

# ACID SULFATE SOIL INVESTIGATION AND MANAGEMENT PLAN

Lot 2 DP733507 and Lot 32 DP1280863

110 - 120 Carrs Drive, Yamba, New South Wales

Easterly Point Environmental

July 2023

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#### Report

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# 1 INTRODUCTION

Precise Environmental (PE) was commissioned by Easterly Point Environmental to conduct and acid sulfate soil investigation (ASSI) and prepare an acid sulfate soil management plan (ASSMP) for the proposed residential subdivision of Lot 2 DP733507 and Lot 32 DP1280863, 110 - 120 Carrs Drive, Yamba, New South Wales.

The current site layout is presented in Appendix A, Figure 1.

# 1.1 Project overview

The extent of the development is 10 ha and will be restricted to the eastern half of the site which is currently zoned for residential land use (refer Table 1). The western half of the site is zoned as environmental conservation and environmental management and is heavily vegetated. The proposed allotment layout is provided in Appendix B.

The development area will be filled by importing ~ 2.0 - 2.5 m of sand across the development area. Whilst most utility services will be constructed / installed within the imported fill, localised excavations will be required in natural soils at depths < 5 m AHD. The vertical extent of earthworks is expected to be limited to disturbance of natural soils in the top 0.5 - 1.0 m, noting the extent of PE's ASSI was 2.0 - 3.0 m depth.

Lateral extents of the ASSI were limited to areas of the site which could be accessed by a drilling rig. Borehole locations are provided in Appendix A, Figure 1.

#### 1.1.1 Potential disturbance of ASS

ASS occur predominantly on coastal land with elevations generally below 5 m Australian Height Datum (AHD). These soils also occur further inland in saline seepage areas, rivers, lake beds and irrigation channels. Where ASS are present, draw-down of the local water table can expose these soils to oxidising conditions creating acidity and mobilising metals at potentially harmful concentrations.

In such situations, extracted groundwater can be impacted by acidity and dissolved heavy metals at potentially harmful concentrations, and requires appropriate management.

#### 1.2 Objectives

The objectives of the ASSMP are to:

- Summarise acid sulfate soil (ASS) conditions within the development area
- Describe the nature and extents of ASS which may be disturbed and any requirement/s for management.

# 1.3 Scope of work

To meet the above objectives, the following scope of work was undertaken:

- Detailed site inspection
- Underground service clearance
- Drilling of fifteen boreholes ranging in depth from 2.0 3.0 m depth
- Collection of soil samples at 0.25 m depth intervals in each borehole
- ASS screen testing (pHF and pHFOX) of all recovered soil samples
- Selective chromium reducible sulfur suite (SCR Method 22B) and  $S_{\mbox{KCI}}$  analysis based on screen testing results
- Preparation of this ASSI and ASSMP.



# 1.4 Relevant guidance

The scope of this ASSI and management measures described in this report have been prepared with reference to the Acid Sulfate Soil Manual (ASSMAC 1998). Other guidance information referenced in completing the scope of work included:

- Acid Sulfate Soils Laboratory Methods Guidelines (Ahern et al, 2004)
- Clarence Valley Local Environmental Plan (LEP) 2011

# 1.5 Planning trigger for ASS management

The <u>NSW Government ePlanning Spatial Viewer</u> maps the site within a Class 2 acid sulfate soil (refer property reports presented in Appendix B). As per section 7.1 of the Clarence Valley LEP development consent is required in Class 2 land where works are carried out below the natural ground surface or where works which will lower the water table.

Section 7.1 states consent must not be granted under this clause for the carrying out of works unless an acid sulfate soils management plan has been prepared for the proposed works in accordance with the Acid Sulfate Soils Manual and has been provided to the consent authority.

#### 1.6 Limitations

The findings of this report are based on the objectives and scope of work outlined above. PE performed the services in a manner consistent with the normal level of care and expertise exercised by members of the environmental assessment profession. No warranties or guarantees, express or implied, are made. Subject to the scope of work, PE's assessment is limited strictly to identifying typical environmental conditions associated with the subject property, and does not include evaluation of any other issues.

This report does not comment on any regulatory obligations based on the findings, for which a legal opinion should be sought. This report relates only to the objectives and scope of work stated, and does not relate to any other works undertaken for the Client. The report and conclusions are based on the information obtained at the time of the assessment. Changes to the subsurface conditions may occur subsequent to the investigation described herein, through natural processes or through the intentional or accidental addition of contaminants, and these conditions may change with space and time.

The results of this assessment are based upon site inspection and fieldwork conducted by PE personnel and information provided by the Client. All conclusions regarding the property area are the professional opinions of the PE personnel involved with the project, subject to the qualifications made above. While normal assessments of data reliability have been made, PE assumes no responsibility or liability for errors in any data obtained from regulatory agencies, information from sources outside of PE, or developments resulting from situations outside the scope of this project.

# 2 SITE CONDITIONS AND ENVIRONMENTAL SETTING

# 2.1 Site and environmental setting

Site identification, land use and environmental setting details are provided in Table 1. Key built features within the site are shown in Appendix A, Figure 1.

