy Clay Loam	-	-	-	#2 Grayish Brown (2.5Y 5/2)	-	-	-	-	26.5	-	0.2	2.2	<0.1
	BH22	**B-cl-n-0.4**	**0.5**	**BH22-0.5**	**EM2110602030**	**21/05/2021**	-	2	#3 Light Medium Clay	-	-	-	#13 Grayish Brown (10YR 5/2)	-	-	-	-	9.4	-	1.8	3.6	0.1
			1	**BH22-1.0**	**EM2110602031**	**21/05/2021**	-	2	#3 Light Medium Clay	-	-	-	#17 Brown (10YR 5/3)	-	-	-	-	18.1	-	1.6	6.7	0.2
			2	**BH22-2.0**	**EM2110602032**	**21/05/2021**	-	2	#3 Light Medium Clay	-	-	-	#2 Grayish Brown (2.5Y 5/2)	-	-	-	-	15.3	-	1.2	5.9	0.1
	BH24	**B-cl-y-0.4**	**0.5**	**BH24-0.5**	**EM2110602033**	**19/05/2021**	-	2	#1 Sandy Clay Loam	-	-	-	#13 Grayish Brown (10YR 5/2)	-	-	-	-	14.1	-	2.0	7.1	0.4
			1	**BH24-1.0**	**EM2110602034**	**19/05/2021**	-	2	#18 Medium Clay	-	-	-	#4 Dark Grayish Brown (2.5Y 4/2)	-	-	-	-	19.4	-	1.6	10.3	0.2
			2	**BH24-2.0**	**EM2110602035**	**19/05/2021**	-	3	#3 Light Medium Clay	-	-	-	#19 Gray (2.5Y 6/1)	-	-	-	-	29.5	-	0.9	7.3	0.2
	BH25	**G-sd-n-0.4**	**0.1**	**BH25-0.1**	**EM2109285062**	**19/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602036	**19/05/2021**	-	2	#20 Silty Loam	-	-	-	#21 Very Dark Brown (10YR 2/2)	-	-	-	-	3.7	-	4.8	1.7	0.4
			0.5	**BH25-0.5**	**EM2109285063**	**19/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602037	**19/05/2021**	-	2	#3 Light Medium Clay	-	-	-	#4 Dark Grayish Brown (2.5Y 4/2)	-	-	-	-	16.4	-	0.8	0.8	<0.1
			1	**BH25-1.0**	**EM2109285064**	**19/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602038	**19/05/2021**	-	2	#9 Light Clay	-	-	-	#2 Grayish Brown (2.5Y 5/2)	-	-	-	-	29.4	-	1.1	6.6	0.1
			2	**BH25-2.0**	**EM2109285065**	**19/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602039	**19/05/2021**	-	2	#5 Sandy Loam	-	-	-	#2 Grayish Brown (2.5Y 5/2)	-	-	-	-	22.7	-	0.6	3.7	<0.1
	BH26	**B-cl-y-0.4**	**0.5**	**BH26-0.5**	**EM2110602040**	**20/05/2021**	-	2	#5 Sandy Loam	-	-	-	#14 Dark Grayish Brown (10YR 4/2)	-	-	-	-	8.6	-	0.8	1.0	<0.1
			1	**BH26-1.0**	**EM2110602041**	**20/05/2021**	-	2	#3 Light Medium Clay	-	-	-	#2 Grayish Brown (2.5Y 5/2)	-	20.6	51.9	1.8	25.8	-	2.7	6.8	0.2
			2	**BH26-2.0**	**EM2110602042**	**20/05/2021**	-	2	#9 Light Clay	-	-	-	#8 Light Olive Brown (2.5Y 5/3)	-	18.1	49.5	1.6	30.8	-	1.7	4.6	<0.2
	BH28	**G-cl-n-<0.3**	**0.1**	**BH28-0.1**	**EM2109607034**	**24/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602043	**24/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	**BH28-0.5**	**EM2109607035**	**24/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602044	**24/05/2021**	-	2	#3 Light Medium Clay	-	-	-	#22 Dark Gray (2.5Y 4/1)	-	-	-	-	12.6	-	1.9	3.5	<0.1
			1	**BH28-1.0**	**EM2109607036**	**24/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602045	**24/05/2021**	-	2	#3 Light Medium Clay	-	-	-	#15 Dark Gray (10YR 4/1)	-	-	-	-	13.5	-	1.6	4.2	<0.1
			2	**BH28-2.0**	**EM2109607037**	**24/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602046	**24/05/2021**	-	3	#7 Clay Loam	-	-	-	#16 Olive Brown (2.5Y 4/3)	-	-	-	-	13.3	-	1.4	4.5	0.1
			3	**BH28-3.0**	**EM2109607038**	**24/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602047	**24/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH29	**B-sd-n-0.4**	**0.1**	**BH29-0.1**	**EM2109285053**	**19/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	**BH29-0.5**	**EM2109285054**	**19/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	**BH29-1.0**	**EM2109285055**	**19/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	**BH29-2.0**	**EM2109285056**	**19/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	**BH29-3.0**	**EM2109285057**	**19/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH30	**G-cl-y-0.4**	**0.1**	**BH30-0.1**	**EM2109392001**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	**BH30-0.5**	**EM2109392002**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	**BH30-1.0**	**EM2109392003**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	**BH30-2.0**	**EM2109392004**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	**BH30-3.0**	**EM2109392005**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH32	**G-cl-y-0.4**	**0.1**	**BH32-0.1**	**EM2109392021**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602048	**20/05/2021**	-	2	#5 Sandy Loam	-	-	-	#23 Very Dark Gray (2.5Y 3/1)	-	-	-	-	12.0	-	1.4	0.6	0.1
			0.5	**BH32-0.5**	**EM2109392022**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602049	**20/05/2021**	-	2	#5 Sandy Loam	-	-	-	#4 Dark Grayish Brown (2.5Y 4/2)	-	-	-	-	21.0	-	0.8	0.6	<0.1
			1	**BH32-1.0**	**EM2109392023**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602050	**20/05/2021**	-	2	#7 Clay Loam	-	-	-	#16 Olive Brown (2.5Y 4/3)	-	13.3	55.0	1.7	30.0	-	1.5	6.1	<0.2
			2	**BH32-2.0**	**EM2109392024**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602051	**20/05/2021**	-	2	#9 Light Clay	-	-	-	#2 Grayish Brown (2.5Y 5/2)	-	10.6	54.2	1.9	33.3	-	1.5	7.6	0.3
			3	**BH32-3.0**	**EM2109392025**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH33	**G-sd-y-0.4**	**0.1**	**BH33-0.1**	**EM2109392026**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602052	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	**BH33-0.5**	**EM2109392027**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602053	**20/05/2021**	-	2	#5 Sandy Loam	-	-	-	#4 Dark Grayish Brown (2.5Y 4/2)	-	-	-	-	8.4	-	1.2	0.7	<0.1
							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	**BH33-1.0**	**EM2109392028**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602054	**20/05/2021**	-	2	#3 Light Medium Clay	-	-	-	#13 Grayish Brown (10YR 5/2)	-	-	-	-	21.6	-	0.6	8.0	0.5
			2	**BH33-2.0**	**EM2109392029**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602055	**20/05/2021**	-	2	#7 Clay Loam	-	-	-	#24 Gray (10YR 5/1)	-	-	-	-	21.9	-	0.7	10.4	0.4
			3	**BH33-3.0**	**EM2109392030**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH34	**G-sd-y->0.5**	**0.1**	**BH34-0.1**	**EM2109607024**	**24/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	**BH34-0.5**	**EM2109607025**	**24/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	**BH34-1.0**	**EM2109607026**	**24/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	**BH34-2.0**	**EM2109607027**	**24/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	**BH34-3.0**	**EM2109607028**	**24/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

							Soil Properties			Particle Size		Inorganics										
							% Moisture	Emerson Class Number	Texture	<2mm Fraction	>2mm Fraction	Analysed Material	Color (Munsell)	Conductivity (1:5 aqueous extract)	Exchangeable Calcium Percent_	Exchangeable Magnesium Percent_	Exchangeable Potassium Percent_	Exchangeable Sodium Percent	Extraneous Material	Exchangeable Calcium	Exchangeable Magnesium	Exchangeable Potassium
							%	-	-	G	G	%	-	µs/cm	%	%	%	%	%	meq/100g	meq/100g	meq/100g
EQL							1			0.005	0.005	0.1		10	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
Site ID	Location Code	Soil Profile	Depth Avg	Field ID	Sample Code	Date																
	BH36	B-cl-n-0.4	0.1	BH36-0.1	EM2109607006	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH36-0.5	EM2109607007	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602056	24/05/2021	-	2	#3 Light Medium Clay	-	-	-	#25 Very Dark Gray (10YR 3/1)	-	-	-	-	11.7	-	3.1	7.4	0.2
			1	BH36-1.0	EM2109607008	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602057	24/05/2021	-	2	#9 Light Clay	-	-	-	#26 Gray (2.5Y 5/1)	-	-	-	-	13.9	-	2.0	6.9	0.1
			2	BH36-2.0	EM2109607009	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602058	24/05/2021	-	2	#3 Light Medium Clay	-	-	-	#8 Light Olive Brown (2.5Y 5/3)	-	-	-	-	18.2	-	1.6	6.4	0.1
			3	BH36-3.0	EM2109607010	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602059	24/05/2021	-	2	#9 Light Clay	-	-	-	#8 Light Olive Brown (2.5Y 5/3)	-	-	-	-	16.1	-	1.0	4.0	<0.1
	BH39	G-cl-n-0.4	0.1	BH39-0.1	EM2109285028	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH39-0.5	EM2109285029	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH39-1.0	EM2109285030	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH39-2.0	EM2109285031	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH40	G-sd-n-<0.3	0.1	BH40-0.1	EM2109285015	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH40-0.5	EM2109285016	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH40-1.0	EM2109285017	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH40-2.0	EM2109285018	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH40-3.0	EM2109285019	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH41	B-sd-n-0.4	0.1	BH41-0.1	EM2109285006	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH41-0.5	EM2109285007	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602060	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH41-1.0	EM2109285008	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602061	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH41-2.0	EM2109285009	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH41-3.0	EM2109285010	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602062	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH42	G-cl-n-0.4	0.1	BH42-0.1	EM2109607001	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH42-0.5	EM2109607002	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH42-1.0	EM2109607003	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH42-2.0	EM2109607004	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH42-3.0	EM2109607005	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH43	G-cl-n-0.4	0.1	BH43-0.1	EM2109498034	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH43-0.5	EM2109498035	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH43-1.0	EM2109498036	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH43-2.0	EM2109498037	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH43-3.0	EM2109498038	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH44	G-cl-n-<0.3	0.1	BH44-0.1	EM2109607015	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602063	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH44-0.5	EM2109607016	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH44-1.0	EM2109607017	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602064	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH44-2.0	EM2109607018	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602065	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH44-3.0	EM2109607019	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602066	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Statistics

Number of Results	5	55	55	1	1	1	55	2	11	11	11	57	1	55	55	55
Minimum Detect	4.4	2	1	200	ND	100	1	43	10	49.5	1.3	3.7	ND	0.2	0.6	0.1
Maximum Concentration	24	3	1	200	<0.005	100	1	290	20.6	63.9	3.5	33.3	<0.1	4.8	10.4	1
Average Concentration *	16	2.1	1				1	166	16	56	1.7	19		1.4	5.1	0.19
95% UCL (Student's-t) *	22.9	2.132	1				1	946.2	17.65	58.23	2.274	20.9		1.616	5.733	0.235
% of Detects	100	100	100	100	0	100	100	100	100	100	82	100	0	100	100	67
% of Non-Detects	0	0	0	0	100	0	0	0	0	0	18	0	100	0	0	33

* A Non Detect Multiplier of 0.5 has been applied.

Soil Profile Notes:

G:	Grey colour
B:	Brown colour
cl:	Predominantly clay to depth
sd:	Sand layer encountered at depth
n:	No silt layer above clay
y:	Silt layer above clay
<#.#, #.#, >#.#:	Approximate depth of topsoil profile

													Acid Sulphate Soils - Field					Acid Sulphate Soils - Acidity Trail					Acid Sulphate		
							Exchangeable Sodium	CEC	Electrical Conductivity (Lab)	Calcium/Magnesium Ratio	Magnesium/Potassium Ratio	pH (Lab)	pH-F (Field pH test)*	pHFox	pH-OX	Reaction Ratings*	Reaction Rate	Titratable Actual Acidity (sulfur units)	Titratable Peroxide Acidity (sulfur units)	Titratable Sulfidic Acidity (sulfur units)	Titratable Actual Acidity	Titratable Sulfidic Acidity	CRS Suite - Net Acidity (Acidity Units)	CRS Suite - Net Acidity (Sulfur Units)	ANC Fineness Factor
							meq/100g	meq/100g	µS/cm	No unit	-	pH Unit	PH UNITS	PH UNITS	pH Units	COMMENT	mg/kg	%S	%S	% pyrite S	mole H+/t	mole H+/t	MOL H+/T	% S	-
EQL							0.1	0.1	1	0.2		0.1	0.1	0.1	0.1		1	0.003	0.02	0.02	2	2	10	0.02	0.5
Site ID	**Location Code**	**Soil Profile**	**Depth Avg**	**Field ID**	**Sample Code**	**Date**																			
Officer South	BH01	B-sd-n-0.4	0.1	BH01-0.1	EM2109285001	19/05/2021	-	-	-	-	-	-	5.7	3.5	-	-	2	-	-	-	-	-	-	-	-
			0.5	BH01-0.5	EM2109285002	19/05/2021	-	-	-	-	-	-	6.5	4.9	-	-	1	-	-	-	-	-	-	-	-
					EM2110602001	19/05/2021	1.7	10.5	150	0.3	23.6	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH01-1.0	EM2109285003	19/05/2021	-	-	-	-	-	-	6.8	5.0	-	-	1	-	-	-	-	-	-	-	-
					EM2110602002	19/05/2021	2.1	13.8	147	0.3	23.2	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH01-2.0	EM2109285004	19/05/2021	-	-	-	-	-	-	6.6	4.8	-	-	1	-	-	-	-	-	-	-	-
					EM2110602003	19/05/2021	0.8	3.3	103	0.3	-	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH01-3.0	EM2109285005	19/05/2021	-	-	-	-	-	-	7.0	5.3	-	-	2	-	-	-	-	-	-	-	-
					EM2110602004	19/05/2021	1.2	4.6	114	0.3	-	8.3	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH02	B-cl-n-0.4	0.1	BH02-0.1	EM2110602005	19/05/2021	1.8	12.4	108	-	-	6.6	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH02-0.5	EM2110602006	19/05/2021	3.2	12.4	246	-	-	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH02-1.0	EM2110602007	19/05/2021	5.0	17.5	528	0.3	39.6	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH03	B-cl-n-0.4	0.1	BH03-0.1	EM2109498010	21/05/2021	-	-	-	-	-	-	6.2	2.3	-	-	3	-	-	-	-	-	-	-	-
					EM2110602008	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	16	-	-	-	1.5
				DUP07-210521	EM2109498015	21/05/2021	-	-	-	-	-	-	6.2	3.0	-	-	3	-	-	-	-	-	-	-	-
					EM2110602068	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-	18	-	-	-	1.5
				DUP08-210521	M21-My47278	21/05/2021	-	-	-	-	-	-	6.9	2.5	-	3.0	-	-	-	-	-	-	-	-	-
				DUP08_210520	M21-Jn04611	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	0.060	-	-	36	-	36	0.06	1.5
			0.5	BH03-0.5	EM2109498011	21/05/2021	-	-	-	-	-	-	6.2	4.3	-	-	2	-	-	-	-	-	-	-	-
			1	BH03-1.0	EM2109498012	21/05/2021	-	-	-	-	-	-	7.2	5.5	-	-	2	-	-	-	-	-	-	-	-
			2	BH03-2.0	EM2109498013	21/05/2021	-	-	-	-	-	-	7.8	5.8	-	-	2	-	-	-	-	-	-	-	-
			3	BH03-3.0	EM2109498014	21/05/2021	-	-	-	-	-	-	7.8	8.0	-	-	4	-	-	-	-	-	-	-	-
	BH08	G-cl-n->0.5	1	BH08-1.0	EM2110602009	19/05/2021	2.5	11.9	508	-	-	6.6	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH08-2.0	EM2110602010	19/05/2021	1.0	3.7	639	-	-	6.6	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH09	G-cl-y->0.5	0.1	BH09-0.1	EM2110602011	21/05/2021	0.8	3.4	153	-	-	5.7	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH09-1.0	EM2110602013	21/05/2021	4.0	13.8	282	-	-	5.9	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH11	B-sd-n-0.4	0.1	BH11-0.1	EM2109498001	21/05/2021	-	-	-	-	-	-	5.4	2.8	-	-	3	-	-	-	-	-	-	-	-
					EM2110602014	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	0.05	-	-	32	-	-	-	1.5
			0.5	BH11-0.5	EM2109498002	21/05/2021	-	-	-	-	-	-	5.2	3.5	-	-	2	-	-	-	-	-	-	-	-
					EM2110602015	21/05/2021	0.3	6.2	65	-	-	5.2	-	-	-	-	-	0.05	-	-	34	-	-	-	1.5
			1	BH11-1.0	EM2109498003	21/05/2021	-	-	-	-	-	-	5.2	2.8	-	-	3	-	-	-	-	-	-	-	-
					EM2110602016	21/05/2021	1.8	12.9	113	-	-	5.9	-	-	-	-	-	0.07	-	-	43	-	-	-	1.5
			2	BH11-2.0	EM2109498004	21/05/2021	-	-	-	-	-	-	5.7	3.6	-	-	2	-	-	-	-	-	-	-	-
					EM2110602017	21/05/2021	2.3	8.7	150	-	-	6.5	-	-	-	-	-	0.02	-	-	16	-	-	-	1.5
			3	BH11-3.0	EM2109498005	21/05/2021	-	-	-	-	-	-	8.0	5.8	-	-	1	-	-	-	-	-	-	-	-
					EM2110602018	21/05/2021	1.5	4.8	185	0.2	-	7.5	-	-	-	-	-	<0.02	-	-	3	-	-	-	1.5
	BH17	G-cl-n-0.4	0.1	BH17-0.1	EM2109498016	21/05/2021	-	-	-	-	-	-	5.6	2.7	-	-	3	-	-	-	-	-	-	-	-
			0.5	BH17-0.5	EM2109498017	21/05/2021	-	-	-	-	-	-	6.6	4.3	-	-	3	-	-	-	-	-	-	-	-
					EM2110602019	21/05/2021	0.4	3.2	47	-	-	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH17-1.0	EM2109498018	21/05/2021	-	-	-	-	-	-	6.1	4.3	-	-	3	-	-	-	-	-	-	-	-
					EM2110602020	21/05/2021	1.6	10.6	91	-	-	6.5	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH17-2.0	EM2109498019	21/05/2021	-	-	-	-	-	-	6.4	4.6	-	-	2	-	-	-	-	-	-	-	-
					EM2110602021	21/05/2021	1.4	6.1	383	-	-	6.4	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH17-3.0	EM2109498020	21/05/2021	-	-	-	-	-	-	6.2	4.2	-	-	2	-	-	-	-	-	-	-	-
					EM2110602022	21/05/2021	1.8	8.3	503	-	-	6.9	-	-	-	-	-	-	-	-	-	-	-	-	-
				DUP09-210521	EM2109498021	21/05/2021	-	-	-	-	-	-	6.7	4.9	-	-	3	-	-	-	-	-	-	-	-
					EM2110602069	21/05/2021	1.8	8.0	480	-	-	6.6	-	-	-	-	-	-	-	-	-	-	-	-	-
				DUP10-210521	M21-My47279	21/05/2021	-	-	-	-	-	-	5.8	5.0	-	2.0	-	-	-	-	-	-	-	-	-
				DUP10_210520	M21-Jn04612	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH18	G-cl-y-0.4	0.1	BH18-0.1	EM2109285042	19/05/2021	-	-	-	-	-	-	5.4	3.0	-	-	3	-	-	-	-	-	-	-	-
			0.5	BH18-0.5	EM2109285043	19/05/2021	-	-	-	-	-	-	5.4	4.0	-	-	2	-	-	-	-	-	-	-	-
			1	BH18-1.0	EM2109285044	19/05/2021	-	-	-	-	-	-	6.1	5.2	-	-	2	-	-	-	-	-	-	-	-
			2	BH18-2.0	EM2109285045	19/05/2021	-	-	-	-	-	-	6.5	5.6	-	-	1	-	-	-	-	-	-	-	-
			3	BH18-3.0	EM2109285046	19/05/2021	-	-	-	-	-	-	6.4	5.7	-	-	1	-	-	-	-	-	-	-	-
	BH19	G-cl-y-0.4	0.1	BH19-0.1	EM2109392031	20/05/2021	-	-	-	-	-	-	5.8	3.2	-	-	3	-	-	-	-	-	-	-	-
					EM2110602023	19/05/2021	0.4	10.6	113	-	-	5.8	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH19-0.5	EM2109392032	20/05/2021	-	-	-	-	-	-	6.0	3.6	-	-	2	-	-	-	-	-	-	-	-
					EM2110602024	19/05/2021	0.4	2.8	77	-	-	6.0	-	-	-	-	-	-	-	-	-	-	-	-	-
				DUP05-210520	EM2109392041	20/05/2021	-	-	-	-	-	-	6.1	3.5	-	-	2	-	-	-	-	-	-	-	-
					EM2110602067	20/05/2021	0.5	3.0	85	-	-	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-
				DUP06_210520	M21-Jn04610	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					M21-My45986	20/05/2021	-	-	-	-	-	-	6.8	3.3	-	4.0	-	-	-	-	-	-	-	-	-
			1	BH19-1.0	EM2109392033	20/05/2021	-	-	-	-	-	-	6.7	5.3	-	-	2	-	-	-	-	-	-	-	-
					EM2110602025	19/05/2021	1.3	6.9	526	-	-	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH19-2.0	EM2109392034	20/05/2021	-	-	-	-	-	-	7.0	5.7	-	-	2	-	-	-	-	-	-	-	-
					EM2110602026	19/05/2021	4.2	13.8	1,120	<0.2	-	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-

													Acid Sulphate Soils - Field					Acid Sulphate Soils - Acidity Trail					Acid Sulphate		
							Exchangeable Sodium	CEC	Electrical Conductivity (Lab)	Calcium/Magnesium Ratio	Magnesium/Potassium Ratio	pH (Lab)	pH-F (Field pH test)*	pHFox	pH-OX	Reaction Ratings*	Reaction Rate	Titratable Actual Acidity (sulfur units)	Titratable Peroxide Acidity (sulfur units)	Titratable Sulfidic Acidity (sulfur units)	Titratable Actual Acidity	Titratable Sulfidic Acidity	CRS Suite - Net Acidity (Acidity Units)	CRS Suite - Net Acidity (Sulfur Units)	ANC Fineness Factor
							meq/100g	meq/100g	µS/cm	No unit	-	pH Unit	PH UNITS	PH UNITS	pH Units	COMMENT	mg/kg	%S	%S	% pyrite S	mole H+/t	mole H+/t	MOL H+/T	% S	-
EQL							0.1	0.1	1	0.2		0.1	0.1	0.1	0.1		1	0.003	0.02	0.02	2	2	10	0.02	0.5
Site ID	**Location Code**	**Soil Profile**	**Depth Avg**	**Field ID**	**Sample Code**	**Date**																			
			3	**BH19-3.0**	**EM2109392035**	**20/05/2021**	-	-	-	-	-	-	7.1	5.7	-	-	2	-	-	-	-	-	-	-	-
	BH21	**G-cl-n-0.4**	**0.5**	**BH21-0.5**	**EM2110602027**	**19/05/2021**	1.0	9.1	66	-	-	5.6	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	**BH21-1.0**	**EM2110602028**	**19/05/2021**	1.1	7.2	83	-	-	5.9	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	**BH21-2.0**	**EM2110602029**	**19/05/2021**	0.9	3.3	358	-	-	6.3	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH22	**B-cl-n-0.4**	**0.5**	**BH22-0.5**	**EM2110602030**	**21/05/2021**	0.6	6.1	54	-	-	5.8	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	**BH22-1.0**	**EM2110602031**	**21/05/2021**	1.9	10.3	228	-	-	5.8	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	**BH22-2.0**	**EM2110602032**	**21/05/2021**	1.3	8.5	514	-	-	6.7	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH24	**B-cl-y-0.4**	**0.5**	**BH24-0.5**	**EM2110602033**	**19/05/2021**	1.6	11.1	128	-	-	6.4	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	**BH24-1.0**	**EM2110602034**	**19/05/2021**	2.9	15.0	224	-	-	6.0	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	**BH24-2.0**	**EM2110602035**	**19/05/2021**	3.5	11.8	205	-	-	6.0	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH25	**G-sd-n-0.4**	**0.1**	**BH25-0.1**	**EM2109285062**	**19/05/2021**	-	-	-	-	-	-	5.9	2.6	-	-	3	-	-	-	-	-	-	-	-
					EM2110602036	**19/05/2021**	0.3	7.2	72	-	-	5.6	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	**BH25-0.5**	**EM2109285063**	**19/05/2021**	-	-	-	-	-	-	6.2	4.5	-	-	2	-	-	-	-	-	-	-	-
					EM2110602037	**19/05/2021**	0.3	2.0	56	-	-	5.8	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	**BH25-1.0**	**EM2109285064**	**19/05/2021**	-	-	-	-	-	-	6.2	4.9	-	-	1	-	-	-	-	-	-	-	-
					EM2110602038	**19/05/2021**	3.3	11.2	293	-	-	6.7	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	**BH25-2.0**	**EM2109285065**	**19/05/2021**	-	-	-	-	-	-	6.6	5.5	-	-	1	-	-	-	-	-	-	-	-
					EM2110602039	**19/05/2021**	1.3	5.8	411	-	-	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH26	**B-cl-y-0.4**	**0.5**	**BH26-0.5**	**EM2110602040**	**20/05/2021**	0.2	2.0	64	-	-	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	**BH26-1.0**	**EM2110602041**	**20/05/2021**	3.4	13.0	234	0.4	29.3	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	**BH26-2.0**	**EM2110602042**	**20/05/2021**	2.9	9.3	284	0.4	-	8.1	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH28	**G-cl-n-<0.3**	**0.1**	**BH28-0.1**	**EM2109607034**	**24/05/2021**	-	-	-	-	-	-	5.5	3.9	-	-	4	-	-	-	-	-	-	-	-
					EM2110602043	**24/05/2021**	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	14	-	-	-	1.5
			0.5	**BH28-0.5**	**EM2109607035**	**24/05/2021**	-	-	-	-	-	-	5.7	4.0	-	-	4	-	-	-	-	-	-	-	-
					EM2110602044	**24/05/2021**	0.8	6.3	113	-	-	5.9	-	-	-	-	-	0.02	-	-	16	-	-	-	1.5
			1	**BH28-1.0**	**EM2109607036**	**24/05/2021**	-	-	-	-	-	-	5.8	4.1	-	-	2	-	-	-	-	-	-	-	-
					EM2110602045	**24/05/2021**	0.9	6.7	120	-	-	5.5	-	-	-	-	-	0.03	-	-	17	-	-	-	1.5
			2	**BH28-2.0**	**EM2109607037**	**24/05/2021**	-	-	-	-	-	-	5.4	4.2	-	-	1	-	-	-	-	-	-	-	-
					EM2110602046	**24/05/2021**	0.9	7.0	115	-	-	5.5	-	-	-	-	-	0.03	-	-	16	-	-	-	1.5
			3	**BH28-3.0**	**EM2109607038**	**24/05/2021**	-	-	-	-	-	-	4.8	3.4	-	-	1	-	-	-	-	-	-	-	-
					EM2110602047	**24/05/2021**	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-	22	-	-	-	1.5
	BH29	**B-sd-n-0.4**	**0.1**	**BH29-0.1**	**EM2109285053**	**19/05/2021**	-	-	-	-	-	-	5.9	2.7	-	-	3	-	-	-	-	-	-	-	-
			0.5	**BH29-0.5**	**EM2109285054**	**19/05/2021**	-	-	-	-	-	-	6.2	3.7	-	-	3	-	-	-	-	-	-	-	-
			1	**BH29-1.0**	**EM2109285055**	**19/05/2021**	-	-	-	-	-	-	6.2	4.7	-	-	3	-	-	-	-	-	-	-	-
			2	**BH29-2.0**	**EM2109285056**	**19/05/2021**	-	-	-	-	-	-	6.2	5.6	-	-	1	-	-	-	-	-	-	-	-
			3	**BH29-3.0**	**EM2109285057**	**19/05/2021**	-	-	-	-	-	-	6.5	5.8	-	-	2	-	-	-	-	-	-	-	-
	BH30	**G-cl-y-0.4**	**0.1**	**BH30-0.1**	**EM2109392001**	**20/05/2021**	-	-	-	-	-	-	5.4	3.5	-	-	1	-	-	-	-	-	-	-	-
			0.5	**BH30-0.5**	**EM2109392002**	**20/05/2021**	-	-	-	-	-	-	5.2	3.6	-	-	2	-	-	-	-	-	-	-	-
			1	**BH30-1.0**	**EM2109392003**	**20/05/2021**	-	-	-	-	-	-	6.0	4.9	-	-	1	-	-	-	-	-	-	-	-
			2	**BH30-2.0**	**EM2109392004**	**20/05/2021**	-	-	-	-	-	-	6.8	5.7	-	-	1	-	-	-	-	-	-	-	-
			3	**BH30-3.0**	**EM2109392005**	**20/05/2021**	-	-	-	-	-	-	7.1	6.0	-	-	2	-	-	-	-	-	-	-	-
	BH32	**G-cl-y-0.4**	**0.1**	**BH32-0.1**	**EM2109392021**	**20/05/2021**	-	-	-	-	-	-	5.2	2.8	-	-	3	-	-	-	-	-	-	-	-
					EM2110602048	**20/05/2021**	0.3	2.4	55	-	-	5.4	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	**BH32-0.5**	**EM2109392022**	**20/05/2021**	-	-	-	-	-	-	6.1	4.3	-	-	2	-	-	-	-	-	-	-	-
					EM2110602049	**20/05/2021**	0.4	1.8	50	-	-	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	**BH32-1.0**	**EM2109392023**	**20/05/2021**	-	-	-	-	-	-	7.4	5.7	-	-	1	-	-	-	-	-	-	-	-
					EM2110602050	**20/05/2021**	3.3	11.1	295	0.2	-	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	**BH32-2.0**	**EM2109392024**	**20/05/2021**	-	-	-	-	-	-	7.5	5.6	-	-	1	-	-	-	-	-	-	-	-
					EM2110602051	**20/05/2021**	4.7	14.0	310	<0.2	28.1	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	**BH32-3.0**	**EM2109392025**	**20/05/2021**	-	-	-	-	-	-	7.7	5.7	-	-	1	-	-	-	-	-	-	-	-
	BH33	**G-sd-y-0.4**	**0.1**	**BH33-0.1**	**EM2109392026**	**20/05/2021**	-	-	-	-	-	-	6.0	3.8	-	-	3	-	-	-	-	-	-	-	-
					EM2110602052	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	<0.02	-	-	5	-	-	-	1.5
			0.5	**BH33-0.5**	**EM2109392027**	**20/05/2021**	-	-	-	-	-	-	6.0	3.7	-	-	3	-	-	-	-	-	-	-	-
					EM2110602053	**20/05/2021**	0.2	2.1	31	-	-	6.6	-	-	5.1	-	-	<0.020	<0.020	<0.020	5	<2	-	-	1.5
							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	**BH33-1.0**	**EM2109392028**	**20/05/2021**	-	-	-	-	-	-	7.1	5.0	-	-	2	-	-	-	-	-	-	-	-
					EM2110602054	**20/05/2021**	2.5	11.7	210	-	-	5.9	-	-	-	-	-	<0.02	-	-	5	-	-	-	1.5
			2	**BH33-2.0**	**EM2109392029**	**20/05/2021**	-	-	-	-	-	-	6.0	4.8	-	-	1	-	-	-	-	-	-	-	-
					EM2110602055	**20/05/2021**	3.2	14.8	178	-	-	6.0	-	-	-	-	-	<0.02	-	-	12	-	-	-	1.5
			3	**BH33-3.0**	**EM2109392030**	**20/05/2021**	-	-	-	-	-	-	6.2	5.0	-	-	1	-	-	-	-	-	-	-	-
	BH34	**G-sd-y->0.5**	**0.1**	**BH34-0.1**	**EM2109607024**	**24/05/2021**	-	-	-	-	-	-	5.9	4.1	-	-	4	-	-	-	-	-	-	-	-
			0.5	**BH34-0.5**	**EM2109607025**	**24/05/2021**	-	-	-	-	-	-	7.5	5.3	-	-	4	-	-	-	-	-	-	-	-
			1	**BH34-1.0**	**EM2109607026**	**24/05/2021**	-	-	-	-	-	-	7.2	5.4	-	-	2	-	-	-	-	-	-	-	-
			2	**BH34-2.0**	**EM2109607027**	**24/05/2021**	-	-	-	-	-	-	5.6	4.4	-	-	2	-	-	-	-	-	-	-	-
			3	**BH34-3.0**	**EM2109607028**	**24/05/2021**	-	-	-	-	-	-	7.2	5.8	-	-	1	-	-	-	-	-	-	-	-

													Acid Sulphate Soils - Field					Acid Sulphate Soils - Acidity Trail						Acid Sulphate		
							Exchangeable Sodium	CEC	Electrical Conductivity (Lab)	Calcium/Magnesium Ratio	Magnesium/Potassium Ratio	pH (Lab)	pH-F (Field pH test)*	pHFox	pH-OX	Reaction Ratings*	Reaction Rate	Titratable Actual Acidity (sulfur units)	Titratable Peroxide Acidity (sulfur units)	Titratable Sulfidic Acidity (sulfur units)	Titratable Actual Acidity	Titratable Sulfidic Acidity	CRS Suite - Net Acidity (Acidity Units)	CRS Suite - Net Acidity (Sulfur Units)	ANC Fineness Factor
							meq/100g	meq/100g	µS/cm	No unit	-	pH Unit	PH UNITS	PH UNITS	pH Units	COMMENT	mg/kg	%S	%S	% pyrite S	mole H+/t	mole H+/t	MOL H+/T	% S	-
EQL							0.1	0.1	1	0.2		0.1	0.1	0.1	0.1		1	0.003	0.02	0.02	2	2	10	0.02	0.5
Site ID	**Location Code**	**Soil Profile**	**Depth Avg**	**Field ID**	**Sample Code**	**Date**																			
	BH36	B-cl-n-0.4	0.1	BH36-0.1	EM2109607006	24/05/2021	-	-	-	-	-	-	6.2	4.4	-	-	4	-	-	-	-	-	-	-	-
			0.5	BH36-0.5	EM2109607007	24/05/2021	-	-	-	-	-	-	5.9	4.5	-	-	4	-	-	-	-	-	-	-	-
					EM2110602056	24/05/2021	1.4	12.1	138	-	-	6.0	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH36-1.0	EM2109607008	24/05/2021	-	-	-	-	-	-	6.0	4.6	-	-	2	-	-	-	-	-	-	-	-
					EM2110602057	24/05/2021	1.5	10.5	553	-	-	6.3	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH36-2.0	EM2109607009	24/05/2021	-	-	-	-	-	-	6.5	5.6	-	-	2	-	-	-	-	-	-	-	-
					EM2110602058	24/05/2021	1.8	9.9	892	-	-	6.7	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH36-3.0	EM2109607010	24/05/2021	-	-	-	-	-	-	6.7	5.6	-	-	2	-	-	-	-	-	-	-	-
					EM2110602059	24/05/2021	1.0	6.0	671	-	-	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH39	G-cl-n-0.4	0.1	BH39-0.1	EM2109285028	19/05/2021	-	-	-	-	-	-	5.1	2.5	-	-	3	-	-	-	-	-	-	-	-
			0.5	BH39-0.5	EM2109285029	19/05/2021	-	-	-	-	-	-	5.5	4.1	-	-	3	-	-	-	-	-	-	-	-
			1	BH39-1.0	EM2109285030	19/05/2021	-	-	-	-	-	-	5.3	3.9	-	-	2	-	-	-	-	-	-	-	-
			2	BH39-2.0	EM2109285031	19/05/2021	-	-	-	-	-	-	5.5	4.2	-	-	1	-	-	-	-	-	-	-	-
	BH40	G-sd-n-<0.3	0.1	BH40-0.1	EM2109285015	19/05/2021	-	-	-	-	-	-	7.2	3.2	-	-	3	-	-	-	-	-	-	-	-
			0.5	BH40-0.5	EM2109285016	19/05/2021	-	-	-	-	-	-	6.9	5.0	-	-	2	-	-	-	-	-	-	-	-
			1	BH40-1.0	EM2109285017	19/05/2021	-	-	-	-	-	-	7.9	6.2	-	-	2	-	-	-	-	-	-	-	-
			2	BH40-2.0	EM2109285018	19/05/2021	-	-	-	-	-	-	7.7	6.6	-	-	3	-	-	-	-	-	-	-	-
			3	BH40-3.0	EM2109285019	19/05/2021	-	-	-	-	-	-	7.6	5.6	-	-	2	-	-	-	-	-	-	-	-
	BH41	B-sd-n-0.4	0.1	BH41-0.1	EM2109285006	19/05/2021	-	-	-	-	-	-	7.3	5.5	-	-	1	-	-	-	-	-	-	-	-
			0.5	BH41-0.5	EM2109285007	19/05/2021	-	-	-	-	-	-	8.1	5.0	-	-	1	-	-	-	-	-	-	-	-
					EM2110602060	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	<0.02	-	-	6	-	-	-	1.5
			1	BH41-1.0	EM2109285008	19/05/2021	-	-	-	-	-	-	6.8	4.1	-	-	3	-	-	-	-	-	-	-	-
					EM2110602061	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	<0.02	-	-	<2	-	-	-	1.5
			2	BH41-2.0	EM2109285009	19/05/2021	-	-	-	-	-	-	7.5	5.6	-	-	1	-	-	-	-	-	-	-	-
			3	BH41-3.0	EM2109285010	19/05/2021	-	-	-	-	-	-	7.5	5.4	-	-	2	-	-	-	-	-	-	-	-
					EM2110602062	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	<0.02	-	-	<2	-	-	-	1.5
	BH42	G-cl-n-0.4	0.1	BH42-0.1	EM2109607001	24/05/2021	-	-	-	-	-	-	5.7	4.1	-	-	4	-	-	-	-	-	-	-	-
			0.5	BH42-0.5	EM2109607002	24/05/2021	-	-	-	-	-	-	6.2	4.1	-	-	3	-	-	-	-	-	-	-	-
			1	BH42-1.0	EM2109607003	24/05/2021	-	-	-	-	-	-	6.4	4.7	-	-	2	-	-	-	-	-	-	-	-
			2	BH42-2.0	EM2109607004	24/05/2021	-	-	-	-	-	-	5.6	4.5	-	-	2	-	-	-	-	-	-	-	-
			3	BH42-3.0	EM2109607005	24/05/2021	-	-	-	-	-	-	5.7	4.4	-	-	2	-	-	-	-	-	-	-	-
	BH43	G-cl-n-0.4	0.1	BH43-0.1	EM2109498034	21/05/2021	-	-	-	-	-	-	5.5	2.5	-	-	3	-	-	-	-	-	-	-	-
			0.5	BH43-0.5	EM2109498035	21/05/2021	-	-	-	-	-	-	6.4	4.1	-	-	2	-	-	-	-	-	-	-	-
			1	BH43-1.0	EM2109498036	21/05/2021	-	-	-	-	-	-	7.0	4.3	-	-	2	-	-	-	-	-	-	-	-
			2	BH43-2.0	EM2109498037	21/05/2021	-	-	-	-	-	-	7.1	5.2	-	-	1	-	-	-	-	-	-	-	-
			3	BH43-3.0	EM2109498038	21/05/2021	-	-	-	-	-	-	7.3	5.6	-	-	1	-	-	-	-	-	-	-	-
	BH44	G-cl-n-<0.3	0.1	BH44-0.1	EM2109607015	24/05/2021	-	-	-	-	-	-	6.0	4.0	-	-	3	-	-	-	-	-	-	-	-
					EM2110602063	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	16	-	-	-	1.5
			0.5	BH44-0.5	EM2109607016	24/05/2021	-	-	-	-	-	-	6.0	4.2	-	-	2	-	-	-	-	-	-	-	-
			1	BH44-1.0	EM2109607017	24/05/2021	-	-	-	-	-	-	5.3	3.7	-	-	2	-	-	-	-	-	-	-	-
					EM2110602064	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	16	-	-	-	1.5
			2	BH44-2.0	EM2109607018	24/05/2021	-	-	-	-	-	-	4.9	3.8	-	-	2	-	-	-	-	-	-	-	-
					EM2110602065	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	15	-	-	-	1.5
			3	BH44-3.0	EM2109607019	24/05/2021	-	-	-	-	-	-	4.7	3.8	-	-	2	-	-	-	-	-	-	-	-
					EM2110602066	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	<0.02	-	-	8	-	-	-	1.5

Statistics

Number of Results	55	55	55	11	5	55	104	104	1	3	101	24	1	1	25	1	1	1	25
Minimum Detect	0.2	1.8	31	0.2	23.2	5.2	4.7	2.3	5.1	2	1	0.02	ND	ND	3	ND	36	0.06	1.5
Maximum Concentration	5	17.5	1,120	0.4	39.6	8.3	8.1	8	5.1	4	4	0.07	<0.02	<0.02	43	<2	36	0.06	1.5
Average Concentration *	1.7	8.4	253	0.26	29	6.5	6.3	4.5		3	2.1	0.024			15				1.5
95% UCL (Student's-t) *	1.971	9.337	304.3	0.32	35.08	6.664	6.459	4.658		4.686	2.297	0.0302			18.96				1.5
% of Detects	100	100	100	82	100	100	100	100	100	100	100	62	0	0	92	0	100	100	100
% of Non-Detects	0	0	0	18	0	0	0	0	0	0	0	38	100	100	8	100	0	0	0

* A Non Detect Multiplier of 0.5 has been applied.