Aspect	Detail			
Street address	120 Carrs Drive, Yamba, New South Wales.			
Real property description	Lot 2 DP733507	Lot 32 DP1280863		
Total area	16.2 ha	~1.5 ha		
Local Government	Clarence Valley Council (CVC)			
Zoning (CVC)	Eastern half:	R1 – General residential		
	R1 – General residential			
	Western half:			
	C2 – Environmental conservation			
	C3 – Environmental management			
	The objectives of the general residenti	al zone are to:		
	1. Provide for the housing need	s of the community		
	2. Provide for a variety of housing	ng types and densities; and		
	3. Enable other land uses that p	rovide facilities of services to meet the day		
	to day needs of residents			
	The objectives of the environmental co	onservation zone are to:		
	<ol> <li>Protect, manage and restore cultural or aesthetic values</li> </ol>	areas of high ecological, scientific,		
	<ol> <li>Prevent development that co an adverse effect on those v</li> </ol>	ould destroy, damage or otherwise have alues		
	3. Protect coastal wetlands and	l littoral rainforests		
	<ol> <li>Protect land affected by coasensitive coastal land</li> </ol>	istal processes and environmentally		
	<ol> <li>Prevent development that would adversely affect, or be adversely affect by coastal processes</li> </ol>			
	The objectives of the environmental m	anagement zone are to:		
	1. Protect, manage and restore cultural or aesthetic values	areas with special ecological, scientific,		
	<ol> <li>Provide for a limited range of adverse effect on those valu</li> </ol>	<ol> <li>Provide for a limited range of development that does not have an adverse effect on those values</li> </ol>		
	<ol> <li>Prevent inappropriate develor as to minimise erosion and ot</li> </ol>	<ol> <li>Prevent inappropriate development in geologically hazardous areas so as to minimise erosion and other adverse impacts on escarpment areas</li> </ol>		
	<ol> <li>Ensure that development do for public services or public fa</li> </ol>	Ensure that development does not unreasonably increase the demand		
	<ol> <li>Ensure development is not ac hazards</li> </ol>	aversely impacted by environmental		
	<ol> <li>Protect prominent hillsides, ric riparian areas and water cat</li> </ol>	lgelines, other major natural features, chment areas		
Existing land use and site structures	An existing (unoccupied) residential d Lot 2 DP733507. A concrete slab lo	welling is located in the southeast corner of ocated in the northeast corner of Lot 2		

Table 1. Site and surrounding land details.



Aspect	Detail
	DP733507 formerly contained a shed – anecdotal information supplied by the client indicates the building was demolished after a fire.
Surrounding land uses	North: Earthworks occurring for adjacent residential subdivision South: Low-density rural / residential land East: Low-density rural / residential land West: Oyster Channel – tidal waterbody between Wooloweyah Lagoon and Clarence River
Watercourses	An ephemeral watercourse is mapped in the southeast corner of the site and traverses west parallel to the southern site boundary terminating beyond the west site boundary in Oyster Channel. The ephemeral watercourse will be repurposed as a riparian zone as part of the redevelopment.

# 3 GEOTECHNICAL INFORMATION

The following sections presents key information derived / summarised from the geotechnical report which will need to be considered as part of the overall management strategy of disturbed ASS within the proposed development. The geotechnical report (GI 2021) was prepared by Geotech Investigations (GI) Pty Ltd on 7 July 2021.

Notwithstanding general limitations of the geotechnical report, it is noted boreholes constructed as part of the investigation were limited to three boreholes adjacent to the residential dwelling in the southeast corner of the site and one adjacent to the western boundary of Lot 32 DP1280863.

A summary of the soil conditions encountered by GI are presented in Table 2. No unconsolidated marine clay sediments were identified.

Material descriptions	BH1 (m)	BH2 (m)	BH3 (m)	BH4 (m)
Alluvial topsoil	0 - 0.2	0 - 0.3	0 - 0.2	NE
Alluvial				
Firm / stiff clay	0.2 – 0.3	0.3 – 0.5	0.2 – 0.3	NE
Loose or worse (SPT 'N' <10) sand	2.3 - 2.8	1.0 – 2.8	1.0 – 5.5	0.0 - 5.4
Medium dense (SPT 10 < 'N' < 30) sand	0.3 - 2.3	0.5 – 1.0	0.3 – 1.0	5.4 - 7.0
	NE	NE	5.5 – 11.1	NE
Dense (SPT 30 < 'N' < 50) sand	NE	NE	11.1 – 12.4	NE
Very dense (SPT 'N' > 50) sand	NE	NE	NE	7.0 – 10.9
Terminated depth	2.8	2.8	12.4	10.9

Table 2. Summary of soil conditions (GI 2021).

Table notes:

NE denotes not encountered

# 3.1 Earthworks

Earthworks proposed for the proposed development include:

- Site preparation, clearing and grubbing
- Importation of up to 2.0 2.5 m of bulk filling across the site to achieve an estimated design level of up to RL 3.6 m
- Construction of a riparian corridor which is expected to comprise excavation and batter shaping
- Construction of a series of internal roads, entrances, and civil infrastructure.

PE has been advised by the client most civil infrastructure will be constructed within the bulk fill soils, with the exception of deeper utility services such as sewer rising mains, service trenches etc. PE has not been supplied with the proposed civil / utility services plan.

# 3.2 Stripping of topsoil

Topsoil stripping across the site will be in the order of 100 – 200 mm and will vary according to areas containing surface vegetation, root regrowth, site drainage and weather conditions encountered prior to stripping. Based on the development area of 10 ha there could be up to 20,000 m<sup>3</sup> of soil which cannot be reused as structural fill (not including uncontrolled fill encountered within the observed earthen access driveway). The topsoil may be reused onsite for landscaping following neutralisation treatment.

Alluvial soft to firm clays encountered from 100 – 500 mm in thickness below the topsoil in conjunction with the shallow water table won't be suitable to pass a 'test roll' and will cause trafficability issues during construction. Geotech Investigations have suggested importing a bridging layer to minimise the extent of disturbance to the natural ground. Building remnants and uncontrolled fill will also need to be stripped.

# 3.3 Bulk filling

Following clearing, site preparation and stripping, 500 mm of clean sand material shall be placed and compacted across the alluvial clay subgrade and a test roll completed prior to additional filling. Fill material should contain similar properties to the sites natural soil, and it was therefore recommended that clean cohesionless sand be used as the bulk filling material and should be placed in layers not exceeding 250 mm.

# 3.4 Groundwater

Groundwater was encountered at shallow depths across the site typically around 0.6 m (this was relatively consistent with PE's findings). Groundwater could rise to surface levels in times of flooding. The geotechnical report states the following relating to groundwater:

- Where excavations such as service trenches are proposed to extend near or below the water table, suitable methods of excavation and localised dewatering need to be considered
- Temporary retention such as shore boxes will be required where excavations of the groundwater is required
- Fill placement in areas within 0.5 1.0 m of the groundwater at the time of placement may pump groundwater into the placed fill causing heaving and compaction difficulties.

# 3.5 Batter slopes

The riparian zone is expected to be positioned at the natural surface level requiring no new fill and long-term batter slopes. The batter will need to be protected from erosion and scour protection.

# 3.6 Settlement

Settlement of the underlying alluvial sands at the site are relatively immediate and based on the depth of fill to be placed, settlement of the underlying alluvial sands is considered to be negligible (less than 20 – 30 mm). Settlements will occur as the surcharge layers are placed and will not impact the development infrastructure, or future structures.

# 4 ACID SULFATE SOIL INVESTIGATION METHODOLOGY

Standard operating procedures upon which the soil collection methods were based are provided in Appendix C.

# 4.1 Soil sampling and analysis

Fifteen boreholes (BH1 – BH15) were drilled on 12 July 2022 to depths of 2.0 – 3.0 m below ground level (BGL) using a track mounted drill rig with solid stem augers. Locations were selected to provide as much site coverage as possible noting parts of the site were inaccessible due to waterlogged soils / dense vegetation.

Soil samples were collected at 0.25 m intervals ensuring inclusion of distinct changes in soil type. Each sample was sealed in a snap-lock bag with excess air evacuated and stored and transported below 4°C to minimise samples oxidation and degradation. All samples were dispatched to a NATA accredited laboratory under chain of custody documentation for field screening. Select samples were analysed for Chromium Reducible Sulfur suite analysis (S<sub>CR</sub> - Method 22B) in accordance with Acid Sulfate Soils Laboratory Methods Guidelines (Ahern et al, 2004).

# 4.2 Action criteria

The Acid Sulfate Soil Manual (ASSMAC, 1998) describes field pH<sub>F</sub> / pH<sub>FOX</sub> test results which indicate potential acid sulfate soils (PASS). Appendix 1 of the Acid Sulfate Soil Manual states that field pH provides a useful quick indication of the likely presence and severity of actual acid sulfate soils. The field pH is a qualitative method only that cannot be used as a substitute for laboratory analysis in the identification of acid sulfate soils for assessment purposes.

The guidelines offer the following information regarding the interpretation of field pH results:

- pH readings of pH ≤ 5 indicates that actual acid sulfate soil are present with the sulfides having been oxidised in the past, resulting in acid soil conditions
- pH values > 4 and < 5.5 are acid and may be the result of some previous or limited oxidation of sulfides, but is not confirmatory of actual acid sulfate soils. Substantial exchangeable / soluble aluminium and hydrogen ions usually exist at these pH values. Other factors such as excessive fertiliser use, organic acids or strong leaching can cause pH >4 - <5.5 units. Field pH alone cannot indicate potential acid sulfate soils as they may be neutral to slightly alkaline when unoxidized
- In order to the for potential acid sulfate soils that contain unoxidized sulfides, peroxide is used to rapidly oxidise the iron sulfides (usually pyrite), resulting in the production of acid with a corresponding drop in pH.

The appropriate criteria, or action thresholds, are the texture-based action criteria from Table 4.4 of the Acid Sulfate Soil Manual (*ASSMAC*. 1998). The action criteria have been developed to determine when management of disturbed acid sulfate soil is required. Soil texture influences the risk associated with a disturbance, due to differences in the rate of oxidation, permeability and potential buffering capacity of the soil. The action criteria are shown in Table 3.

The ASS to be disturbed is >1,000 tonnes and the applicable action criteria is 18 mol.  $H^+/t$ .



 Table 3. Texture-based acid sulfate soil action criteria.

Type of Material		Sum of existing and potential acidity				
Type of Material	Approx. clay	1-1000 tonnes disturbed		>1000 tonnes disturbed		
Texture range (NCST, 2009)	content (%)	% S-equiv. (oven-dried basis)	mol H⁺/t (oven-dried basis)	% S-equiv. (oven-dried basis)	mol H⁺/t (oven-dried basis)	
<b>Fine</b> Medium to heavy clays and silty clays	> 40	0.1	62			
<b>Medium</b> Sandy loams to light clays	5 - 40	0.06	36	0.03	18	
Coarse Sands - Ioamy sands, peats	< 5	0.03	18			

# 5 FIELD OBSERVATIONS AND LABORATORY RESULTS

The following section presents the results of the ASSI and should be read in conjunction with the borehole locations provided in Appendix A, data tables presented in Appendix D, complete soil profile descriptions in Appendix E and laboratory certificates of analysis presented in Appendix F.