Soil Profile Notes:

G:	Grey colour
B:	Brown colour
cl:	Predominantly clay to depth
sd:	Sand layer encountered at depth
n:	No silt layer above clay
y:	Silt layer above clay
<#.#, #.#, >#.#:	Approximate depth of topsoil profile

							Acid Sulphate Soils - Acid Base Accounting						SPOCAS				Acid Sulphate Soils - Sulfur Trail				Acid Sulphate Soils - Calcium Values				
							Net Acidity (sulfur units)	Net Acidity (acidity units)	Liming Rate	a-Net Acidity without ANCE	s-Net Acidity without ANCE	Liming Rate excluding ANC_1	CRS Suite - Liming Rate	HCl Extractable Sulfur Correction Factor	pH (KCl)	Titratable Peroxide Acidity	Peroxide Oxidisable Sulfur (acidity units)	KCl Extractable Sulfur	Peroxide Oxidisable Sulfur	Peroxide Sulfur	Acid Reacted Calcium	acidity - Acid Reacted Calcium	Calcium in Peroxide	KCl Extractable Calcium	sulfidic - Acid Reacted Calcium_
							%S	mole H+/t	kg CaCO3/t	moles H+/t	%w/w S	kg CaCO3/t	KG CACO3/T	FACTOR	pH Units	mole H+/T	mole H+/t	%	%	%	%	mole H+/t	%	%	% S
EQL							0.02	10	1	10	0.02		1	1	0.1	2	10	0.02	0.02	0.02	0.02	10	0.02	0.02	0.02
Site ID	**Location Code**	**Soil Profile**	**Depth Avg**	**Field ID**	**Sample Code**	**Date**																			
Officer South	BH01	B-sd-n-0.4	0.1	BH01-0.1	EM2109285001	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH01-0.5	EM2109285002	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602001	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH01-1.0	EM2109285003	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602002	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH01-2.0	EM2109285004	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602003	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH01-3.0	EM2109285005	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602004	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH02	B-cl-n-0.4	0.1	BH02-0.1	EM2110602005	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH02-0.5	EM2110602006	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH02-1.0	EM2110602007	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH03	B-cl-n-0.4	0.1	BH03-0.1	EM2109498010	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602008	21/05/2021	0.04	22	2	22	0.04	2	-	-	5.0	-	-	-	-	-	-	-	-	-	-
				DUP07-210521	EM2109498015	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602068	21/05/2021	0.04	29	2	29	0.04	2	-	-	4.7	-	-	-	-	-	-	-	-	-	-
				DUP08-210521	M21-My47278	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				DUP08_210520	M21-Jn04611	21/05/2021	-	-	-	-	-	-	2.7	2.0	4.9	-	-	-	-	-	-	-	-	-	-
			0.5	BH03-0.5	EM2109498011	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH03-1.0	EM2109498012	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH03-2.0	EM2109498013	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH03-3.0	EM2109498014	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH08	G-cl-n->0.5	1	BH08-1.0	EM2110602009	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH08-2.0	EM2110602010	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH09	G-cl-y->0.5	0.1	BH09-0.1	EM2110602011	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH09-1.0	EM2110602013	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH11	B-sd-n-0.4	0.1	BH11-0.1	EM2109498001	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602014	21/05/2021	0.06	39	3	39	0.06	3	-	-	4.5	-	-	-	-	-	-	-	-	-	-
			0.5	BH11-0.5	EM2109498002	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602015	21/05/2021	0.06	38	3	38	0.06	3	-	-	4.6	-	-	-	-	-	-	-	-	-	-
			1	BH11-1.0	EM2109498003	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602016	21/05/2021	0.08	50	4	50	0.08	4	-	-	4.5	-	-	-	-	-	-	-	-	-	-
			2	BH11-2.0	EM2109498004	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602017	21/05/2021	0.04	22	2	22	0.04	2	-	-	4.8	-	-	-	-	-	-	-	-	-	-
			3	BH11-3.0	EM2109498005	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602018	21/05/2021	<0.02	<10	<1	<10	<0.02	<1	-	-	5.9	-	-	-	-	-	-	-	-	-	-
	BH17	G-cl-n-0.4	0.1	BH17-0.1	EM2109498016	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH17-0.5	EM2109498017	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602019	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH17-1.0	EM2109498018	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602020	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH17-2.0	EM2109498019	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602021	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH17-3.0	EM2109498020	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602022	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				DUP09-210521	EM2109498021	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602069	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				DUP10-210521	M21-My47279	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				DUP10_210520	M21-Jn04612	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH18	G-cl-y-0.4	0.1	BH18-0.1	EM2109285042	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH18-0.5	EM2109285043	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH18-1.0	EM2109285044	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH18-2.0	EM2109285045	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH18-3.0	EM2109285046	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH19	G-cl-y-0.4	0.1	BH19-0.1	EM2109392031	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602023	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH19-0.5	EM2109392032	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602024	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				DUP05-210520	EM2109392041	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602067	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				DUP06_210520	M21-Jn04610	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					M21-My45986	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH19-1.0	EM2109392033	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602025	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH19-2.0	EM2109392034	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602026	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

							Acid Sulphate Soils - Acid Base Accounting						SPOCAS				Acid Sulphate Soils - Sulfur Trail				Acid Sulphate Soils - Calcium Values				
							Net Acidity (sulfur units)	Net Acidity (acidity units)	Liming Rate	a-Net Acidity without ANCE	s-Net Acidity without ANCE	Liming Rate excluding ANC_1	CRS Suite - Liming Rate	HCl Extractable Sulfur Correction Factor	pH (KCl)	Titratable Peroxide Acidity	Peroxide Oxidisable Sulfur (acidity units)	KCl Extractable Sulfur	Peroxide Oxidisable Sulfur	Peroxide Sulfur	Acid Reacted Calcium	acidity - Acid Reacted Calcium	Calcium in Peroxide	KCl Extractable Calcium	sulfidic - Acid Reacted Calcium_
							%S	mole H+/t	kg CaCO3/t	moles H+/t	%w/w S	kg CaCO3/t	KG CACO3/T	FACTOR	pH Units	mole H+/T	mole H+/t	%	%	%	%	mole H+/t	%	%	% S
EQL							0.02	10	1	10	0.02		1	1	0.1	2	10	0.02	0.02	0.02	0.02	10	0.02	0.02	0.02
Site ID	**Location Code**	**Soil Profile**	**Depth Avg**	**Field ID**	**Sample Code**	**Date**																			
			3	BH19-3.0	EM2109392035	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH21	G-cl-n-0.4	0.5	BH21-0.5	EM2110602027	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH21-1.0	EM2110602028	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH21-2.0	EM2110602029	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH22	B-cl-n-0.4	0.5	BH22-0.5	EM2110602030	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH22-1.0	EM2110602031	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH22-2.0	EM2110602032	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH24	B-cl-y-0.4	0.5	BH24-0.5	EM2110602033	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH24-1.0	EM2110602034	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH24-2.0	EM2110602035	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH25	G-sd-n-0.4	0.1	BH25-0.1	EM2109285062	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602036	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH25-0.5	EM2109285063	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602037	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH25-1.0	EM2109285064	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602038	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH25-2.0	EM2109285065	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602039	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH26	B-cl-y-0.4	0.5	BH26-0.5	EM2110602040	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH26-1.0	EM2110602041	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH26-2.0	EM2110602042	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH28	G-cl-n-<0.3	0.1	BH28-0.1	EM2109607034	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602043	24/05/2021	0.04	26	2	26	0.04	2	-	-	5.1	-	-	-	-	-	-	-	-	-	-
			0.5	BH28-0.5	EM2109607035	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602044	24/05/2021	0.02	16	1	16	0.02	1	-	-	4.9	-	-	-	-	-	-	-	-	-	-
			1	BH28-1.0	EM2109607036	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602045	24/05/2021	0.04	22	2	22	0.04	2	-	-	4.8	-	-	-	-	-	-	-	-	-	-
			2	BH28-2.0	EM2109607037	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602046	24/05/2021	0.03	21	2	21	0.03	2	-	-	4.9	-	-	-	-	-	-	-	-	-	-
			3	BH28-3.0	EM2109607038	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602047	24/05/2021	0.04	27	2	27	0.04	2	-	-	4.7	-	-	-	-	-	-	-	-	-	-
	BH29	B-sd-n-0.4	0.1	BH29-0.1	EM2109285053	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH29-0.5	EM2109285054	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH29-1.0	EM2109285055	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH29-2.0	EM2109285056	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH29-3.0	EM2109285057	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH30	G-cl-y-0.4	0.1	BH30-0.1	EM2109392001	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH30-0.5	EM2109392002	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH30-1.0	EM2109392003	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH30-2.0	EM2109392004	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH30-3.0	EM2109392005	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH32	G-cl-y-0.4	0.1	BH32-0.1	EM2109392021	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602048	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH32-0.5	EM2109392022	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602049	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH32-1.0	EM2109392023	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602050	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH32-2.0	EM2109392024	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602051	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH32-3.0	EM2109392025	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH33	G-sd-y-0.4	0.1	BH33-0.1	EM2109392026	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602052	20/05/2021	<0.02	10	<1	10	<0.02	<1	-	-	5.7	-	-	-	-	-	-	-	-	-	-
			0.5	BH33-0.5	EM2109392027	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602053	20/05/2021	0.02	<10	1	<10	0.02	1	-	-	5.4	6	<10	<0.020	<0.020	<0.020	<0.020	<10	0.024	0.024	<0.020
							-	14	-	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH33-1.0	EM2109392028	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602054	20/05/2021	<0.02	11	<1	11	<0.02	<1	-	-	5.6	-	-	-	-	-	-	-	-	-	-
			2	BH33-2.0	EM2109392029	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602055	20/05/2021	0.03	20	1	20	0.03	1	-	-	5.0	-	-	-	-	-	-	-	-	-	-
			3	BH33-3.0	EM2109392030	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH34	G-sd-y->0.5	0.1	BH34-0.1	EM2109607024	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH34-0.5	EM2109607025	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH34-1.0	EM2109607026	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH34-2.0	EM2109607027	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH34-3.0	EM2109607028	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

							Acid Sulphate Soils - Acid Base Accounting						SPOCAS				Acid Sulphate Soils - Sulfur Trail				Acid Sulphate Soils - Calcium Values				
							Net Acidity (sulfur units)	Net Acidity (acidity units)	Liming Rate	a-Net Acidity without ANCE	s-Net Acidity without ANCE	Liming Rate excluding ANC_1	CRS Suite - Liming Rate	HCl Extractable Sulfur Correction Factor	pH (KCl)	Titratable Peroxide Acidity	Peroxide Oxidisable Sulfur (acidity units)	KCl Extractable Sulfur	Peroxide Oxidisable Sulfur	Peroxide Sulfur	Acid Reacted Calcium	acidity - Acid Reacted Calcium	Calcium in Peroxide	KCl Extractable Calcium	sulfidic - Acid Reacted Calcium_
							%S	mole H+/t	kg CaCO3/t	moles H+/t	%w/w S	kg CaCO3/t	KG CACO3/T	FACTOR	pH Units	mole H+/T	mole H+/t	%	%	%	%	mole H+/t	%	%	% S
EQL							0.02	10	1	10	0.02		1	1	0.1	2	10	0.02	0.02	0.02	0.02	10	0.02	0.02	0.02
Site ID	Location Code	Soil Profile	Depth Avg	Field ID	Sample Code	Date																			
	BH36	B-cl-n-0.4	0.1	BH36-0.1	EM2109607006	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH36-0.5	EM2109607007	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602056	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH36-1.0	EM2109607008	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602057	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH36-2.0	EM2109607009	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602058	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH36-3.0	EM2109607010	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602059	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH39	G-cl-n-0.4	0.1	BH39-0.1	EM2109285028	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH39-0.5	EM2109285029	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH39-1.0	EM2109285030	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH39-2.0	EM2109285031	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH40	G-sd-n-<0.3	0.1	BH40-0.1	EM2109285015	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH40-0.5	EM2109285016	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH40-1.0	EM2109285017	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH40-2.0	EM2109285018	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH40-3.0	EM2109285019	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH41	B-sd-n-0.4	0.1	BH41-0.1	EM2109285006	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH41-0.5	EM2109285007	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602060	19/05/2021	0.02	12	<1	12	0.02	<1	-	-	5.5	-	-	-	-	-	-	-	-	-	-
			1	BH41-1.0	EM2109285008	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602061	19/05/2021	<0.02	<10	<1	<10	<0.02	<1	-	-	6.1	-	-	-	-	-	-	-	-	-	-
			2	BH41-2.0	EM2109285009	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH41-3.0	EM2109285010	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602062	19/05/2021	<0.02	<10	<1	<10	<0.02	<1	-	-	6.1	-	-	-	-	-	-	-	-	-	-
	BH42	G-cl-n-0.4	0.1	BH42-0.1	EM2109607001	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH42-0.5	EM2109607002	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH42-1.0	EM2109607003	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH42-2.0	EM2109607004	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH42-3.0	EM2109607005	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH43	G-cl-n-0.4	0.1	BH43-0.1	EM2109498034	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.5	BH43-0.5	EM2109498035	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH43-1.0	EM2109498036	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			2	BH43-2.0	EM2109498037	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			3	BH43-3.0	EM2109498038	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH44	G-cl-n-<0.3	0.1	BH44-0.1	EM2109607015	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602063	24/05/2021	0.04	24	2	24	0.04	2	-	-	5.0	-	-	-	-	-	-	-	-	-	-
			0.5	BH44-0.5	EM2109607016	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			1	BH44-1.0	EM2109607017	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602064	24/05/2021	0.04	23	2	23	0.04	2	-	-	4.8	-	-	-	-	-	-	-	-	-	-
			2	BH44-2.0	EM2109607018	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602065	24/05/2021	0.03	19	1	19	0.03	1	-	-	4.9	-	-	-	-	-	-	-	-	-	-
			3	BH44-3.0	EM2109607019	24/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					EM2110602066	24/05/2021	0.03	18	1	18	0.03	1	-	-	4.8	-	-	-	-	-	-	-	-	-	-

Statistics

Number of Results	**24**	**24**	**24**	**24**	**24**	**24**	**1**	**1**	**25**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
Minimum Detect	**0.02**	**10**	**1**	**10**	**0.02**	**1**	**2.7**	**2**	**4.5**	**6**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**0.024**	**0.024**	**ND**
Maximum Concentration	**0.08**	**50**	**4**	**50**	**0.08**	**4**	**2.7**	**2**	**6.1**	**6**	**<10**	**<0.02**	**<0.02**	**<0.02**	**<0.02**	**<10**	**0.024**	**0.024**	**<0.02**
Average Concentration *	**0.032**	**20**	**1.5**	**20**	**0.032**	**1.5**			**5.1**										
95% UCL (Student's-t) *	**0.0381**	**24.11**	**1.857**	**24.11**	**0.0381**	**1.857**			**5.267**										
% of Detects	**75**	**83**	**71**	**83**	**75**	**71**	**100**	**100**	**100**	**100**	**0**	**0**	**0**	**0**	**0**	**0**	**100**	**100**	**0**
% of Non-Detects	**25**	**17**	**29**	**17**	**25**	**29**	**0**	**0**	**0**	**0**	**100**	**100**	**100**	**100**	**100**	**100**	**0**	**0**	**100**

* A Non Detect Multiplier of 0.5 has been applied.

Soil Profile Notes:

G:	Grey colour
B:	Brown colour
cl:	Predominantly clay to depth
sd:	Sand layer encountered at depth
n:	No silt layer above clay
y:	Silt layer above clay
<#.#, #.#, >#.#:	Approximate depth of topsoil profile

							Acid Sulphate Soils - Magnesium Values					Acid Sulphate Soils -	
							Acid Reacted Magnesium	Acid Reacted Magnesium (acidity units)	KCl Extractable Magnesium	Magnesium in Peroxide	Acid Reacted Magnesium (sulfur units)	Chromium Reducible Sulfur	Chromium Reducible Sulphur (acidity units)
							% Mg	mole H+/t	%	%	%S	%S	mole H+/t
EQL							0.02	10	0.02	0.02	0.02	0.005	3
Site ID	**Location Code**	**Soil Profile**	**Depth Avg**	**Field ID**	**Sample Code**	**Date**							
Officer South	BH01	B-sd-n-0.4	0.1	BH01-0.1	EM2109285001	19/05/2021	-	-	-	-	-	-	-
			0.5	BH01-0.5	EM2109285002	19/05/2021	-	-	-	-	-	-	-
					EM2110602001	19/05/2021	-	-	-	-	-	-	-
			1	BH01-1.0	EM2109285003	19/05/2021	-	-	-	-	-	-	-
					EM2110602002	19/05/2021	-	-	-	-	-	-	-
			2	BH01-2.0	EM2109285004	19/05/2021	-	-	-	-	-	-	-
					EM2110602003	19/05/2021	-	-	-	-	-	-	-
			3	BH01-3.0	EM2109285005	19/05/2021	-	-	-	-	-	-	-
					EM2110602004	19/05/2021	-	-	-	-	-	-	-
	BH02	B-cl-n-0.4	0.1	BH02-0.1	EM2110602005	19/05/2021	-	-	-	-	-	-	-
			0.5	BH02-0.5	EM2110602006	19/05/2021	-	-	-	-	-	-	-
			1	BH02-1.0	EM2110602007	19/05/2021	-	-	-	-	-	-	-
	BH03	B-cl-n-0.4	0.1	BH03-0.1	EM2109498010	21/05/2021	-	-	-	-	-	-	-
					EM2110602008	21/05/2021	-	-	-	-	-	0.010	<10
				DUP07-210521	EM2109498015	21/05/2021	-	-	-	-	-	-	-
					EM2110602068	21/05/2021	-	-	-	-	-	0.017	10
				DUP08-210521	M21-My47278	21/05/2021	-	-	-	-	-	-	-
				DUP08_210520	M21-Jn04611	21/05/2021	-	-	-	-	-	<0.005	<3
			0.5	BH03-0.5	EM2109498011	21/05/2021	-	-	-	-	-	-	-
			1	BH03-1.0	EM2109498012	21/05/2021	-	-	-	-	-	-	-
			2	BH03-2.0	EM2109498013	21/05/2021	-	-	-	-	-	-	-
			3	BH03-3.0	EM2109498014	21/05/2021	-	-	-	-	-	-	-
	BH08	G-cl-n->0.5	1	BH08-1.0	EM2110602009	19/05/2021	-	-	-	-	-	-	-
			2	BH08-2.0	EM2110602010	19/05/2021	-	-	-	-	-	-	-
	BH09	G-cl-y->0.5	0.1	BH09-0.1	EM2110602011	21/05/2021	-	-	-	-	-	-	-
			1	BH09-1.0	EM2110602013	21/05/2021	-	-	-	-	-	-	-
	BH11	B-sd-n-0.4	0.1	BH11-0.1	EM2109498001	21/05/2021	-	-	-	-	-	-	-
					EM2110602014	21/05/2021	-	-	-	-	-	0.011	<10
			0.5	BH11-0.5	EM2109498002	21/05/2021	-	-	-	-	-	-	-
					EM2110602015	21/05/2021	-	-	-	-	-	0.007	<10
			1	BH11-1.0	EM2109498003	21/05/2021	-	-	-	-	-	-	-
					EM2110602016	21/05/2021	-	-	-	-	-	0.011	<10
			2	BH11-2.0	EM2109498004	21/05/2021	-	-	-	-	-	-	-
					EM2110602017	21/05/2021	-	-	-	-	-	0.010	<10
			3	BH11-3.0	EM2109498005	21/05/2021	-	-	-	-	-	-	-
					EM2110602018	21/05/2021	-	-	-	-	-	0.010	<10
	BH17	G-cl-n-0.4	0.1	BH17-0.1	EM2109498016	21/05/2021	-	-	-	-	-	-	-
			0.5	BH17-0.5	EM2109498017	21/05/2021	-	-	-	-	-	-	-
					EM2110602019	21/05/2021	-	-	-	-	-	-	-
			1	BH17-1.0	EM2109498018	21/05/2021	-	-	-	-	-	-	-
					EM2110602020	21/05/2021	-	-	-	-	-	-	-
			2	BH17-2.0	EM2109498019	21/05/2021	-	-	-	-	-	-	-
					EM2110602021	21/05/2021	-	-	-	-	-	-	-
			3	BH17-3.0	EM2109498020	21/05/2021	-	-	-	-	-	-	-
					EM2110602022	21/05/2021	-	-	-	-	-	-	-
				DUP09-210521	EM2109498021	21/05/2021	-	-	-	-	-	-	-
					EM2110602069	21/05/2021	-	-	-	-	-	-	-
				DUP10-210521	M21-My47279	21/05/2021	-	-	-	-	-	-	-
				DUP10_210520	M21-Jn04612	21/05/2021	-	-	-	-	-	-	-
	BH18	G-cl-y-0.4	0.1	BH18-0.1	EM2109285042	19/05/2021	-	-	-	-	-	-	-
			0.5	BH18-0.5	EM2109285043	19/05/2021	-	-	-	-	-	-	-
			1	BH18-1.0	EM2109285044	19/05/2021	-	-	-	-	-	-	-
			2	BH18-2.0	EM2109285045	19/05/2021	-	-	-	-	-	-	-
			3	BH18-3.0	EM2109285046	19/05/2021	-	-	-	-	-	-	-
	BH19	G-cl-y-0.4	0.1	BH19-0.1	EM2109392031	20/05/2021	-	-	-	-	-	-	-
					EM2110602023	19/05/2021	-	-	-	-	-	-	-
			0.5	BH19-0.5	EM2109392032	20/05/2021	-	-	-	-	-	-	-
					EM2110602024	19/05/2021	-	-	-	-	-	-	-
				DUP05-210520	EM2109392041	20/05/2021	-	-	-	-	-	-	-
					EM2110602067	20/05/2021	-	-	-	-	-	-	-
				DUP06_210520	M21-Jn04610	20/05/2021	-	-	-	-	-	-	-
					M21-My45986	20/05/2021	-	-	-	-	-	-	-
			1	BH19-1.0	EM2109392033	20/05/2021	-	-	-	-	-	-	-
					EM2110602025	19/05/2021	-	-	-	-	-	-	-
			2	BH19-2.0	EM2109392034	20/05/2021	-	-	-	-	-	-	-
					EM2110602026	19/05/2021	-	-	-	-	-	-	-

							Acid Sulphate Soils - Magnesium Values					Acid Sulphate Soils -	
							Acid Reacted Magnesium	Acid Reacted Magnesium (acidity units)	KCl Extractable Magnesium	Magnesium in Peroxide	Acid Reacted Magnesium (sulfur units)	Chromium Reducible Sulfur	Chromium Reducible Sulphur (acidity units)
							% Mg	mole H+/t	%	%	%S	%S	mole H+/t
EQL							0.02	10	0.02	0.02	0.02	0.005	3
Site ID	**Location Code**	**Soil Profile**	**Depth Avg**	**Field ID**	**Sample Code**	**Date**							
			3	BH19-3.0	EM2109392035	20/05/2021	-	-	-	-	-	-	-
	BH21	G-cl-n-0.4	0.5	BH21-0.5	EM2110602027	19/05/2021	-	-	-	-	-	-	-
			1	BH21-1.0	EM2110602028	19/05/2021	-	-	-	-	-	-	-
			2	BH21-2.0	EM2110602029	19/05/2021	-	-	-	-	-	-	-
	BH22	B-cl-n-0.4	0.5	BH22-0.5	EM2110602030	21/05/2021	-	-	-	-	-	-	-
			1	BH22-1.0	EM2110602031	21/05/2021	-	-	-	-	-	-	-
			2	BH22-2.0	EM2110602032	21/05/2021	-	-	-	-	-	-	-
	BH24	B-cl-y-0.4	0.5	BH24-0.5	EM2110602033	19/05/2021	-	-	-	-	-	-	-
			1	BH24-1.0	EM2110602034	19/05/2021	-	-	-	-	-	-	-
			2	BH24-2.0	EM2110602035	19/05/2021	-	-	-	-	-	-	-
	BH25	G-sd-n-0.4	0.1	BH25-0.1	EM2109285062	19/05/2021	-	-	-	-	-	-	-
					EM2110602036	19/05/2021	-	-	-	-	-	-	-
			0.5	BH25-0.5	EM2109285063	19/05/2021	-	-	-	-	-	-	-
					EM2110602037	19/05/2021	-	-	-	-	-	-	-
			1	BH25-1.0	EM2109285064	19/05/2021	-	-	-	-	-	-	-
					EM2110602038	19/05/2021	-	-	-	-	-	-	-
			2	BH25-2.0	EM2109285065	19/05/2021	-	-	-	-	-	-	-
					EM2110602039	19/05/2021	-	-	-	-	-	-	-
	BH26	B-cl-y-0.4	0.5	BH26-0.5	EM2110602040	20/05/2021	-	-	-	-	-	-	-
			1	BH26-1.0	EM2110602041	20/05/2021	-	-	-	-	-	-	-
			2	BH26-2.0	EM2110602042	20/05/2021	-	-	-	-	-	-	-
	BH28	G-cl-n-<0.3	0.1	BH28-0.1	EM2109607034	24/05/2021	-	-	-	-	-	-	-
					EM2110602043	24/05/2021	-	-	-	-	-	0.021	13
			0.5	BH28-0.5	EM2109607035	24/05/2021	-	-	-	-	-	-	-
					EM2110602044	24/05/2021	-	-	-	-	-	<0.005	<10
			1	BH28-1.0	EM2109607036	24/05/2021	-	-	-	-	-	-	-
					EM2110602045	24/05/2021	-	-	-	-	-	0.007	<10
			2	BH28-2.0	EM2109607037	24/05/2021	-	-	-	-	-	-	-
					EM2110602046	24/05/2021	-	-	-	-	-	0.008	<10
			3	BH28-3.0	EM2109607038	24/05/2021	-	-	-	-	-	-	-
					EM2110602047	24/05/2021	-	-	-	-	-	0.008	<10
	BH29	B-sd-n-0.4	0.1	BH29-0.1	EM2109285053	19/05/2021	-	-	-	-	-	-	-
			0.5	BH29-0.5	EM2109285054	19/05/2021	-	-	-	-	-	-	-
			1	BH29-1.0	EM2109285055	19/05/2021	-	-	-	-	-	-	-
			2	BH29-2.0	EM2109285056	19/05/2021	-	-	-	-	-	-	-
			3	BH29-3.0	EM2109285057	19/05/2021	-	-	-	-	-	-	-
	BH30	G-cl-y-0.4	0.1	BH30-0.1	EM2109392001	20/05/2021	-	-	-	-	-	-	-
			0.5	BH30-0.5	EM2109392002	20/05/2021	-	-	-	-	-	-	-
			1	BH30-1.0	EM2109392003	20/05/2021	-	-	-	-	-	-	-
			2	BH30-2.0	EM2109392004	20/05/2021	-	-	-	-	-	-	-
			3	BH30-3.0	EM2109392005	20/05/2021	-	-	-	-	-	-	-
	BH32	G-cl-y-0.4	0.1	BH32-0.1	EM2109392021	20/05/2021	-	-	-	-	-	-	-
					EM2110602048	20/05/2021	-	-	-	-	-	-	-
			0.5	BH32-0.5	EM2109392022	20/05/2021	-	-	-	-	-	-	-
					EM2110602049	20/05/2021	-	-	-	-	-	-	-
			1	BH32-1.0	EM2109392023	20/05/2021	-	-	-	-	-	-	-
					EM2110602050	20/05/2021	-	-	-	-	-	-	-
			2	BH32-2.0	EM2109392024	20/05/2021	-	-	-	-	-	-	-
					EM2110602051	20/05/2021	-	-	-	-	-	-	-
			3	BH32-3.0	EM2109392025	20/05/2021	-	-	-	-	-	-	-
	BH33	G-sd-y-0.4	0.1	BH33-0.1	EM2109392026	20/05/2021	-	-	-	-	-	-	-
					EM2110602052	20/05/2021	-	-	-	-	-	0.008	<10
			0.5	BH33-0.5	EM2109392027	20/05/2021	-	-	-	-	-	-	-
					EM2110602053	20/05/2021	<0.020	<10	<0.020	<0.020	<0.020	0.014	<10
							-	-	-	-	-	-	-
			1	BH33-1.0	EM2109392028	20/05/2021	-	-	-	-	-	-	-
					EM2110602054	20/05/2021	-	-	-	-	-	0.009	<10
			2	BH33-2.0	EM2109392029	20/05/2021	-	-	-	-	-	-	-
					EM2110602055	20/05/2021	-	-	-	-	-	0.014	<10
			3	BH33-3.0	EM2109392030	20/05/2021	-	-	-	-	-	-	-
	BH34	G-sd-y->0.5	0.1	BH34-0.1	EM2109607024	24/05/2021	-	-	-	-	-	-	-
			0.5	BH34-0.5	EM2109607025	24/05/2021	-	-	-	-	-	-	-
			1	BH34-1.0	EM2109607026	24/05/2021	-	-	-	-	-	-	-
			2	BH34-2.0	EM2109607027	24/05/2021	-	-	-	-	-	-	-
			3	BH34-3.0	EM2109607028	24/05/2021	-	-	-	-	-	-	-

						Acid Sulphate Soils - Magnesium Values					Acid Sulphate Soils -	
						Acid Reacted Magnesium	Acid Reacted Magnesium (acidity units)	KCl Extractable Magnesium	Magnesium in Peroxide	Acid Reacted Magnesium (sulfur units)	Chromium Reducible Sulfur	Chromium Reducible Sulphur (acidity units)
						% Mg	mole H+/t	%	%	%S	%S	mole H+/t
EQL						0.02	10	0.02	0.02	0.02	0.005	3
Site ID	**Location Code**	**Soil Profile**	**Depth Avg**	**Field ID**	**Sample Code**	**Date**						
	BH36	B-cl-n-0.4	0.1	BH36-0.1	EM2109607006	24/05/2021	-	-	-	-	-	-
			0.5	BH36-0.5	EM2109607007	24/05/2021	-	-	-	-	-	-
					EM2110602056	24/05/2021	-	-	-	-	-	-
			1	BH36-1.0	EM2109607008	24/05/2021	-	-	-	-	-	-
					EM2110602057	24/05/2021	-	-	-	-	-	-
			2	BH36-2.0	EM2109607009	24/05/2021	-	-	-	-	-	-
					EM2110602058	24/05/2021	-	-	-	-	-	-
			3	BH36-3.0	EM2109607010	24/05/2021	-	-	-	-	-	-
					EM2110602059	24/05/2021	-	-	-	-	-	-
	BH39	G-cl-n-0.4	0.1	BH39-0.1	EM2109285028	19/05/2021	-	-	-	-	-	-
			0.5	BH39-0.5	EM2109285029	19/05/2021	-	-	-	-	-	-
			1	BH39-1.0	EM2109285030	19/05/2021	-	-	-	-	-	-
			2	BH39-2.0	EM2109285031	19/05/2021	-	-	-	-	-	-
	BH40	G-sd-n-<0.3	0.1	BH40-0.1	EM2109285015	19/05/2021	-	-	-	-	-	-
			0.5	BH40-0.5	EM2109285016	19/05/2021	-	-	-	-	-	-
			1	BH40-1.0	EM2109285017	19/05/2021	-	-	-	-	-	-
			2	BH40-2.0	EM2109285018	19/05/2021	-	-	-	-	-	-
			3	BH40-3.0	EM2109285019	19/05/2021	-	-	-	-	-	-
	BH41	B-sd-n-0.4	0.1	BH41-0.1	EM2109285006	19/05/2021	-	-	-	-	-	-
			0.5	BH41-0.5	EM2109285007	19/05/2021	-	-	-	-	-	-
					EM2110602060	19/05/2021	-	-	-	-	-	0.010	<10
			1	BH41-1.0	EM2109285008	19/05/2021	-	-	-	-	-	-	-
					EM2110602061	19/05/2021	-	-	-	-	-	<0.005	<10
			2	BH41-2.0	EM2109285009	19/05/2021	-	-	-	-	-	-	-
			3	BH41-3.0	EM2109285010	19/05/2021	-	-	-	-	-	-	-
					EM2110602062	19/05/2021	-	-	-	-	-	0.008	<10
	BH42	G-cl-n-0.4	0.1	BH42-0.1	EM2109607001	24/05/2021	-	-	-	-	-	-	-
			0.5	BH42-0.5	EM2109607002	24/05/2021	-	-	-	-	-	-	-
			1	BH42-1.0	EM2109607003	24/05/2021	-	-	-	-	-	-	-
			2	BH42-2.0	EM2109607004	24/05/2021	-	-	-	-	-	-	-
			3	BH42-3.0	EM2109607005	24/05/2021	-	-	-	-	-	-	-
	BH43	G-cl-n-0.4	0.1	BH43-0.1	EM2109498034	21/05/2021	-	-	-	-	-	-	-
			0.5	BH43-0.5	EM2109498035	21/05/2021	-	-	-	-	-	-	-
			1	BH43-1.0	EM2109498036	21/05/2021	-	-	-	-	-	-	-
			2	BH43-2.0	EM2109498037	21/05/2021	-	-	-	-	-	-	-
			3	BH43-3.0	EM2109498038	21/05/2021	-	-	-	-	-	-	-
	BH44	G-cl-n-<0.3	0.1	BH44-0.1	EM2109607015	24/05/2021	-	-	-	-	-	-	-
					EM2110602063	24/05/2021	-	-	-	-	-	0.014	<10
			0.5	BH44-0.5	EM2109607016	24/05/2021	-	-	-	-	-	-	-
			1	BH44-1.0	EM2109607017	24/05/2021	-	-	-	-	-	-	-
					EM2110602064	24/05/2021	-	-	-	-	-	0.011	<10
			2	BH44-2.0	EM2109607018	24/05/2021	-	-	-	-	-	-	-
					EM2110602065	24/05/2021	-	-	-	-	-	0.006	<10
			3	BH44-3.0	EM2109607019	24/05/2021	-	-	-	-	-	-	-
					EM2110602066	24/05/2021	-	-	-	-	-	0.016	<10

Statistics

Number of Results	**1**	**1**	**1**	**1**	**1**	**24**	**24**
Minimum Detect	**ND**	**ND**	**ND**	**ND**	**ND**	**0.006**	**10**
Maximum Concentration	**<0.02**	**<10**	**<0.02**	**<0.02**	**<0.02**	**0.021**	**13**
Average Concentration *						**0.0099**	**5.4**
95% UCL (Student's-t) *						**0.0115**	**6.116**
% of Detects	**0**	**0**	**0**	**0**	**0**	**88**	**8**
% of Non-Detects	**100**	**100**	**100**	**100**	**100**	**12**	**92**

* A Non Detect Multiplier of 0.5 has been applied.