# 5.1 Soil profiles

Fill soils were encountered in BH6, BH8 and BH11 which were drilled in the observed earthen access driveway (refer Appendix A, Figure 1). Fill soil comprised a mix of sand and clay of variable plasticity with silt inclusions to depths of 0.5 – 0.8 m.

With the exception of BH5 which comprised clayey sand and sand, natural soils comprised clay of variable plasticity (light to heavy) with silt and sand inclusions up to 0.95 m depth overlying sand (with some clay and silt inclusions).

Soil profiles were generally consistent with the geotechnical report (GI 2021) although deeper clay profiles were observed in some locations.

Groundwater seepage was observed on the day of works from 0.25 - 1.5 m.

# 5.2 Screening results

The screening results indicated the presence of PASS on the basis that:

- Most pH<sub>FOX</sub> results were ≥1 unit less than pH<sub>F</sub> results and pH<sub>FOX</sub> results ≥ 2 units less than pH<sub>F</sub> results was common.
- $pH_{FOX}$  results < 3 were common although there did not appear to be any trends between sample depth and results.

# 5.3 Laboratory results

# 5.3.1 Fill soil

Net acidity excluding acid neutralising capacity (ANC) in analysed fill soils (applicable to BH6 0.5 – 0.75 m, BH8 0.0 – 0.25 m, BH8 0.25 – 0.5 m and BH11 0.5 – 0.75 m) ranged from 49 – 61 mol. H<sup>+</sup>/tonne and exceeded the 18 mol. H<sup>+</sup>/tonne action criteria). Net acidity in these samples predominantly comprised titratable actual acidity (TAA) ranging from 32 – 45 mol. H<sup>+</sup> / tonne. Chromium reducible sulfur (potential acidity) was reported at <10 – 16 mol. H<sup>+</sup> / tonne.

# 5.3.2 Natural clay soil above the water bearing zone

Net acidity excluding ANC was detected in all analysed natural clay soil samples above the water bearing zone except for BH9 0.5 - 0.75 m. Results ranged from 26 - 138 mol H<sup>+</sup> / tonne and all results exceeded the action criteria.

Net acidity in these samples predominantly comprised TAA ranging from 9 – 124 mol H $^{*}$  / tonne and potential acidity ranged from <10 – 24 mol H $^{*}$  / tonne.

# 5.3.3 Natural sand soil below the water bearing zone

Net acidity excluding ANC was detected in all analysed natural sand soils below the water bearing zone. Results ranged from  $13 - 142 \text{ mol H}^+$  / tonne and more than 60 % of samples exceeded the action criteria.

Net acidity in these samples predominantly comprised potential acidity ranging from <10 - 139 mol H $^+$  / tonne. TAA ranged from <2 – 15 mol H $^+$  / tonne.

# 6 ACID SULFATE SOIL MANAGEMENT MEASURES

#### 6.1 Responsibility

The Principal Contractor shall be responsible for ensuring the appropriate management of acid sulfate soil (ASS) as detailed in the document.

#### 6.2 Stripped surfaces

Aglime shall be placed at a rate  $\geq$  5 kg/m<sup>2</sup> across all surfaces following the stripping and grubbing of topsoil / clay above the water table. Additional aglime shall also be placed around the perimeter of stripped areas daily throughout the earthworks program. This shall be applied in all drainage lines, whether temporary or permanent.

# 6.3 Temporary ASS stockpiling and treatment areas

Stockpiling of untreated ASS should be minimised by preparing a detailed earthworks strategy that documents the timing of soil volumes to be moved, treatment locations and capacity of specified areas to accept materials.

Excavated ASS which has not been treated and verified must be contained within bunded areas constructed in accordance with relevant design standards and the cross sections presented in Appendix G. These areas will be positioned to mitigate potential runoff and/or stormwater ingress.

A guard layer of aglime shall be placed beneath and over the surface of untreated soils and surrounded by a lime enriched perimeter. The basal layer of aglime shall be at a minimum rate of 5 kg per m<sup>2</sup> per vertical metre of fill, with 5 kg per m<sup>2</sup> spread over the stockpile surface.

The recommended maximum time for which soils can be temporarily stockpiled without treatment are presented in Table 4. The total volume of material that is placed in short-term stockpiles should not exceed 20% of a day's total extraction, as immediate treatment should be implemented.

Type of Material			
<b>Texture range</b> (NCST, 2009)	Texture range (NCST, 2009)Approx. clay content (%)		
<b>Fine</b> Medium to heavy clays and silty clays	> 40	3 nights, e.g. a weekend (66 hours)	
<b>Medium</b> Sandy loams to light clays	5 - 40	2 nights (42 hours)	
<b>Coarse</b> Sands to loamy sands and peats	< 5	Overnight (18 hours)	

Table 4. Indicative maximum periods for short term stockpiling of untreated ASS.

#### 6.4 Leachate collection and discharge

Leachate collection drains surrounding the treatment pads will be constructed within bunded areas. Leachate will be directed to a sump or holding ponds for monitoring, and treatment (if required), prior to discharge.

Alternatively, dispersal over land of leachate shall be the preferred method of disposal and shall be conducted in a manner to ensure the leachate does not enter the stormwater network, or adjacent waterways. Where this is not possible leachate must be managed in accordance with an approved Dewatering Management Plan.



Where off-site discharge via dispersal over land is required, or has the potential to occur, water quality monitoring shall be conducted prior to discharge in accordance Section 6.4.1.

#### 6.4.1 Leachate monitoring

Where dewatering is occurring during works involving ASS, leachate generated shall be monitored in accordance with an approved DMP.

In all other cases (i.e. where leachate is generated in collection drains and stored in sumps / holding ponds) surface water quality monitoring shall be undertaken at the locations and frequencies specified in Table 5.

A suitably qualified person shall review the monitoring results. Non-compliance with the water quality objectives shall trigger corrective and preventive action to be determined by a suitably qualified expert (SQE).

#### Table 5. Water quality monitoring program.

Parameter	Water quality objectives	Location	Frequency
pH (units)	6.5 – 8.5 <sup>A</sup>		
Total suspended solids (mg/L)	≤50 в	Discharge	Prior to release
Dissolved aluminium and iron	-		

#### Table notes

A. Derived from Acid Sulfate Soils Management Guidelines (ASSMAC 1998)

B. Derived from Soils and construction (NSW Blue Book) Vol. 1 – 4th Edition, March 2004 (NSW Landcom 2004)

Corrective actions shall be implemented in consultation with a SQE to ensure potential impacts of the release on the receiving environment are mitigated.

Monitoring results shall be reviewed by a SQE prior to release and the necessary actions (e.g. water treatment) determined by the SQE. If visual and/or water quality monitoring indicates the production and migration of acidic leachate, additional treatment measures will be implemented as necessary. These measures may include:

- The application of additional neutralising agent (typically agricultural lime) to temporary and permanent stockpiles
- The application of additional neutralising agent (typically agricultural lime) to leachate collection drains and overland flow pathways
- Neutralisation treatment (typically hydrated lime) of surface water contained within the leachate collection tanks or basins.

# 6.5 Neutralisation treatment

# 6.5.1 Bulk excavated and trench excavated soils

All bulk excavated soils including topsoil will be treated using conventional neutralisation methods whereby agricultural lime is incorporated homogenously into the material either during the excavation process or on a purpose-built treatment pad/s (Refer Appendix G).

Testing will be undertaken on the treated soil not used as backfill on the day of excavation to verify that the quantity of lime added is sufficient to neutralise the soils net acidity to the standards specified in the Acid Sulfate Soils Laboratory Methods Guidelines (Ahern et al, 2004).

Verification results shall be interpreted by a SQE to assess conformance with the verification performance criteria (Table 2). Material deemed by the SQE to be non-conforming shall be re-treated at the liming rate nominated by the SQE and the verification process repeated.

Treated material may be reused within the development where fit for purpose or disposed of at a licensed landfill (Refer Section 6.7).

# 6.5.2 Excavations

The geotechnical investigation has not specified the depth of footings for the development as additional investigations are required following placement of compacted fill. Notwithstanding this, no ASS will be disturbed for all civil infrastructure constructed within the compacted fill.

Soils excavated as part of deeper service trenches which penetrate natural soils shall be treated by applying aglime at the nominated liming rate specified in Section 3.4.3 (according to the soil type encountered.

# 6.5.3 Liming rates

Based on a bulk density (BD) of 1.7 t / m<sup>3</sup>, agricultural lime (97% pure fine CaCO<sub>3</sub>) must be applied to the excavated material as per Table 6. Given the relatively high variability in net acidity between the three main soil types encountered at the site, liming rates have been calculated based on the 95% of net acidity results.

Where material requiring a higher liming rate cannot be separated from material with a lower liming rate then the highest liming applicable to those material types shall be used for neutralisation treatment.

Soil type	Encountered depth	Liming rate minimum (kg / m³)
Uncontrolled fill soils (earthen access driveway - refer Figure 1)	Up to 0.8 m below existing surface level	8.4
Natural clay	Up to 0.95 m below existing surface level	19.2
Natural sand	Generally ≥ 0.5 m below existing surface level	19.2

Table 6. ASS treatment liming rates.

The calculation used to determine the liming rates was:

- 1) Sum of existing acidity + potential acidity (moles H+/t for oven-dried soil)
- 2) divided conversion factor for mol H+/t to kg CaCO<sup>3</sup>/t (i.e. 19.98)
- 3) multiplied by lime purity factor for 97 % pure aglime (i.e. 100/97, or 1.03)
- 4) multiplied by default bulk density of wet soil (i.e. 1.7 t / m<sup>3</sup>)
- 5) multiplied by default safety factor of (i.e. 1.5).

Note: Where soil bulk density is likely to vary from the default  $(1.7 \text{ t} / \text{m}^3)$ , or lime product used has a purity below 97%) lime treatment rates must be modified accordingly.

# 6.6 Verification of neutralisation treatment

All treated soil shall be verified at a minimum rate of 1 sample /  $1,000 \text{ m}^3$  (as required for soils containing acidity concentrations < 142 mol H+/t), or greater where necessary in each batch of soil. Each sample



shall be a composite sample made up of at least 6 sub-samples collected using a random or stratifiedrandom approach.