Soil Profile Notes:

G:	Grey colour
B:	Brown colour
cl:	Predominantly clay to depth
sd:	Sand layer encountered at depth
n:	No silt layer above clay
y:	Silt layer above clay
<#.#, #.#, >#.#:	Approximate depth of topsoil profile

Field or Interlab Duplicates

				Soil Properties			Particle Size		Inorganics												Acid Sulphate Soils - Field			
				% Moisture	Emerson Class Number	Texture	<2mm Fraction	>2mm Fraction	Analysed Material	Color (Munsell)	Conductivity (1:5 aqueous extract)	Exchangeable Sodium Percent	Extraneous Material	Exchangeable Calcium	Exchangeable Magnesium	Exchangeable Potassium	Exchangeable Sodium	CEC	Electrical Conductivity (Lab)	pH (Lab)	pH-F (Field pH test)*	pHFox	Reaction Ratings*	Reaction Rate
				%	-	-	G	G	%	-	µs/cm	%	%	meq/100g	meq/100g	meq/100g	meq/100g	meq/100g	µS/cm	pH Unit	PH UNITS	PH UNITS	COMMENT	mg/kg
EQL				1			0.005	0.005	0.1		10	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	0.1		1
Lab Report Number	**Field ID**	**Matrix Type**	**Date**																					
EM2110602	**BH19-0.5**	**soil**	**19/05/2021**	-	2	1[#1]	-	-	-	1[#2]	-	14.3	-	0.7	1.3	0.4	0.4	2.8	77	6.0	-	-	-	-
EM2110602	**DUP05-210520**	**soil**	**20/05/2021**	-	2	1[#3]	-	-	-	1[#4]	-	16.6	-	0.6	1.4	0.5	0.5	3.0	85	6.1	-	-	-	-
RPD				-	0	0	-	-	-	0	-	15	-	**15**	7	**22**	**22**	7	10	2	-	-	-	-
EM2110602	**BH19-0.5**	**soil**	**19/05/2021**	-	2	1[#1]	-	-	-	1[#2]	-	14.3	-	0.7	1.3	0.4	0.4	2.8	77	6.0	-	-	-	-
800029	**DUP06_210520**	**soil**	**20/05/2021**	4.4	2	-	-	-	-	-	43	13	-	-	-	-	-	-	-	-	-	-	-	-
RPD				-	0	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-
EM2109392	**BH19-0.5**	**soil**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.0	3.6	-	2
EM2109392	**DUP05-210520**	**soil**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.1	3.5	-	2
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	-	0
EM2109392	**BH19-0.5**	**soil**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.0	3.6	-	2
797539	**DUP06_210520**	**soil**	**20/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.8	3.3	4.0	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	9	-	-
EM2109498	**BH03-0.1**	**soil**	**21/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.2	2.3	-	3
EM2109498	**DUP07-210521**	**soil**	**21/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.2	3.0	-	3
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	26	-	0
EM2109498	**BH03-0.1**	**soil**	**21/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.2	2.3	-	3
797669	**DUP08-210521**	**soil**	**21/05/2021**	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.9	2.5	3.0	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	8	-	-
EM2110602	**BH03-0.1**	**soil**	**21/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2110602	**DUP07-210521**	**soil**	**21/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2110602	**BH03-0.1**	**soil**	**21/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
800029	**DUP08_210520**	**soil**	**21/05/2021**	18	-	-	200	<0.005	100	-	-	-	<0.1	-	-	-	-	-	-	-	-	-	-	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2109498	**BH17-3.0**	**soil**	**21/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.2	4.2	-	2
EM2109498	**DUP09-210521**	**soil**	**21/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.7	4.9	-	3
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	15	-	**40**
EM2109498	**BH17-3.0**	**soil**	**21/05/2021**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.2	4.2	-	2
797669	**DUP10-210521**	**soil**	**21/05/2021**	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.8	5.0	2.0	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	17	-	-
EM2110602	**BH17-3.0**	**soil**	**21/05/2021**	-	2	1[#5]	-	-	-	1[#6]	-	21.7	-	1.0	5.4	0.1	1.8	8.3	503	6.9	-	-	-	-
EM2110602	**DUP09-210521**	**soil**	**21/05/2021**	-	2	1[#5]	-	-	-	1[#6]	-	21.9	-	1.0	5.2	0.1	1.8	8.0	480	6.6	-	-	-	-
RPD				-	0	0	-	-	-	0	-	1	-	0	4	0	0	4	5	4	-	-	-	-
EM2110602	**BH17-3.0**	**soil**	**21/05/2021**	-	2	1[#5]	-	-	-	1[#6]	-	21.7	-	1.0	5.4	0.1	1.8	8.3	503	6.9	-	-	-	-
800029	**DUP10_210520**	**soil**	**21/05/2021**	17	2	-	-	-	-	-	290	32	-	-	-	-	-	-	-	-	-	-	-	-
RPD				-	0	-	-	-	-	-	-	**38**	-	-	-	-	-	-	-	-	-	-	-	-

Comments
#1 Sandy Loam
#2 Dark Gray (10YR 4/1)
#3 Light Clay
#4 Olive Brown (2.5Y 4/3)
#5 Clay Loam
#6 Light Olive Brown (2.5Y 5/3)

***RPDs have only been considered where a concentration is greater than 1 times the EQL.**
****Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: (1 - 10 x EQL); 30 (10 - 20 x EQL); 30 (> 20 x EQL))**
*****Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory**

Field or Interlab Duplicates

				Acid Sulphate Soils -		Acid Sulphate		Acid Sulphate Soils - Acid Base Accounting							SPOCAS			Acid Sulphate Soils -	
				Titratable Actual Acidity (sulfur units)	Titratable Actual Acidity	CRS Suite - Net Acidity (Acidity Units)	CRS Suite - Net Acidity (Sulfur Units)	ANC Fineness Factor	Net Acidity (sulfur units)	Net Acidity (acidity units)	Liming Rate	a-Net Acidity without ANCE	s-Net Acidity without ANCE	Liming Rate excluding ANC_1	CRS Suite - Liming Rate	HCl Extractable Sulfur Correction Factor	pH (KCl)	Chromium Reducible Sulfur	Chromium Reducible Sulphur (acidity units)
				%S	mole H+/t	MOL H+/T	% S	-	%S	mole H+/t	kg CaCO3/t	moles H+/t	%w/w S	kg CaCO3/t	KG CACO3/T	FACTOR	pH Units	%S	mole H+/t
EQL				0.003	2	10	0.02	0.5	0.02	10	1	10	0.02		1	1	0.1	0.005	3
Lab Report Number	**Field ID**	**Matrix Type**	**Date**																
EM2110602	BH19-0.5	soil	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2110602	DUP05-210520	soil	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2110602	BH19-0.5	soil	19/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
800029	DUP06_210520	soil	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2109392	BH19-0.5	soil	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2109392	DUP05-210520	soil	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2109392	BH19-0.5	soil	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
797539	DUP06_210520	soil	20/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2109498	BH03-0.1	soil	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2109498	DUP07-210521	soil	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2109498	BH03-0.1	soil	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
797669	DUP08-210521	soil	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2110602	BH03-0.1	soil	21/05/2021	0.02	16	-	-	1.5	0.04	22	2	22	0.04	2	-	-	5.0	0.010	<10
EM2110602	DUP07-210521	soil	21/05/2021	0.03	18	-	-	1.5	0.04	29	2	29	0.04	2	-	-	4.7	0.017	10
RPD				**40**	**12**	-	-	0	0	**27**	0	**27**	0	0	-	-	6	**52**	0
EM2110602	BH03-0.1	soil	21/05/2021	0.02	16	-	-	1.5	0.04	22	2	22	0.04	2	-	-	5.0	0.010	<10
800029	DUP08_210520	soil	21/05/2021	0.060	36	36	0.06	1.5	-	-	-	-	-	-	2.7	2.0	4.9	<0.005	<3
RPD				**100**	**77**	-	-	0	-	-	-	-	-	-	-	-	2	**67**	0
EM2109498	BH17-3.0	soil	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2109498	DUP09-210521	soil	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2109498	BH17-3.0	soil	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
797669	DUP10-210521	soil	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2110602	BH17-3.0	soil	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2110602	DUP09-210521	soil	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EM2110602	BH17-3.0	soil	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
800029	DUP10_210520	soil	21/05/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comments
#1 Sandy Loam
#2 Dark Gray (10YR 4/1)
#3 Light Clay
#4 Olive Brown (2.5Y 4/3)
#5 Clay Loam
#6 Light Olive Brown (2.5Y 5/3)

***RPDs have only been considered where a concentration is greater than 1 times the EQL.**
****Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier ran**
*****Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any**

APPENDIX E

LABORATORY CERTIFICATES AND CHAIN OF CUSTODY DOCUMENTATION

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EM2109285**

Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Contact	: Graeme Jablonskas
Address	: Level 15, 28 Freshwater Place SOUTHBANK VIC, AUSTRALIA 3006	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: shane.giliam@wsp.com	E-mail	: graeme.jablonskas@alsglobal.com
Telephone	: +61 03 9861 1111	Telephone	: +6138549 9609
Facsimile	: +61 03 9861 1144	Facsimile	: +61-3-8549 9626
Project	: PS124554	Page	: 1 of 4
Order number	: ----	Quote number	: EM2021PARBRIVIC0004 (ME/167/21)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: EVAN LISHMUND		

Dates

Date Samples Received	: 19-May-2021 17:15	Issue Date	: 20-May-2021
Client Requested Due Date	: 27-May-2021	Scheduled Reporting Date	: **27-May-2021**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 4	Temperature	: 4.8°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 65 / 33

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	(On Hold) SOIL No analysis requested	SOIL - EA037 ASS Field Screening Analysis
EM2109285-001	19-May-2021 08:30	BH01-0.1		✓
EM2109285-002	19-May-2021 08:30	BH01-0.5		✓
EM2109285-003	19-May-2021 08:30	BH01-1.0		✓
EM2109285-004	19-May-2021 08:30	BH01-2.0		✓
EM2109285-005	19-May-2021 08:30	BH01-3.0		✓
EM2109285-006	19-May-2021 09:15	BH41-0.1		✓
EM2109285-007	19-May-2021 09:15	BH41-0.5		✓
EM2109285-008	19-May-2021 09:15	BH41-1.0		✓
EM2109285-009	19-May-2021 09:15	BH41-2.0		✓
EM2109285-010	19-May-2021 09:15	BH41-3.0		✓
EM2109285-011	19-May-2021 09:40	BH02-0.1	✓	
EM2109285-012	19-May-2021 09:40	BH02-0.5	✓	
EM2109285-013	19-May-2021 09:40	BH02-1.0	✓	
EM2109285-014	19-May-2021 09:40	BH02-2.0	✓	
EM2109285-015	19-May-2021 10:40	BH40-0.1		✓
EM2109285-016	19-May-2021 10:40	BH40-0.5		✓
EM2109285-017	19-May-2021 10:40	BH40-1.0		✓
EM2109285-018	19-May-2021 10:40	BH40-2.0		✓
EM2109285-019	19-May-2021 10:40	BH40-3.0		✓
EM2109285-020	19-May-2021 12:00	BH05-0.1	✓	
EM2109285-021	19-May-2021 12:00	BH05-0.5	✓	
EM2109285-022	19-May-2021 12:00	BH05-1.0	✓	
EM2109285-023	19-May-2021 12:00	BH05-2.0	✓	
EM2109285-024	19-May-2021 12:30	BH04-0.1	✓	
EM2109285-025	19-May-2021 12:30	BH04-0.5	✓	
EM2109285-026	19-May-2021 12:30	BH04-1.0	✓	
EM2109285-027	19-May-2021 12:30	BH04-2.0	✓	
EM2109285-028	19-May-2021 12:50	BH39-0.1		✓
EM2109285-029	19-May-2021 12:50	BH39-0.5		✓
EM2109285-030	19-May-2021 12:50	BH39-1.0		✓
EM2109285-031	19-May-2021 12:50	BH39-2.0		✓
EM2109285-032	19-May-2021 13:10	BH08-0.1	✓	
EM2109285-033	19-May-2021 13:10	BH08-1.0	✓	
EM2109285-034	19-May-2021 13:10	BH08-2.0	✓	
EM2109285-035	19-May-2021 13:50	BH12-0.5	✓	

			(On Hold) SOIL No analysis requested	SOIL - EA037 ASS Field Screening Analysis
EM2109285-036	19-May-2021 13:50	BH12-1.0	✓	
EM2109285-037	19-May-2021 13:50	BH12-2.0	✓	
EM2109285-038	19-May-2021 14:15	BH13-0.1	✓	
EM2109285-039	19-May-2021 14:15	BH13-1.0	✓	
EM2109285-040	19-May-2021 14:15	BH13-2.0	✓	
EM2109285-041	19-May-2021 14:15	BH13-3.0	✓	
EM2109285-042	19-May-2021 14:40	BH18-0.1		✓
EM2109285-043	19-May-2021 14:40	BH18-0.5		✓
EM2109285-044	19-May-2021 14:40	BH18-1.0		✓
EM2109285-045	19-May-2021 14:40	BH18-2.0		✓
EM2109285-046	19-May-2021 14:40	BH18-3.0		✓
EM2109285-047	19-May-2021 00:00	DUP1-210519	✓	
EM2109285-048	19-May-2021 00:00	DUP2-210519	✓	
EM2109285-049	19-May-2021 15:00	BH24-0.1	✓	
EM2109285-050	19-May-2021 15:00	BH24-0.5	✓	
EM2109285-051	19-May-2021 15:00	BH24-1.0	✓	
EM2109285-052	19-May-2021 15:00	BH24-2.0	✓	
EM2109285-053	19-May-2021 15:30	BH29-0.1		✓
EM2109285-054	19-May-2021 15:30	BH29-0.5		✓
EM2109285-055	19-May-2021 15:30	BH29-1.0		✓
EM2109285-056	19-May-2021 15:30	BH29-2.0		✓
EM2109285-057	19-May-2021 15:30	BH29-3.0		✓
EM2109285-058	19-May-2021 15:50	BH23-0.1	✓	
EM2109285-059	19-May-2021 15:50	BH23-0.5	✓	
EM2109285-060	19-May-2021 15:50	BH23-1.0	✓	
EM2109285-061	19-May-2021 15:50	BH23-2.0	✓	
EM2109285-062	19-May-2021 16:10	BH25-0.1		✓
EM2109285-063	19-May-2021 16:10	BH25-0.5		✓
EM2109285-064	19-May-2021 16:10	BH25-1.0		✓
EM2109285-065	19-May-2021 16:10	BH25-2.0		✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICES

- A4 - AU Tax Invoice (INV)	Email	AU.AccountsPayable@wsp.com

EVAN LISHMUND

- *AU Certificate of Analysis - NATA (COA)	Email	evan.lishmund@wsp.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	evan.lishmund@wsp.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	evan.lishmund@wsp.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	evan.lishmund@wsp.com
- Chain of Custody (CoC) (COC)	Email	evan.lishmund@wsp.com
- EDI Format - ENMRG (ENMRG)	Email	evan.lishmund@wsp.com
- EDI Format - ESDAT (ESDAT)	Email	evan.lishmund@wsp.com

SHANE GILIAM

- *AU Certificate of Analysis - NATA (COA)	Email	shane.giliam@wsp.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	shane.giliam@wsp.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	shane.giliam@wsp.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	shane.giliam@wsp.com
- Chain of Custody (CoC) (COC)	Email	shane.giliam@wsp.com
- EDI Format - ENMRG (ENMRG)	Email	shane.giliam@wsp.com
- EDI Format - ESDAT (ESDAT)	Email	shane.giliam@wsp.com

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP
OFFICE:
PROJECT: OFFICER SOUTH
ORDER NUMBER: PS124584
PROJECT MANAGER: SHANE GILLAM CONTACT PH: 0437 007 737
SAMPLER: EVAN LISHMUND SAMPLER MOBILE: 0426 891 083
COC emailed to ALS? YES EDD FORMAT (or default):
Email Reports to (will default to PM if no other addresses are listed): PM + Evan
Email Invoice to (will default to PM if no other addresses are listed): accounts

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)
☒ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.: ME-167-21

COC SEQUENCE NUMBER (Circle)
COC 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)
[illegible]

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Yen Ly			
DATE/TIME: 19/5/21 17:15	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE | SAMPLE DETAILS MATRIX: SOLID (S) WATER (W) | CONTAINER INFORMATION | ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). | Additional Information

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Emerson Class Dispersion	Exchangeable sodium %	pH (fox)						Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	BH01 - 0.1	19-5 08:30	S	JAR + ASS	2			/						
2	BH01 - 0.5	↓	↓	↓	↓			/						
3	BH01 - 1.0							/						
4	BH01 - 2.0							/						
5	BH01 - 3.0	↓						/						
6	BH41 - 0.1	19-5 09:15						/						
7	BH41 - 0.5	↓						/						
8	BH41 - 1.0							/						
9	BH41 - 2.0							/						
10	BH41 - 3.0	↓						/						
11	BH02 - 0.1	19-5 09:40												
12	BH02 - 0.5													
13	BH02 - 1.0													
14	BH02 - 2.0													
15	BH40 - 0.1	19-5 10:40						/						
16	BH40 - 0.5							/						
				TOTAL	32									

Environmental Division Melbourne
Work Order Reference
EM2109285
Telephone : + 61-3-8549 9600

Received: 19/5 17:15 Carrier: Courier
C/note:
Temp: 4.8 °C Seal: Y (N)
(Ice) / Icebricks / NA

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
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☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP

OFFICE:

PROJECT: OFFICER SOUTH

ORDER NUMBER: PS124554

PROJECT MANAGER: SHANE GILLIAN **CONTACT PH:** 0437 003 739

SAMPLER: EVAN LISHMUND **SAMPLER MOBILE:** 0426 891 033

COC emailed to ALS? YES **EDD FORMAT (or default):**

Email Reports to (will default to PM if no other addresses are listed):

Email Invoice to (will default to PM if no other addresses are listed): accounts

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)

☒ Standard TAT (List due date):

☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.:

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? NA
Free ice / frozen ice bricks present upon receipt? NA
Random Sample Temperature on Receipt:
Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Emerson Class Dispersion	Exchangeable Sodium %	pH (fox)						Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
17	BH40 - 1.0	19-5 / 10:40	S	JAR + ASS	2			✓						
18	BH40 - 2.0	↓	↓	↓	↓			✓						
19	BH40 - 3.0	↓	↓	↓	↓			✓						
20	BH05 - 0.1	19-5 / 12:00												
21	BH05 - 0.5	↓												
22	BH05 - 1.0	↓												
23	BH05 - 2.0	↓												
24	BH04 - 0.1	19-5 / 12:30												
25	BH04 - 0.5	↓												
26	BH04 - 1.0	↓												
27	BH04 - 2.0	↓												
28	BH39 - 0.1	19-5 / 12:50						✓						
29	BH39 - 0.5	↓						✓						
30	BH39 - 1.0	↓						✓						
31	BH39 - 2.0	↓						✓						
32	BH08 - 0.1	19-5 / 17:10												
				TOTAL	32									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
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MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
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TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☒ Standard TAT (List due date):	**FOR LABORATORY USE ONLY (Circle)** Custody Seal Intact? Yes No N/A
OFFICE:		☐ Non Standard or urgent TAT (List due date):	Free ice / frozen coolants present on receipt? Yes No N/A
PROJECT: OFFICER SOUTH	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)** COC 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
ORDER NUMBER: PS124584		OF: 1 2 3 4 5 6 7	Other comments:
PROJECT MANAGER: SHANE GILLAM	**CONTACT PH:**		
SAMPLER: EVAN LIMMOND	**SAMPLER MOBILE:** 0426 891 073	**RELINQUISHED BY:**	**RECEIVED BY:**
COC emailed to ALS? YES	**EDD FORMAT (or default):**		
Email Reports to (will default to PM if no other addresses are listed):		DATE/TIME:	DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed): accounts		**RELINQUISHED BY:**	**RECEIVED BY:**
		DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS — MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	Emerson - Coal Dispersion	Exchangeable Sodium %	pH (FOX)						Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
33	BH08 - 0.0	19-5 | 13:10	S	ASS + OAR	2									
34	BH08 - 2.0	↓	↓	↓	↓									
35	BH12 - 0.5	19-5 | 13:50												
36	BH12 - 1.0	↓												
37	BH12 - 2.0													
38	BH13 - 0.1	19-5 | 14:15												
39	BH13 - 1.0	↓												
40	BH13 - 2.0													
41	BH13 - 3.0													
42	BH18 - 0.1	19-5 | 14:40						/						
43	BH18 - 0.5	↓						/						
44	BH18 - 1.0							/						
45	BH18 - 2.0							/						
46	BH18 - 3.0							/						
47	DUP1 - 210519													
48	DUP2 - 210519													
				TOTAL	32									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserve
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
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☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☒ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):
OFFICE:		
PROJECT:	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)** COC 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
ORDER NUMBER:		
PROJECT MANAGER:	**CONTACT PH:**	
SAMPLER:	**SAMPLER MOBILE:**	
COC emailed to ALS? YES	**EDD FORMAT (or default):**	
Email Reports to (will default to PM if no other addresses are listed):		
Email Invoice to (will default to PM if no other addresses are listed): accounts		

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt °C
Other comments:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS – MATRIX (SOLID (S) WATER (W))			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).							Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Emulsion Class Dispersion	Extractable Solids %	pH (1:5)					Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
49	BH24 - 0.1	19-05 | 15:00	S	JAR + ASS	2								
50	BH24 - 0.5	↓	↓	↓	↓								
51	BH24 - 1.0												
52	BH24 - 2.0												
53	BH29 - 0.1	19-05 | 15:30						/					
54	BH29 - 0.5	↓						/					
55	BH29 - 1.0							/					
56	BH29 - 2.0							/					
57	BH29 - 3.0							/					
58	BH27 - 0.1	19-5 | 15:50											
59	BH23 - 0.5												
60	BH27 - 1.0												
61	BH27 - 2.0												
62	BH25 - 0.1	19 - 5 | 16:10						/					
63	BH25 - 0.5							/					
64	BH25 - 1.0							/					
				TOTAL	72								

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	✻ Standard TAT (List due date):
OFFICE:		☐ Non Standard or urgent TAT (List due date):
PROJECT:	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)** COC 1 2 3 4 5 6 7
ORDER NUMBER:		OF: 1 2 3 4 5 6 7
PROJECT MANAGER:	**CONTACT PH:**	
SAMPLER:	**SAMPLER MOBILE:**	
COC emailed to ALS? YES	**EDD FORMAT (or default):**	
Email Reports to (will default to PM if no other addresses are listed):		
Email Invoice to (will default to PM if no other addresses are listed): accounts		

FOR LABORATORY USE ONLY (Circle)

Custody seal intact? Yes / No / N/A

Free ice / frozen ice bricks present upon receipt? Yes / No / N/A

Random Sample Temperature on Receipt: °C

Other comments:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED Including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	pH (ROX)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
65	BH25 - 2.0	19-5 | 16:10	S	JAR + ASS	2	/								
				TOTAL	2									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserve
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

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☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
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☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
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☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP
OFFICE:
PROJECT: OFFICER SOUTH
ORDER NUMBER: PS124584
PROJECT MANAGER: SHANE CILIAM
SAMPLER: EVAN LISHMUND
COC emailed to ALS? YES
Email Reports to (will default to PM if no other addresses are listed): PM + Evan
Email Invoice to (will default to PM if no other addresses are listed): accounts

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)
☒ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):
ALS QUOTE NO.: ME-167-21
CONTACT PH: 0437 007 737
SAMPLER MOBILE: 0426 891 033
EDD FORMAT (or default):

COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Yen Ly			
DATE/TIME: 19/5/21 17:15	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE | SAMPLE DETAILS MATRIX: SOLID (S) WATER (W) | CONTAINER INFORMATION | ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). | Additional Information

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Emerson Class Dispersion	Exchangeable Sodium %	pH (fox)						Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	BH01 - 0.1	19-5 / 08:30	S	JAR + ASS	2			/						
2	BH01 - 0.5	↓	↓	↓	↓			/						
3	BH01 - 1.0							/						
4	BH01 - 2.0							/						
5	BH01 - 3.0	↓						/						
6	BH41 - 0.1	19-5 / 09:15						/						
7	BH41 - 0.5	↓						/						
8	BH41 - 1.0							/						
9	BH41 - 2.0							/						
10	BH41 - 3.0	↓						/						
11	BH02 - 0.1	19-5 / 09:40												
12	BH02 - 0.5													
13	BH02 - 1.0													
14	BH02 - 2.0													
15	BH40 - 0.1	19-5 / 10:40						/						
16	BH40 - 0.5							/						
				TOTAL	32									

Environmental Division
Melbourne
Work Order Reference
EM2109285

Telephone : + 61-3-8549 9600

Received: 19/5 17:15 Carrier: Courier
C/note:
Temp: 4.8 °C Seal: Y (N)
(Ice) Icebricks / NA

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserve
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP
OFFICE:
PROJECT: OFFICER SOUTH
ORDER NUMBER: PS124554
PROJECT MANAGER: SHANE GILLAM **CONTACT PH:** 0437 003 739
SAMPLER: EVAN LUSHMUND **SAMPLER MOBILE:** 0426 891 033
COC emailed to ALS? YES **EDD FORMAT (or default):**
Email Reports to (will default to PM if no other addresses are listed):
Email Invoice to (will default to PM if no other addresses are listed): accounts

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)
☒ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.:

COC SEQUENCE NUMBER (Circle)
COC 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).									Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Emerson Class Dispersion	Exchangeable Sodium %	pH (fox)							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
17	BH40 - 1.0	19-5 / 10:40	S	JAR + ASS	2			✓							
18	BH40 - 2.0	↓	↓	↓	↓			✓							
19	BH40 - 3.0	↓	↓	↓	↓			✓							
20	BH05 - 0.1	19-5 / 12:00													
21	BH05 - 0.5	↓													
22	BH05 - 1.0	↓													
23	BH05 - 2.0	↓													
24	BH04 - 0.1	19-5 / 12:30													
25	BH04 - 0.5	↓													
26	BH04 - 1.0	↓													
27	BH04 - 2.0	↓													
28	BH39 - 0.1	19-5 / 12:50						✓							
29	BH39 - 0.5	↓						✓							
30	BH39 - 1.0	↓						✓							
31	BH39 - 2.0	↓						✓							
32	BH08 - 0.1	19-5 / 17:00													
				TOTAL	32										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☒ Standard TAT (**List due date**):	**FOR LABORATORY USE ONLY (Circle)** Custody Seal Intact? Yes No N/A
OFFICE:		☐ Non Standard or urgent TAT (**List due date**):	Free ice / frozen ice bricks present upon receipt? Yes No N/A
PROJECT: OFFICER SOUTH	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)** COC 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
ORDER NUMBER: PS124554		OF: 1 2 3 4 5 6 7	Other comments:
PROJECT MANAGER: SHANE GILLAM	**CONTACT PH:**		
SAMPLER: EVAN LIMMOND	**SAMPLER MOBILE:** 0426 891 073	**RELINQUISHED BY:**	**RECEIVED BY:**
COC emailed to ALS? YES	**EDD FORMAT (or default):**		
Email Reports to (will default to PM if no other addresses are listed):		DATE/TIME:	DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed): accounts		**RELINQUISHED BY:**	**RECEIVED BY:**
		DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	Emerson (Aust) Dispersion	Exchangeable Sodium Percent	pH (Fox)						Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
33	BH08 - 0.0	19-5 | 13:10	S	ASS + JAR	2									
34	BH08 - 2.0	↓	↓	↓	↓									
35	BH12 - 0.5	19-5 | 13:50												
36	BH12 - 1.0	↓												
37	BH12 - 2.0													
38	BH13 - 0.1	19-5 | 14:15												
39	BH13 - 0.0	↓												
40	BH13 - 2.0													
41	BH13 - 3.0													
42	BH18 - 0.1	19-5 | 14:40						/						
43	BH18 - 0.5	↓						/						
44	BH18 - 1.0							/						
45	BH18 - 2.0							/						
46	BH18 - 3.0							/						
47	DUP1 - 210519													
48	DUP2 - 210519													
				TOTAL	32									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserve
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

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☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E portkembla@alsglobal.com

CLIENT: WSP	**TURNAROUND REQUIREMENTS :** ✠ Standard TAT (List due date):	**FOR LABORATORY USE ONLY (Circle)**
OFFICE:	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody seal intact? Yes / No / N/A
PROJECT:	**ALS QUOTE NO.:**	Free ice / frozen ice bricks present upon receipt? Yes / No / N/A
ORDER NUMBER:		COC SEQUENCE NUMBER (Circle): COC 1 2 3 4 5 6 7
PROJECT MANAGER:	**CONTACT PH:**	OF: 1 2 3 4 5 6 7
SAMPLER:	**SAMPLER MOBILE:**	Random Sample temperature on Receipt: °C
COC emailed to ALS? YES	**EDD FORMAT (or default):**	Other comments:
Email Reports to (will default to PM if no other addresses are listed):		
Email Invoice to (will default to PM if no other addresses are listed): accounts		

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	Emerson Class Dispersion	Exchangeable Sodium %	pH (1:5)						Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
49	BH24 - 0.1	19-05 | 15:00	S	JAR - ASS	2									
50	BH24 - 0.5	↓	↓	↓	↓									
51	BH24 - 1.0													
52	BH24 - 2.0													
53	BH29 - 0.1	19-05 | 15:30						/						
54	BH29 - 0.5							/						
55	BH29 - 1.0	↓						/						
56	BH29 - 2.0							/						
57	BH29 - 3.0							/						
58	BH27 - 0.1	19-5 | 15:50												
59	BH23 - 0.5													
60	BH23 - 1.0													
61	BH23 - 2.0													
62	BH25 - 0.1	19 - 5 | 16:10						/						
63	BH25 - 0.5							/						
64	BH25 - 1.0							/						
					TOTAL	72								

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP
OFFICE:
PROJECT:
ORDER NUMBER:
PROJECT MANAGER: CONTACT PH:
SAMPLER: SAMPLER MOBILE:
COC emailed to ALS? YES EDD FORMAT (or default):
Email Reports to (will default to PM if no other addresses are listed):
Email Invoice to (will default to PM if no other addresses are listed): accounts
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)
☒ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):
ALS QUOTE NO.:

COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: °C
Other comment:

RELINQUISHED BY: DATE/TIME:
RECEIVED BY: DATE/TIME:
RELINQUISHED BY: DATE/TIME:
RECEIVED BY: DATE/TIME:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED Including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (fox)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
65	BH28-2.0	19-5 | 16:00	S	JAR + ASS	2	/								
				TOTAL	2									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2109285**	Page	: 1 of 9
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Contact	: Graeme Jablonskas
Address	: Level 15, 28 Freshwater Place SOUTHBANK VIC, AUSTRALIA 3006	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 9861 1111	Telephone	: +6138549 9609
Project	: PS124554	Date Samples Received	: 19-May-2021 17:15
Order number	: ----	Date Analysis Commenced	: 24-May-2021
C-O-C number	: ----	Issue Date	: 25-May-2021 15:31
Sampler	: EVAN LISHMUND		
Site	: ----		
Quote number	: ME/167/21		
No. of samples received	: 65		
No. of samples analysed	: 33		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

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

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
~ = Indicates an estimated value.

- ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Sample ID	BH01-0.1	BH01-0.5	BH01-1.0	BH01-2.0	BH01-3.0
			Sampling date / time	19-May-2021 08:30	19-May-2021 08:30	19-May-2021 08:30	19-May-2021 08:30	19-May-2021 08:30
Compound	*CAS Number*	*LOR*	*Unit*	**EM2109285-001**	**EM2109285-002**	**EM2109285-003**	**EM2109285-004**	**EM2109285-005**
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**5.7**	**6.5**	**6.8**	**6.6**	**7.0**
pH (Fox)	----	0.1	pH Unit	**3.5**	**4.9**	**5.0**	**4.8**	**5.3**
Reaction Rate	----	1	-	**2**	**1**	**1**	**1**	**2**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH41-0.1	BH41-0.5	BH41-1.0	BH41-2.0	BH41-3.0
			Sampling date / time	19-May-2021 09:15	19-May-2021 09:15	19-May-2021 09:15	19-May-2021 09:15	19-May-2021 09:15
Compound	CAS Number	LOR	Unit	EM2109285-006	EM2109285-007	EM2109285-008	EM2109285-009	EM2109285-010
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**7.3**	**8.1**	**6.8**	**7.5**	**7.5**
pH (Fox)	----	0.1	pH Unit	**5.5**	**5.0**	**4.1**	**5.6**	**5.4**
Reaction Rate	----	1	-	**1**	**1**	**3**	**1**	**2**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH40-0.1	BH40-0.5	BH40-1.0	BH40-2.0	BH40-3.0
			Sampling date / time	19-May-2021 10:40	19-May-2021 10:40	19-May-2021 10:40	19-May-2021 10:40	19-May-2021 10:40
Compound	CAS Number	LOR	Unit	EM2109285-015	EM2109285-016	EM2109285-017	EM2109285-018	EM2109285-019
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**7.2**	**6.9**	**7.9**	**7.7**	**7.6**
pH (Fox)	----	0.1	pH Unit	**3.2**	**5.0**	**6.2**	**6.6**	**5.6**
Reaction Rate	----	1	-	**3**	**2**	**2**	**3**	**2**

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Sample ID	BH39-0.1	BH39-0.5	BH39-1.0	BH39-2.0	BH18-0.1
			Sampling date / time	19-May-2021 12:50	19-May-2021 12:50	19-May-2021 12:50	19-May-2021 12:50	19-May-2021 14:40
Compound	*CAS Number*	*LOR*	*Unit*	**EM2109285-028**	**EM2109285-029**	**EM2109285-030**	**EM2109285-031**	**EM2109285-042**
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**5.1**	**5.5**	**5.3**	**5.5**	**5.4**
pH (Fox)	----	0.1	pH Unit	**2.5**	**4.1**	**3.9**	**4.2**	**3.0**
Reaction Rate	----	1	-	**3**	**3**	**2**	**1**	**3**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH18-0.5	BH18-1.0	BH18-2.0	BH18-3.0	BH29-0.1
			Sampling date / time	19-May-2021 14:40	19-May-2021 14:40	19-May-2021 14:40	19-May-2021 14:40	19-May-2021 15:30
Compound	CAS Number	LOR	Unit	EM2109285-043	EM2109285-044	EM2109285-045	EM2109285-046	EM2109285-053
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**5.4**	**6.1**	**6.5**	**6.4**	**5.9**
pH (Fox)	----	0.1	pH Unit	**4.0**	**5.2**	**5.6**	**5.7**	**2.7**
Reaction Rate	----	1	-	**2**	**2**	**1**	**1**	**3**

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Sample ID	BH29-0.5	BH29-1.0	BH29-2.0	BH29-3.0	BH25-0.1
			Sampling date / time	19-May-2021 15:30	19-May-2021 15:30	19-May-2021 15:30	19-May-2021 15:30	19-May-2021 16:10
Compound	*CAS Number*	*LOR*	*Unit*	**EM2109285-054**	**EM2109285-055**	**EM2109285-056**	**EM2109285-057**	**EM2109285-062**
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**6.2**	**6.2**	**6.2**	**6.5**	**5.9**
pH (Fox)	----	0.1	pH Unit	**3.7**	**4.7**	**5.6**	**5.8**	**2.6**
Reaction Rate	----	1	-	**3**	**3**	**1**	**2**	**3**

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Sample ID	**BH25-0.5**	**BH25-1.0**	**BH25-2.0**	**----**	**----**
			Sampling date / time	19-May-2021 16:10	19-May-2021 16:10	19-May-2021 16:10	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EM2109285-063**	**EM2109285-064**	**EM2109285-065**	**--------**	**--------**
				Result	Result	Result	----	----
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**6.2**	**6.2**	**6.6**	**----**	**----**
pH (Fox)	----	0.1	pH Unit	**4.5**	**4.9**	**5.5**	**----**	**----**
Reaction Rate	----	1	-	**2**	**1**	**1**	**----**	**----**

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM2109285**	Page	: 1 of 3
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Contact	: Graeme Jablonskas
Address	: Level 15, 28 Freshwater Place SOUTHBANK VIC, AUSTRALIA 3006	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 9861 1111	Telephone	: +6138549 9609
Project	: PS124554	Date Samples Received	: 19-May-2021
Order number	: ----	Date Analysis Commenced	: 24-May-2021
C-O-C number	: ----	Issue Date	: 25-May-2021
Sampler	: EVAN LISHMUND		
Site	: ----		
Quote number	: ME/167/21		
No. of samples received	: 65		
No. of samples analysed	: 33		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	*Position*	*Accreditation Category*
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

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

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

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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA037: Ass Field Screening Analysis (QC Lot: 3693235)									
EM2109285-001	BH01-0.1	EA037: Reaction Rate	----	1	-	2	2	0.0	No Limit
		EA037: pH (F)	----	0.1	pH Unit	5.7	5.8	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	3.5	3.5	0.0	0% - 20%
EM2109285-010	BH41-3.0	EA037: Reaction Rate	----	1	-	2	2	0.0	No Limit
		EA037: pH (F)	----	0.1	pH Unit	7.5	7.5	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	5.4	5.4	0.0	0% - 20%
EA037: Ass Field Screening Analysis (QC Lot: 3693236)									
EM2109285-043	BH18-0.5	EA037: Reaction Rate	----	1	-	2	2	0.0	No Limit
		EA037: pH (F)	----	0.1	pH Unit	5.4	5.4	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	4.0	4.1	0.0	0% - 20%
EM2109285-062	BH25-0.1	EA037: Reaction Rate	----	1	-	3	3	0.0	No Limit
		EA037: pH (F)	----	0.1	pH Unit	5.9	5.9	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	2.6	2.7	0.0	0% - 20%

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (LCS) Results are required to be reported.**

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2109285**	Page	: 1 of 4
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Telephone	: +6138549 9609
Project	: PS124554	Date Samples Received	: 19-May-2021
Site	: ----	Issue Date	: 25-May-2021
Sampler	: EVAN LISHMUND	No. of samples received	: 65
Order number	: ----	No. of samples analysed	: 33

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA037: Ass Field Screening Analysis								
Snap Lock Bag - frozen (EA037)								
BH01-0.1,	BH01-0.5,	**19-May-2021**	**24-May-2021**	15-Nov-2021	✓	**25-May-2021**	15-Nov-2021	✓
BH01-1.0,	BH01-2.0,							
BH01-3.0,	BH41-0.1,							
BH41-0.5,	BH41-1.0,							
BH41-2.0,	BH41-3.0,							
BH40-0.1,	BH40-0.5,							
BH40-1.0,	BH40-2.0,							
BH40-3.0,	BH39-0.1,							
BH39-0.5,	BH39-1.0,							
BH39-2.0,	BH18-0.1,							
BH18-0.5,	BH18-1.0,							
BH18-2.0,	BH18-3.0,							
BH29-0.1,	BH29-0.5,							
BH29-1.0,	BH29-2.0,							
BH29-3.0,	BH25-0.1,							
BH25-0.5,	BH25-1.0,							
BH25-2.0								

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
ASS Field Screening Analysis	EA037	4	33	**12.12**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
ASS Field Screening Analysis	* EA037	SOIL	In house: Referenced to Acid Sulfate Soils Laboratory Methods Guidelines. As received samples are tested for pH field and pH fox and assessed for a reaction rating.