Chromium suite acid base accounting will be used to verify treated material in accordance with Table A3.6 of the Laboratory Methods Guidelines (Ahern et al. 2004).

The following performance criteria must all be met for soil that has been treated:

- The neutralising capacity of the treated soil must exceed the existing plus potential acidity of the soil by at least a safety factor of 1.5
- Post-neutralisation, the soil pH ( $pH_{KCI}$ ) is to be > 6.5, and preferably < 8.5
- Excess neutralising agent should stay within the treated soil until all acid generation reactions are complete and the soil has no further capacity to generate acidity.

Interpretation of verification results may consider the following:

Medium and fine textured material (sandy loams, light clays, heavy clays and silty clays):

- 1) No single sample shall exceed a net acidity of  $62 \mod H^+/t$ .
- 2) If any single sample is between 0 62 mol H+/t, then the average of any four spatially adjacent samples (including the exceeding sample) shall have an average net acidity of zero or less.

Coarse textured material (sands to loamy sands and peats):

- 1) No single sample shall exceed a net acidity of 18 mol  $H^+/t$ .
- 2) If any single sample is between 0 18 mol H+/t, then the average of any four spatially adjacent samples (including the exceeding sample) shall have an average net acidity of zero or less.

Poorly buffered sands (see Soil Management Guidelines Table 4.1 and associated commentary):

- 1) No single sample shall exceed a net acidity of 6 mol H+/t.
- 2) If any single sample is between 0 6 mol H+/t, then the average of any four spatially adjacent samples (including the exceeding sample) shall have an average net acidity of zero or less.

#### 6.7 Disposal of surplus acid sulfate soil

Following treatment, material that cannot be re-used within the development site (namely uncontrolled fill and clay topsoil) shall be removed to a landfill licensed to accept ASS in accordance with the NSW Waste Classification Guidelines Part 4: Acid Sulfate Soils (Refer Appendix H).

Dry material shall be kept moist and covered during transport. Wet material shall be of at least 'spadable' consistency or carted in lined containers to minimise potential spillage. Council must be provided with the full details of the facility prior to any material being removed off-site, and other records such as tonnage receipts upon request following disposal.

#### 6.8 Potential displacement and extrusion of ASS due to settlement of materials

The upper unconsolidated natural clay layer and loose underlying sand has the potential to displace and extrude during the bulk filling of the site, and a rise in the groundwater level in the surrounding area. The degree of soil and groundwater movement which will depend on the settlement strategy adopted.

A slow rate (i.e. many years) of compression of unconsolidated material may minimise the environmental risks associated with the oxidation of disturbed ASS. However, this may not be feasible for the site.

The Soil Management Guidelines (2014) state:

Dewatering soils using wick drains is a common management strategy available when sediments need to be compressed and dewatered. Vacuum settlement (also known as vacuum consolidation) methods can potentially be employed to hasten the compression process. Vacuum settlement involves sealing the surface of the soil with an impermeable membrane and then using a preinstalled drainage network to pump air and water out of the soil, rather than waiting for it to compress under load....

Note that where these techniques are employed, extracted water must be treated to meet pH, metals (particularly iron and aluminium) and visual amenity targets prior to discharge, and care must be taken to properly isolate the soil to be dewatered from the surrounding environment.

Note: These techniques do not necessarily provide a clearance layer of non-ASS or fully treated ASS material for future land uses.

Wick drains enable the direct vertical rise and capture of groundwater (typically by a preload perimeter drain) reducing the likelihood of lateral displacement of groundwater and extrusion of ASS.

Where wick drains are not required (e.g. no to limited unconsolidated soils present), then a limestone filled cut-off drain of sufficient depth to neutralise horizontal sub-surface groundwater flow may need to be installed around the fill zone boundaries. Decisions on, and design of, the most appropriate management strategy will be the responsibility of the project geotechnical engineer, in consultation with the SQE.

Groundwater monitoring wells must be installed around the perimeter of the fill area and baseline groundwater conditions assess at these locations. Existing baseline groundwater information shall be incorporated for the wider site where available. There can be no decline in groundwater pH as a result of the filling activities. A groundwater neutralising agent may be required where there is an unacceptable change in pH to mitigate risks to groundwater dependant ecosystems including surfaces waters.

# 6.9 Dewatering and oxidation of ASS

Excavation methodologies that minimise the extent and duration of dewatering as far as practicable shall be adopted as a primary control measure. All dewatering shall be undertaken in accordance with an approved dewatering management plan.

# 7 MONITORING

# 7.1 Visual monitoring of ASS impacts

Regular visual monitoring shall be undertaken to detect:

- Unexplained scalding or degradation of vegetation
- Iron staining
- Green-blue or extremely clear water indicating high concentrations of aluminium.

Any observations of the above shall be reported to the SQE who shall inspect the site and advise appropriate corrective action/s, as required.



# 8 **REPORTING**

All incidents that have the potential to cause environmental harm shall be immediately reported to Clarence Valley Council. The Site Manager is responsible for liaising with the Principal's Representative to determine the most appropriate communication pathways for reporting such incidents in accordance with the Protection of the Environment Operations (PoEO) Act 1997 and its associated schedules.

The Principal Contractor shall maintain records of the following:

- ASS verification testing
- ASS disposal (volumes, contractor, disposal facility, waste transport certificates)
- Soil and water treatment
- Water quality monitoring
- Incidents
- Corrective and preventive actions.

The records shall be available for inspection on site during the construction phase and maintained for a minimum of 5 years.

# 9 **REFERENCES**

Ahern, C.R., McElnea, A.E., Sulivan, L.A. 2004. *Acid Sulfate Soils Laboratory Methods Guidelines*. Queensland Department of Natural Resources, Mines and Energy

Stone, Y., Ahern C R., Blunden B., (1998), Acid Sulfate Soil Manual 1998, Acid Sulfate Soil Management Advisory Committee (ASSMAC), Wollongbar, NSW, Australia

Clarence Valley Local Environmental Plan 2011, July 2022, New South Wales Government

Gl. 2021. Preliminary Geotechnical Investigation for Proposed Manufactured Housing Estate at Carrs Drive, Yamba, NSW, Described as Lot 2 on DP733507, Geotech Investigatons Pty Ltd, 7 July 2022.

APPENDIX A – FIGURE



APPENDIX B - PROPOSED SUBDIVISION LAYOUT AND PROPERTY REPORTS



		tip the
MIL	ES STREET (UNFOR	MED)
	75         74         73         72         71         70         69         68         67         66         65         64         63         62         61         60	59 58 57 56 55 54 53
TATION OF DEVENDING	76         80         81         82         83         84         85         86         87           78         95         94         93         92         91         90         88         88           116         115         106         105         96         104         97         103         98         88           118         113         108         102         99         101         100         COMMUNITY FACILITIES 6,475m²           120         111         110         105         164         97         101         100         COMMUNITY FACILITIES 6,475m²           120         111         110         101         100         COT         1         0           121         137         138         153         154         0 <th><math display="block"> \begin{array}{c ccccccccccccccccccccccccccccccccccc</math></th>	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
	103     104     101     100     111     101       26     23     22     21     20     19     18     17     16     15     14     13       109     108     81     80     Community     12     11     12     11       110     107     82     79     Community     12     11       109     108     81     80     Community     12     11       110     107     82     79     Community     12     11       PROPOSED     LOT     23     IN     UNREGISTERED     SUBDIVISION     OF     LOT     3     IN     DEPOSITE       113     104     85     76     Y     AMBA     3     27     31       115     102     87     74     60     59     28     32       116     101     88     73     27     31       2     DP733507     89     72     63     56     54       119     98     91     70     63     56     54       121     96     93     68     65     54     66       121     96     94     67     65     54     66	EXISTING DWELLING (NOT PART OF DEVELOPMENT) OT 3 DP733507
LOT 1 DP1222612		LOT 7 DP1222612 LOT 6 DP1222612



120 CARRS DRIVE YAMBA 2464



# **Property Details**

Address: 120 CARRS DRIVE YAMBA 2464 Lot/Section 2/-/DP733507 /Plan No: Council:

CLARENCE VALLEY COUNCIL

# Summary of planning controls

Planning controls held within the Planning Database are summarised below. The property may be affected by additional planning controls not outlined in this report. Please contact your council for more information.

Local Environmental Plans	Clarence Valley Local Environmental Plan 2011 (pub. 23-12-2011)
Land Zoning	C2 - Environmental Conservation: (pub. 5-11-2021)
	C3 - Environmental Management: (pub. 5-11-2021)
	R1 - General Residential: (pub. 23-12-2011)
Height Of Building	9 m
Floor Space Ratio	NA
Minimum Lot Size	6 ha
Heritage	NA
Land Reservation Acquisition	NA
Foreshore Building Line	NA
Acid Sulfate Soils	Class 2
Local Provisions	Earthworks exclusion area
Urban Release Area	Urban Release Area



120 CARRS DRIVE YAMBA 2464

Greenfield Housing Code Area

Complying Development Code: <u>https://www.planningportal.nsw.gov.au/greenfield-housing-code</u>

Building type: 1-2 storey homes, residential alterations and additions

Development consent authority: Council or accredited certifier

Note: Applications which meet all relevant requirements in the State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be approved within 20 days. Exclusions may apply.

https://legislation.nsw.gov.au/#/view/EPI/2008/572/full

# **Detailed planning information**

# State Environmental Planning Policies which apply to this property

State Environmental Planning Policies can specify planning controls for certain areas and/or types of development. They can also identify the development assessment system that applies and the type of environmental assessment that is required.



120 CARRS DRIVE YAMBA 2464

- State Environmental Planning Policy (Biodiversity and Conservation) 2021: Allowable Clearing Area (pub. 2-12-2021)
- State Environmental Planning Policy (Biodiversity and Conservation) 2021: Land Application (pub. 2-12-2021)
- State Environmental Planning Policy (Biodiversity and Conservation) 2021: Subject Land (pub. 2-12-2021)
- State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004: Land Application (pub. 25-6-2004)
- State Environmental Planning Policy (Exempt and Complying Development Codes) 2008: Land Application (pub. 12-12-2008)
- State Environmental Planning Policy (Exempt and Complying Development Codes) 2008: Subject Land (pub. 6-5-2018)
- State Environmental Planning Policy (Housing) 2021: Land Application (pub. 26-11-2021)
- State Environmental Planning Policy (Industry and Employment) 2021: Land Application (pub. 2-12-2021)
- State Environmental Planning Policy (Planning Systems) 2021: Land Application (pub. 2-12-2021)
- State Environmental Planning Policy (Primary Production) 2021: Land Application (pub. 2-12-2021)
- State Environmental Planning Policy (Resilience and Hazards) 2021: Land Application (pub. 2 -12-2021)
- State Environmental Planning Policy (Resilience and Hazards) 2021: Subject Land (pub. 2-12 -2021)
- State Environmental Planning Policy (Resources and Energy) 2021: Land Application (pub. 2-12-2021)
- State Environmental Planning Policy (Transport and Infrastructure) 2021: Land Application (pub. 2-12-2021)
- State Environmental Planning Policy No 65—Design Quality of Residential Apartment Development: Land Application (pub. 26-7-2002)