Preparation Methods	Method	Matrix	Method Descriptions
Drying only	* EN020D	SOIL	In house

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EM2109392**

Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Contact	: Graeme Jablonskas
Address	: Level 15, 28 Freshwater Place SOUTHBANK VIC, AUSTRALIA 3006	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: shane.giliam@wsp.com	E-mail	: graeme.jablonskas@alsglobal.com
Telephone	: +61 03 9861 1111	Telephone	: +6138549 9609
Facsimile	: +61 03 9861 1144	Facsimile	: +61-3-8549 9626
Project	: PS124554	Page	: 1 of 3
Order number	: PS124554	Quote number	: EM2021PARBRIVIC0004 (ME/167/21)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Officer South		
Sampler	: EL		

Dates

Date Samples Received	: 20-May-2021 17:30	Issue Date	: 21-May-2021
Client Requested Due Date	: 28-May-2021	Scheduled Reporting Date	: **28-May-2021**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 3	Temperature	: 5.0°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 45 / 21

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	(On Hold) SOIL No analysis requested	SOIL - EA037 ASS Field Screening Analysis
EM2109392-001	20-May-2021 00:00	BH30-0.1		✓
EM2109392-002	20-May-2021 00:00	BH30-0.5		✓
EM2109392-003	20-May-2021 00:00	BH30-1.0		✓
EM2109392-004	20-May-2021 00:00	BH30-2.0		✓
EM2109392-005	20-May-2021 00:00	BH30-3.0		✓
EM2109392-006	20-May-2021 00:00	BH20-0.1	✓	
EM2109392-007	20-May-2021 00:00	BH20-0.5	✓	
EM2109392-008	20-May-2021 00:00	BH20-1.0	✓	
EM2109392-009	20-May-2021 00:00	BH20-2.0	✓	
EM2109392-010	20-May-2021 00:00	BH20-3.0	✓	
EM2109392-011	20-May-2021 00:00	DUP03-210520	✓	
EM2109392-013	20-May-2021 00:00	BH26-0.1	✓	
EM2109392-014	20-May-2021 00:00	BH26-0.5	✓	
EM2109392-015	20-May-2021 00:00	BH26-1.0	✓	
EM2109392-016	20-May-2021 00:00	BH26-2.0	✓	
EM2109392-017	20-May-2021 00:00	BH27-0.1	✓	
EM2109392-018	20-May-2021 00:00	BH27-0.5	✓	
EM2109392-019	20-May-2021 00:00	BH27-1.0	✓	
EM2109392-020	20-May-2021 00:00	BH27-2.0	✓	
EM2109392-021	20-May-2021 00:00	BH32-0.1		✓
EM2109392-022	20-May-2021 00:00	BH32-0.5		✓
EM2109392-023	20-May-2021 00:00	BH32-1.0		✓
EM2109392-024	20-May-2021 00:00	BH32-2.0		✓
EM2109392-025	20-May-2021 00:00	BH32-3.0		✓
EM2109392-026	20-May-2021 00:00	BH33-0.1		✓
EM2109392-027	20-May-2021 00:00	BH33-0.5		✓
EM2109392-028	20-May-2021 00:00	BH33-1.0		✓
EM2109392-029	20-May-2021 00:00	BH33-2.0		✓
EM2109392-030	20-May-2021 00:00	BH33-3.0		✓
EM2109392-031	20-May-2021 00:00	BH19-0.1		✓
EM2109392-032	20-May-2021 00:00	BH19-0.5		✓
EM2109392-033	20-May-2021 00:00	BH19-1.0		✓
EM2109392-034	20-May-2021 00:00	BH19-2.0		✓
EM2109392-035	20-May-2021 00:00	BH19-3.0		✓
EM2109392-036	20-May-2021 00:00	BH16-0.1	✓	

			(On Hold) SOIL No analysis requested	SOIL - EA037 ASS Field Screening Analysis
EM2109392-037	20-May-2021 00:00	BH16-0.5	✓	
EM2109392-038	20-May-2021 00:00	BH16-1.0	✓	
EM2109392-039	20-May-2021 00:00	BH16-2.0	✓	
EM2109392-040	20-May-2021 00:00	BH16-3.0	✓	
EM2109392-041	20-May-2021 00:00	DUP05-210520		✓
EM2109392-043	20-May-2021 00:00	BH21-0.1	✓	
EM2109392-044	20-May-2021 00:00	BH21-0.5	✓	
EM2109392-045	20-May-2021 00:00	BH21-1.0	✓	
EM2109392-046	20-May-2021 00:00	BH21-2.0	✓	
EM2109392-047	20-May-2021 00:00	BH21-3.0	✓	

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

Accounts PayableAU

- A4 - AU Tax Invoice (INV)	Email	AU.AccountsPayable@wsp.com

ALL INVOICES

- A4 - AU Tax Invoice (INV)	Email	AU.AccountsPayable@wsp.com

EVAN LISHMUND

- *AU Certificate of Analysis - NATA (COA)	Email	evan.lishmund@wsp.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	evan.lishmund@wsp.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	evan.lishmund@wsp.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	evan.lishmund@wsp.com
- Chain of Custody (CoC) (COC)	Email	evan.lishmund@wsp.com
- EDI Format - ENMRG (ENMRG)	Email	evan.lishmund@wsp.com
- EDI Format - ESDAT (ESDAT)	Email	evan.lishmund@wsp.com

SHANE GILIAM

- *AU Certificate of Analysis - NATA (COA)	Email	shane.giliam@wsp.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	shane.giliam@wsp.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	shane.giliam@wsp.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	shane.giliam@wsp.com
- Chain of Custody (CoC) (COC)	Email	shane.giliam@wsp.com
- EDI Format - ENMRG (ENMRG)	Email	shane.giliam@wsp.com
- EDI Format - ESDAT (ESDAT)	Email	shane.giliam@wsp.com

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	✻ Standard TAT (List due date):	**FOR LABORATORY USE ONLY (Circle)** Custody Seal Intact? Yes / No / N/A
OFFICE:		☐ Non Standard or urgent TAT (List due date):	Free ice / frozen ice bricks present upon receipt? Yes / No / N/A
PROJECT: OFFICER SOUTH	**ALS QUOTE NO.:** ME-167-21	**COC SEQUENCE NUMBER (Circle)** COC 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
ORDER NUMBER: PS124554		OF: 1 2 3 4 5 6 7	Other comments:
PROJECT MANAGER: SHANE GILIAM	**CONTACT PH:** 0437 003 779		
SAMPLER: EVAN LISHMUND	**SAMPLER MOBILE:** 0426 841 073		
COC emailed to ALS? YES	**EDD FORMAT (or default):**		
Email Reports to (will default to PM if no other addresses are listed): Shane + Evan			
Email Invoice to (will default to PM if no other addresses are listed): accounts			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Yen Ly	LP		
DATE/TIME: 20-05-21 | 17:30	DATE/TIME: 20|5 17 30	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).							Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (FOR)							
1	BH30 - 0.1	20-5 | 08:30	S	JAR + ASS	2	/							
2	BH30 - 0.5					/							
3	BH30 - 1.0					/							
4	BH30 - 2.0					/							
5	BH30 - 3.0					/							
6	BH20 - 0.1	20-5 | 09:20											
7	BH20 - 0.5												
8	BH20 - 1.0												
9	BH20 - 2.0												
10	BH20 - 3.0												
11	DUP03 - 210520												
12	DUP04 - 210520												Forward to Chatfield
13	BH26 - 0.1	20-5 | 09:50											
14	BH26 - 0.5												
15	BH26 - 1.0												
16	BH26 - 2.0												
				TOTAL	32								

Environmental Division
Melbourne
Work Order Reference
EM2109392

Telephone : - 61-3-8549 9600

Received: 20/5 17:30 Carrier: Client
C/note:
Temp: 5.0 °C Seal: Y / N
Ice / Icebricks / NA

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
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MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	TURNAROUND REQUIREMENTS : ✻ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE:	(Standard TAT may be longer for some tests e.g.. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A
PROJECT: OFFICER SOUTH	ALS QUOTE NO.:	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: PS124554	COC SEQUENCE NUMBER (Circle) COC 1 2 3 4 5 6 7	Random Sample Temperature on Receipt Yes
PROJECT MANAGER:	CONTACT PH: OF: 1 2 3 4 5 6 7	Other comment:

SAMPLER:	SAMPLER MOBILE:	RELINQUISHED BY:	RECEIVED BY:
COC emailed to ALS? YES	EDD FORMAT (or default):	DATE/TIME:	DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed):		RELINQUISHED BY:	RECEIVED BY:
Email Invoice to (will default to PM if no other addresses are listed): accounts		DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (Low)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
17	BH27 - 0.1	20-5 | 10:15	S	JAR + ASS	2									
18	BH27 -0.5													
19	BH27 - 1.0													
20	BH27 - 2.0													
21	BH32 - 0.1	20-5 | 10.50				/								
22	BH32 - 0.5					/								
23	BH32 - 1.0					/								
24	BH32 - 2.0					/								
25	BH32 - 3.0					/								
26	BH33 - 0.1	20-5 | 11:20				/								
27	BH33 - 0.5					/								
28	BH33 - 1.0					/								
29	BH33 - 2.0					/								
30	BH33 - 3.0					/								
31	BH19 - 0.1	20-5 | 12:40				/								
32	BH19 - 0.5	20-5 | 12:40				/								
				TOTAL	32									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	**TURNAROUND REQUIREMENTS :** ☒ Standard TAT (List due date):	**FOR LABORATORY USE ONLY (Circle)**
OFFICE:	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody seal intact on sample cooler/s? Yes No N/A
PROJECT: OFFICER SOUTH	**ALS QUOTE NO.:**	Free ice/frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: PS124554	**COC SEQUENCE NUMBER (Circle)** COC 1 2 3 4 5 6 7	Random Sample Temperature on Receipt (°C):
PROJECT MANAGER:	**CONTACT PH:** OF: 1 2 3 4 5 6 7	Other comments:

SAMPLER:	**SAMPLER MOBILE:**	**RELINQUISHED BY:**	**RECEIVED BY:**	**RELINQUISHED BY:**	**RECEIVED BY:**
COC emailed to ALS? YES	**EDD FORMAT (or default):**				
Email Reports to (will default to PM if no other addresses are listed):		DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed): accounts					

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (FOX)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
33	BH19 - 1.0	20-5 / 12:40	S	JAR + ASS	2	/								
34	BH19 - 2.0					/								
35	BH19 - 3.0					/								
36	BH16 - 0.1	20-5 / 14:10												
37	BH16 - 0.5													
38	BH16 - 1.0													
39	BH16 - 2.0													
40	BH16 - 3.0													
41	DUP05 - 210520	20-5 / 12:40				/								
42	DUP06 - 210520	20-5 / 12:40				/								Forward to Eurofins
43	BH21 - 0.1													
44	BH21 - 0.5													
45	BH21 - 1.0													
46	BH21 - 2.0													
47	BH21 - 3.0													
				TOTAL	30									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
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☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
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☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	TURNAROUND REQUIREMENTS : ☒ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE:	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	Yes / No / N/A
PROJECT: OFFICER SOUTH	ALS QUOTE NO.: ME-167-21	Free Ice / Frozen Ice Bricks Present upon receipt?	Yes / No / N/A
ORDER NUMBER: PJ124554	COC SEQUENCE NUMBER (Circle) COC 1 2 3 4 5 6 7	Random Sample Temperature on Receipt	°C
PROJECT MANAGER: SHANE LILIAM	CONTACT PH: 0437 003 719	OF: 1 2 3 4 5 6 7	Other comments:
SAMPLER: EVAN LISHMAN	SAMPLER MOBILE: 0426 891 073	RELINQUISHED BY: Yen Ly	RECEIVED BY: LP
COC emailed to ALS? YES	EDD FORMAT (or default):	DATE/TIME: 20-05-24 | 17:30	DATE/TIME: 20|5 17 30
Email Reports to (will default to PM if no other addresses are listed): Shane + Evan		RELINQUISHED BY:	RECEIVED BY:
Email Invoice to (will default to PM if no other addresses are listed): accounts		DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).							Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (Lab)							
1	BH30 - 0.1	20-5 | 08:30	S	JAR + ASS	2	/							
2	BH30 - 0.5					/							
3	BH30 - 1.0					/							
4	BH30 - 2.0					/							
5	BH30 - 3.0					/							
6	BH20 - 0.1	20-5 | 09:20											
7	BH20 - 0.5												
8	BH20 - 1.0												
9	BH20 - 2.0												
10	BH20 - 3.0												
11	DUP03 - 210520												
12	DUP04 - 210520												Forward to Eurofins
13	BH26 - 0.1	20-5 | 09:50											
14	BH26 - 0.5												
15	BH26 - 1.0												
16	BH26 - 2.0												
				TOTAL	32								

Environmental Division
Melbourne
Work Order Reference
EM2109392

Telephone : +61-3-8549 9600

Received: 20|5 17:30 Carrier: Client
C/note:
Temp: 5.0 °C Seal: Y / N
Ice / Icebricks / NA

ALS

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	**TURNAROUND REQUIREMENTS :** ☒ Standard TAT (List due date):	**FOR LABORATORY USE ONLY (Circle)**
OFFICE:	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A
PROJECT: OFFICER SOUTH	**ALS QUOTE NO.:**	Free Ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: PS124554	**COC SEQUENCE NUMBER (Circle)** COC 1 2 3 4 5 6 7	Random Sample Temperature on Receipt? Yes No
PROJECT MANAGER:	**CONTACT PH:** OF: 1 2 3 4 5 6 7	Other comments:

SAMPLER:	**SAMPLER MOBILE:**	**RELINQUISHED BY:**	**RECEIVED BY:**
COC emailed to ALS? YES	**EDD FORMAT (or default):**		
Email Reports to (will default to PM if no other addresses are listed):		DATE/TIME:	DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed): accounts			

RELINQUISHED BY:	**RECEIVED BY:**
DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (Low)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
17	BH27 - 0.1	20-5 | 10:15	S	JAR + ASS	2									
18	BH27 -0.5													
19	BH27 - 1.0													
20	BH27 - 2.0													
21	BH32 - 0.1	20-5 | 10:50				/								
22	BH32 - 0.5					/								
23	BH32 - 1.0					/								
24	BH32 - 2.0					/								
25	BH32 - 3.0					/								
26	BH33 - 0.1	20-5 | 11:30				/								
27	BH33 - 0.5					/								
28	BH33 - 1.0					/								
29	BH33 - 2.0					/								
30	BH33 - 3.0					/								
31	BH19 - 0.1	20-5 | 12:40				/								
32	BH19 - 0.5	20-5 | 12:40				/								
				TOTAL	32									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	**TURNAROUND REQUIREMENTS :** ✠ Standard TAT (List due date):	**FOR LABORATORY USE ONLY (Circle)**
OFFICE:	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A
PROJECT: OFFILER SOUTH	**ALS QUOTE NO.:**	Freeze/frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: PS124554	**COC SEQUENCE NUMBER (Circle)** COC 1 2 3 4 5 6 7	Random Sample Temperature on Receipt °C
PROJECT MANAGER:	**CONTACT PH:** OF: 1 2 3 4 5 6 7	Other comments:
SAMPLER:	**SAMPLER MOBILE:**	
COC emailed to ALS? YES	**EDD FORMAT (or default):**	
Email Reports to (will default to PM if no other addresses are listed):		
Email Invoice to (will default to PM if no other addresses are listed): accounts		

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (FOX)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
33	BH19 - 1.0	20-5/12:40	S	JAR + ASS	2	✓								
34	BH19 - 2.0					✓								
35	BH19 - 3.0					✓								
36	BH16 - 0.1	20-5/14:30												
37	BH16 - 0.5													
38	BH16 - 1.0													
39	BH16 - 2.0													
40	BH16 - 3.0													
41	DUP05 - 210520	20-5/12:40				✓								
42	DUP06 - 210520	20-5/12:40				✓								Forward to Eurofins
43	BH21 - 0.1													
44	BH21 - 0.5													
45	BH21 - 1.0													
46	BH21 - 2.0													
47	BH21 - 3.0													
				TOTAL	30									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2109392**	Page	: 1 of 7
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Contact	: Graeme Jablonskas
Address	: Level 15, 28 Freshwater Place SOUTHBANK VIC, AUSTRALIA 3006	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 9861 1111	Telephone	: +6138549 9609
Project	: PS124554	Date Samples Received	: 20-May-2021 17:30
Order number	: PS124554	Date Analysis Commenced	: 25-May-2021
C-O-C number	: ----	Issue Date	: 25-May-2021 15:30
Sampler	: EL		
Site	: Officer South		
Quote number	: ME/167/21		
No. of samples received	: 45		
No. of samples analysed	: 21		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

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

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
~ = Indicates an estimated value.

- ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH30-0.1	BH30-0.5	BH30-1.0	BH30-2.0	BH30-3.0
			Sampling date / time	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2109392-001	EM2109392-002	EM2109392-003	EM2109392-004	EM2109392-005
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**5.4**	**5.2**	**6.0**	**6.8**	**7.1**
pH (Fox)	----	0.1	pH Unit	**3.5**	**3.6**	**4.9**	**5.7**	**6.0**
Reaction Rate	----	1	-	**1**	**2**	**1**	**1**	**2**

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Sample ID	BH32-0.1	BH32-0.5	BH32-1.0	BH32-2.0	BH32-3.0
			Sampling date / time	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EM2109392-021**	**EM2109392-022**	**EM2109392-023**	**EM2109392-024**	**EM2109392-025**
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**5.2**	**6.1**	**7.4**	**7.5**	**7.7**
pH (Fox)	----	0.1	pH Unit	**2.8**	**4.3**	**5.7**	**5.6**	**5.7**
Reaction Rate	----	1	-	**3**	**2**	**1**	**1**	**1**

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	BH33-0.1	BH33-0.5	BH33-1.0	BH33-2.0	BH33-3.0
				Sampling date / time	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00
					EM2109392-026	EM2109392-027	EM2109392-028	EM2109392-029	EM2109392-030
					Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis									
pH (F)	----	0.1	pH Unit		**6.0**	**6.0**	**7.1**	**6.0**	**6.2**
pH (Fox)	----	0.1	pH Unit		**3.8**	**3.7**	**5.0**	**4.8**	**5.0**
Reaction Rate	----	1	-		**3**	**3**	**2**	**1**	**1**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH19-0.1	BH19-0.5	BH19-1.0	BH19-2.0	BH19-3.0
			Sampling date / time	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2109392-031	EM2109392-032	EM2109392-033	EM2109392-034	EM2109392-035
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**5.8**	**6.0**	**6.7**	**7.0**	**7.1**
pH (Fox)	----	0.1	pH Unit	**3.2**	**3.6**	**5.3**	**5.7**	**5.7**
Reaction Rate	----	1	-	**3**	**2**	**2**	**2**	**2**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	DUP05-210520	----	----	----	----
			Sampling date / time	20-May-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2109392-041	--------	--------	--------	--------
				Result	----	----	----	----
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**6.1**	----	----	----	----
pH (Fox)	----	0.1	pH Unit	**3.5**	----	----	----	----
Reaction Rate	----	1	-	**2**	----	----	----	----

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM2109392**	Page	: 1 of 3
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Contact	: Graeme Jablonskas
Address	: Level 15, 28 Freshwater Place SOUTHBANK VIC, AUSTRALIA 3006	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 9861 1111	Telephone	: +6138549 9609
Project	: PS124554	Date Samples Received	: 20-May-2021
Order number	: PS124554	Date Analysis Commenced	: 25-May-2021
C-O-C number	: ----	Issue Date	: 25-May-2021
Sampler	: EL		
Site	: Officer South		
Quote number	: ME/167/21		
No. of samples received	: 45		
No. of samples analysed	: 21		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

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

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

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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA037: Ass Field Screening Analysis (QC Lot: 3693252)									
EM2109392-001	BH30-0.1	EA037: Reaction Rate	----	1	-	1	1	0.0	No Limit
		EA037: pH (F)	----	0.1	pH Unit	5.4	5.4	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	3.5	3.5	0.0	0% - 20%
EM2109392-025	BH32-3.0	EA037: Reaction Rate	----	1	-	1	1	0.0	No Limit
		EA037: pH (F)	----	0.1	pH Unit	7.7	7.6	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	5.7	5.8	0.0	0% - 20%
EA037: Ass Field Screening Analysis (QC Lot: 3693253)									
EM2109392-041	DUP05-210520	EA037: Reaction Rate	----	1	-	2	2	0.0	No Limit
		EA037: pH (F)	----	0.1	pH Unit	6.1	6.0	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	3.5	3.6	0.0	0% - 20%

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (LCS) Results are required to be reported.**

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2109392**	Page	: 1 of 4
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Telephone	: +6138549 9609
Project	: PS124554	Date Samples Received	: 20-May-2021
Site	: Officer South	Issue Date	: 25-May-2021
Sampler	: EL	No. of samples received	: 45
Order number	: PS124554	No. of samples analysed	: 21

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA037: Ass Field Screening Analysis							
Snap Lock Bag - frozen on receipt at ALS (EA037)							
BH30-0.1, BH30-0.5, BH30-1.0, BH30-2.0, BH30-3.0, BH32-0.1, BH32-0.5, BH32-1.0, BH32-2.0, BH32-3.0, BH33-0.1, BH33-0.5, BH33-1.0, BH33-2.0, BH33-3.0, BH19-0.1, BH19-0.5, BH19-1.0, BH19-2.0, BH19-3.0, DUP05-210520	**20-May-2021**	**25-May-2021**	16-Nov-2021	✓	**25-May-2021**	16-Nov-2021	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
ASS Field Screening Analysis	EA037	3	28	**10.71**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
ASS Field Screening Analysis	* EA037	SOIL	In house: Referenced to Acid Sulfate Soils Laboratory Methods Guidelines. As received samples are tested for pH field and pH fox and assessed for a reaction rating.

Preparation Methods	Method	Matrix	Method Descriptions
Drying only	* EN020D	SOIL	In house

ALS Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EM2109498**

Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Contact	: Graeme Jablonskas
Address	: Level 15, 28 Freshwater Place SOUTHBANK VIC, AUSTRALIA 3006	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: shane.giliam@wsp.com	E-mail	: graeme.jablonskas@alsglobal.com
Telephone	: +61 03 9861 1111	Telephone	: +6138549 9609
Facsimile	: +61 03 9861 1144	Facsimile	: +61-3-8549 9626
Project	: PS124554	Page	: 1 of 4
Order number	: ----	Quote number	: EM2021PARBRIVIC0004 (ME/167/21)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Officer South		
Sampler	: EL		

Dates

Date Samples Received	: 21-May-2021 15:35	Issue Date	: 21-May-2021
Client Requested Due Date	: 28-May-2021	Scheduled Reporting Date	: **28-May-2021**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 4	Temperature	: 6.7°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 61 / 22

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	(On Hold) SOIL No analysis requested	SOIL - EA037 ASS Field Screening Analysis
EM2109498-001	21-May-2021 00:00	BH11-0.1		✓
EM2109498-002	21-May-2021 00:00	BH11-0.5		✓
EM2109498-003	21-May-2021 00:00	BH11-1.0		✓
EM2109498-004	21-May-2021 00:00	BH11-2.0		✓
EM2109498-005	21-May-2021 00:00	BH11-3.0		✓
EM2109498-006	21-May-2021 00:00	BH09-0.1	✓	
EM2109498-007	21-May-2021 00:00	BH09-0.5	✓	
EM2109498-008	21-May-2021 00:00	BH09-1.0	✓	
EM2109498-009	21-May-2021 00:00	BH09-2.0	✓	
EM2109498-010	21-May-2021 00:00	BH03-0.1		✓
EM2109498-011	21-May-2021 00:00	BH03-0.5		✓
EM2109498-012	21-May-2021 00:00	BH03-1.0		✓
EM2109498-013	21-May-2021 00:00	BH03-2.0		✓
EM2109498-014	21-May-2021 00:00	BH03-3.0		✓
EM2109498-015	21-May-2021 00:00	DUP07-210521		✓
EM2109498-016	21-May-2021 00:00	BH17-0.1		✓
EM2109498-017	21-May-2021 00:00	BH17-0.5		✓
EM2109498-018	21-May-2021 00:00	BH17-1.0		✓
EM2109498-019	21-May-2021 00:00	BH17-2.0		✓
EM2109498-020	21-May-2021 00:00	BH17-3.0		✓
EM2109498-021	21-May-2021 00:00	DUP09-210521		✓
EM2109498-022	21-May-2021 00:00	BH22-0.1	✓	
EM2109498-023	21-May-2021 00:00	BH22-0.5	✓	
EM2109498-024	21-May-2021 00:00	BH22-1.0	✓	
EM2109498-025	21-May-2021 00:00	BH22-2.0	✓	
EM2109498-026	21-May-2021 00:00	BH14-0.1	✓	
EM2109498-027	21-May-2021 00:00	BH14-0.5	✓	
EM2109498-028	21-May-2021 00:00	BH14-1.0	✓	
EM2109498-029	21-May-2021 00:00	BH14-2.0	✓	
EM2109498-030	21-May-2021 00:00	BH06-0.1	✓	
EM2109498-031	21-May-2021 00:00	BH06-0.5	✓	
EM2109498-032	21-May-2021 00:00	BH06-1.0	✓	
EM2109498-033	21-May-2021 00:00	BH06-2.0	✓	
EM2109498-034	21-May-2021 00:00	BH43-0.1		✓
EM2109498-035	21-May-2021 00:00	BH43-0.5		✓

			(On Hold) SOIL No analysis requested	SOIL - EA037 ASS Field Screening Analysis
EM2109498-036	21-May-2021 00:00	BH43-1.0		✓
EM2109498-037	21-May-2021 00:00	BH43-2.0		✓
EM2109498-038	21-May-2021 00:00	BH43-3.0		✓
EM2109498-039	21-May-2021 00:00	BH07-0.1	✓	
EM2109498-040	21-May-2021 00:00	BH07-0.5	✓	
EM2109498-041	21-May-2021 00:00	BH07-1.0	✓	
EM2109498-042	21-May-2021 00:00	BH07-2.0	✓	
EM2109498-043	21-May-2021 00:00	BH07-3.0	✓	
EM2109498-044	21-May-2021 00:00	BH10-0.1	✓	
EM2109498-045	21-May-2021 00:00	BH10-0.5	✓	
EM2109498-046	21-May-2021 00:00	BH10-1.0	✓	
EM2109498-047	21-May-2021 00:00	BH10-2.0	✓	
EM2109498-048	21-May-2021 00:00	BH15-0.1	✓	
EM2109498-049	21-May-2021 00:00	BH15-0.5	✓	
EM2109498-050	21-May-2021 00:00	BH15-1.0	✓	
EM2109498-051	21-May-2021 00:00	BH15-2.0	✓	
EM2109498-052	21-May-2021 00:00	BH45-0.1	✓	
EM2109498-053	21-May-2021 00:00	BH45-0.5	✓	
EM2109498-054	21-May-2021 00:00	BH45-1.0	✓	
EM2109498-055	21-May-2021 00:00	BH45-2.0	✓	
EM2109498-056	21-May-2021 00:00	BH45-3.0	✓	
EM2109498-057	21-May-2021 00:00	BH38-0.1	✓	
EM2109498-058	21-May-2021 00:00	BH38-0.5	✓	
EM2109498-059	21-May-2021 00:00	BH38-1.0	✓	
EM2109498-060	21-May-2021 00:00	BH38-2.0	✓	
EM2109498-061	21-May-2021 00:00	BH38-3.0	✓	

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

Accounts PayableAU		
- A4 - AU Tax Invoice (INV)	Email	AU.AccountsPayable@wsp.com
ALL INVOICES		
- A4 - AU Tax Invoice (INV)	Email	AU.AccountsPayable@wsp.com
EVAN LISHMUND		
- *AU Certificate of Analysis - NATA (COA)	Email	evan.lishmund@wsp.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	evan.lishmund@wsp.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	evan.lishmund@wsp.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	evan.lishmund@wsp.com
- Chain of Custody (CoC) (COC)	Email	evan.lishmund@wsp.com
- EDI Format - ENMRG (ENMRG)	Email	evan.lishmund@wsp.com
- EDI Format - ESDAT (ESDAT)	Email	evan.lishmund@wsp.com
SHANE GILIAM		
- *AU Certificate of Analysis - NATA (COA)	Email	shane.giliam@wsp.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	shane.giliam@wsp.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	shane.giliam@wsp.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	shane.giliam@wsp.com
- Chain of Custody (CoC) (COC)	Email	shane.giliam@wsp.com
- EDI Format - ENMRG (ENMRG)	Email	shane.giliam@wsp.com
- EDI Format - ESDAT (ESDAT)	Email	shane.giliam@wsp.com

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	TURNAROUND REQUIREMENTS: ✠ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE:	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody seal intact? Yes / No / N/A
PROJECT: OFFICER SOUTH	ALS QUOTE NO.: ME-167-21	Free ice / frozen ice bricks present upon receipt? Yes / No / N/A
ORDER NUMBER: PS124554	COC SEQUENCE NUMBER (Circle) COC 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: SHANE GILLAM	CONTACT PH: 0437 007 739	Other comments:
SAMPLER: EVAN LISHMUND	SAMPLER MOBILE: 0426 84. 033	OF: 1 2 3 4 5 6 7
COC emailed to ALS? YES	EDD FORMAT (or default):	
Email Reports to (will default to PM if no other addresses are listed): Shane + Evan		
Email Invoice to (will default to PM if no other addresses are listed): accounts		

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (Field)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	BH11-0.1	21-5/07:50	S	JAR + AIS	2	✓								Received: 21/5 1535. Carrier: Client
2	BH11-0.5					✓								C/note:
3	BH11-1.0					✓								Temp: 6.7 °C Seal: Y / N
4	BH11-2.0					✓								Ice / Icebricks / NA
5	BH11-3.0					✓								
6	BH09-0.1	21-5/08:30												
7	BH09-0.5													
8	BH09-1.0													
9	BH09-2.0													
10	BH03-0.1	21-5/08:50				✓								
11	BH03-0.5					✓								
12	BH03-1.0					✓								
13	BH03-2.0					✓								
14	BH03-3.0					✓								
15	DUP01-210521					✓								
—	DUP08-210521					✓								Forward to Eurofins
				TOTAL										

Environmental Division
Melbourne
Work Order Reference
EM2109498

Telephone : +61-3-8549 9600

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5800 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	✠ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):
OFFICE:		
PROJECT: OFFICER SOUTH	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle) COC 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
ORDER NUMBER: PS124554		
PROJECT MANAGER: SHANE GILLAM	CONTACT PH:	
SAMPLER: EVAN HISHMUND	SAMPLER MOBILE: 0426891033	
COC emailed to ALS? YES	EDD FORMAT (or default):	
Email Reports to (will default to PM if no other addresses are listed):		
Email Invoice to (will default to PM if no other addresses are listed): accounts		

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes / No / N/A
Free ice / frozen ice bricks present upon receipt? Yes / No / N/A
Random Sample Temperature on Receipt: °C
Other comments:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (Soil)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
16	BH17 - 0.1	21-5 | 10:00	S	JAR + AP	2	✓								
17	BH17 - 0.5					✓								
18	BH17 - 1.0					✓								
19	BH17 - 2.0					✓								
20	BH17 - 3.0					✓								
21	DUP09 - 210521					✓								
—	DUP10 - 210521					✓								Forward to Eurofins
22	BH22 - 0.1	21-5 | 10:20												
23	BH22 - 0.5	21-5												
24	BH22 - 1.0													
25	BH22 - 2.0													
26	BH14 - 0.1	21-5 | 11:45												
27	BH14 - 0.5													
28	BH14 - 1.0													
29	BH14 - 2.0													
30	BH06 - 0.1	21-5 | 12:05												
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	✠ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):
OFFICE:		
PROJECT: OFFICER SOUTH	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)** COC 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
ORDER NUMBER: PS124554		
PROJECT MANAGER: SHANE GILLAM	**CONTACT PH:**	
SAMPLER: EVAN LISHMUND	**SAMPLER MOBILE:**	
COC emailed to ALS? YES	**EDD FORMAT (or default):**	
Email Reports to (will default to PM if no other addresses are listed):		
Email Invoice to (will default to PM if no other addresses are listed): accounts		

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt		°C	
Other comment:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	PM (Cox)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
31	BH06 - 0.5	21-05 | 12:05	S	JAR + ASS	2									
32	BH06 - 1.0													
33	BH06 - 2.0													
34	BH43 - 0.1	21-5 | 12:20				/								
35	BH43 - 0.5					/								
36	BH43 - 1.0					/								
37	BH43 - 2.0					/								
38	BH43 - 3.0					/								
39	BH07 - 0.1	21-5 | 12:35												
40	BH07 - 0.5													
41	BH07 - 1.0													
42	BH07 - 2.0													
43	BH07 - 3.0													
44	BH10 - 0.1	21-5 | 12:55												
45	BH10 - 0.5													
46	BH10 - 1.0													
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserve
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
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☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph. 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	✠ Standard TAT (**List due date**):
OFFICE:		☐ Non Standard or urgent TAT (**List due date**):
PROJECT: OFFICER SOUTH	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)** COC 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
ORDER NUMBER: PS124554		
PROJECT MANAGER:	**CONTACT PH:**	
SAMPLER:	**SAMPLER MOBILE:**	
COC emailed to ALS? YES	**EDD FORMAT (or default):**	
Email Reports to (will default to PM if no other addresses are listed):		
Email Invoice to (will default to PM if no other addresses are listed): accounts		

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: °C
Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (Cox)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
47	BH10 - 2.0	21-5 | 12:55	S	JAR + ASS	2									
48	BH15 - 0.1	21-5 | 13:15				/								
49	BH15 - 0.5					/								
50	BH15 - 1.0					/								
51	BH15 - 2.0					/								
52	BH45 - 0.1	21-5 | 13:50												
53	BH45 - 0.5													
54	BH45 - 1.0													
55	BH45 - 2.0													
56	BH45 - 7.0													
57	BH38 - 0.1	21-5 | 14:30												
58	BH38 - 0.5													
59	BH38 - 1.0													
60	BH38 - 2.0													
61	BH38 - 3.0													
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
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MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
SYDNEY 277-289 Woodpark Ph: 02 8784 8555 E: samples.sy
TOWNSVILLE 14-15 Desma Ph: 07 4796 0600 E: townsville.e
WOLLONGONG 99 Kenny Stree Ph: 02 4225 3125 E: portkembla@al

CLIENT: WSP

OFFICE:

PROJECT: OFFICER SOUTH

ORDER NUMBER: PS124554

PROJECT MANAGER: SHANE GILIAM

SAMPLER: EVAN LISHMUND

CONTACT PH: 0437 007 779

SAMPLER MOBILE: 0426 84. 033

COC emailed to ALS? YES

EDD FORMAT (or default):

Email Reports to (will default to PM if no other addresses are listed): Shane + Evan

Email Invoice to (will default to PM if no other addresses are listed): accounts

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS: ☒ Standard TAT (List due date):
(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.: ME-167-21

COC SEQUENCE NUMBER (Circle)
COC 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)
Custody seal intact? Yes / No / N/A
Free ice / frozen ice bricks present upon receipt? Yes / No / N/A
Random Sample Temperature on Receipt °C
Other comments:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

ALS USE	SAMPLE DETAILS - MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).	Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (lab)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	BH11-0.1	21-5/07:50	S	JAR + AIS	2	✓	
2	BH11-0.5					✓	
3	BH11-1.0					✓	
4	BH11-2.0					✓	
5	BH11-3.0					✓	
6	BH09-0.1	21-5/08:30				✓	
7	BH09-0.5					✓	
8	BH09-1.0						
9	BH09-2.0						
10	BH03-0.1	21-5/08:50					
11	BH03-0.5						
12	BH03-1.0					✓	
13	BH03-2.0					✓	
14	BH03-3.0					✓	
15	DUP01-210521					✓	
—	DUP08-210521					✓	
					TOTAL	✓	

Received: 21/5 1535.
C/note:
Temp: 6.7 °C Seal: Y / N
Ice / Icebricks / NA
Carrier: Client

Environmental Division
Melbourne
Work Order Reference
EM2109498

Telephone : +61-3-8549 9600

Forward to Eurofins

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserv
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

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☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville environmental@alsglobal.com

☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	✠ Standard TAT (List due date):
OFFICE:		☐ Non Standard or urgent TAT (List due date):
PROJECT: OFFICER SOUTH	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle): COC 1 2 3 4 5 6 7 / OF: 1 2 3 4 5 6 7
ORDER NUMBER: PS124554		
PROJECT MANAGER: SHANE GILLAM	CONTACT PH:	
SAMPLER: EVAN LISHMUND	SAMPLER MOBILE: 0426 891033	
COC emailed to ALS? YES	EDD FORMAT (or default):	
Email Reports to (will default to PM if no other addresses are listed):		
Email Invoice to (will default to PM if no other addresses are listed): accounts		
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:		

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (Lab)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
16	BH17 - 0.1	21-5 | 10:00	S	JAR + ACE	2	✓								
17	BH17 - 0.5					✓								
18	BH17 - 1.0					✓								
19	BH17 - 2.0					✓								
20	BH17 - 3.0					✓								
21	DUP09 - 210521					✓								
—	DUP10 - 210521					✓								
22	BH22 - 0.1	21-5 | 10:20				✓								Forward to Eurofins
23	BH22 - 0.5	21-5												
24	BH22 - 1.0													
25	BH22 - 2.0													
26	BH14 - 0.1	21-5 | 11:45												
27	BH14 - 0.5													
28	BH14 - 1.0													
29	BH14 - 2.0													
30	BH14 - 0.1	21-5 | 12:05												
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 8735 E: mudgee.mail@alsglobal.com

NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	**TURNAROUND REQUIREMENTS :** ✠ Standard TAT (List due date):	**FOR LABORATORY USE ONLY (Circle)**
OFFICE:	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes / No / N/A
PROJECT: OFFICER SOUTH	**ALS QUOTE NO.:**	Free Ice / Frozen Ice Bricks present upon receipt? Yes / No / N/A
ORDER NUMBER: PS124554		Random Sample Temperature on Receipt: °C
PROJECT MANAGER: SHANE GILFAM	**CONTACT PH:**	Other comment:
SAMPLER: EVAN LISHMUND	**SAMPLER MOBILE:**	
COC emailed to ALS? YES	**EDD FORMAT (or default):**	
Email Reports to (will default to PM if no other addresses are listed):		
Email Invoice to (will default to PM if no other addresses are listed): accounts		

COC SEQUENCE NUMBER (Circle)

COC 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	pH (Lab)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
31	BH06 - 0.5	21-05 | 12:05	S	JAR + ASS	2									
32	BH06 - 1.0													
33	BH06 - 2.0													
34	BH43 - 0.1	21-5 | 12:20				✓								
35	BH43 - 0.5					✓								
36	BH43 - 1.0					✓								
37	BH43 - 2.0					✓								
38	BH43 - 3.0					✓								
39	BH07 - 0.1	21-5 | 12:35												
40	BH07 - 0.5													
41	BH07 - 1.0													
42	BH07 - 2.0													
43	BH07 - 3.0													
44	BH10 - 0.1	21-5 | 12:55												
45	BH10 - 0.5													
46	BH10 - 1.0													
					TOTAL									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	✠ Standard TAT (List due date): ☐ Non Standard or urgent TAT (List due date):
OFFICE:		
PROJECT: OFFICER SOUTH	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)** COC 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
ORDER NUMBER: PS124554		
PROJECT MANAGER:	**CONTACT PH:**	
SAMPLER:	**SAMPLER MOBILE:**	
COC emailed to ALS? YES	**EDD FORMAT (or default):**	
Email Reports to (will default to PM if no other addresses are listed):		
Email Invoice to (will default to PM if no other addresses are listed): accounts		

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt		°C	
Other comment:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)
Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).

(ALS USE)	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION									Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (Cox)							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
47	BH10 - 2.0	21-5 | 12:55	2	JAR + ASS	2								
48	BH15 - 0.1	21-5 | 13:15				/							
49	BH15 - 0.5					/							
50	BH15 - 1.0					/							
51	BH15 - 2.0					/							
52	BH45 - 0.1	21-5 | 13:50											
53	BH45 - 0.5												
54	BH45 - 1.0												
55	BH45 - 2.0												
56	BH45 - 7.0												
57	BH38 - 0.1	21-5 | 14:30											
58	BH38 - 0.5												
59	BH38 - 1.0												
60	BH38 - 2.0												
61	BH38 - 3.0												
				TOTAL									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2109498**	Page	: 1 of 7
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Contact	: Graeme Jablonskas
Address	: Level 15, 28 Freshwater Place SOUTHBANK VIC, AUSTRALIA 3006	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 9861 1111	Telephone	: +6138549 9609
Project	: PS124554	Date Samples Received	: 21-May-2021 15:35
Order number	: ----	Date Analysis Commenced	: 25-May-2021
C-O-C number	: ----	Issue Date	: 27-May-2021 08:34
Sampler	: EL		
Site	: Officer South		
Quote number	: ME/167/21		
No. of samples received	: 61		
No. of samples analysed	: 22		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

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

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
~ = Indicates an estimated value.

- ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH11-0.1	BH11-0.5	BH11-1.0	BH11-2.0	BH11-3.0
			Sampling date / time	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2109498-001	EM2109498-002	EM2109498-003	EM2109498-004	EM2109498-005
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**5.4**	**5.2**	**5.2**	**5.7**	**8.0**
pH (Fox)	----	0.1	pH Unit	**2.8**	**3.5**	**2.8**	**3.6**	**5.8**
Reaction Rate	----	1	-	**3**	**2**	**3**	**2**	**1**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH03-0.1	BH03-0.5	BH03-1.0	BH03-2.0	BH03-3.0
			Sampling date / time	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2109498-010	EM2109498-011	EM2109498-012	EM2109498-013	EM2109498-014
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**6.2**	**6.2**	**7.2**	**7.8**	**7.8**
pH (Fox)	----	0.1	pH Unit	**2.3**	**4.3**	**5.5**	**5.8**	**8.0**
Reaction Rate	----	1	-	**3**	**2**	**2**	**2**	**4**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	DUP07-210521	BH17-0.1	BH17-0.5	BH17-1.0	BH17-2.0
			Sampling date / time	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2109498-015	EM2109498-016	EM2109498-017	EM2109498-018	EM2109498-019
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**6.2**	**5.6**	**6.6**	**6.1**	**6.4**
pH (Fox)	----	0.1	pH Unit	**3.0**	**2.7**	**4.3**	**4.3**	**4.6**
Reaction Rate	----	1	-	**3**	**3**	**3**	**3**	**2**

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Sample ID	BH17-3.0	DUP09-210521	BH43-0.1	BH43-0.5	BH43-1.0
			Sampling date / time	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EM2109498-020**	**EM2109498-021**	**EM2109498-034**	**EM2109498-035**	**EM2109498-036**
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**6.2**	**6.7**	**5.5**	**6.4**	**7.0**
pH (Fox)	----	0.1	pH Unit	**4.2**	**4.9**	**2.5**	**4.1**	**4.3**
Reaction Rate	----	1	-	**2**	**3**	**3**	**2**	**2**

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Sample ID	**BH43-2.0**	**BH43-3.0**	**----**	**----**	**----**
			Sampling date / time	21-May-2021 00:00	21-May-2021 00:00	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EM2109498-037**	**EM2109498-038**	**--------**	**--------**	**--------**
				Result	Result	----	----	----
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**7.1**	**7.3**	**----**	**----**	**----**
pH (Fox)	----	0.1	pH Unit	**5.2**	**5.6**	**----**	**----**	**----**
Reaction Rate	----	1	-	**1**	**1**	**----**	**----**	**----**

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM2109498**	Page	: 1 of 3
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Contact	: Graeme Jablonskas
Address	: Level 15, 28 Freshwater Place SOUTHBANK VIC, AUSTRALIA 3006	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 9861 1111	Telephone	: +6138549 9609
Project	: PS124554	Date Samples Received	: 21-May-2021
Order number	: ----	Date Analysis Commenced	: 25-May-2021
C-O-C number	: ----	Issue Date	: 27-May-2021
Sampler	: EL		
Site	: Officer South		
Quote number	: ME/167/21		
No. of samples received	: 61		
No. of samples analysed	: 22		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	*Position*	*Accreditation Category*
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

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

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

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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA037: Ass Field Screening Analysis (QC Lot: 3695926)									
EM2109418-003	Anonymous	EA037: Reaction Rate	----	1	-	4	4	0.0	No Limit
		EA037: pH (F)	----	0.1	pH Unit	8.6	8.6	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	7.7	7.8	0.0	0% - 20%
EM2109498-011	BH03-0.5	EA037: Reaction Rate	----	1	-	2	2	0.0	No Limit
		EA037: pH (F)	----	0.1	pH Unit	6.2	6.3	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	4.3	4.3	0.0	0% - 20%
EA037: Ass Field Screening Analysis (QC Lot: 3695927)									
EM2109498-034	BH43-0.1	EA037: Reaction Rate	----	1	-	3	3	0.0	No Limit
		EA037: pH (F)	----	0.1	pH Unit	5.5	5.5	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	2.5	2.5	0.0	0% - 20%
EM2109521-028	Anonymous	EA037: Reaction Rate	----	1	-	2	2	0.0	No Limit
		EA037: pH (F)	----	0.1	pH Unit	7.2	7.2	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	3.6	3.5	3.6	0% - 20%

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (LCS) Results are required to be reported.**

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2109498**	Page	: 1 of 4
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Telephone	: +6138549 9609
Project	: PS124554	Date Samples Received	: 21-May-2021
Site	: Officer South	Issue Date	: 27-May-2021
Sampler	: EL	No. of samples received	: 61
Order number	: ----	No. of samples analysed	: 22

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA037: Ass Field Screening Analysis							
Snap Lock Bag - frozen on receipt at ALS (EA037)							
BH11-0.1, BH11-0.5, BH11-1.0, BH11-2.0, BH11-3.0, BH03-0.1, BH03-0.5, BH03-1.0, BH03-2.0, BH03-3.0, DUP07-210521, BH17-0.1, BH17-0.5, BH17-1.0, BH17-2.0, BH17-3.0, DUP09-210521, BH43-0.1, BH43-0.5, BH43-1.0, BH43-2.0	**21-May-2021**	**25-May-2021**	17-Nov-2021	✓	**26-May-2021**	17-Nov-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA037)							
BH43-3.0	**21-May-2021**	**26-May-2021**	17-Nov-2021	✓	**26-May-2021**	17-Nov-2021	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
ASS Field Screening Analysis	EA037	4	30	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
ASS Field Screening Analysis	* EA037	SOIL	In house: Referenced to Acid Sulfate Soils Laboratory Methods Guidelines. As received samples are tested for pH field and pH fox and assessed for a reaction rating.

Preparation Methods	Method	Matrix	Method Descriptions
Drying only	* EN020D	SOIL	In house

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2109607**		
Amendment	: **1**		
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Contact	: Graeme Jablonskas
Address	: Level 15, 28 Freshwater Place SOUTHBANK VIC, AUSTRALIA 3006	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: shane.giliam@wsp.com	E-mail	: graeme.jablonskas@alsglobal.com
Telephone	: +61 03 9861 1111	Telephone	: +6138549 9609
Facsimile	: +61 03 9861 1144	Facsimile	: +61-3-8549 9626
Project	: PS124554	Page	: 1 of 3
Order number	: ----	Quote number	: EM2021PARBRIVIC0004 (ME/167/21)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Officer South		
Sampler	: EVAN LISHMUND		

Dates

Date Samples Received	: 24-May-2021 14:45	Issue Date	: 31-May-2021
Client Requested Due Date	: 31-May-2021	Scheduled Reporting Date	: **31-May-2021**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 4	Temperature	: 4.3°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 38 / 25

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	(On Hold) SOIL No analysis requested	SOIL - EA037 ASS Field Screening Analysis
EM2109607-001	24-May-2021 08:18	BH42-0.1		✓
EM2109607-002	24-May-2021 08:18	BH42-0.5		✓
EM2109607-003	24-May-2021 08:18	BH42-1.0		✓
EM2109607-004	24-May-2021 08:18	BH42-2.0		✓
EM2109607-005	24-May-2021 08:18	BH42-3.0		✓
EM2109607-006	24-May-2021 08:35	BH36-0.1		✓
EM2109607-007	24-May-2021 08:35	BH36-0.5		✓
EM2109607-008	24-May-2021 08:35	BH36-1.0		✓
EM2109607-009	24-May-2021 08:35	BH36-2.0		✓
EM2109607-010	24-May-2021 08:35	BH36-3.0		✓
EM2109607-011	24-May-2021 09:00	BH35-0.1	✓	
EM2109607-012	24-May-2021 09:00	BH35-0.5	✓	
EM2109607-013	24-May-2021 09:00	BH35-1.0	✓	
EM2109607-014	24-May-2021 09:00	BH35-2.0	✓	
EM2109607-015	24-May-2021 09:20	BH44-0.1		✓
EM2109607-016	24-May-2021 09:20	BH44-0.5		✓
EM2109607-017	24-May-2021 09:20	BH44-1.0		✓
EM2109607-018	24-May-2021 09:20	BH44-2.0		✓
EM2109607-019	24-May-2021 09:20	BH44-3.0		✓
EM2109607-020	24-May-2021 09:40	BH31-0.1	✓	
EM2109607-021	24-May-2021 09:40	BH31-0.5	✓	
EM2109607-022	24-May-2021 09:40	BH31-1.0	✓	
EM2109607-023	24-May-2021 09:40	BH31-2.0	✓	
EM2109607-024	24-May-2021 10:10	BH34-0.1		✓
EM2109607-025	24-May-2021 10:10	BH34-0.5		✓
EM2109607-026	24-May-2021 10:10	BH34-1.0		✓
EM2109607-027	24-May-2021 10:10	BH34-2.0		✓
EM2109607-028	24-May-2021 10:10	BH34-3.0		✓
EM2109607-029	24-May-2021 10:35	BH37-0.1	✓	
EM2109607-030	24-May-2021 10:35	BH37-0.5	✓	
EM2109607-031	24-May-2021 10:35	BH37-1.0	✓	
EM2109607-032	24-May-2021 10:35	BH37-2.0	✓	
EM2109607-033	24-May-2021 10:35	BH37-3.0	✓	
EM2109607-034	24-May-2021 11:20	BH28-0.1		✓
EM2109607-035	24-May-2021 11:20	BH28-0.5		✓

			(On Hold) SOIL No analysis requested	SOIL - EA037 ASS Field Screening Analysis
EM2109607-036	24-May-2021 11:20	BH28-1.0		✓
EM2109607-037	24-May-2021 11:20	BH28-2.0		✓
EM2109607-038	24-May-2021 11:20	BH28-3.0		✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICES

- A4 - AU Tax Invoice (INV)	Email	AU.AccountsPayable@wsp.com

EVAN LISHMUND

- *AU Certificate of Analysis - NATA (COA)	Email	evan.lishmund@wsp.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	evan.lishmund@wsp.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	evan.lishmund@wsp.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	evan.lishmund@wsp.com
- Chain of Custody (CoC) (COC)	Email	evan.lishmund@wsp.com
- EDI Format - ENMRG (ENMRG)	Email	evan.lishmund@wsp.com
- EDI Format - ESDAT (ESDAT)	Email	evan.lishmund@wsp.com

SHANE GILIAM

- *AU Certificate of Analysis - NATA (COA)	Email	shane.giliam@wsp.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	shane.giliam@wsp.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	shane.giliam@wsp.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	shane.giliam@wsp.com
- Chain of Custody (CoC) (COC)	Email	shane.giliam@wsp.com
- EDI Format - ENMRG (ENMRG)	Email	shane.giliam@wsp.com
- EDI Format - ESDAT (ESDAT)	Email	shane.giliam@wsp.com

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville environmental@alsglobal.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☒ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle): Custody Seal Intact? Yes No N/A
OFFICE:		☐ Non Standard or urgent TAT (List due date):	Free ice / frozen ice bricks present upon receipt? Yes No N/A
PROJECT: OFFICER SOUTH	ALS QUOTE NO.: ME-169-21	COC SEQUENCE NUMBER (Circle) COC 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
ORDER NUMBER: PS124554		OF: 1 2 3 4 5 6 7	Other comments:
PROJECT MANAGER: SHANE GILLAM	CONTACT PH: 0437003739		
SAMPLER: EVAN USHMUND	SAMPLER MOBILE: 0426 891 033		
COC emailed to ALS? YES	EDD FORMAT (or default):		
Email Reports to (will default to PM if no other addresses are listed): Evan + Shane			
Email Invoice to (will default to PM if no other addresses are listed): accounts			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
EVAN USHMUND			
DATE/TIME: 24/5/21 14:45	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).							Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (Fax)							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	BH42 - 0.1	24-5 | 08:15	S	JAR + AJJ	2	/							
2	BH42 - 0.5					/							
3	BH42 - 1.0					/							
4	BH42 - 2.0					/							
5	BH42 - 3.0					/							
6	BH36 - 0.1	24-5 | 08:35				/							
7	BH36 - 0.5					/							
8	BH36 - 1.0					/							
9	BH36 - 2.0					/							
10	BH36 - 3.0					/							
11	BH35 - 0.1	24-5 | 09:00											
12	BH35 - 0.5												
13	BH35 - 1.0												
14	BH35 - 2.0												
15	BH44 - 0.1	24-5 | 09:20				/							
16	BH44 - 0.5					/							
				TOTAL									

Environmental Division
Melbourne
Work Order Reference
EM2109607

Telephone : +61-3-8549 9600

Received: 24-5, 14:45 Carrier:

C/note: 4.3 -0.5 °C Seal: Y N

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AV = Airfreight Unpreserved Vial; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; R = Formaldehyde Preserved; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP

OFFICE:

PROJECT: OFFICER SOUTH

ORDER NUMBER: PS124554

PROJECT MANAGER:

SAMPLER:

CONTACT PH:

SAMPLER MOBILE:

COC emailed to ALS? YES

EDD FORMAT (or default):

Email Reports to (will default to PM if no other addresses are listed):

Email Invoice to (will default to PM if no other addresses are listed): accounts

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)

☒ Standard TAT (List due date):

☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.:

COC SEQUENCE NUMBER (Circle)

COC 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

ALS USE | SAMPLE DETAILS MATRIX: SOLID (S) WATER (W) | CONTAINER INFORMATION | ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). | Additional Information

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (x6)								Additional Information
17	BH44 - 1.0	24-5 | 09:20	S	SAR + ASS	2	✓								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
18	BH44 - 2.0					✓								
19	BH44 - 3.0					✓								
20	BH31 - 0.1	24-5 | 09:40												
21	BH31 - 0.5													
22	BH31 - 1.0													
23	BH31 - 2.0													
24	BH34 - 0.1	24-5 | 10:10												
25	BH34 - 0.5					✓								
26	BH34 - 1.0					✓								
27	BH34 - 2.0					✓								
28	BH34 - 3.0					✓								
29	BH37 - 0.1	24-5 | 12:35				✓								
30	BH37 - 0.5													
31	BH37 - 1.0													
32	BH37 - 2.0													
					TOTAL									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserve
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
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☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
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☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP
OFFICE:
PROJECT: OFFICER SOUTH
ORDER NUMBER: PS124554
PROJECT MANAGER:
CONTACT PH:
SAMPLER:
SAMPLER MOBILE:
COC emailed to ALS? YES
EDD FORMAT (or default):
Email Reports to (will default to PM if no other addresses are listed):
Email Invoice to (will default to PM if no other addresses are listed): accounts
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)
☒ Standard TAT (List due date):
☐ Non Standard or urgent TAT (List due date):
ALS QUOTE NO.:

COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: °C
Other comment:

RELINQUISHED BY: DATE/TIME:
RECEIVED BY: DATE/TIME:
RELINQUISHED BY: DATE/TIME:
RECEIVED BY: [signature] DATE/TIME:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).	Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (fox)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
33	BH34-3.0	24-5 / 10:35	S	JAR + ASS	2		
34	BH28-0.4	24-5 / 11:20				/	
35	BH28-0.5					/	
36	BH28-1.0	24-5 / 14:40				/	
37	BH28-2.0					/	
38	BH28-3.0					/	
				TOTAL			

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	TURNAROUND REQUIREMENTS: ✠ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE:	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	Yes / No / N/A
PROJECT: OFFICER SOUTH	ALS QUOTE NO.: ME-169-21	Free ice / frozen ice bricks present upon receipt?	Yes / No / N/A
ORDER NUMBER: PS124554	COC SEQUENCE NUMBER (Circle) COC 1 2 3 4 5 6 7	Random Sample Temperature on Receipt:	°C
PROJECT MANAGER: SHANE GILLAM	CONTACT PH: 0432003739	OF: 1 2 3 4 5 6 7	Other comments:
SAMPLER: EVAN USHMUND	SAMPLER MOBILE: 0421 891 033		
COC emailed to ALS? YES	EDD FORMAT (or default):		
Email Reports to (will default to PM if no other addresses are listed): Evan + Shane			
Email Invoice to (will default to PM if no other addresses are listed): accounts			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
EVAN USHMUND			
DATE/TIME: 24/5/21 14:45	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).							Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (lab)							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	BH42-0.1	24-5 08:15	S	JAR + AJS	2	/							
2	BH42-0.5					/							
3	BH42-1.0					/							
4	BH42-2.0					/							
5	BH42-3.0					/							
6	BH36-0.1	24-5 08:35				/							
7	BH36-0.5					/							
8	BH36-1.0					/							
9	BH36-2.0					/							
10	BH36-3.0					/							
11	BH35-0.1	24-5 09:00											
12	BH35-0.5												
13	BH35-1.0												
14	BH35-2.0												
15	BH44-0.1	24-5 09:20				/							
16	BH44-0.5					/							
					TOTAL								

Environmental Division Melbourne
Work Order Reference
EM2109607

Telephone : +61-3-8549 9600

Received: 24/5, 14:45 Carrier:
C/note: 4-3-10-9
Temp: °C Seal: Y N

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AV = Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

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☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	✻ Standard TAT (List due date):
OFFICE:		☐ Non Standard or urgent TAT (List due date):
PROJECT: OFFICER SOUTH	ALS QUOTE NO.:	
ORDER NUMBER: PS124554		COC SEQUENCE NUMBER (Circle): COC 1 2 3 4 5 6 7 / OF: 1 2 3 4 5 6 7
PROJECT MANAGER:	CONTACT PH:	
SAMPLER:	SAMPLER MOBILE:	
COC emailed to ALS? YES	EDD FORMAT (or default):	
Email Reports to (will default to PM if no other addresses are listed):		
Email Invoice to (will default to PM if no other addresses are listed): accounts		

FOR LABORATORY USE ONLY (Circle):
Custody Seal Intact? Yes / No / N/A
Free ice / frozen ice bricks present upon receipt? Yes / No / N/A
Random Sample Temperature on Receipt: °C
Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME: Nov 24

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price). Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (Fox)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
17	BH44 - 1.0	24-5 | 09:20	S	SAR + ASS	2	✓								
18	BH44 - 2.0					✓								
19	BH44 - 3.0					✓								
20	BH31 - 0.1	24-5 | 09:40												
21	BH31 - 0.5													
22	BH31 - 1.0													
23	BH31 - 2.0													
24	BH34 - 0.1	24-5 | 10:10				✓								
25	BH34 - 0.5					✓								
26	BH34 - 1.0					✓								
27	BH34 - 2.0					✓								
28	BH34 - 3.0					✓								
29	BH37 - 0.1	24-5 | 10:35												
30	BH37 - 0.5													
31	BH37 - 1.0													
32	BH37 < 2.0													
					TOTAL									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

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WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☒ Standard TAT (List due date):
OFFICE:		☐ Non Standard or urgent TAT (List due date):
PROJECT: OFFICER SOUTH	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)** COC 1 2 3 4 5 6 7
ORDER NUMBER: 08124554		OF: 1 2 3 4 5 6 7
PROJECT MANAGER:	**CONTACT PH:**	
SAMPLER:	**SAMPLER MOBILE:**	
COC emailed to ALS? YES	**EDD FORMAT (or default):**	
Email Reports to (will default to PM if no other addresses are listed):		
Email Invoice to (will default to PM if no other addresses are listed): accounts		

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:			°C
Other comment:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	PM (Fox)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
33	BH34 - 3.0	24-5 | 10:35	S	JAR + ASS	2									
34	BH28 - 0.5	24-5 | 11:20				/								
35	BH28 - 0.5					/								
36	BH28 - 1.0	24-5 | 11:40				/								
37	BH28 - 2.0					/								
38	BH28 - 3.0					/								
				TOTAL										

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserve
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2109607**	Page	: 1 of 7
Amendment	: **1**		
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Contact	: Graeme Jablonskas
Address	: Level 15, 28 Freshwater Place SOUTHBANK VIC, AUSTRALIA 3006	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 9861 1111	Telephone	: +6138549 9609
Project	: PS124554	Date Samples Received	: 24-May-2021 14:45
Order number	: ----	Date Analysis Commenced	: 27-May-2021
C-O-C number	: ----	Issue Date	: 31-May-2021 12:06
Sampler	: EVAN LISHMUND		
Site	: Officer South		
Quote number	: ME/167/21		
No. of samples received	: 38		
No. of samples analysed	: 25		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Arenie Vijayaratnam	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC

General Comments

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

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
~ = Indicates an estimated value.

- Amendment (31/5/21):This report has been amended following the correction of sample IDs to BH34-0.1 (#24) and BH34-0.5 (#25). All results remained unchanged.
- ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Sample ID	BH42-0.1	BH42-0.5	BH42-1.0	BH42-2.0	BH42-3.0
			Sampling date / time	24-May-2021 08:18	24-May-2021 08:18	24-May-2021 08:18	24-May-2021 08:18	24-May-2021 08:18
Compound	*CAS Number*	*LOR*	*Unit*	**EM2109607-001**	**EM2109607-002**	**EM2109607-003**	**EM2109607-004**	**EM2109607-005**
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**5.7**	**6.2**	**6.4**	**5.6**	**5.7**
pH (Fox)	----	0.1	pH Unit	**4.1**	**4.1**	**4.7**	**4.5**	**4.4**
Reaction Rate	----	1	-	**4**	**3**	**2**	**2**	**2**

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	BH36-0.1	BH36-0.5	BH36-1.0	BH36-2.0	BH36-3.0
				Sampling date / time	24-May-2021 08:35	24-May-2021 08:35	24-May-2021 08:35	24-May-2021 08:35	24-May-2021 08:35
					EM2109607-006	EM2109607-007	EM2109607-008	EM2109607-009	EM2109607-010
					Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis									
pH (F)	----	0.1	pH Unit		**6.2**	**5.9**	**6.0**	**6.5**	**6.7**
pH (Fox)	----	0.1	pH Unit		**4.4**	**4.5**	**4.6**	**5.6**	**5.6**
Reaction Rate	----	1	-		**4**	**4**	**2**	**2**	**2**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH44-0.1	BH44-0.5	BH44-1.0	BH44-2.0	BH44-3.0
			Sampling date / time	24-May-2021 09:20	24-May-2021 09:20	24-May-2021 09:20	24-May-2021 09:20	24-May-2021 09:20
Compound	CAS Number	LOR	Unit	EM2109607-015	EM2109607-016	EM2109607-017	EM2109607-018	EM2109607-019
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**6.0**	**6.0**	**5.3**	**4.9**	**4.7**
pH (Fox)	----	0.1	pH Unit	**4.0**	**4.2**	**3.7**	**3.8**	**3.8**
Reaction Rate	----	1	-	**3**	**2**	**2**	**2**	**2**

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	Sample ID	BH34-0.1	BH34-0.5	BH34-1.0	BH34-2.0	BH34-3.0
				Sampling date / time	24-May-2021 10:10	24-May-2021 10:10	24-May-2021 10:10	24-May-2021 10:10	24-May-2021 10:10
					EM2109607-024	EM2109607-025	EM2109607-026	EM2109607-027	EM2109607-028
					Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis									
pH (F)	----	0.1	pH Unit		**5.9**	**7.5**	**7.2**	**5.6**	**7.2**
pH (Fox)	----	0.1	pH Unit		**4.1**	**5.3**	**5.4**	**4.4**	**5.8**
Reaction Rate	----	1	-		**4**	**4**	**2**	**2**	**1**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH28-0.1	BH28-0.5	BH28-1.0	BH28-2.0	BH28-3.0
			Sampling date / time	24-May-2021 11:20	24-May-2021 11:20	24-May-2021 11:20	24-May-2021 11:20	24-May-2021 11:20
Compound	CAS Number	LOR	Unit	EM2109607-034	EM2109607-035	EM2109607-036	EM2109607-037	EM2109607-038
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**5.5**	**5.7**	**5.8**	**5.4**	**4.8**
pH (Fox)	----	0.1	pH Unit	**3.9**	**4.0**	**4.1**	**4.2**	**3.4**
Reaction Rate	----	1	-	**4**	**4**	**2**	**1**	**1**

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM2109607**	Page	: 1 of 3
Amendment	: **1**		
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Contact	: Graeme Jablonskas
Address	: Level 15, 28 Freshwater Place SOUTHBANK VIC, AUSTRALIA 3006	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 9861 1111	Telephone	: +6138549 9609
Project	: PS124554	Date Samples Received	: 24-May-2021
Order number	: ----	Date Analysis Commenced	: 27-May-2021
C-O-C number	: ----	Issue Date	: 31-May-2021
Sampler	: EVAN LISHMUND		
Site	: Officer South		
Quote number	: ME/167/21		
No. of samples received	: 38		
No. of samples analysed	: 25		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	*Position*	*Accreditation Category*
Arenie Vijayaratnam	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC

General Comments

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

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

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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA037: Ass Field Screening Analysis (QC Lot: 3698439)									
EM2109607-001	BH42-0.1	EA037: Reaction Rate	----	1	-	4	4	0.0	No Limit
		EA037: pH (F)	----	0.1	pH Unit	5.7	5.8	2.1	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	4.1	4.4	8.0	0% - 20%
EM2109607-010	BH36-3.0	EA037: Reaction Rate	----	1	-	2	2	0.0	No Limit
		EA037: pH (F)	----	0.1	pH Unit	6.7	6.8	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	5.6	5.6	0.0	0% - 20%
EA037: Ass Field Screening Analysis (QC Lot: 3698440)									
EM2109607-034	BH28-0.1	EA037: Reaction Rate	----	1	-	4	4	0.0	No Limit
		EA037: pH (F)	----	0.1	pH Unit	5.5	5.6	0.0	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	3.9	3.9	0.0	0% - 20%

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (LCS) Results are required to be reported.**

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2109607**	Page	: 1 of 4
Amendment	: **1**		
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Telephone	: +6138549 9609
Project	: PS124554	Date Samples Received	: 24-May-2021
Site	: Officer South	Issue Date	: 31-May-2021
Sampler	: EVAN LISHMUND	No. of samples received	: 38
Order number	: ----	No. of samples analysed	: 25

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA037: Ass Field Screening Analysis							
Snap Lock Bag - frozen on receipt at ALS (EA037)							
BH42-0.1, BH42-0.5, BH42-1.0, BH42-2.0, BH42-3.0, BH36-0.1, BH36-0.5, BH36-1.0, BH36-2.0, BH36-3.0, BH44-0.1, BH44-0.5, BH44-1.0, BH44-2.0, BH44-3.0, BH34-0.1, BH34-0.5, BH34-1.0, BH34-2.0, BH34-3.0, BH28-0.1, BH28-0.5, BH28-1.0, BH28-2.0, BH28-3.0	**24-May-2021**	**27-May-2021**	20-Nov-2021	✓	**27-May-2021**	20-Nov-2021	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
ASS Field Screening Analysis	EA037	3	28	**10.71**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
ASS Field Screening Analysis	* EA037	SOIL	In house: Referenced to Acid Sulfate Soils Laboratory Methods Guidelines. As received samples are tested for pH field and pH fox and assessed for a reaction rating.

Preparation Methods	Method	Matrix	Method Descriptions
Drying only	* EN020D	SOIL	In house

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2110602**		
Amendment	: **1**		
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Contact	: Graeme Jablonskas
Address	: Level 15, 28 Freshwater Place SOUTHBANK VIC, AUSTRALIA 3006	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: shane.giliam@wsp.com	E-mail	: graeme.jablonskas@alsglobal.com
Telephone	: +61 03 9861 1111	Telephone	: +6138549 9609
Facsimile	: +61 03 9861 1144	Facsimile	: +61-3-8549 9626
Project	: PS124554	Page	: 1 of 4
Order number	: ----	Quote number	: EM2021PARBRIVIC0004 (ME/167/21)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 19-May-2021 17:15	Issue Date	: 06-Jul-2021
Client Requested Due Date	: 22-Jun-2021	Scheduled Reporting Date	: **22-Jun-2021**

Delivery Details

Mode of Delivery	: Samples On Hand	Security Seal	: Not Available
No. of coolers/boxes	: ----	Temperature	: ----
Receipt Detail	:	No. of samples received / analysed	: 68 / 68

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale and ALS Brisbane.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- This is a rebatch of EM2109285, EM2109498, EM2109392, and EM2109706.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - AG-1 EM Only Agricultural (CEC) Soil Suite 1 (pretest air dried)	SOIL - EA029 SPOCAS	SOIL - EA033 Chromium Suite for Acid Sulphate Soils	SOIL - EA058 Emerson Aggregate Test
EM2110602-001	19-May-2021 00:00	BH01-0.5	✓			✓
EM2110602-002	19-May-2021 00:00	BH01-1.0	✓			✓
EM2110602-003	19-May-2021 00:00	BH01-2.0	✓			✓
EM2110602-004	19-May-2021 00:00	BH01-3.0	✓			✓
EM2110602-005	19-May-2021 00:00	BH02-0.1	✓			✓
EM2110602-006	19-May-2021 00:00	BH02-0.5	✓			✓
EM2110602-007	19-May-2021 00:00	BH02-1.0	✓			✓
EM2110602-008	21-May-2021 00:00	BH03-0.1			✓	
EM2110602-009	19-May-2021 00:00	BH08-1.0	✓			✓
EM2110602-010	19-May-2021 00:00	BH08-2.0	✓			✓
EM2110602-011	21-May-2021 00:00	BH09-0.1	✓			✓
EM2110602-013	21-May-2021 00:00	BH09-1.0	✓			✓
EM2110602-014	21-May-2021 00:00	BH11-0.1			✓	
EM2110602-015	21-May-2021 00:00	BH11-0.5	✓		✓	✓
EM2110602-016	21-May-2021 00:00	BH11-1.0	✓		✓	✓
EM2110602-017	21-May-2021 00:00	BH11-2.0	✓		✓	✓
EM2110602-018	21-May-2021 00:00	BH11-3.0	✓		✓	✓
EM2110602-019	21-May-2021 00:00	BH17-0.5	✓			✓
EM2110602-020	21-May-2021 00:00	BH17-1.0	✓			✓
EM2110602-021	21-May-2021 00:00	BH17-2.0	✓			✓
EM2110602-022	21-May-2021 00:00	BH17-3.0	✓			✓
EM2110602-023	19-May-2021 00:00	BH19-0.1	✓			✓
EM2110602-024	19-May-2021 00:00	BH19-0.5	✓			✓
EM2110602-025	19-May-2021 00:00	BH19-1.0	✓			✓
EM2110602-026	19-May-2021 00:00	BH19-2.0	✓			✓
EM2110602-027	19-May-2021 00:00	BH21-0.5	✓			✓
EM2110602-028	19-May-2021 00:00	BH21-1.0	✓			✓
EM2110602-029	19-May-2021 00:00	BH21-2.0	✓			✓
EM2110602-030	21-May-2021 00:00	BH22-0.5	✓			✓
EM2110602-031	21-May-2021 00:00	BH22-1.0	✓			✓
EM2110602-032	21-May-2021 00:00	BH22-2.0	✓			✓
EM2110602-033	19-May-2021 00:00	BH24-0.5	✓			✓
EM2110602-034	19-May-2021 00:00	BH24-1.0	✓			✓
EM2110602-035	19-May-2021 00:00	BH24-2.0	✓			✓
EM2110602-036	19-May-2021 00:00	BH25-0.1	✓			✓

			SOIL - AG-1 EM Only Agricultural (CEC) Soil Suite 1 (pretest air dried)	SOIL - EA029 SPOCAS	SOIL - EA033 Chromium Suite for Acid Sulphate Soils	SOIL - EA058 Emerson Aggregate Test
EM2110602-037	19-May-2021 00:00	BH25-0.5	✓			✓
EM2110602-038	19-May-2021 00:00	BH25-1.0	✓			✓
EM2110602-039	19-May-2021 00:00	BH25-2.0	✓			✓
EM2110602-040	20-May-2021 00:00	BH26-0.5	✓			✓
EM2110602-041	20-May-2021 00:00	BH26-1.0	✓			✓
EM2110602-042	20-May-2021 00:00	BH26-2.0	✓			✓
EM2110602-043	24-May-2021 00:00	BH28-0.1			✓	
EM2110602-044	24-May-2021 00:00	BH28-0.5	✓		✓	✓
EM2110602-045	24-May-2021 00:00	BH28-1.0	✓		✓	✓
EM2110602-046	24-May-2021 00:00	BH28-2.0	✓		✓	✓
EM2110602-047	24-May-2021 00:00	BH28-3.0			✓	
EM2110602-048	20-May-2021 00:00	BH32-0.1	✓			✓
EM2110602-049	20-May-2021 00:00	BH32-0.5	✓			✓
EM2110602-050	20-May-2021 00:00	BH32-1.0	✓			✓
EM2110602-051	20-May-2021 00:00	BH32-2.0	✓			✓
EM2110602-052	20-May-2021 00:00	BH33-0.1			✓	
EM2110602-053	20-May-2021 00:00	BH33-0.5	✓	✓	✓	✓
EM2110602-054	20-May-2021 00:00	BH33-1.0	✓		✓	✓
EM2110602-055	20-May-2021 00:00	BH33-2.0	✓		✓	✓
EM2110602-056	24-May-2021 00:00	BH36-0.5	✓			✓
EM2110602-057	24-May-2021 00:00	BH36-1.0	✓			✓
EM2110602-058	24-May-2021 00:00	BH36-2.0	✓			✓
EM2110602-059	24-May-2021 00:00	BH36-3.0	✓			✓
EM2110602-060	19-May-2021 00:00	BH41-0.5			✓	
EM2110602-061	19-May-2021 00:00	BH41-1.0			✓	
EM2110602-062	19-May-2021 00:00	BH41-3.0			✓	
EM2110602-063	24-May-2021 00:00	BH44-0.1			✓	
EM2110602-064	24-May-2021 00:00	BH44-1.0			✓	
EM2110602-065	24-May-2021 00:00	BH44-2.0			✓	
EM2110602-066	24-May-2021 00:00	BH44-3.0			✓	
EM2110602-067	20-May-2021 00:00	DUP05-210520	✓			✓
EM2110602-068	21-May-2021 00:00	DUP07-210521			✓	
EM2110602-069	21-May-2021 00:00	DUP09-210521	✓			✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

Accounts PayableAU		
- A4 - AU Tax Invoice (INV)	Email	AU.AccountsPayable@wsp.com
ALL INVOICES		
- A4 - AU Tax Invoice (INV)	Email	AU.AccountsPayable@wsp.com
EVAN LISHMUND		
- *AU Certificate of Analysis - NATA (COA)	Email	evan.lishmund@wsp.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	evan.lishmund@wsp.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	evan.lishmund@wsp.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	evan.lishmund@wsp.com
- Chain of Custody (CoC) (COC)	Email	evan.lishmund@wsp.com
- EDI Format - ENMRG (ENMRG)	Email	evan.lishmund@wsp.com
- EDI Format - ESDAT (ESDAT)	Email	evan.lishmund@wsp.com
SHANE GILIAM		
- *AU Certificate of Analysis - NATA (COA)	Email	shane.giliam@wsp.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	shane.giliam@wsp.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	shane.giliam@wsp.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	shane.giliam@wsp.com
- Chain of Custody (CoC) (COC)	Email	shane.giliam@wsp.com
- EDI Format - ENMRG (ENMRG)	Email	shane.giliam@wsp.com
- EDI Format - ESDAT (ESDAT)	Email	shane.giliam@wsp.com

Rebatch

Client / Client code: PARBRIVIC
Project: PS124554
Project Manger: SHANE GILIAM
Date /time sample rec: Various
Date/time Instructions rec: Wed 2/06/2021 2:36 PM
Due date: 5 day TAT

CS Contact: gj
Additional Information:

New Lab ID	Sample information: Client ID	Sampling Date / Time	Previous Work Order Reference	Previous ALS ID	Tray Number(s)	Container	Number of Containers	Analysis: Standard: Emerson Class Dispersion Testing + Exchangeable Sodium Percentage	Standard: Chromium Suite	Standard: SPOCAS Suite	Standard	Standard	Leach	Leach	Leach	Leach	Leach	Shortest Holding time expiry
1	BH01-0.5		EM2109285	2	MS2708-21, Freezer C1			X										
2	BH01-1.0		EM2109285	3	MS2708-21, Freezer C1			X										
3	BH01-2.0		EM2109285	4	MS2708-21, Freezer C1			X										
4	BH01-3.0		EM2109285	5	MS2708-21, Freezer C1			X										
5	BH02-0.1		EM2109285	11	MS2708-21, Freezer C1			X										
6	BH02-0.5		EM2109285	12	MS2708-21, Freezer C1			X										
7	BH02-1.0		EM2109285	13	MS2708-21, Freezer C1			X										
8	BH03-0.1		EM2109498	10					X									
9	BH08-1.0		EM2109285	33	MS2708-21, Freezer C1			X										
10	BH08-2.0		EM2109285	34	MS2708-21, Freezer C1			X										
11	BH09-0.1		EM2109498	6	HS:1240-1245			X										
12	BH09-0.5		EM2109498	7	Freezer B7			X										
13	BH09-1.0		EM2109498	8				X										
14	BH11-0.1		EM2109498	1					X									
15	BH11-0.5		EM2109498	2				X	X									
16	BH11-1.0		EM2109498	3				X	X									
17	BH11-2.0		EM2109498	4				X	X									
18	BH11-3.0		EM2109498	5				X	X									
19	BH17-0.5		EM2109498	17				X										
20	BH17-1.0		EM2109498	18				X										
21	BH17-2.0		EM2109498	19				X										
22	BH17-3.0		EM2109498	20				X										
23	BH19-0.1		EM2109285	31	MS2708-21, Freezer C1			X										
24	BH19-0.5		EM2109285	32	MS2708-21, Freezer C1			X										
25	BH19-1.0		EM2109285	33	MS2708-21, Freezer C1			X										
26	BH19-2.0		EM2109285	34	MS2708-21, Freezer C1			X										
27	BH21-0.5		EM2109285	44	MS2708-21, Freezer C1			X										
28	BH21-1.0		EM2109285	45	MS2708-21, Freezer C1			X										
29	BH21-2.0		EM2109285	46	MS2708-21, Freezer C1			X										
30	BH22-0.5		EM2109498	23				X										
31	BH22-1.0		EM2109498	24				X										

Environmental Division
Melbourne
Work Order Reference
EM2110602

Telephone : +61-3-8549 9600

Rebatch

Client / Client code: PARBRIVIC
Project: PS124554
Project Manger: SHANE GILIAM
Date /time sample rec: Various
Date/time Instructions rec: Wed 2/06/2021 2:36 PM
Due date: 5 day TAT

CS Contact: gj
Additional Information:

New Lab ID	Sample information						Number of Containers	Analysis										Shortest Holding time expiry
								Standard					Leach					
	Client ID	Sampling Date / Time	Previous Work Order Reference	Previous ALS ID	Tray Number(s)	Container		Emerson Class Dispersion Testing + Exchangeable Sodium Percentage	Chromium Suite	SPOCAS Suite								
32	BH22-2.0		EM2109498	25				X										
33	BH24-0.5		EM2109285	50	MS2708-21, Freezer C1			X										
34	BH24-1.0		EM2109285	51	MS2708-21, Freezer C1			X										
35	BH24-2.0		EM2109285	52	MS2708-21, Freezer C1			X										
36	BH25-0.1		EM2109285	62	MS2708-21, Freezer C1			X										
37	BH25-0.5		EM2109285	63	MS2708-21, Freezer C1			X										
38	BH25-1.0		EM2109285	64	MS2708-21, Freezer C1			X										
39	BH25-2.0		EM2109285	65	MS2708-21, Freezer C1			X										
40	BH26-0.5		EM2109392	14	HS1229-33, Freezer B1			X										
41	BH26-1.0		EM2109392	15	HS1229-33, Freezer B1			X										
42	BH26-2.0		EM2109392	16	HS1229-33, Freezer B1			X										
43	BH28-0.1		EM2109607	34	MS2780-2, HS1259, Freezer C1				X									
44	BH28-0.5		EM2109607	35	MS2780-2, HS1259, Freezer C1			X	X									
45	BH28-1.0		EM2109607	36	MS2780-2, HS1259, Freezer C1			X	X									
46	BH28-2.0		EM2109607	37	MS2780-2, HS1259, Freezer C1			X	X									
47	BH28-3.0		EM2109607	38	MS2780-2, HS1259, Freezer C1				X									
48	BH32-0.1		EM2109392	21	HS1229-33, Freezer B1			X										
49	BH32-0.5		EM2109392	22	HS1229-33, Freezer B1			X										
50	BH32-1.0		EM2109392	23	HS1229-33, Freezer B1			X										
51	BH32-2.0		EM2109392	24	HS1229-33, Freezer B1			X										
52	BH33-0.1		EM2109392	26	HS1229-33, Freezer B1				X									
53	BH33-0.5		EM2109392	27	HS1229-33, Freezer B1			X	X	X								
54	BH33-1.0		EM2109392	28	HS1229-33, Freezer B1			X	X									
55	BH33-2.0		EM2109392	29	HS1229-33, Freezer B1			X	X									
56	BH36-0.5		EM2109607	7	MS2780-2, HS1259, Freezer C1			X										
57	BH36-1.0		EM2109607	8	MS2780-2, HS1259, Freezer C1			X										
58	BH36-2.0		EM2109607	9	MS2780-2, HS1259, Freezer C1			X										
59	BH36-3.0		EM2109607	10	MS2780-2, HS1259, Freezer C1			X										
60	BH41-0.5		EM2109285	7	MS2708-21, Freezer C1				X									
61	BH41-1.0		EM2109285	8	MS2708-21, Freezer C1				X									
62	BH41-3.0		EM2109285	10	MS2708-21, Freezer C1				X									

Rebatch

Client / Client code: PARBRIVIC
Project: PS124554
Project Manger: SHANE GILIAM
Date /time sample rec: Various
Date/time Instructions rec: Wed 2/06/2021 2:36 PM
Due date: 5 day TAT

CS Contact: gj
Additional Information:

New Lab ID	Sample information						Number of Containers	Analysis										Shortest Holding time expiry
								Standard					Leach					
	Client ID	Sampling Date / Time	Previous Work Order Reference	Previous ALS ID	Tray Number(s)	Container		Emerson Class Dispersion Testing + Exchangeable Sodium Percentage	Chromium Suite	SPOCAS Suite								
63	BH44-0.1		EM2109607	15	MS2780-2, HS1259, Freezer C1				X									
64	BH44-1.0		EM2109607	17	MS2780-2, HS1259, Freezer C1				X									
65	BH44-2.0		EM2109607	18	MS2780-2, HS1259, Freezer C1				X									
66	BH44-3.0		EM2109607	19	MS2780-2, HS1259, Freezer C1				X									
67	DUP05-210520		EM2109392	41	HS1229-33, Freezer B1			X										
68	DUP07-210521		EM2109498	15					X									
69	DUP09-210521		EM2109498	21				X										
						TOTAL	0											

[EXTERNAL] - Officer South

Lishmund, Evan <Evan.Lishmund@wsp.com>

Wed 6/2/2021 2:36 PM

To: Graeme Jablonskas <Graeme.Jablonskas@alsglobal.com>
Cc: Giliam, Shane <Shane.Giliam@wsp.com>

Graeme,

Can I please request the below analysis on standard TAT:

Sample ID	Laboratory Sample ID	Emerson Class Dispersion Testing + Exchangeable Sodium Percentage	Chromium Reducible Sulfur Suite	SPOCAS Suite
BH01-0.5	EM2109285-002	X		
BH01-1.0	EM2109285-003	X		
BH01-2.0	EM2109285-004	X		
BH01-3.0	EM2109285-005	X		
BH02-0.1	EM2109285-011	X		
BH02-0.5	EM2109285-012	X		
BH02-1.0	EM2109285-013	X		
BH03-0.1	EM2109498010		X	
BH08-1.0	EM2109285-033	X		
BH08-2.0	EM2109285-034	X		
BH09-0.1	EM2109498-006	X		
BH09-0.5	EM2109498-007	X		
BH09-1.0	EM2109498-008	X		
BH11-0.1	EM2109498001		X	
BH11-0.5	EM2109498-002	X	X	
BH11-1.0	EM2109498-003	X	X	
BH11-2.0	EM2109498-004	X	X	
BH11-3.0	EM2109498-005	X	X	
BH17-0.5	EM2109498-017	X		
BH17-1.0	EM2109498-018	X		
BH17-2.0	EM2109498-019	X		
BH17-3.0	EM2109498-020	X		
BH19-0.1	EM2109285-031	X		
BH19-0.5	EM2109285-032	X		
BH19-1.0	EM2109285-033	X		
BH19-2.0	EM2109285-034	X		
BH21-0.5	EM2109285-044	X		
BH21-1.0	EM2109285-045	X		
BH21-2.0	EM2109285-046	X		
BH22-0.5	EM2109498-023	X		
BH22-1.0	EM2109498-024	X		
BH22-2.0	EM2109498-025	X		
BH24-0.5	EM2109285-050	X		
BH24-1.0	EM2109285-051	X		
BH24-2.0	EM2109285-052	X		
BH25-0.1	EM2109285-062	X		
BH25-0.5	EM2109285-063	X		

BH25-1.0	EM2109285-064	X		
BH25-2.0	EM2109285-065	X		
BH26-0.5	EM2109392-014	X		
BH26-1.0	EM2109392-015	X		
BH26-2.0	EM2109392-016	X		
BH28-0.1	EM2109607034		X	
BH28-0.5	EM2109607-035	X	X	
BH28-1.0	EM2109607-036	X	X	
BH28-2.0	EM2109607-037	X	X	
BH28-3.0	EM2109607038		X	
BH32-0.1	EM2109392-021	X		
BH32-0.5	EM2109392-022	X		
BH32-1.0	EM2109392-023	X		
BH32-2.0	EM2109392-024	X		
BH33-0.1	EM2109392026		X	
BH33-0.5	EM2109392-027	X	X	X
BH33-1.0	EM2109392-028	X	X	
BH33-2.0	EM2109392-028	X	X	
BH36-0.5	EM2109607-007	X		
BH36-1.0	EM2109607-008	X		
BH36-2.0	EM2109607-009	X		
BH36-3.0	EM2109607-010	X		
BH41-0.5	EM2109285007		X	
BH41-1.0	EM2109285008		X	
BH41-3.0	EM2109285010		X	
BH44-0.1	EM2109607015		X	
BH44-1.0	EM2109607017		X	
BH44-2.0	EM2109607018		X	
BH44-3.0	EM2109607019		X	
DUP05-210520	EM2109392-041	X		
DUP07-210521	EM2109498015		X	
DUP09-210521	EM2109498-021	X		

Let me know if there are any issues.

Cheers,

Evan Lishmund
Environmental Scientist

T: +61 3 8327 8691

Evan.Lishmund@wsp.com

WSP Australia Pty Limited
Level 15, 28 Freshwater Place
Southbank, VIC
3006 Australia

wsp.com/au

Rebatch

Client / Client code: PARBRIVIC
Project: PS124554
Project Manger: SHANE GILIAM
Date /time sample rec: Various
Date/time Instructions rec: Wed 2/06/2021 2:36 PM
Due date: 5 day TAT

CS Contact: gj
Additional Information:

New Lab ID	Sample information: Client ID	Sampling Date / Time	Previous Work Order Reference	Previous ALS ID	Tray Number(s)	Container	Number of Containers	Analysis: Standard: Emerson Class Dispersion Testing + Exchangeable Sodium Percentage	Chromium Suite	SPOCAS Suite			Leach					Shortest Holding time expiry
1	BH01-0.5		EM2109285	2	MS2708-21, Freezer C1			X										
2	BH01-1.0		EM2109285	3	MS2708-21, Freezer C1			X										
3	BH01-2.0		EM2109285	4	MS2708-21, Freezer C1			X										
4	BH01-3.0		EM2109285	5	MS2708-21, Freezer C1			X										
5	BH02-0.1		EM2109285	11	MS2708-21, Freezer C1			X										
6	BH02-0.5		EM2109285	12	MS2708-21, Freezer C1			X										
7	BH02-1.0		EM2109285	13	MS2708-21, Freezer C1			X										
8	BH03-0.1		EM2109498	10					X									
9	BH08-1.0		EM2109285	33	MS2708-21, Freezer C1			X										
10	BH08-2.0		EM2109285	34	MS2708-21, Freezer C1			X										
11	BH09-0.1		EM2109498	6	HS:1240-1245			X										
12	BH09-0.5		EM2109498	7	Freezer B7			X										
13	BH09-1.0		EM2109498	8				X										
14	BH11-0.1		EM2109498	1					X									
15	BH11-0.5		EM2109498	2				X	X									
16	BH11-1.0		EM2109498	3				X	X									
17	BH11-2.0		EM2109498	4				X	X									
18	BH11-3.0		EM2109498	5				X	X									
19	BH17-0.5		EM2109498	17				X										
20	BH17-1.0		EM2109498	18				X										
21	BH17-2.0		EM2109498	19				X										
22	BH17-3.0		EM2109498	20				X										
23	BH19-0.1		EM2109285	31	MS2708-21, Freezer C1			X										
24	BH19-0.5		EM2109285	32	MS2708-21, Freezer C1			X										
25	BH19-1.0		EM2109285	33	MS2708-21, Freezer C1			X										
26	BH19-2.0		EM2109285	34	MS2708-21, Freezer C1			X										
27	BH21-0.5		EM2109285	44	MS2708-21, Freezer C1			X										
28	BH21-1.0		EM2109285	45	MS2708-21, Freezer C1			X										
29	BH21-2.0		EM2109285	46	MS2708-21, Freezer C1			X										
30	BH22-0.5		EM2109498	23				X										
31	BH22-1.0		EM2109498	24				X										

Environmental Division
Melbourne
Work Order Reference
EM2110602

Telephone : +61-3-8549 9600

Rebatch

Client / Client code: PARBRIVIC
Project: PS124554
Project Manger: SHANE GILIAM
Date /time sample rec: Various
Date/time Instructions rec: Wed 2/06/2021 2:36 PM
Due date: 5 day TAT

CS Contact: gj
Additional Information:

New Lab ID	Sample information						Number of Containers	Analysis										Shortest Holding time expiry
								Standard					Leach					
	Client ID	Sampling Date / Time	Previous Work Order Reference	Previous ALS ID	Tray Number(s)	Container		Emerson Class Dispersion Testing + Exchangeable Sodium Percentage	Chromium Suite	SPOCAS Suite								
32	BH22-2.0		EM2109498	25				X										
33	BH24-0.5		EM2109285	50	MS2708-21, Freezer C1			X										
34	BH24-1.0		EM2109285	51	MS2708-21, Freezer C1			X										
35	BH24-2.0		EM2109285	52	MS2708-21, Freezer C1			X										
36	BH25-0.1		EM2109285	62	MS2708-21, Freezer C1			X										
37	BH25-0.5		EM2109285	63	MS2708-21, Freezer C1			X										
38	BH25-1.0		EM2109285	64	MS2708-21, Freezer C1			X										
39	BH25-2.0		EM2109285	65	MS2708-21, Freezer C1			X										
40	BH26-0.5		EM2109392	14	HS1229-33, Freezer B1			X										
41	BH26-1.0		EM2109392	15	HS1229-33, Freezer B1			X										
42	BH26-2.0		EM2109392	16	HS1229-33, Freezer B1			X										
43	BH28-0.1		EM2109607	34	MS2780-2, HS1259, Freezer C1				X									
44	BH28-0.5		EM2109607	35	MS2780-2, HS1259, Freezer C1			X	X									
45	BH28-1.0		EM2109607	36	MS2780-2, HS1259, Freezer C1			X	X									
46	BH28-2.0		EM2109607	37	MS2780-2, HS1259, Freezer C1			X	X									
47	BH28-3.0		EM2109607	38	MS2780-2, HS1259, Freezer C1				X									
48	BH32-0.1		EM2109392	21	HS1229-33, Freezer B1			X										
49	BH32-0.5		EM2109392	22	HS1229-33, Freezer B1			X										
50	BH32-1.0		EM2109392	23	HS1229-33, Freezer B1			X										
51	BH32-2.0		EM2109392	24	HS1229-33, Freezer B1			X										
52	BH33-0.1		EM2109392	26	HS1229-33, Freezer B1				X									
53	BH33-0.5		EM2109392	27	HS1229-33, Freezer B1			X	X	X								
54	BH33-1.0		EM2109392	28	HS1229-33, Freezer B1			X	X									
55	BH33-2.0		EM2109392	29	HS1229-33, Freezer B1			X	X									
56	BH36-0.5		EM2109607	7	MS2780-2, HS1259, Freezer C1			X										
57	BH36-1.0		EM2109607	8	MS2780-2, HS1259, Freezer C1			X										
58	BH36-2.0		EM2109607	9	MS2780-2, HS1259, Freezer C1			X										
59	BH36-3.0		EM2109607	10	MS2780-2, HS1259, Freezer C1			X										
60	BH41-0.5		EM2109285	7	MS2708-21, Freezer C1				X									
61	BH41-1.0		EM2109285	8	MS2708-21, Freezer C1				X									
62	BH41-3.0		EM2109285	10	MS2708-21, Freezer C1				X									

Rebatch

Client / Client code: PARBRIVIC
Project: PS124554
Project Manger: SHANE GILIAM
Date /time sample rec: Various
Date/time Instructions rec: Wed 2/06/2021 2:36 PM
Due date: 5 day TAT

CS Contact: gj
Additional Information:

New Lab ID	Sample information						Number of Containers	Analysis										Shortest Holding time expiry
								Standard					Leach					
	Client ID	Sampling Date / Time	Previous Work Order Reference	Previous ALS ID	Tray Number(s)	Container		Emerson Class Dispersion Testing + Exchangeable Sodium Percentage	Chromium Suite	SPOCAS Suite								
63	BH44-0.1		EM2109607	15	MS2780-2, HS1259, Freezer C1				X									
64	BH44-1.0		EM2109607	17	MS2780-2, HS1259, Freezer C1				X									
65	BH44-2.0		EM2109607	18	MS2780-2, HS1259, Freezer C1				X									
66	BH44-3.0		EM2109607	19	MS2780-2, HS1259, Freezer C1				X									
67	DUP05-210520		EM2109392	41	HS1229-33, Freezer B1			X										
68	DUP07-210521		EM2109498	15					X									
69	DUP09-210521		EM2109498	21				X										
						TOTAL	0											

[EXTERNAL] - Officer South

Lishmund, Evan <Evan.Lishmund@wsp.com>

Wed 6/2/2021 2:36 PM

To: Graeme Jablonskas <Graeme.Jablonskas@alsglobal.com>
Cc: Giliam, Shane <Shane.Giliam@wsp.com>

Graeme,

Can I please request the below analysis on standard TAT:

Sample ID	Laboratory Sample ID	Emerson Class Dispersion Testing + Exchangeable Sodium Percentage	Chromium Reducible Sulfur Suite	SPOCAS Suite
BH01-0.5	EM2109285-002	X		
BH01-1.0	EM2109285-003	X		
BH01-2.0	EM2109285-004	X		
BH01-3.0	EM2109285-005	X		
BH02-0.1	EM2109285-011	X		
BH02-0.5	EM2109285-012	X		
BH02-1.0	EM2109285-013	X		
BH03-0.1	EM2109498010		X	
BH08-1.0	EM2109285-033	X		
BH08-2.0	EM2109285-034	X		
BH09-0.1	EM2109498-006	X		
BH09-0.5	EM2109498-007	X		
BH09-1.0	EM2109498-008	X		
BH11-0.1	EM2109498001		X	
BH11-0.5	EM2109498-002	X	X	
BH11-1.0	EM2109498-003	X	X	
BH11-2.0	EM2109498-004	X	X	
BH11-3.0	EM2109498-005	X	X	
BH17-0.5	EM2109498-017	X		
BH17-1.0	EM2109498-018	X		
BH17-2.0	EM2109498-019	X		
BH17-3.0	EM2109498-020	X		
BH19-0.1	EM2109285-031	X		
BH19-0.5	EM2109285-032	X		
BH19-1.0	EM2109285-033	X		
BH19-2.0	EM2109285-034	X		
BH21-0.5	EM2109285-044	X		
BH21-1.0	EM2109285-045	X		
BH21-2.0	EM2109285-046	X		
BH22-0.5	EM2109498-023	X		
BH22-1.0	EM2109498-024	X		
BH22-2.0	EM2109498-025	X		
BH24-0.5	EM2109285-050	X		
BH24-1.0	EM2109285-051	X		
BH24-2.0	EM2109285-052	X		
BH25-0.1	EM2109285-062	X		
BH25-0.5	EM2109285-063	X		

BH25-1.0	EM2109285-064	X		
BH25-2.0	EM2109285-065	X		
BH26-0.5	EM2109392-014	X		
BH26-1.0	EM2109392-015	X		
BH26-2.0	EM2109392-016	X		
BH28-0.1	EM2109607034		X	
BH28-0.5	EM2109607-035	X	X	
BH28-1.0	EM2109607-036	X	X	
BH28-2.0	EM2109607-037	X	X	
BH28-3.0	EM2109607038		X	
BH32-0.1	EM2109392-021	X		
BH32-0.5	EM2109392-022	X		
BH32-1.0	EM2109392-023	X		
BH32-2.0	EM2109392-024	X		
BH33-0.1	EM2109392026		X	
BH33-0.5	EM2109392-027	X	X	X
BH33-1.0	EM2109392-028	X	X	
BH33-2.0	EM2109392-028	X	X	
BH36-0.5	EM2109607-007	X		
BH36-1.0	EM2109607-008	X		
BH36-2.0	EM2109607-009	X		
BH36-3.0	EM2109607-010	X		
BH41-0.5	EM2109285007		X	
BH41-1.0	EM2109285008		X	
BH41-3.0	EM2109285010		X	
BH44-0.1	EM2109607015		X	
BH44-1.0	EM2109607017		X	
BH44-2.0	EM2109607018		X	
BH44-3.0	EM2109607019		X	
DUP05-210520	EM2109392-041	X		
DUP07-210521	EM2109498015		X	
DUP09-210521	EM2109498-021	X		

Let me know if there are any issues.

Cheers,

Evan Lishmund
Environmental Scientist

T: +61 3 8327 8691

Evan.Lishmund@wsp.com

WSP Australia Pty Limited
Level 15, 28 Freshwater Place
Southbank, VIC
3006 Australia

wsp.com/au

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2110602**	Page	: 1 of 22
Amendment	: **1**		
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Contact	: Graeme Jablonskas
Address	: Level 15, 28 Freshwater Place SOUTHBANK VIC, AUSTRALIA 3006	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 9861 1111	Telephone	: +6138549 9609
Project	: PS124554	Date Samples Received	: 19-May-2021 17:15
Order number	: ----	Date Analysis Commenced	: 05-Jun-2021
C-O-C number	: ----	Issue Date	: 07-Jul-2021 10:18
Sampler	: ----		
Site	: ----		
Quote number	: ME/167/21		
No. of samples received	: 68		
No. of samples analysed	: 68		

Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- ED006 : Potassium for sample EM2110602 #3, 4, 18, 26, 42 and 50 have been detected at less than LOR therefore the Magnesium/ Potassium ratio calculation cannot be performed.
- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- ASS: EA029 (SPOCAS): Retained Acidity not required because pH KCl greater than or equal to 4.5
- ASS: EA033 (CRS Suite):Retained Acidity not required because pH KCl greater than or equal to 4.5
- ASS: EA033 (CRS Suite): ANC not required because pH KCl less than 6.5
- ASS: EA029 (SPOCAS): Excess ANC not required because pH OX less than 6.5.
- Amendment (6/07/21): This report has been amended to change incorrect holding time breaches displayed in the QCI report for pH and EC.
- This is a rebatch of EM2109285, EM2109498, EM2109392, and EM2109706.
- ASS: EA033 (CRS Suite): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m3'.
- ASS: EA029 (SPOCAS): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from kg/t dry weight to kg/m3 in-situ soil, multiply reported results x wet bulk density of soil in t/m3.
- EA058 Emerson: V. = Very, D. = Dark, L. = Light, VD. = Very Dark
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH01-0.5	BH01-1.0	BH01-2.0	BH01-3.0	BH02-0.1
			Sampling date / time	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2110602-001	EM2110602-002	EM2110602-003	EM2110602-004	EM2110602-005
				Result	Result	Result	Result	Result
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Grayish Brown (2.5Y 5/2)	Dark Grayish Brown (2.5Y 4/2)	Dark Grayish Brown (2.5Y 4/2)	Light Brownish Gray (2.5Y 6/2)	Light Olive Brown (2.5Y 5/3)
Texture	----	-	-	Sandy Clay Loam	Light Medium Clay	Sandy Loam	Sandy Loam	Clay Loam
Emerson Class Number	EC/TC	-	-	2	2	2	2	2
ED006: Exchangeable Cations on Alkaline Soils								
ø Exchangeable Calcium	----	0.2	meq/100g	1.9	2.5	0.6	0.8	----
ø Exchangeable Magnesium	----	0.2	meq/100g	6.6	8.8	1.9	2.5	----
ø Exchangeable Potassium	----	0.2	meq/100g	0.3	0.4	<0.2	<0.2	----
ø Exchangeable Sodium	----	0.2	meq/100g	1.7	2.1	0.8	1.2	----
ø Cation Exchange Capacity	----	0.2	meq/100g	10.5	13.8	3.3	4.6	----
ø Exchangeable Calcium Percent	----	0.2	%	18.5	18.2	18.5	16.6	----
ø Exchangeable Magnesium Percent	----	0.2	%	62.6	63.9	56.2	53.9	----
ø Exchangeable Potassium Percent	----	0.2	%	2.6	2.8	<0.2	3.5	----
ø Exchangeable Sodium Percent	----	0.2	%	16.3	15.1	25.3	26.1	----
ø Calcium/Magnesium Ratio	----	0.2	-	0.3	0.3	0.3	0.3	----
ø Magnesium/Potassium Ratio	----	0.2	-	23.6	23.2	----	----	----
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	----	3.3
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	----	7.1
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	----	0.2
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	----	1.8
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	----	12.4
Exchangeable Sodium Percent	----	0.1	%	----	----	----	----	14.8

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH02-0.5	BH02-1.0	BH03-0.1	BH08-1.0	BH08-2.0
			Sampling date / time	19-May-2021 00:00	19-May-2021 00:00	21-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2110602-006	EM2110602-007	EM2110602-008	EM2110602-009	EM2110602-010
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	----	5.0	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	----	16	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	----	0.02	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	----	0.010	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	----	<10	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	----	1.5	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	----	0.04	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	----	22	----	----
Liming Rate	----	1	kg CaCO3/t	----	----	2	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	----	0.04	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	----	22	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	----	2	----	----
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Light Olive Brown (2.5Y 5/3)	Grayish Brown (2.5Y 5/2)	----	Grayish Brown (2.5Y 5/2)	Light Brownish Gray (2.5Y 6/2)
Texture	----	-	-	Light Medium Clay	Light Medium Clay	----	Light Medium Clay	Light Medium Clay
Emerson Class Number	EC/TC	-	-	2	2	----	2	2
ED006: Exchangeable Cations on Alkaline Soils								
ø Exchangeable Calcium	----	0.2	meq/100g	----	2.7	----	----	----
ø Exchangeable Magnesium	----	0.2	meq/100g	----	9.5	----	----	----
ø Exchangeable Potassium	----	0.2	meq/100g	----	0.2	----	----	----
ø Exchangeable Sodium	----	0.2	meq/100g	----	5.0	----	----	----
ø Cation Exchange Capacity	----	0.2	meq/100g	----	17.5	----	----	----
ø Exchangeable Calcium Percent	----	0.2	%	----	15.6	----	----	----
ø Exchangeable Magnesium Percent	----	0.2	%	----	54.2	----	----	----
ø Exchangeable Potassium Percent	----	0.2	%	----	1.4	----	----	----
ø Exchangeable Sodium Percent	----	0.2	%	----	28.8	----	----	----
ø Calcium/Magnesium Ratio	----	0.2	-	----	0.3	----	----	----
ø Magnesium/Potassium Ratio	----	0.2	-	----	39.6	----	----	----
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	2.2	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH02-0.5	BH02-1.0	BH03-0.1	BH08-1.0	BH08-2.0
				Sampling date / time	19-May-2021 00:00	19-May-2021 00:00	21-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00
Compound	CAS Number	LOR	Unit		EM2110602-006	EM2110602-007	EM2110602-008	EM2110602-009	EM2110602-010
					Result	Result	Result	Result	Result
ED007: Exchangeable Cations - Continued									
Exchangeable Magnesium	----	0.1	meq/100g		**6.9**	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g		**0.2**	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g		**3.2**	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g		**12.4**	----	----	----	----
Exchangeable Sodium Percent	----	0.1	%		**25.5**	----	----	----	----
ED008: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		----	----	----	**1.7**	**0.5**
Exchangeable Magnesium	----	0.1	meq/100g		----	----	----	**7.6**	**2.2**
Exchangeable Potassium	----	0.1	meq/100g		----	----	----	**0.2**	<0.1
Exchangeable Sodium	----	0.1	meq/100g		----	----	----	**2.5**	**1.0**
Exchangeable Sodium Percent	----	0.1	%		----	----	----	**20.8**	**25.9**
Cation Exchange Capacity	----	0.1	meq/100g		----	----	----	**11.9**	**3.7**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH09-0.1	BH09-1.0	BH11-0.1	BH11-0.5	BH11-1.0
			Sampling date / time	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2110602-011	EM2110602-013	EM2110602-014	EM2110602-015	EM2110602-016
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	----	4.5	4.6	4.5
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	----	32	34	43
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	----	0.05	0.05	0.07
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	----	0.011	0.007	0.011
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	----	<10	<10	<10
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	----	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	----	----	0.06	0.06	0.08
Net Acidity (acidity units)	----	10	mole H+ / t	----	----	39	38	50
Liming Rate	----	1	kg CaCO3/t	----	----	3	3	4
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	----	0.06	0.06	0.08
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	----	39	38	50
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	----	3	3	4
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Dark Grayish Brown (2.5Y 4/2)	Light Olive Brown (2.5Y 5/3)	----	Dark Olive Brown (2.5Y 3/3)	Light Olive Brown (2.5Y 5/4)
Texture	----	-	-	Light Clay	Light Clay	----	Light Clay	Sandy Clay Loam
Emerson Class Number	EC/TC	-	-	2	2	----	3	2
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	0.8	0.6	----	0.7	1.5
Exchangeable Magnesium	----	0.1	meq/100g	1.6	8.9	----	4.5	9.4
Exchangeable Potassium	----	0.1	meq/100g	0.2	0.2	----	0.7	0.2
Exchangeable Sodium	----	0.1	meq/100g	0.8	4.0	----	0.3	1.8
Cation Exchange Capacity	----	0.1	meq/100g	3.4	13.8	----	6.2	12.9
Exchangeable Sodium Percent	----	0.1	%	23.8	29.4	----	4.6	13.8

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH11-2.0	BH11-3.0	BH17-0.5	BH17-1.0	BH17-2.0
			Sampling date / time	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2110602-017	EM2110602-018	EM2110602-019	EM2110602-020	EM2110602-021
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	**4.8**	**5.9**	----	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	**16**	**3**	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	**0.02**	<0.02	----	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	**0.010**	**0.010**	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	----	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	**0.04**	<0.02	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	**22**	<10	----	----	----
Liming Rate	----	1	kg CaCO3/t	**2**	<1	----	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	**0.04**	<0.02	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	**22**	<10	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	**2**	<1	----	----	----
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	**Light Olive Brown (2.5Y 5/6)**	**Light Olive Brown (2.5Y 5/4)**	**Grayish Brown (10YR 5/2)**	**Light Olive Brown (2.5Y 5/3)**	**Grayish Brown (2.5Y 5/2)**
Texture	----	-	-	**Light Clay**	**Light Clay**	**Sandy Clay Loam**	**Light Medium Clay**	**Sandy Clay Loam**
Emerson Class Number	EC/TC	-	-	**2**	**2**	**2**	**2**	**2**
ED006: Exchangeable Cations on Alkaline Soils								
ø Exchangeable Calcium	----	0.2	meq/100g	----	**0.6**	----	----	----
ø Exchangeable Magnesium	----	0.2	meq/100g	----	**2.6**	----	----	----
ø Exchangeable Potassium	----	0.2	meq/100g	----	<0.2	----	----	----
ø Exchangeable Sodium	----	0.2	meq/100g	----	**1.5**	----	----	----
ø Cation Exchange Capacity	----	0.2	meq/100g	----	**4.8**	----	----	----
ø Exchangeable Calcium Percent	----	0.2	%	----	**13.0**	----	----	----
ø Exchangeable Magnesium Percent	----	0.2	%	----	**55.8**	----	----	----
ø Exchangeable Potassium Percent	----	0.2	%	----	<0.2	----	----	----
ø Exchangeable Sodium Percent	----	0.2	%	----	**31.2**	----	----	----
ø Calcium/Magnesium Ratio	----	0.2	-	----	**0.2**	----	----	----
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	**0.9**	----	**1.1**	**1.5**	----
Exchangeable Magnesium	----	0.1	meq/100g	**5.4**	----	**1.7**	**7.2**	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH11-2.0	BH11-3.0	BH17-0.5	BH17-1.0	BH17-2.0
				Sampling date / time	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00
Compound	CAS Number	LOR	Unit		EM2110602-017	EM2110602-018	EM2110602-019	EM2110602-020	EM2110602-021
					Result	Result	Result	Result	Result
ED007: Exchangeable Cations - Continued									
Exchangeable Potassium	----	0.1	meq/100g		**0.2**	**----**	<0.1	**0.2**	**----**
Exchangeable Sodium	----	0.1	meq/100g		**2.3**	**----**	**0.4**	**1.6**	**----**
Cation Exchange Capacity	----	0.1	meq/100g		**8.7**	**----**	**3.2**	**10.6**	**----**
Exchangeable Sodium Percent	----	0.1	%		**26.4**	**----**	**10.9**	**15.3**	**----**
ED008: Exchangeable Cations									
Exchangeable Calcium	----	0.1	meq/100g		**----**	**----**	**----**	**----**	**0.6**
Exchangeable Magnesium	----	0.1	meq/100g		**----**	**----**	**----**	**----**	**4.0**
Exchangeable Potassium	----	0.1	meq/100g		**----**	**----**	**----**	**----**	<0.1
Exchangeable Sodium	----	0.1	meq/100g		**----**	**----**	**----**	**----**	**1.4**
Exchangeable Sodium Percent	----	0.1	%		**----**	**----**	**----**	**----**	**22.9**
Cation Exchange Capacity	----	0.1	meq/100g		**----**	**----**	**----**	**----**	**6.1**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH17-3.0	BH19-0.1	BH19-0.5	BH19-1.0	BH19-2.0
			Sampling date / time	21-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2110602-022	EM2110602-023	EM2110602-024	EM2110602-025	EM2110602-026
				Result	Result	Result	Result	Result
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Light Olive Brown (2.5Y 5/3)	Dark Grayish Brown (10YR 4/2)	Dark Gray (10YR 4/1)	Light Olive Brown (2.5Y 5/3)	Light Olive Brown (2.5Y 5/4)
Texture	----	-	-	Clay Loam	Light Clay	Sandy Loam	Sandy Clay Loam	Sandy Clay Loam
Emerson Class Number	EC/TC	-	-	2	2	2	2	2
ED006: Exchangeable Cations on Alkaline Soils								
ø Exchangeable Calcium	----	0.2	meq/100g	----	----	----	----	1.4
ø Exchangeable Magnesium	----	0.2	meq/100g	----	----	----	----	8.0
ø Exchangeable Potassium	----	0.2	meq/100g	----	----	----	----	<0.2
ø Exchangeable Sodium	----	0.2	meq/100g	----	----	----	----	4.2
ø Cation Exchange Capacity	----	0.2	meq/100g	----	----	----	----	13.8
ø Exchangeable Calcium Percent	----	0.2	%	----	----	----	----	10.0
ø Exchangeable Magnesium Percent	----	0.2	%	----	----	----	----	57.8
ø Exchangeable Potassium Percent	----	0.2	%	----	----	----	----	1.3
ø Exchangeable Sodium Percent	----	0.2	%	----	----	----	----	30.8
ø Calcium/Magnesium Ratio	----	0.2	-	----	----	----	----	<0.2
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	4.3	0.7	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	4.8	1.3	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	1.0	0.4	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	0.4	0.4	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	10.6	2.8	----	----
Exchangeable Sodium Percent	----	0.1	%	----	4.3	14.3	----	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	1.0	----	----	0.8	----
Exchangeable Magnesium	----	0.1	meq/100g	5.4	----	----	4.7	----
Exchangeable Potassium	----	0.1	meq/100g	0.1	----	----	0.2	----
Exchangeable Sodium	----	0.1	meq/100g	1.8	----	----	1.3	----
Exchangeable Sodium Percent	----	0.1	%	21.7	----	----	18.6	----
Cation Exchange Capacity	----	0.1	meq/100g	8.3	----	----	6.9	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH21-0.5	BH21-1.0	BH21-2.0	BH22-0.5	BH22-1.0
			Sampling date / time	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2110602-027	EM2110602-028	EM2110602-029	EM2110602-030	EM2110602-031
				Result	Result	Result	Result	Result
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Dark Grayish Brown (2.5Y 4/2)	Grayish Brown (2.5Y 5/2)	Grayish Brown (2.5Y 5/2)	Grayish Brown (10YR 5/2)	Brown (10YR 5/3)
Texture	----	-	-	Light Clay	Light Medium Clay	Sandy Clay Loam	Light Medium Clay	Light Medium Clay
Emerson Class Number	EC/TC	-	-	3	2	2	2	2
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	0.5	0.4	----	1.8	1.6
Exchangeable Magnesium	----	0.1	meq/100g	7.2	5.6	----	3.6	6.7
Exchangeable Potassium	----	0.1	meq/100g	0.2	0.1	----	0.1	0.2
Exchangeable Sodium	----	0.1	meq/100g	1.0	1.1	----	0.6	1.9
Cation Exchange Capacity	----	0.1	meq/100g	9.1	7.2	----	6.1	10.3
Exchangeable Sodium Percent	----	0.1	%	11.0	15.8	----	9.4	18.1
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	0.2	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	2.2	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	<0.1	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	0.9	----	----
Exchangeable Sodium Percent	----	0.1	%	----	----	26.5	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	3.3	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH22-2.0	BH24-0.5	BH24-1.0	BH24-2.0	BH25-0.1
			Sampling date / time	21-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2110602-032	EM2110602-033	EM2110602-034	EM2110602-035	EM2110602-036
				Result	Result	Result	Result	Result
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Grayish Brown (2.5Y 5/2)	Grayish Brown (10YR 5/2)	Dark Grayish Brown (2.5Y 4/2)	Gray (2.5Y 6/1)	Very Dark Brown (10YR 2/2)
Texture	----	-	-	Light Medium Clay	Sandy Clay Loam	Medium Clay	Light Medium Clay	Silty Loam
Emerson Class Number	EC/TC	-	-	2	2	2	3	2
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	2.0	1.6	0.9	4.8
Exchangeable Magnesium	----	0.1	meq/100g	----	7.1	10.3	7.3	1.7
Exchangeable Potassium	----	0.1	meq/100g	----	0.4	0.2	0.2	0.4
Exchangeable Sodium	----	0.1	meq/100g	----	1.6	2.9	3.5	0.3
Cation Exchange Capacity	----	0.1	meq/100g	----	11.1	15.0	11.8	7.2
Exchangeable Sodium Percent	----	0.1	%	----	14.1	19.4	29.5	3.7
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	1.2	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	5.9	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	0.1	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	1.3	----	----	----	----
Exchangeable Sodium Percent	----	0.1	%	15.3	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	8.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH25-0.5	BH25-1.0	BH25-2.0	BH26-0.5	BH26-1.0
			Sampling date / time	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2110602-037	EM2110602-038	EM2110602-039	EM2110602-040	EM2110602-041
				Result	Result	Result	Result	Result
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Dark Grayish Brown (2.5Y 4/2)	Grayish Brown (2.5Y 5/2)	Grayish Brown (2.5Y 5/2)	Dark Grayish Brown (10YR 4/2)	Grayish Brown (2.5Y 5/2)
Texture	----	-	-	Light Medium Clay	Light Clay	Sandy Loam	Sandy Loam	Light Medium Clay
Emerson Class Number	EC/TC	-	-	2	2	2	2	2
ED006: Exchangeable Cations on Alkaline Soils								
ø Exchangeable Calcium	----	0.2	meq/100g	----	----	----	----	2.7
ø Exchangeable Magnesium	----	0.2	meq/100g	----	----	----	----	6.8
ø Exchangeable Potassium	----	0.2	meq/100g	----	----	----	----	0.2
ø Exchangeable Sodium	----	0.2	meq/100g	----	----	----	----	3.4
ø Cation Exchange Capacity	----	0.2	meq/100g	----	----	----	----	13.0
ø Exchangeable Calcium Percent	----	0.2	%	----	----	----	----	20.6
ø Exchangeable Magnesium Percent	----	0.2	%	----	----	----	----	51.9
ø Exchangeable Potassium Percent	----	0.2	%	----	----	----	----	1.8
ø Exchangeable Sodium Percent	----	0.2	%	----	----	----	----	25.8
ø Calcium/Magnesium Ratio	----	0.2	-	----	----	----	----	0.4
ø Magnesium/Potassium Ratio	----	0.2	-	----	----	----	----	29.3
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	0.8	1.1	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	0.8	6.6	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.1	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	0.3	3.3	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	2.0	11.2	----	----	----
Exchangeable Sodium Percent	----	0.1	%	16.4	29.4	----	----	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	0.6	0.8	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	3.7	1.0	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	<0.1	<0.1	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	1.3	0.2	----
Exchangeable Sodium Percent	----	0.1	%	----	----	22.7	8.6	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	5.8	2.0	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH26-2.0	BH28-0.1	BH28-0.5	BH28-1.0	BH28-2.0
			Sampling date / time	20-May-2021 00:00	24-May-2021 00:00	24-May-2021 00:00	24-May-2021 00:00	24-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2110602-042	EM2110602-043	EM2110602-044	EM2110602-045	EM2110602-046
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	5.1	4.9	4.8	4.9
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	14	16	17	16
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	0.02	0.02	0.03	0.03
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	0.021	<0.005	0.007	0.008
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	13	<10	<10	<10
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	----	0.04	0.02	0.04	0.03
Net Acidity (acidity units)	----	10	mole H+ / t	----	26	16	22	21
Liming Rate	----	1	kg CaCO3/t	----	2	1	2	2
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	0.04	0.02	0.04	0.03
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	26	16	22	21
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	2	1	2	2
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Light Olive Brown (2.5Y 5/3)	----	Dark Gray (2.5Y 4/1)	Dark Gray (10YR 4/1)	Olive Brown (2.5Y 4/3)
Texture	----	-	-	Light Clay	----	Light Medium Clay	Light Medium Clay	Clay Loam
Emerson Class Number	EC/TC	-	-	2	----	2	2	3
ED006: Exchangeable Cations on Alkaline Soils								
ø Exchangeable Calcium	----	0.2	meq/100g	1.7	----	----	----	----
ø Exchangeable Magnesium	----	0.2	meq/100g	4.6	----	----	----	----
ø Exchangeable Potassium	----	0.2	meq/100g	<0.2	----	----	----	----
ø Exchangeable Sodium	----	0.2	meq/100g	2.9	----	----	----	----
ø Cation Exchange Capacity	----	0.2	meq/100g	9.3	----	----	----	----
ø Exchangeable Calcium Percent	----	0.2	%	18.1	----	----	----	----
ø Exchangeable Magnesium Percent	----	0.2	%	49.5	----	----	----	----
ø Exchangeable Potassium Percent	----	0.2	%	1.6	----	----	----	----
ø Exchangeable Sodium Percent	----	0.2	%	30.8	----	----	----	----
ø Calcium/Magnesium Ratio	----	0.2	-	0.4	----	----	----	----
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	1.9	1.6	1.4
Exchangeable Magnesium	----	0.1	meq/100g	----	----	3.5	4.2	4.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH26-2.0	BH28-0.1	BH28-0.5	BH28-1.0	BH28-2.0
				Sampling date / time	20-May-2021 00:00	24-May-2021 00:00	24-May-2021 00:00	24-May-2021 00:00	24-May-2021 00:00
Compound	CAS Number	LOR	Unit		EM2110602-042	EM2110602-043	EM2110602-044	EM2110602-045	EM2110602-046
					Result	Result	Result	Result	Result
ED007: Exchangeable Cations - Continued									
Exchangeable Potassium	----	0.1	meq/100g		**----**	**----**	<0.1	<0.1	**0.1**
Exchangeable Sodium	----	0.1	meq/100g		**----**	**----**	**0.8**	**0.9**	**0.9**
Cation Exchange Capacity	----	0.1	meq/100g		**----**	**----**	**6.3**	**6.7**	**7.0**
Exchangeable Sodium Percent	----	0.1	%		**----**	**----**	**12.6**	**13.5**	**13.3**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH28-3.0	BH32-0.1	BH32-0.5	BH32-1.0	BH32-2.0
			Sampling date / time	24-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2110602-047	EM2110602-048	EM2110602-049	EM2110602-050	EM2110602-051
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	4.7	----	----	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	22	----	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.03	----	----	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.008	----	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	----	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	0.04	----	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	27	----	----	----	----
Liming Rate	----	1	kg CaCO3/t	2	----	----	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	0.04	----	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	27	----	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	2	----	----	----	----
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	----	Very Dark Gray (2.5Y 3/1)	Dark Grayish Brown (2.5Y 4/2)	Olive Brown (2.5Y 4/3)	Grayish Brown (2.5Y 5/2)
Texture	----	-	-	----	Sandy Loam	Sandy Loam	Clay Loam	Light Clay
Emerson Class Number	EC/TC	-	-	----	2	2	2	2
ED006: Exchangeable Cations on Alkaline Soils								
ø Exchangeable Calcium	----	0.2	meq/100g	----	----	----	1.5	1.5
ø Exchangeable Magnesium	----	0.2	meq/100g	----	----	----	6.1	7.6
ø Exchangeable Potassium	----	0.2	meq/100g	----	----	----	<0.2	0.3
ø Exchangeable Sodium	----	0.2	meq/100g	----	----	----	3.3	4.7
ø Cation Exchange Capacity	----	0.2	meq/100g	----	----	----	11.1	14.0
ø Exchangeable Calcium Percent	----	0.2	%	----	----	----	13.3	10.6
ø Exchangeable Magnesium Percent	----	0.2	%	----	----	----	55.0	54.2
ø Exchangeable Potassium Percent	----	0.2	%	----	----	----	1.7	1.9
ø Exchangeable Sodium Percent	----	0.2	%	----	----	----	30.0	33.3
ø Calcium/Magnesium Ratio	----	0.2	-	----	----	----	0.2	<0.2
ø Magnesium/Potassium Ratio	----	0.2	-	----	----	----	----	28.1
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	1.4	0.8	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH28-3.0	BH32-0.1	BH32-0.5	BH32-1.0	BH32-2.0
				Sampling date / time	24-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00
Compound	CAS Number	LOR	Unit		EM2110602-047	EM2110602-048	EM2110602-049	EM2110602-050	EM2110602-051
					Result	Result	Result	Result	Result
ED007: Exchangeable Cations - Continued									
Exchangeable Magnesium	----	0.1	meq/100g		**----**	**0.6**	**0.6**	**----**	**----**
Exchangeable Potassium	----	0.1	meq/100g		**----**	**0.1**	<0.1	**----**	**----**
Exchangeable Sodium	----	0.1	meq/100g		**----**	**0.3**	**0.4**	**----**	**----**
Cation Exchange Capacity	----	0.1	meq/100g		**----**	**2.4**	**1.8**	**----**	**----**
Exchangeable Sodium Percent	----	0.1	%		**----**	**12.0**	**21.0**	**----**	**----**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH33-0.1	BH33-0.5	BH33-1.0	BH33-2.0	BH36-0.5
			Sampling date / time	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	24-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2110602-052	EM2110602-053	EM2110602-054	EM2110602-055	EM2110602-056
				Result	Result	Result	Result	Result
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	----	**5.4**	----	----	----
pH OX (23B)	----	0.1	pH Unit	----	**5.1**	----	----	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	**5**	----	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	----	**6**	----	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	----	<2	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.020	% pyrite S	----	<0.020	----	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.020	% pyrite S	----	<0.020	----	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.020	% pyrite S	----	<0.020	----	----	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.020	% S	----	<0.020	----	----	----
Peroxide Sulfur (23De)	----	0.020	% S	----	<0.020	----	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.020	% S	----	<0.020	----	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	----	<10	----	----	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.020	% Ca	----	**0.024**	----	----	----
Peroxide Calcium (23Wh)	----	0.020	% Ca	----	**0.024**	----	----	----
Acid Reacted Calcium (23X)	----	0.020	% Ca	----	<0.020	----	----	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	----	<10	----	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.020	% S	----	<0.020	----	----	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.020	% Mg	----	<0.020	----	----	----
Peroxide Magnesium (23Tm)	----	0.020	% Mg	----	<0.020	----	----	----
Acid Reacted Magnesium (23U)	----	0.020	% Mg	----	<0.020	----	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	----	<10	----	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.020	% S	----	<0.020	----	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	**1.5**	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	<0.02	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	<10	----	----	----
Liming Rate	----	1	kg CaCO3/t	----	<1	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH33-0.1	BH33-0.5	BH33-1.0	BH33-2.0	BH36-0.5
			Sampling date / time	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	24-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2110602-052	EM2110602-053	EM2110602-054	EM2110602-055	EM2110602-056
				Result	Result	Result	Result	Result
EA029-H: Acid Base Accounting - Continued								
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	<0.02	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	<10	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	<1	----	----	----
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	5.7	5.4	5.6	5.0	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	5	5	5	12	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.008	0.014	0.009	0.014	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	<10	<10	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	----
Net Acidity (sulfur units)	----	0.02	% S	<0.02	0.02	<0.02	0.03	----
Net Acidity (acidity units)	----	10	mole H+ / t	10	14	11	20	----
Liming Rate	----	1	kg CaCO3/t	<1	1	<1	1	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	0.02	<0.02	0.03	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	10	14	11	20	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	1	<1	1	----
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	----	Dark Grayish Brown (2.5Y 4/2)	Grayish Brown (10YR 5/2)	Gray (10YR 5/1)	Very Dark Gray (10YR 3/1)
Texture	----	-	-	----	Sandy Loam	Light Medium Clay	Clay Loam	Light Medium Clay
Emerson Class Number	EC/TC	-	-	----	2	2	2	2
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	1.2	0.6	0.7	3.1
Exchangeable Magnesium	----	0.1	meq/100g	----	0.7	8.0	10.4	7.4
Exchangeable Potassium	----	0.1	meq/100g	----	<0.1	0.5	0.4	0.2
Exchangeable Sodium	----	0.1	meq/100g	----	0.2	2.5	3.2	1.4
Cation Exchange Capacity	----	0.1	meq/100g	----	2.1	11.7	14.8	12.1
Exchangeable Sodium Percent	----	0.1	%	----	8.4	21.6	21.9	11.7

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH36-1.0	BH36-2.0	BH36-3.0	BH41-0.5	BH41-1.0
			Sampling date / time	24-May-2021 00:00	24-May-2021 00:00	24-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2110602-057	EM2110602-058	EM2110602-059	EM2110602-060	EM2110602-061
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	----	----	**5.5**	**6.1**
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	----	----	**6**	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	----	----	<0.02	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	----	----	**0.010**	<0.005
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	----	----	<10	<10
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	----	----	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S	----	----	----	**0.02**	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	----	----	----	**12**	<10
Liming Rate	----	1	kg CaCO3/t	----	----	----	<1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	----	----	**0.02**	<0.02
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	----	----	**12**	<10
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	----	----	<1	<1
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	**Gray (2.5Y 5/1)**	**Light Olive Brown (2.5Y 5/3)**	**Light Olive Brown (2.5Y 5/3)**	----	----
Texture	----	-	-	**Light Clay**	**Light Medium Clay**	**Light Clay**	----	----
Emerson Class Number	EC/TC	-	-	**2**	**2**	**2**	----	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	**2.0**	**1.6**	**1.0**	----	----
Exchangeable Magnesium	----	0.1	meq/100g	**6.9**	**6.4**	**4.0**	----	----
Exchangeable Potassium	----	0.1	meq/100g	**0.1**	**0.1**	<0.1	----	----
Exchangeable Sodium	----	0.1	meq/100g	**1.5**	**1.8**	**1.0**	----	----
Exchangeable Sodium Percent	----	0.1	%	**13.9**	**18.2**	**16.1**	----	----
Cation Exchange Capacity	----	0.1	meq/100g	**10.5**	**9.9**	**6.0**	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH41-3.0	BH44-0.1	BH44-1.0	BH44-2.0	BH44-3.0
			Sampling date / time	19-May-2021 00:00	24-May-2021 00:00	24-May-2021 00:00	24-May-2021 00:00	24-May-2021 00:00
Compound	CAS Number	LOR	Unit	EM2110602-062	EM2110602-063	EM2110602-064	EM2110602-065	EM2110602-066
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	6.1	5.0	4.8	4.9	4.8
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	16	16	15	8
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	0.02	0.02	0.02	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	0.008	0.014	0.011	0.006	0.016
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	<10	<10	<10
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	<0.02	0.04	0.04	0.03	0.03
Net Acidity (acidity units)	----	10	mole H+ / t	<10	24	23	19	18
Liming Rate	----	1	kg CaCO3/t	<1	2	2	1	1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	0.04	0.04	0.03	0.03
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	24	23	19	18
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	2	2	1	1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	DUP05-210520	DUP07-210521	DUP09-210521	----	----
			Sampling date / time	20-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2110602-067	EM2110602-068	EM2110602-069	--------	--------
				Result	Result	Result	----	----
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	----	4.7	----	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	----	18	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	0.03	----	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	0.017	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	10	----	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	----	1.5	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	0.04	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	29	----	----	----
Liming Rate	----	1	kg CaCO3/t	----	2	----	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	0.04	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	29	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	2	----	----	----
EA058: Emerson Aggregate Test								
Color (Munsell)	----	-	-	Olive Brown (2.5Y 4/3)	----	Light Olive Brown (2.5Y 5/3)	----	----
Texture	----	-	-	Light Clay	----	Clay Loam	----	----
Emerson Class Number	EC/TC	-	-	2	----	2	----	----
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	0.6	----	----	----	----
Exchangeable Magnesium	----	0.1	meq/100g	1.4	----	----	----	----
Exchangeable Potassium	----	0.1	meq/100g	0.5	----	----	----	----
Exchangeable Sodium	----	0.1	meq/100g	0.5	----	----	----	----
Cation Exchange Capacity	----	0.1	meq/100g	3.0	----	----	----	----
Exchangeable Sodium Percent	----	0.1	%	16.6	----	----	----	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	1.0	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	5.2	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	0.1	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	1.8	----	----
Exchangeable Sodium Percent	----	0.1	%	----	----	21.9	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	8.0	----	----

Inter-Laboratory Testing

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry) 18958 (Biology).

(SOIL) EA058: Emerson Aggregate Test

(SOIL) EA033-B: Potential Acidity

(SOIL) EA033-C: Acid Neutralising Capacity

(SOIL) EA033-D: Retained Acidity

(SOIL) EA033-A: Actual Acidity

(SOIL) EA033-E: Acid Base Accounting

(SOIL) EA029-D: Calcium Values

(SOIL) EA029-E: Magnesium Values

(SOIL) EA029-F: Excess Acid Neutralising Capacity

(SOIL) EA029-H: Acid Base Accounting

(SOIL) EA029-G: Retained Acidity

(SOIL) EA029-A: pH Measurements

(SOIL) EA029-C: Sulfur Trail

(SOIL) EA029-B: Acidity Trail

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM2110602**	Page	: 1 of 8
Amendment	: **1**		
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Contact	: Graeme Jablonskas
Address	: Level 15, 28 Freshwater Place SOUTHBANK VIC, AUSTRALIA 3006	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 03 9861 1111	Telephone	: +6138549 9609
Project	: PS124554	Date Samples Received	: 19-May-2021
Order number	: ----	Date Analysis Commenced	: 05-Jun-2021
C-O-C number	: ----	Issue Date	: 07-Jul-2021
Sampler	: ----		
Site	: ----		
Quote number	: ME/167/21		
No. of samples received	: 68		
No. of samples analysed	: 68		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ben Felgendrejeris	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

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

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

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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA029-A: pH Measurements (QC Lot: 3738887)									
EM2110602-053	BH33-0.5	EA029: pH KCl (23A)	----	0.1	pH Unit	5.4	5.4	0.0	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	5.1	5.0	2.0	0% - 20%
EA029-B: Acidity Trail (QC Lot: 3738887)									
EM2110602-053	BH33-0.5	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.020	<0.020	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.020	<0.020	0.0	No Limit
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.020	<0.020	0.0	No Limit
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	5	5	0.0	No Limit
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	6	5	0.0	No Limit
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	No Limit
EA029-C: Sulfur Trail (QC Lot: 3738887)									
EM2110602-053	BH33-0.5	EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.020	<0.020	0.0	No Limit
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.020	<0.020	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.020	<0.020	0.0	No Limit
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA029-D: Calcium Values (QC Lot: 3738887)									
EM2110602-053	BH33-0.5	EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.024	0.023	0.0	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.024	0.024	0.0	No Limit
		EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.020	<0.020	0.0	No Limit
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.020	<0.020	0.0	No Limit
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA029-E: Magnesium Values (QC Lot: 3738887)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA029-E: Magnesium Values (QC Lot: 3738887) - continued									
EM2110602-053	BH33-0.5	EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.020	<0.020	0.0	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.020	<0.020	0.0	No Limit
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.020	<0.020	0.0	No Limit
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.020	<0.020	0.0	No Limit
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA029-H: Acid Base Accounting (QC Lot: 3738887)									
EM2110602-053	BH33-0.5	EA029: ANC Fineness Factor	----	0.5	-	1.5	1.5	0.0	No Limit
		EA029: Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Liming Rate	----	1	kg CaCO3/t	<1	<1	0.0	No Limit
		EA029: Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	0.0	No Limit
		EA029: Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	0.0	No Limit
		EA029: Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA033-A: Actual Acidity (QC Lot: 3738886)									
EB2116421-001	Anonymous	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	9.5	9.6	0.0	0% - 20%
EM2110602-043	BH28-0.1	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.02	0.02	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	14	13	0.0	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	5.1	5.1	0.0	0% - 20%
EA033-A: Actual Acidity (QC Lot: 3738888)									
EM2110602-061	BH41-1.0	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	6.1	6.1	0.0	0% - 20%
EA033-B: Potential Acidity (QC Lot: 3738886)									
EB2116421-001	Anonymous	EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	0.010	0.007	36.4	No Limit
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EM2110602-043	BH28-0.1	EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	0.021	0.017	16.7	No Limit
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	13	11	16.7	No Limit
EA033-B: Potential Acidity (QC Lot: 3738888)									
EM2110602-061	BH41-1.0	EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	0.008	46.0	No Limit
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	0.0	No Limit
ED006: Exchangeable Cations on Alkaline Soils (QC Lot: 3719993)									
EM2110602-001	BH01-0.5	ED006: Calcium/Magnesium Ratio	----	0.1	-	0.3	0.3	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED006: Exchangeable Cations on Alkaline Soils (QC Lot: 3719993) - continued									
EM2110602-001	BH01-0.5	ED006: Magnesium/Potassium Ratio	----	0.1	-	23.6	24.4	3.2	0% - 20%
		ED006: Exchangeable Calcium Percent	----	0.2	%	18.5	18.8	1.9	0% - 20%
		ED006: Exchangeable Magnesium Percent	----	0.2	%	62.6	62.5	0.0	0% - 20%
		ED006: Exchangeable Potassium Percent	----	0.2	%	2.6	2.6	0.0	0% - 50%
		ED006: Exchangeable Sodium Percent	----	0.2	%	16.3	16.0	1.3	0% - 20%
		ED006: Exchangeable Calcium	----	0.2	meq/100g	1.9	2.0	0.0	0% - 50%
		ED006: Exchangeable Magnesium	----	0.2	meq/100g	6.6	6.8	2.6	0% - 20%
		ED006: Exchangeable Potassium	----	0.2	meq/100g	0.3	0.3	0.0	No Limit
		ED006: Exchangeable Sodium	----	0.2	meq/100g	1.7	1.7	0.0	No Limit
		ED006: Cation Exchange Capacity	----	0.2	meq/100g	10.5	10.8	2.7	0% - 20%
ED006: Exchangeable Cations on Alkaline Soils (QC Lot: 3719995)									
EM2110602-051	BH32-2.0	ED006: Calcium/Magnesium Ratio	----	0.1	-	<0.2	<0.2	0.0	No Limit
		ED006: Magnesium/Potassium Ratio	----	0.1	-	28.1	28.4	1.0	0% - 20%
		ED006: Exchangeable Calcium Percent	----	0.2	%	10.6	10.8	2.5	0% - 20%
		ED006: Exchangeable Magnesium Percent	----	0.2	%	54.2	54.3	0.0	0% - 20%
		ED006: Exchangeable Potassium Percent	----	0.2	%	1.9	1.9	0.0	No Limit
		ED006: Exchangeable Sodium Percent	----	0.2	%	33.3	33.0	0.9	0% - 20%
		ED006: Exchangeable Calcium	----	0.2	meq/100g	1.5	1.5	0.0	No Limit
		ED006: Exchangeable Magnesium	----	0.2	meq/100g	7.6	7.7	0.0	0% - 20%
		ED006: Exchangeable Potassium	----	0.2	meq/100g	0.3	0.3	0.0	No Limit
		ED006: Exchangeable Sodium	----	0.2	meq/100g	4.7	4.6	0.0	0% - 20%
		ED006: Cation Exchange Capacity	----	0.2	meq/100g	14.0	14.1	0.9	0% - 20%
ED007: Exchangeable Cations (QC Lot: 3719988)									
EM2110602-005	BH02-0.1	ED007: Exchangeable Sodium Percent	----	0.1	%	14.8	14.9	0.0	0% - 20%
		ED007: Exchangeable Calcium	----	0.1	meq/100g	3.3	3.3	0.0	0% - 20%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	7.1	7.1	0.0	0% - 20%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.2	0.2	0.0	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	1.8	1.8	0.0	0% - 50%
		ED007: Cation Exchange Capacity	----	0.1	meq/100g	12.4	12.4	0.0	0% - 20%
ED007: Exchangeable Cations (QC Lot: 3719990)									
EM2110602-024	BH19-0.5	ED007: Exchangeable Sodium Percent	----	0.1	%	14.3	14.3	0.0	0% - 20%
		ED007: Exchangeable Calcium	----	0.1	meq/100g	0.7	0.7	0.0	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	1.3	1.3	0.0	0% - 50%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.4	0.4	0.0	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.4	0.4	0.0	No Limit
		ED007: Cation Exchange Capacity	----	0.1	meq/100g	2.8	2.8	0.0	0% - 20%
EM2110602-044	BH28-0.5	ED007: Exchangeable Sodium Percent	----	0.1	%	12.6	12.8	1.9	0% - 20%
		ED007: Exchangeable Calcium	----	0.1	meq/100g	1.9	1.9	0.0	0% - 50%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	3.5	3.5	0.0	0% - 20%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.1	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
ED007: Exchangeable Cations (QC Lot: 3719990) - continued									
EM2110602-044	BH28-0.5	ED007: Exchangeable Sodium	----	0.1	meq/100g	0.8	0.8	0.0	No Limit
		ED007: Cation Exchange Capacity	----	0.1	meq/100g	6.3	6.3	0.0	0% - 20%
ED007: Exchangeable Cations (QC Lot: 3719992)									
EM2110602-045	BH28-1.0	ED007: Exchangeable Sodium Percent	----	0.1	%	13.5	13.9	3.0	0% - 20%
		ED007: Exchangeable Calcium	----	0.1	meq/100g	1.6	1.6	0.0	0% - 50%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	4.2	4.2	0.0	0% - 20%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.1	0.0	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.9	1.0	0.0	No Limit
		ED007: Cation Exchange Capacity	----	0.1	meq/100g	6.7	6.8	0.0	0% - 20%
ED008: Exchangeable Cations (QC Lot: 3719987)									
EM2110602-009	BH08-1.0	ED008: Exchangeable Sodium Percent	----	0.1	%	20.8	20.8	0.0	0% - 20%
		ED008: Exchangeable Calcium	----	0.1	meq/100g	1.7	1.7	0.0	0% - 50%
		ED008: Exchangeable Magnesium	----	0.1	meq/100g	7.6	7.6	0.0	0% - 20%
		ED008: Exchangeable Potassium	----	0.1	meq/100g	0.2	0.2	0.0	No Limit
		ED008: Exchangeable Sodium	----	0.1	meq/100g	2.5	2.5	0.0	0% - 20%
		ED008: Cation Exchange Capacity	----	0.1	meq/100g	11.9	12.0	0.0	0% - 20%
ED008: Exchangeable Cations (QC Lot: 3719991)									
EM2110602-058	BH36-2.0	ED008: Exchangeable Sodium Percent	----	0.1	%	18.2	18.2	0.0	0% - 20%
		ED008: Exchangeable Calcium	----	0.1	meq/100g	1.6	1.6	0.0	0% - 50%
		ED008: Exchangeable Magnesium	----	0.1	meq/100g	6.4	6.4	0.0	0% - 20%
		ED008: Exchangeable Potassium	----	0.1	meq/100g	0.1	0.1	0.0	No Limit
		ED008: Exchangeable Sodium	----	0.1	meq/100g	1.8	1.8	0.0	0% - 50%
		ED008: Cation Exchange Capacity	----	0.1	meq/100g	9.9	9.8	0.0	0% - 20%

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA029-A: pH Measurements (QCLot: 3738887)								
EA029: pH KCl (23A)	----	0.1	pH Unit	<0.1	4.4 pH Unit	104	70.0	130
EA029: pH OX (23B)	----	0.1	pH Unit	<0.1	4.2 pH Unit	107	70.0	130
EA029-B: Acidity Trail (QCLot: 3738887)								
EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	15 mole H+ / t	107	70.0	130
EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	27.5 mole H+ / t	105	70.0	130
EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	----	----
EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.020	----	----	----	----
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.020	----	----	----	----
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.020	----	----	----	----
EA029-C: Sulfur Trail (QCLot: 3738887)								
EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.020	0.04779 % S	96.1	70.0	130
EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.020	0.20322 % S	91.2	70.0	130
EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.020	----	----	----	----
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	----	----	----
EA029-D: Calcium Values (QCLot: 3738887)								
EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	<0.020	0.14152 % Ca	116	70.0	130
EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	<0.020	0.19926 % Ca	108	70.0	130
EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.020	----	----	----	----
EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.020	----	----	----	----
EA029-E: Magnesium Values (QCLot: 3738887)								
EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.020	0.213 % Mg	81.4	70.0	130
EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.020	0.22344 % Mg	112	70.0	130
EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.020	----	----	----	----
EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.020	----	----	----	----
EA029-H: Acid Base Accounting (QCLot: 3738887)								
EA029: ANC Fineness Factor	----	0.5	-	<0.5	----	----	----	----
EA029: Net Acidity (sulfur units)	----	0.02	% S	<0.02	----	----	----	----
EA029: Net Acidity (acidity units)	----	10	mole H+ / t	<10	----	----	----	----
EA029: Liming Rate	----	1	kg CaCO3/t	<1	----	----	----	----
EA029: Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	----	----	----	----
EA029: Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	----	----	----	----
EA029: Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	----	----	----	----

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EA033-A: Actual Acidity (QCLot: 3738886)								
EA033: pH KCl (23A)	----	----	pH Unit	----	4.4 pH Unit	100	91.0	107
EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	15 mole H+ / t	107	70.0	124
EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033-A: Actual Acidity (QCLot: 3738888)								
EA033: pH KCl (23A)	----	----	pH Unit	----	4.4 pH Unit	99.9	91.0	107
EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	15 mole H+ / t	103	70.0	124
EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033-B: Potential Acidity (QCLot: 3738886)								
EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	0.155 % S	92.8	77.0	121
EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----
EA033-B: Potential Acidity (QCLot: 3738888)								
EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	0.155 % S	95.4	77.0	121
EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----
ED006: Exchangeable Cations on Alkaline Soils (QCLot: 3719993)								
ED006: Exchangeable Calcium	----	0.2	meq/100g	<0.2	33 meq/100g	79.0	66.6	101
ED006: Exchangeable Magnesium	----	0.2	meq/100g	<0.2	32 meq/100g	80.2	66.9	120
ED006: Exchangeable Potassium	----	0.2	meq/100g	<0.2	2.2 meq/100g	101	72.8	119
ED006: Exchangeable Sodium	----	0.2	meq/100g	<0.2	5.6 meq/100g	91.6	67.5	112
ED006: Cation Exchange Capacity	----	0.2	meq/100g	<0.2	----	----	----	----
ED006: Exchangeable Calcium Percent	----	0.2	%	<0.2	----	----	----	----
ED006: Exchangeable Magnesium Percent	----	0.2	%	<0.2	----	----	----	----
ED006: Exchangeable Sodium Percent	----	0.2	%	<0.2	----	----	----	----
ED006: Calcium/Magnesium Ratio	----	0.1	-	<0.1	----	----	----	----
ED006: Magnesium/Potassium Ratio	----	0.1	-	<0.1	----	----	----	----
ED007: Exchangeable Cations (QCLot: 3719988)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	24.13 meq/100g	98.7	80.0	130
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.96 meq/100g	119	72.2	130
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	1.01 meq/100g	118	77.4	130
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.86 meq/100g	103	89.2	130
ED007: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	----	----	----	----
ED007: Exchangeable Cations (QCLot: 3719990)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	24.13 meq/100g	97.9	80.0	130
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.96 meq/100g	120	72.2	130
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	1.01 meq/100g	116	77.4	130
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.86 meq/100g	104	89.2	130
ED007: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	----	----	----	----
ED007: Exchangeable Cations (QCLot: 3719992)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	24.13 meq/100g	95.9	80.0	130

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
ED007: Exchangeable Cations (QCLot: 3719992) - continued								
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.96 meq/100g	119	72.2	130
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	1.01 meq/100g	117	77.4	130
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.86 meq/100g	103	89.2	130
ED007: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	----	----	----	----
ED008: Exchangeable Cations (QCLot: 3719987)								
ED008: Exchangeable Calcium	----	0.1	meq/100g	<0.1	24.44 meq/100g	86.0	70.0	130
ED008: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.65 meq/100g	98.1	70.0	130
ED008: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.83 meq/100g	115	83.4	130
ED008: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.31 meq/100g	129	85.2	130
ED008: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2110602**	Page	: 1 of 11
Amendment	: **1**		
Client	: **WSP Australia Pty Ltd**	Laboratory	: Environmental Division Melbourne
Contact	: MR SHANE GILIAM	Telephone	: +6138549 9609
Project	: PS124554	Date Samples Received	: 19-May-2021
Site	: ----	Issue Date	: 07-Jul-2021
Sampler	: ----	No. of samples received	: 68
Order number	: ----	No. of samples analysed	: 68

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA029-A: pH Measurements							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
BH33-0.5	**20-May-2021**	**17-Jun-2021**	13-Feb-2024	✓	**17-Jun-2021**	15-Sep-2021	✓
EA029-B: Acidity Trail							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
BH33-0.5	**20-May-2021**	**17-Jun-2021**	13-Feb-2024	✓	**17-Jun-2021**	15-Sep-2021	✓
EA029-C: Sulfur Trail							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
BH33-0.5	**20-May-2021**	**17-Jun-2021**	13-Feb-2024	✓	**17-Jun-2021**	15-Sep-2021	✓
EA029-D: Calcium Values							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
BH33-0.5	**20-May-2021**	**17-Jun-2021**	13-Feb-2024	✓	**17-Jun-2021**	15-Sep-2021	✓
EA029-E: Magnesium Values							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
BH33-0.5	**20-May-2021**	**17-Jun-2021**	13-Feb-2024	✓	**17-Jun-2021**	15-Sep-2021	✓
EA029-F: Excess Acid Neutralising Capacity							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
BH33-0.5	**20-May-2021**	**17-Jun-2021**	13-Feb-2024	✓	**17-Jun-2021**	15-Sep-2021	✓
EA029-G: Retained Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
BH33-0.5	**20-May-2021**	**17-Jun-2021**	13-Feb-2024	✓	**17-Jun-2021**	15-Sep-2021	✓
EA029-H: Acid Base Accounting							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
BH33-0.5	**20-May-2021**	**17-Jun-2021**	13-Feb-2024	✓	**17-Jun-2021**	15-Sep-2021	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-A: Actual Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA033) BH41-0.5, BH41-1.0, BH41-3.0	**19-May-2021**	**17-Jun-2021**	19-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) BH33-0.1, BH33-0.5, BH33-1.0, BH33-2.0	**20-May-2021**	**17-Jun-2021**	20-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) BH03-0.1, BH11-0.1, BH11-0.5, BH11-1.0, BH11-2.0, BH11-3.0, DUP07-210521	**21-May-2021**	**17-Jun-2021**	21-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) BH28-0.1, BH28-0.5, BH28-1.0, BH28-2.0, BH28-3.0, BH44-0.1, BH44-1.0, BH44-2.0, BH44-3.0	**24-May-2021**	**17-Jun-2021**	24-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
EA033-B: Potential Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA033) BH41-0.5, BH41-1.0, BH41-3.0	**19-May-2021**	**17-Jun-2021**	19-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) BH33-0.1, BH33-0.5, BH33-1.0, BH33-2.0	**20-May-2021**	**17-Jun-2021**	20-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) BH03-0.1, BH11-0.1, BH11-0.5, BH11-1.0, BH11-2.0, BH11-3.0, DUP07-210521	**21-May-2021**	**17-Jun-2021**	21-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) BH28-0.1, BH28-0.5, BH28-1.0, BH28-2.0, BH28-3.0, BH44-0.1, BH44-1.0, BH44-2.0, BH44-3.0	**24-May-2021**	**17-Jun-2021**	24-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-C: Acid Neutralising Capacity							
Snap Lock Bag - frozen on receipt at ALS (EA033) BH41-0.5, BH41-1.0, BH41-3.0	**19-May-2021**	**17-Jun-2021**	19-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) BH33-0.1, BH33-0.5, BH33-1.0, BH33-2.0	**20-May-2021**	**17-Jun-2021**	20-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) BH03-0.1, BH11-0.1, BH11-0.5, BH11-1.0, BH11-2.0, BH11-3.0, DUP07-210521	**21-May-2021**	**17-Jun-2021**	21-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) BH28-0.1, BH28-0.5, BH28-1.0, BH28-2.0, BH28-3.0, BH44-0.1, BH44-1.0, BH44-2.0, BH44-3.0	**24-May-2021**	**17-Jun-2021**	24-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
EA033-D: Retained Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA033) BH41-0.5, BH41-1.0, BH41-3.0	**19-May-2021**	**17-Jun-2021**	19-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) BH33-0.1, BH33-0.5, BH33-1.0, BH33-2.0	**20-May-2021**	**17-Jun-2021**	20-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) BH03-0.1, BH11-0.1, BH11-0.5, BH11-1.0, BH11-2.0, BH11-3.0, DUP07-210521	**21-May-2021**	**17-Jun-2021**	21-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) BH28-0.1, BH28-0.5, BH28-1.0, BH28-2.0, BH28-3.0, BH44-0.1, BH44-1.0, BH44-2.0, BH44-3.0	**24-May-2021**	**17-Jun-2021**	24-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-E: Acid Base Accounting							
Snap Lock Bag - frozen on receipt at ALS (EA033) BH41-0.5, BH41-1.0, BH41-3.0	**19-May-2021**	**17-Jun-2021**	19-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) BH33-0.1, BH33-0.5, BH33-1.0, BH33-2.0	**20-May-2021**	**17-Jun-2021**	20-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) BH03-0.1, BH11-0.1, BH11-0.5, BH11-1.0, BH11-2.0, BH11-3.0, DUP07-210521	**21-May-2021**	**17-Jun-2021**	21-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓
Snap Lock Bag - frozen on receipt at ALS (EA033) BH28-0.1, BH28-0.5, BH28-1.0, BH28-2.0, BH28-3.0, BH44-0.1, BH44-1.0, BH44-2.0, BH44-3.0	**24-May-2021**	**17-Jun-2021**	24-May-2022	✓	**17-Jun-2021**	15-Sep-2021	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA058: Emerson Aggregate Test							
Snap Lock Bag (EA058)							
BH01-0.5, BH01-1.0, BH01-2.0, BH01-3.0, BH02-0.1, BH02-0.5, BH02-1.0, BH08-1.0, BH08-2.0, BH19-0.1, BH19-0.5, BH19-1.0, BH19-2.0, BH21-0.5, BH21-1.0, BH21-2.0, BH24-0.5, BH24-1.0, BH24-2.0, BH25-0.1, BH25-0.5, BH25-1.0, BH25-2.0	**19-May-2021**	**----**	----	----	**21-Jun-2021**	15-Nov-2021	✓
Snap Lock Bag (EA058)							
BH26-0.5, BH26-1.0, BH26-2.0, BH32-0.1, BH32-0.5, BH32-1.0, BH32-2.0, BH33-0.5, BH33-1.0, BH33-2.0, DUP05-210520	**20-May-2021**	**----**	----	----	**21-Jun-2021**	16-Nov-2021	✓
Snap Lock Bag (EA058)							
BH09-0.1, BH09-1.0, BH11-0.5, BH11-1.0, BH11-2.0, BH11-3.0, BH17-0.5, BH17-1.0, BH17-2.0, BH17-3.0, BH22-0.5, BH22-1.0, BH22-2.0, DUP09-210521	**21-May-2021**	**----**	----	----	**21-Jun-2021**	17-Nov-2021	✓
Snap Lock Bag (EA058)							
BH28-0.5, BH28-1.0, BH28-2.0, BH36-0.5, BH36-1.0, BH36-2.0, BH36-3.0	**24-May-2021**	**----**	----	----	**21-Jun-2021**	20-Nov-2021	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED006: Exchangeable Cations on Alkaline Soils							
Soil Glass Jar - Unpreserved (ED006)							
BH01-0.5, BH01-1.0, BH01-2.0, BH01-3.0, BH02-0.1, BH02-0.5, BH02-1.0, BH08-1.0, BH08-2.0, BH19-0.1, BH19-0.5, BH19-1.0, BH19-2.0, BH21-0.5, BH21-1.0, BH21-2.0, BH24-0.5, BH24-1.0, BH24-2.0, BH25-0.1, BH25-0.5, BH25-1.0, BH25-2.0	**19-May-2021**	**05-Jun-2021**	16-Jun-2021	✓	**09-Jun-2021**	16-Jun-2021	✓
Soil Glass Jar - Unpreserved (ED006)							
BH26-0.5, BH26-1.0, BH26-2.0, BH32-0.1, BH32-0.5, BH32-1.0, BH32-2.0, BH33-0.5, BH33-1.0, BH33-2.0, DUP05-210520	**20-May-2021**	**05-Jun-2021**	17-Jun-2021	✓	**09-Jun-2021**	17-Jun-2021	✓
Soil Glass Jar - Unpreserved (ED006)							
BH09-0.1, BH09-1.0, BH11-0.5, BH11-1.0, BH11-2.0, BH11-3.0, BH17-0.5, BH17-1.0, BH17-2.0, BH17-3.0, BH22-0.5, BH22-1.0, BH22-2.0, DUP09-210521	**21-May-2021**	**05-Jun-2021**	18-Jun-2021	✓	**09-Jun-2021**	18-Jun-2021	✓
Soil Glass Jar - Unpreserved (ED006)							
BH28-0.5, BH28-1.0, BH28-2.0, BH36-0.5, BH36-1.0, BH36-2.0, BH36-3.0	**24-May-2021**	**05-Jun-2021**	21-Jun-2021	✓	**09-Jun-2021**	21-Jun-2021	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED007: Exchangeable Cations							
Soil Glass Jar - Unpreserved (ED007)							
BH01-0.5, BH01-1.0, BH01-2.0, BH01-3.0, BH02-0.1, BH02-0.5, BH02-1.0, BH08-1.0, BH08-2.0, BH19-0.1, BH19-0.5, BH19-1.0, BH19-2.0, BH21-0.5, BH21-1.0, BH21-2.0, BH24-0.5, BH24-1.0, BH24-2.0, BH25-0.1, BH25-0.5, BH25-1.0, BH25-2.0	**19-May-2021**	**05-Jun-2021**	16-Jun-2021	✓	**09-Jun-2021**	16-Jun-2021	✓
Soil Glass Jar - Unpreserved (ED007)							
BH26-0.5, BH26-1.0, BH26-2.0, BH32-0.1, BH32-0.5, BH32-1.0, BH32-2.0, BH33-0.5, BH33-1.0, BH33-2.0, DUP05-210520	**20-May-2021**	**05-Jun-2021**	17-Jun-2021	✓	**09-Jun-2021**	17-Jun-2021	✓
Soil Glass Jar - Unpreserved (ED007)							
BH09-0.1, BH09-1.0, BH11-0.5, BH11-1.0, BH11-2.0, BH11-3.0, BH17-0.5, BH17-1.0, BH17-2.0, BH17-3.0, BH22-0.5, BH22-1.0, BH22-2.0, DUP09-210521	**21-May-2021**	**05-Jun-2021**	18-Jun-2021	✓	**09-Jun-2021**	18-Jun-2021	✓
Soil Glass Jar - Unpreserved (ED007)							
BH28-0.5, BH28-1.0, BH28-2.0, BH36-0.5, BH36-1.0, BH36-2.0, BH36-3.0	**24-May-2021**	**05-Jun-2021**	21-Jun-2021	✓	**09-Jun-2021**	21-Jun-2021	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED008: Exchangeable Cations							
Soil Glass Jar - Unpreserved (ED008)							
BH01-0.5, BH01-1.0, BH01-2.0, BH01-3.0, BH02-0.1, BH02-0.5, BH02-1.0, BH08-1.0, BH08-2.0, BH19-0.1, BH19-0.5, BH19-1.0, BH19-2.0, BH21-0.5, BH21-1.0, BH21-2.0, BH24-0.5, BH24-1.0, BH24-2.0, BH25-0.1, BH25-0.5, BH25-1.0, BH25-2.0	**19-May-2021**	**05-Jun-2021**	16-Jun-2021	✓	**09-Jun-2021**	16-Jun-2021	✓
Soil Glass Jar - Unpreserved (ED008)							
BH26-0.5, BH26-1.0, BH26-2.0, BH32-0.1, BH32-0.5, BH32-1.0, BH32-2.0, BH33-0.5, BH33-1.0, BH33-2.0, DUP05-210520	**20-May-2021**	**05-Jun-2021**	17-Jun-2021	✓	**09-Jun-2021**	17-Jun-2021	✓
Soil Glass Jar - Unpreserved (ED008)							
BH09-0.1, BH09-1.0, BH11-0.5, BH11-1.0, BH11-2.0, BH11-3.0, BH17-0.5, BH17-1.0, BH17-2.0, BH17-3.0, BH22-0.5, BH22-1.0, BH22-2.0, DUP09-210521	**21-May-2021**	**05-Jun-2021**	18-Jun-2021	✓	**09-Jun-2021**	18-Jun-2021	✓
Soil Glass Jar - Unpreserved (ED008)							
BH28-0.5, BH28-1.0, BH28-2.0, BH36-0.5, BH36-1.0, BH36-2.0, BH36-3.0	**24-May-2021**	**05-Jun-2021**	21-Jun-2021	✓	**09-Jun-2021**	21-Jun-2021	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Chromium Suite for Acid Sulphate Soils	EA033	3	30	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	4	31	**12.90**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations with pre-treatment	ED008	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Chromium Suite for Acid Sulphate Soils	EA033	2	30	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	3	31	**9.68**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations with pre-treatment	ED008	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chromium Suite for Acid Sulphate Soils	EA033	2	30	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	3	31	**9.68**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations with pre-treatment	ED008	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	SOIL	In house: Referenced to Ahern et al 2004 - a suspension peroxide oxidation method following the 'sulfur trail' by determining the level of 1M KCL extractable sulfur and the sulfur level after oxidation of soil sulphides. The 'acidity trail' is followed by measurement of TAA, TPA and TSA. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
Chromium Suite for Acid Sulphate Soils	EA033	SOIL	In house: Referenced to Ahern et al 2004. This method covers the determination of Chromium Reducible Sulfur (SCR); pHKCl; titratable actual acidity (TAA); acid neutralising capacity by back titration (ANC); and net acid soluble sulfur (SNAS) which incorporates peroxide sulfur. It applies to soils and sediments (including sands) derived from coastal regions. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
Emerson Aggregate Test	EA058	SOIL	In house: Referenced to AS1289.3.8.1. Testing is performed only on soils with suitable aggregates; sands and gravels are usually unsuitable for this test. The test classifies the behaviour of soil aggregates, when immersed, on their coherence in water.
Exchangeable Cations on Alkaline Soils	* ED006	SOIL	In house: Referenced to Soil Survey Test Method C5. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with alcoholic ammonium chloride at pH 8.5. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil.
Exchangeable Cations	ED007	SOIL	In house: Referenced to Rayment & Lyons Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM Schedule B(3).
Exchangeable Cations with pre-treatment	ED008	SOIL	In house: Referenced to Rayment & Lyons Method 15A2. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM Schedule B(3).

Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method (Alkaline Soils)	ED006PR	SOIL	In house: Referenced to Rayment and Lyons method 15C1.
Exchangeable Cations Preparation Method	ED007PR	SOIL	In house: Referenced to Rayment & Lyons method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
1:5 solid / water leach following drying at 40°C	EN34-AD	SOIL	10 g of 40°C dried soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

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ABN: 50 005 085 521 www.eurofins.com.au EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448
NATA # 1261 Site # 25079

New Zealand

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Sample Receipt Advice

Company name:	WSP Australia P/L MELB
Contact name:	Shane Giliam
Project name:	OFFICER SOUTH
Project ID:	PS124554
Turnaround time:	5 Day
Date/Time received	May 24, 2021 2:27 PM
Eurofins reference	797539

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
X	Split sample sent to requested external lab.
X	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Harry Bacalis on phone : or by email: HarryBacalis@eurofins.com

Results will be delivered electronically via email to Shane Giliam - sgiliam@pb.com.au.

Note: A copy of these results will also be delivered to the general WSP Australia P/L MELB email address.

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448
NATA # 1261 Site # 25079

New Zealand

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: WSP Australia P/L MELB
Address: Lvl 15, 28 FreshwaterPlace
Southbank
VIC 3006

Project Name: OFFICER SOUTH
Project ID: PS124554

Order No.:
Report #: 797539
Phone: 9861 1111
Fax: 9861 1144

Received: May 24, 2021 2:27 PM
Due: May 31, 2021
Priority: 5 Day
Contact Name: Shane Giliam

Eurofins Analytical Services Manager : Harry Bacalis

Sample Detail						HOLD	Acid Sulfate Soils Field pH Test
Melbourne Laboratory - NATA Site # 1254 & 14271						X	
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							X
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	DUP06_210520	May 20, 2021		Soil	M21-My45986		X
2	DUP04_210520	May 20, 2021		Soil	M21-My45987	X	
Test Counts						1	1

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ONOWRA 4/13 Geary Place North Nowra NSW 2541 Ph 024423 2063

CLIENT: WSP

OFFICE:

PROJECT: OFFICER SOUTH

ORDER NUMBER: PS124554

PROJECT MANAGER: SHANE LILIAM

CONTACT PH: 0437 003 779

SAMPLER: EVAN LISHMAND

SAMPLER MOBILE: 0426 841 073

COC emailed to ALS? YES

EDD FORMAT (or default):

Email Reports to (will default to PM if no other addresses are listed): Shane + Evan

Email Invoice to (will default to PM if no other addresses are listed): accounts

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)

☒ Standard TAT (List due date):

☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.: ME-167-21

COC SEQUENCE NUMBER (Circle)

COC 1 2 3 4 5 6 7

OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:		°C	
Other comment:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Yen Ly	20/5 LP	Milika (ALS)	
DATE/TIME: 20-05-21 | 17:30	DATE/TIME: 17 30	DATE/TIME: 21/5/21	DATE/TIME:

KS of ELS Received 21/5/21 Relinquished 24/5/21

ALS USE: LAB ID	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W): SAMPLE ID	DATE / TIME	MATRIX	CONTAINER INFORMATION: TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).: pH (fox)	Additional Information: Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	BH30 - 0.1	20-5 | 08:30	S	JAR + ASS	2	✓	
2	BH30 - 0.5					✓	
3	BH30 - 1.0					✓	
4	BH30 - 2.0					✓	
5	BH30 - 3.0					✓	CT 24/5/21 2:27pm
6	BH20 - 0.1	20-5 | 09:20					○ 3.2 -0.3 2.9
7	BH20 - 0.5						Courier
8	BH20 - 1.0						
9	BH20 - 2.0						
10	BH20 - 3.0						
11	DUP03 - 210520						
12	DUP04 - 210520						Forward to Envirofing
13	BH26 - 0.1	20-5 | 09:50					
14	BH26 - 0.5						
	BH26 - 1.0						Jake
	BH26 - 2.0						797539
				TOTAL	32		

Environmental Division
Melbourne
Work Order Reference
EM2109392

Telephone : + 61-3-8549 9600

Received: 20/5 17:30 Carrier: Client
Temp: 5.0 ⓪
Ice

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag

CHAIN OF CUSTODY

ALS Laboratory: please tick →

WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph. 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: WSP	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☒ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE:		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A
PROJECT: OFFICER SOUTH	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle) COC 1 2 3 4 5 6 7	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: PS124554		OF: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER:	CONTACT PH:		Other comment:
SAMPLER:	SAMPLER MOBILE:		
COC emailed to ALS? YES	EDD FORMAT (or default):		
Email Reports to (will default to PM if no other addresses are listed):			
Email Invoice to (will default to PM if no other addresses are listed): accounts			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:	DATE/TIME: 21/5/21 (Milika (ALS))	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: KS of ELS Received 21/5/21 Relinquished 24/5/21

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	PH (FOC)								
	BH19 - 1.0	20/5/12:40	S	JAR + ASS	2	/								
	BH19 - 2.0					/								
	BH19 - 3.0					/								
	BH16 - 0.1	20/5/14:30												
	BH16 - 0.5													
	BH16 - 1.0													
	BH16 - 2.0													
	BH16 - 3.0													
	DUP05 - 210520	20/5/12:40				/								
	DUP06 - 210520	20/5/12:40				/								Forward to Eurofins
	BH21 - 0.1													
	BH21 - 0.5													
	BH21 - 1.0													
	BH21 - 2.0													
	BH21 - 3.0													
				TOTAL	30									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag

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WSP Australia P/L MELB
Lvl 15, 28 FreshwaterPlace
Southbank
VIC 3006

Attention: **Shane Giliam**

Report **797539-S**
Project name OFFICER SOUTH
Project ID PS124554
Received Date May 24, 2021

Client Sample ID			**DUP06_210520**
Sample Matrix			**Soil**
Eurofins Sample No.			**M21-My45986**
Date Sampled			**May 20, 2021**
Test/Reference	LOR	Unit	
Acid Sulfate Soils Field pH Test			
pH-F (Field pH test)*	0.1	pH Units	6.8
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.3
Reaction Ratings*[S05]	-	comment	4.0

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
Acid Sulfate Soils Field pH Test	Brisbane	May 27, 2021	7 Days

- Method: LTM-GEN-7060 Determination of field pH (pHF) and field pH peroxide (pHFOX) tests

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
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Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
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Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Newcastle
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PO Box 60 Wickham 2293
Phone : +61 2 4968 8448
NATA # 1261 Site # 25079

New Zealand

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: WSP Australia P/L MELB
Address: Lvl 15, 28 FreshwaterPlace
Southbank
VIC 3006

Project Name: OFFICER SOUTH
Project ID: PS124554

Order No.:
Report #: 797539
Phone: 9861 1111
Fax: 9861 1144

Received: May 24, 2021 2:27 PM
Due: May 31, 2021
Priority: 5 Day
Contact Name: Shane Giliam

Eurofins Analytical Services Manager : Harry Bacalis

Sample Detail						HOLD	Acid Sulfate Soils Field pH Test
Melbourne Laboratory - NATA Site # 1254 & 14271						X	
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							X
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	DUP06_210520	May 20, 2021		Soil	M21-My45986		X
2	DUP04_210520	May 20, 2021		Soil	M21-My45987	X	
Test Counts						1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to '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 prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - 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.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a 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 is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. 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.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	M21-My45986	CP	pH Units	6.8	6.8	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
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:

Harry Bacalis	Analytical Services Manager
Myles Clark	Senior Analyst-SPOCAS (QLD)

Glenn Jackson
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 or please click here.

eurofins | Environment Testing

ABN: 50 005 085 521 www.eurofins.com.au EnviroSales@eurofins.com

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IANZ # 1290

Sample Receipt Advice

Company name:	WSP Australia P/L MELB
Contact name:	Shane Giliam
Project name:	OFFICER SOUTH
Project ID:	PS124554
Turnaround time:	5 Day
Date/Time received	May 25, 2021 8:20 AM
Eurofins reference	797669

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
X	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
X	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
X	Split sample sent to requested external lab.
X	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Harry Bacalis on phone : or by email: HarryBacalis@eurofins.com

Results will be delivered electronically via email to Shane Giliam - sgiliam@pb.com.au.

Note: A copy of these results will also be delivered to the general WSP Australia P/L MELB email address.

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

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Company Name: WSP Australia P/L MELB
Address: Lvl 15, 28 FreshwaterPlace
Southbank
VIC 3006

Project Name: OFFICER SOUTH
Project ID: PS124554

Order No.:
Report #: 797669
Phone: 9861 1111
Fax: 9861 1144

Received: May 25, 2021 8:20 AM
Due: Jun 1, 2021
Priority: 5 Day
Contact Name: Shane Giliam

Eurofins Analytical Services Manager : Harry Bacalis

Sample Detail						Acid Sulfate Soils Field pH Test	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794						X	X
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	DUP08-210521	May 21, 2021	8:50AM	Soil	M21-My47278	X	X
2	DUP10-210521	May 21, 2021	10:00AM	Soil	M21-My47279	X	X
Test Counts						2	2

3

CHAIN OF CUSTODY

ALS Laboratory: please tick →

NEWCASTLE Ph: 02 4014 25

CLIENT: WSP	TURNAROUND REQUIREMENTS : Standard TAT (List due date):
OFFICE:	(Standard TAT may be longer for some tests e.g.. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):
PROJECT: OFFICER SOUTH	ALS QUOTE NO.: ME-167-21
ORDER NUMBER: PS124554	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
PROJECT MANAGER: SHANE GILLAM	CONTACT PH: 0437 003 737
SAMPLER: EVAN LISHMUND	SAMPLER MOBILE: 0426 891 033
COC emailed to ALS? YES	EDD FORMAT (or default):
Email Reports to (will default to PM if no other addresses are listed): Shane + Evan	
Email Invoice to (will default to PM if no other addresses are listed): accounts	

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:	°C		
Other comment:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
M.S (ALS)			
DATE/TIME: 24/5	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).	Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH (fox)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	BH11-0.1	21-5 / 07:50	S	JAR + ASS	2	✓	1535
	BH11-0.5					✓	Received: 21/5
	BH11-1.0					✓	Carrier: Client
	BH11-2.0					✓	Temp: 6.7 C Seal: Y/N
	BH11-3.0					✓	Ice / Icebricks / NA
	BH09-0.1	21-5 / 08:30					
	BH09-0.5						
	BH09-1.0						
	BH09-2.0						25/5
	BH03-0.1	21-5 / 08:50				✓	0
	BH03-0.5					✓	5.9 →3
	BH03-1.0					✓	5.0
	BH03-2.0					✓	
	BH03-3.0					✓	
	DUP08-210521					✓	
	DUP08-210524					✓	Forward to Eurofins
				TOTAL			797669

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag

CHAIN OF CUSTODY

ALS Laboratory: please tick →

CLIENT: WSP	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☒ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE:		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A
PROJECT: OFFICER SOUTH	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle) COC 1 2 3 4 5 6 7	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: PS124554		OF: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: SHANE GILLAM	CONTACT PH:		Other comment:
SAMPLER: EVAN LISHMUND	SAMPLER MOBILE: 0426891033	RELINQUISHED BY: M.S (ALS)	RECEIVED BY:
COC emailed to ALS? YES	EDD FORMAT (or default):	DATE/TIME: 24/5	DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed):		RELINQUISHED BY:	RECEIVED BY:
Email Invoice to (will default to PM if no other addresses are listed): accounts		DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	10H (24hr)								
	BH17 - 0.1	24-5 | 10:00	S	JAR + AP	2	/								
	BH17 - 0.5					/								
	BH17 - 1.0					/								
	BH17 - 2.0					/								
	BH17 - 3.0					/								
	DUP09 - 210521					/								
	DUP10 - 210521					/								Forward to Eurofins
	BH22 - 0.1	21-5 | 10:20												
	BH22 - 0.5	21-5												
	BH22 - 1.0													
	BH22 - 2.0													
	BH14 - 0.1	21-5 | 11:45												
	BH14 - 0.5													
	BH14 - 1.0													
	BH14 - 2.0													
	BH04 - 0.1	21-5 | 12:05												
				TOTAL										797669

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WSP Australia P/L MELB
Lvl 15, 28 FreshwaterPlace
Southbank
VIC 3006

Attention: **Shane Giliam**

Report **797669-S**
Project name OFFICER SOUTH
Project ID PS124554
Received Date May 25, 2021

Client Sample ID			**DUP08-210521**	**DUP10-210521**
Sample Matrix			**Soil**	**Soil**
Eurofins Sample No.			**M21-My47278**	**M21-My47279**
Date Sampled			**May 21, 2021**	**May 21, 2021**
Test/Reference	LOR	Unit		
Acid Sulfate Soils Field pH Test				
pH-F (Field pH test)*	0.1	pH Units	6.9	5.8
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.5	5.0
Reaction Ratings*[S05]	-	comment	3.0	2.0
% Moisture	1	%	24	17

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
Acid Sulfate Soils Field pH Test	Brisbane	May 27, 2021	7 Days
- Method: LTM-GEN-7060 Determination of field pH (pHF) and field pH peroxide (pHFOX) tests			
% Moisture	Brisbane	May 28, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

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Project ID: PS124554

Order No.:
Report #: 797669
Phone: 9861 1111
Fax: 9861 1144

Received: May 25, 2021 8:20 AM
Due: Jun 1, 2021
Priority: 5 Day
Contact Name: Shane Giliam

Eurofins Analytical Services Manager : Harry Bacalis

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Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794						X	X
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	DUP08-210521	May 21, 2021	8:50AM	Soil	M21-My47278	X	X
2	DUP10-210521	May 21, 2021	10:00AM	Soil	M21-My47279	X	X
Test Counts						2	2

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Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a 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 is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. 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.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	M21-My53320	NCP	pH Units	9.3	9.5	pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	M21-My47279	CP	%	17	17	1.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	No
Appropriate sample containers have been used	No
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
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:

Harry Bacalis	Analytical Services Manager
Myles Clark	Senior Analyst-SPOCAS (QLD)

Glenn Jackson
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 or please click here.

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ABN: 50 005 085 521 www.eurofins.com.au EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
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Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

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NATA # 1261
Site # 23736

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Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448
NATA # 1261 Site # 25079

New Zealand

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Sample Receipt Advice

Company name:	WSP Australia P/L MELB
Contact name:	Evan Lishmund
Project name:	OFFICER SOUTH
Project ID:	PS124554
Turnaround time:	5 Day
Date/Time received	Jun 2, 2021 2:38 PM
Eurofins reference	800029

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
✗	Split sample sent to requested external lab.
✓	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Harry Bacalis on phone : or by email: HarryBacalis@eurofins.com

Results will be delivered electronically via email to Evan Lishmund - Evan.lishmund@wsp.com.

Note: A copy of these results will also be delivered to the general WSP Australia P/L MELB email address.

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ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

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Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: WSP Australia P/L MELB
Address: Lvl 15, 28 FreshwaterPlace
Southbank
VIC 3006

Project Name: OFFICER SOUTH
Project ID: PS124554

Order No.:
Report #: 800029
Phone: 9861 1111
Fax: 9861 1144

Received: Jun 2, 2021 2:38 PM
Due: Jun 9, 2021
Priority: 5 Day
Contact Name: Evan Lishmund

Eurofins Analytical Services Manager : Harry Bacalis

Sample Detail						Emerson Class Number	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Exchangeable Sodium Percentage (ESP)
Melbourne Laboratory - NATA Site # 1254 & 14271								X	X	X
Sydney Laboratory - NATA Site # 18217										
Brisbane Laboratory - NATA Site # 20794							X	X	X	X
Perth Laboratory - NATA Site # 23736										
Mayfield Laboratory - NATA Site # 25079										
External Laboratory						X				
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**					
1	DUP06_210520	May 20, 2021		Soil	M21-Jn04610	X		X		X
2	DUP08_210520	May 21, 2021		Soil	M21-Jn04611		X		X	
3	DUP10_210520	May 21, 2021		Soil	M21-Jn04612	X		X		X
Test Counts						2	1	3	3	2

RE: Officer South - Additional Analysis

Harry Bacalis <HarryBacalis@eurofins.com>
Wed 2/06/2021 2:43 PM
To: Lishmund, Evan <Evan.Lishmund@wsp.com>
Cc: Giliam, Shane <Shane.Giliam@wsp.com>; #AU_CAU001_EnviroSampleVic <EnviroSampleVic@eurofins.com>

Thanks Evan

Canh – STD TAT

Kind regards,

Harry Bacalis
Phone: +61 3 8564 5064
Mobile: +61 438 858 924
Email : HarryBacalis@eurofins.com

From: Lishmund, Evan <Evan.Lishmund@wsp.com>
Sent: Wednesday, 2 June 2021 2:38 PM
To: Harry Bacalis <HarryBacalis@eurofins.com>
Cc: Giliam, Shane <Shane.Giliam@wsp.com>
Subject: Officer South - Additional Analysis

EXTERNAL EMAIL*

Harry,

Can I please request the below analysis on standard TAT:

Sample ID	Laboratory Sample ID	Emerson Class Dispersion Testing + Exchangeable Sodium Percentage	Chromium Reducible Sulfur Suite
DUP06-210520	M21-My45986	X	
DUP08-210521	M21-My47278		X
DUP10-210521	M21-My47279	X	

Please let me know if there's any issues.

Cheers,

MY45986 - HTS13
MY47278 - Bris
MY47279 - ↓

WSP

Evan Lishmund
Environmental Scientist

T: +61 3 8327 8691

Evan.Lishmund@wsp.com

WSP Australia Pty Limited
Level 15, 28 Freshwater Place
Southbank, VIC
3006 Australia

wsp.com/au

800029
Jake

eurofins

☐ BRISBANE ☐ MELBOURNE
☐ PERTH ☐ SYDNEY

Purchase Order for External Analysis - AU

Eurofins Reference: [illegible] Eurofins Purchase Order: [illegible] Results Required: [illegible]

Receiving Laboratory: EASTWEST

Eurofins Contact: Harry Bacalis

Address: 82 PLAIN STREET
TAMWORTH NSW 2340

Telephone:

Report results to: EnviroReportsAU@eurofins.com
Melbourne - 6 Monterey Rd, Dandenong South, Vic Australia 3175.
Send invoices to: CAU001_AP@eurofins.com

Client ID	Eurofins ID	Matrix	Tests Required	Sampling Date	Comments
DUP06_210520	M21-Jn04610	SOIL	Emerson Class Number	20/05/2021	Glass jar 210864 -1
DUP10_210520	M21-Jn04612	SOIL	Emerson Class Number	21/05/2021	-2

Total No. Samples: 2

Chain of Custody

Relinquished by:	Jake Beaumont	Date/Time:	2/06/2021
Received by:	[signature]	Date/Time:	07 JUN 2021
Relinquished by:		Date/Time:	
Received by:		Date/Time:	

***Sample Receipt Advice** (Receiving Lab Use Only)*

All Samples Received in Good Condition ☑ *Average sample temp on receipt: (°C)* [ ]
All Documentation in Proper Order ☑
Samples Received with an Attempt to Chill ☑ *For all enquires please quote Ref. No.* [ ]
Samples Received Within Holding Times ☑
Please complete this section and email a scan copy to EnviroReportsAU@eurofins.com

210864

07 JUN 2021

WSP Australia P/L MELB
Lvl 15, 28 FreshwaterPlace
Southbank
VIC 3006

NATA Accredited
Accreditation Number 1261
Site Number 1254

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 and proficiency testing scheme providers reports.

Attention: **Evan Lishmund**

Report **800029-S**
Project name OFFICER SOUTH
Project ID PS124554
Received Date Jun 02, 2021

Client Sample ID			**DUP06_210520**	**DUP08_210520**	**DUP10_210520**
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**M21-Jn04610**	**M21-Jn04611**	**M21-Jn04612**
Date Sampled			**May 20, 2021**	**May 21, 2021**	**May 21, 2021**
Test/Reference	LOR	Unit			
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	43	-	290
Exchangeable Sodium Percentage (ESP)	0.1	%	13	-	32
% Moisture	1	%	4.4	18	17
Emerson Class Number	1	units	see attached	-	see attached
Chromium Suite					
pH-KCL	0.1	pH Units	-	4.9	-
Acid trail - Titratable Actual Acidity	2	mol H+/t	-	36	-
sulfidic - TAA equiv. S% pyrite	0.003	% pyrite S	-	0.060	-
Chromium Reducible Sulfur[S04]	0.005	% S	-	< 0.005	-
Chromium Reducible Sulfur -acidity units	3	mol H+/t	-	< 3	-
Sulfur - KCl Extractable	0.02	% S	-	N/A	-
HCl Extractable Sulfur Correction Factor	1	factor	-	2.0	-
HCl Extractable Sulfur	0.02	% S	-	N/A	-
Net Acid soluble sulfur	0.02	% S	-	N/A	-
Net Acid soluble sulfur - acidity units	10	mol H+/t	-	N/A	-
Net Acid soluble sulfur - equivalent S% pyrite[S02]	0.02	% S	-	N/A	-
Acid Neutralising Capacity (ANCbt)	0.01	% CaCO3	-	N/A	-
Acid Neutralising Capacity - acidity (a-ANCbt)	2	mol H+/t	-	N/A	-
Acid Neutralising Capacity - equivalent S% pyrite (s-ANCbt)[S03]	0.02	% S	-	N/A	-
ANC Fineness Factor		factor	-	1.5	-
CRS Suite - Net Acidity (Sulfur Units)	0.02	% S	-	0.06	-
CRS Suite - Net Acidity (Acidity Units)	10	mol H+/t	-	36	-
CRS Suite - Liming Rate[S01]	1	kg CaCO3/t	-	2.7	-
Extraneous Material					
<2mm Fraction	0.005	g	-	200	-
>2mm Fraction	0.005	g	-	< 0.005	-
Analysed Material	0.1	%	-	100	-
Extraneous Material	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
Conductivity (1:5 aqueous extract at 25°C as rec.)	Melbourne	Jun 03, 2021	7 Days
- Method: LTM-INO-4030 Conductivity			
Exchangeable Sodium Percentage (ESP)	Melbourne	Jun 04, 2021	28 Days
- Method: LTM-MET-3060 - Cation Exchange Capacity (CEC) & Exchangeable Sodium Percentage (ESP)			
% Moisture	Brisbane	Jun 08, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			
Chromium Reducible Sulfur Suite			
Chromium Suite	Brisbane	Jun 04, 2021	6 Week
- Method: LTM-GEN-7070 Chromium Reducible Sulfur Suite			
Extraneous Material	Brisbane	Jun 04, 2021	6 Week
- Method: LTM-GEN-7050/7070			

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Australia

Melbourne
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Dandenong South VIC 3175
Phone : +61 3 8564 5000
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IANZ # 1290

Company Name: WSP Australia P/L MELB
Address: Lvl 15, 28 FreshwaterPlace
Southbank
VIC 3006

Project Name: OFFICER SOUTH
Project ID: PS124554

Order No.:
Report #: 800029
Phone: 9861 1111
Fax: 9861 1144

Received: Jun 2, 2021 2:38 PM
Due: Jun 9, 2021
Priority: 5 Day
Contact Name: Evan Lishmund

Eurofins Analytical Services Manager : Harry Bacalis

Sample Detail						Emerson Class Number	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Exchangeable Sodium Percentage (ESP)
Melbourne Laboratory - NATA Site # 1254 & 14271								X	X	X
Sydney Laboratory - NATA Site # 18217										
Brisbane Laboratory - NATA Site # 20794							X	X	X	X
Perth Laboratory - NATA Site # 23736										
Mayfield Laboratory - NATA Site # 25079										
External Laboratory						X				
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**					
1	DUP06_210520	May 20, 2021		Soil	M21-Jn04610	X		X		X
2	DUP08_210520	May 21, 2021		Soil	M21-Jn04611		X		X	
3	DUP10_210520	May 21, 2021		Soil	M21-Jn04612	X		X		X
Test Counts						2	1	3	3	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to '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 prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - 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.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a 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 is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. 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.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. 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							
Conductivity (1:5 aqueous extract at 25°C as rec.)	uS/cm	< 10			10	Pass	
Exchangeable Sodium Percentage (ESP)	%	< 0.1			0.1	Pass	
LCS - % Recovery							
Chromium Suite							
pH-KCL	%	100			80-120	Pass	
Acid trail - Titratable Actual Acidity	%	97			80-120	Pass	
Chromium Reducible Sulfur	%	99			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	M21-Jn03267	NCP	uS/cm	80	88	9.1	30%	Pass	
% Moisture	M21-Jn04216	NCP	%	24	24	<1	30%	Pass	
Duplicate									
Chromium Suite				Result 1	Result 2	RPD			
pH-KCL	B21-Jn06637	NCP	pH Units	8.1	8.1	<1	30%	Pass	
Acid trail - Titratable Actual Acidity	B21-Jn06637	NCP	mol H+/t	< 2	< 2	<1	30%	Pass	
sulfidic - TAA equiv. S% pyrite	B21-Jn06637	NCP	% pyrite S	< 0.003	< 0.003	<1	30%	Pass	
Chromium Reducible Sulfur	B21-Jn06637	NCP	% S	0.014	0.013	7.0	30%	Pass	
Chromium Reducible Sulfur -acidity units	B21-Jn06637	NCP	mol H+/t	9.0	8.4	7.0	30%	Pass	
Sulfur - KCl Extractable	B21-Jn06637	NCP	% S	0.02	0.02	1.0	30%	Pass	
HCl Extractable Sulfur	B21-Jn06637	NCP	% S	N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur	B21-Jn06637	NCP	% S	N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur - acidity units	B21-Jn06637	NCP	mol H+/t	N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur - equivalent S% pyrite	B21-Jn06637	NCP	% S	N/A	N/A	N/A	30%	Pass	
Acid Neutralising Capacity (ANCbt)	B21-Jn06637	NCP	% CaCO3	1.2	1.3	7.0	30%	Pass	
Acid Neutralising Capacity - equivalent S% pyrite (s-ANCbt)	B21-Jn06637	NCP	% S	0.38	0.41	7.0	30%	Pass	
ANC Fineness Factor	B21-Jn06637	NCP	factor	1.5	1.5	<1	30%	Pass	
CRS Suite - Net Acidity (Sulfur Units)	B21-Jn06637	NCP	% S	< 0.02	< 0.02	<1	30%	Pass	
CRS Suite - Net Acidity (Acidity Units)	B21-Jn06637	NCP	mol H+/t	< 10	< 10	<1	30%	Pass	
CRS Suite - Liming Rate	B21-Jn06637	NCP	kg CaCO3/t	< 1	< 1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Exchangeable Sodium Percentage (ESP)	M21-Jn04612	CP	%	32	32	1.0	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	Yes

Qualifier Codes/Comments

Code	Description
S01	Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil' multiply 'reported results' x 'wet bulk density of soil in t/m3'
S02	Retained Acidity is Reported when the pHKCl is less than pH 4.5
S03	Acid Neutralising Capacity is only required if the pHKCl if greater than or equal to pH 6.5
S04	Acid Sulfate Soil Samples have a 24 hour holding time unless frozen or dried within that period

Authorised by:

Harry Bacalis	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Myles Clark	Senior Analyst-SPOCAS (QLD)
Scott Beddoes	Senior Analyst-Inorganic (VIC)

Glenn Jackson
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 or please click here.

eastwest
geo ag enviro

82 Plain Street Tamworth NSW 2340
e admin@eastwestonline.com.au
t 02 6762 1733
f 02 6765 9109
abn 82 125 442 382

eastwestonline.com.au

ANALYSIS REPORT SOIL

PROJECT NO: EW210864		**Date of Issue:**	**15/06/2021**
Customer:	EUROFINS MELBOURNE	Report No:	1
Address:	2-5 Kingston Town Close 2-5 Kingston Town Close Oakleigh VIC 3164 OAKLEIGH VIC 3164	Date Received:	7/06/2021
		Matrix:	Soil
Attention:	Harry Bacalis	Location:	800029
Phone:	03-8564 5000	Sampler ID:	Client
Fax:		Date of Sampling:	20/05/2021
Email:	enviroreportsAU@eurofins.com	Sample Condition:	Acceptable

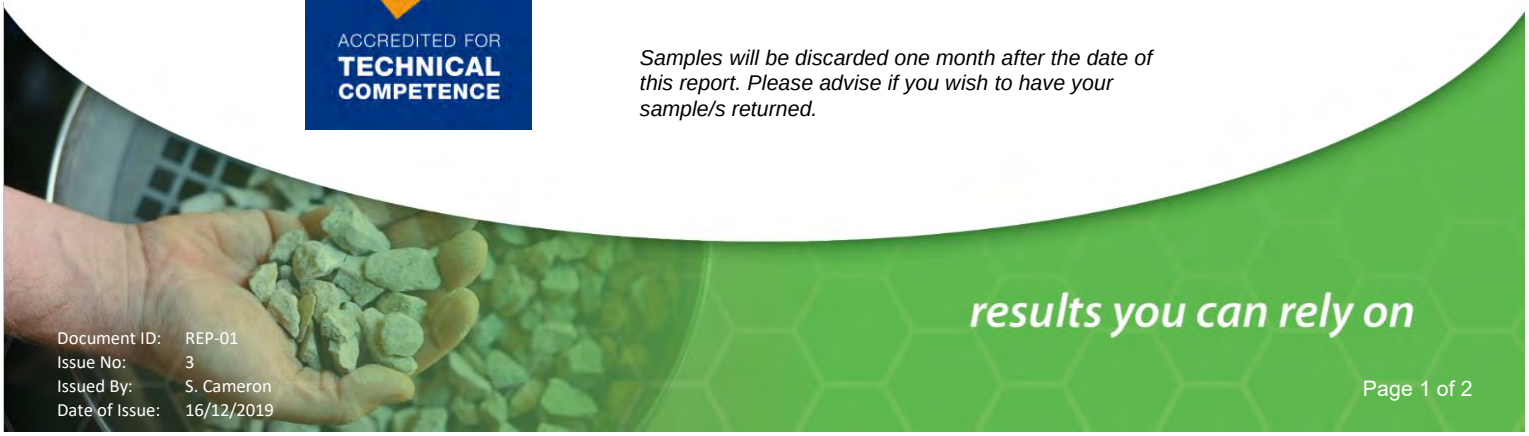
Results apply to the samples as submitted. All pages of this report have been checked and approved for release.

Signed: Anne Michie

NATA Accredited Laboratory 12360
Accredited for compliance with ISO/IEC 17025 - Testing

This analysis relates to the sample submitted and it is the client's responsibility to make certain the sample is representative of the matrix to be tested.

Samples will be discarded one month after the date of this report. Please advise if you wish to have your sample/s returned.



ANALYSIS REPORT

PROJECT NO: EW210864 **Location: 800029**

				CLIENT SAMPLE ID	**M21-Jn04610**	**M21-Jn04612**		
				DEPTH	**DUP06_210520**	**DUP10_210520**		
Test Parameter	**Method Description**	**Method Reference**	**Units**	**LOR**	**210864-1**	**210864-2**		
Emerson Aggregate Test	Class	PMS-21	Number	na	2	2		

This Analysis Report shall not be reproduced except in full without the written approval of the laboratory.

Soils are air dried at 40^{o}C and ground <2mm.

NB: LOR is the Lowest Obtainable Reading.

DOCUMENT END

APPENDIX F

GROUNDWATER GAUGING

F1 GROUNDWATER GAUGING AND MONITORING RESULTS

Groundwater results recorded following installation of groundwater monitoring wells MW01 – MW03 are recorded in Table F.1 below.

It is noted that monitoring wells were gauged within 7 days of installation, and the readings are considered to be indicative only.

The calibration certificate for the water quality meter (YSI) is provided in this appendix.

Table F.1 Groundwater parameter summary

LOCATION	DATE/TIME	SWL	pH	REDOX.	D.O.	E.C.	TEMP.	COLOUR	TURB. / COMM.
		MBTOC	PH	MV	PPM	MS/CM	CELC.		
MW01	24/5 12:45	3.39	6.37	174	10.8	12.16	17.1	Clear	None, TD 3.1
	24/5 12:55	(purge 5L)	6.19	167.2	-	12.21	16.9	Clear	Slight
MW02	24/5 13:30	3.30	6.09	154	5.11	12.46	16.4	Clear	None, TD 3.1
MW03	24/5 14:00	DRY	-	-	-	-	-	-	Total depth 7.1
Well at 235 Lecky Road Gin Gin	24/5 12:30	4.63	-	-	-	-	-	-	Total depth 16.15

Equipment Calibration Form
YSI ProPlus

Enqip #: 14121
Company: WSP Australia Pty Limited
Consultant: Shane Giliam
PO #: PS123382 - Used from 19MAY2021-23MAY2021 at VPA Officer South (PS124554)
Certificate #: 20780

INSTRUMENT IDENTIFICATION

Model Number: 6050000
Serial Number: 18G100553
Instrument Type: YSI ProPlus

INSPECTION RECORD

Batteries Checked:	PASS	**Date & Time:**	PASS
Electrodes Cleaned/Checked:	PASS	**Temperature:**	PASS

CALIBRATION DETAILS

Sensor	Cal Solution	Value	Reading
pH	Buffer 4.00	4.00 pH	3.99 pH
	Buffer 7.00	7.00 pH	7.00 pH
Redox	Standard ORP	234.5 mV @ 20 °C	234.5 mV
O_2	Zero Dissolved Oxygen	0.0 %	0.0 %
	Air	100.0 %	99.9 %
Conductivity	Standard Conductivity	2.76 mS/cm	2.76 mS/cm

Calibration Successful: YES

Calibrated By: Doyle Schapendonk **Test Date:** 17/05/2021

enqip
116 Thistlethwaite St, South Melbourne 3205
P 1300 218 987
E info@enqip.com.au | W www.enqip.com.au

Instrument Quality Report
Interface Meter

Enqip #: 14121
Company: WSP Australia Pty Limited
Consultant: Shane Giliam
PO #: PS123382 - Used from 19MAY2021-23MAY2021 at VPA Officer South (PS124554)
Certificate #: 20781

INSTRUMENT IDENTIFICATION

Instrument Type: Solinst Interface Meter
Model Number: 122
Serial Number: IM-0524

INSPECTION RECORD

Battery:	PASS	**Water Tone:**	PASS
Tape Condition:	PASS	**Hydrocarbon Tone:**	PASS

Tested By: Will Hatzimihalis **Test Date:** 17/05/2021

enqip
116 Thistlethwaite St, South Melbourne 3205
P 1300 218 987
E info@enqip.com.au | W www.enqip.com.au

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