# Other matters affecting the property

Information held in the Planning Database about other matters affecting the property appears below. The property may also be affected by additional planning controls not outlined in this report. Please speak to your council for more information

Land near Electrical Infrastructure	This property may be located near electrical infrastructure and could be subject to requirements listed under ISEPP Clause 45. Please contact Essential Energy for more information.
Local Aboriginal Land Council	BIRRIGAN GARGLE
Regional Plan Boundary	North Coast



# 110 CARRS DRIVE YAMBA 2464



# **Property Details**

Address: Lot/Section /Plan No:

110 CARRS DRIVE YAMBA 2464 32/-/DP1280863

Council:

CLARENCE VALLEY COUNCIL

# Summary of planning controls

Planning controls held within the Planning Database are summarised below. The property may be affected by additional planning controls not outlined in this report. Please contact your council for more information.

Local Environmental Plans

Heritage

Clarence Valley Local Environmental Plan 2011 (pub. 23-12-2011) R1 - General Residential: (pub. 23-12-2011) Land Zoning Height Of Building 9 m Floor Space Ratio NA Minimum Lot Size NA NA Land Reservation Acquisition NA Foreshore Building Line NA Acid Sulfate Soils Class 2 Urban Release Area Urban Release Area Greenfield Housing Code Area Complying Development Code: https://www.planningportal.nsw.gov.au/greenfield-housing-code Building type: 1-2 storey homes, residential alterations and additions Development consent authority: Council or accredited certifier Note: Applications which meet all relevant requirements in the State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be approved within 20 days. Exclusions may apply.

https://legislation.nsw.gov.au/#/view/EPI/2008/572/full



**Property Report** 110 CARRS DRIVE YAMBA 2464

# Detailed planning information

# State Environmental Planning Policies which apply to this property

State Environmental Planning Policies can specify planning controls for certain areas and/or types of development. They can also identify the development assessment system that applies and the type of environmental assessment that is required.

- State Environmental Planning Policy (Biodiversity and Conservation) 2021: Allowable Clearing Area (pub. 2-12-2021)
- State Environmental Planning Policy (Biodiversity and Conservation) 2021: Land Application (pub. 2-12-2021)
- State Environmental Planning Policy (Biodiversity and Conservation) 2021: Subject Land (pub. 2-12-2021)
- State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004: Land Application (pub. 25-6-2004)
- State Environmental Planning Policy (Exempt and Complying Development Codes) 2008: Land Application (pub. 12-12-2008)
- State Environmental Planning Policy (Exempt and Complying Development Codes) 2008: Subject Land (pub. 6-5-2018)
- State Environmental Planning Policy (Housing) 2021: Land Application (pub. 26-11-2021)
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- State Environmental Planning Policy (Planning Systems) 2021: Land Application (pub. 2-12-2021)
- State Environmental Planning Policy (Primary Production) 2021: Land Application (pub. 2-12-2021)
- State Environmental Planning Policy (Resilience and Hazards) 2021: Land Application (pub. 2 -12-2021)
- State Environmental Planning Policy (Resilience and Hazards) 2021: Subject Land (pub. 2-12 -2021)
- State Environmental Planning Policy (Resources and Energy) 2021: Land Application (pub. 2-12-2021)
- State Environmental Planning Policy (Transport and Infrastructure) 2021: Land Application (pub. 2-12-2021)
- State Environmental Planning Policy No 65—Design Quality of Residential Apartment Development: Land Application (pub. 26-7-2002)



**Property Report** 110 CARRS DRIVE YAMBA 2464

# Other matters affecting the property

Information held in the Planning Database about other matters affecting the property appears below. The property may also be affected by additional planning controls not outlined in this report. Please speak to your council for more information

Land near Electrical Infrastructure	This property may be located near electrical infrastructure and could be subject to requirements listed under ISEPP Clause 45. Please contact Essential Energy for more information.
Local Aboriginal Land Council	BIRRIGAN GARGLE
Regional Plan Boundary	North Coast

APPENDIX C - STANDARD OPERATING PROCEDURES



# SOP.PROC.001 - SOIL SAMPLING

# 1 PURPOSE AND SCOPE

This is a standard procedure for the collection of soil samples for environmental assessment. This procedure must be followed to ensure that soil samples are collected in an appropriate and consistent manner, that the soil sampling is appropriate for the media and analytes, and to allow the documentation of standard operating procedures used for soil sample collection and handling.

This procedure has been written for environmental soil sampling of *in situ* and *ex situ* soils and fills for general physical and chemical tests and non-volatile, semi-volatile, and volatile analyses.

# 2 **DEFINITIONS**

CoC - chain of custody form

OH&S - occupational health and safety

PID - photo-ionisation detector

VOCs - volatile organic compounds

# 3 **REFERENCES**

Guidance considered in preparing this standard operating procedure included:

- Australian Standard AS 4482.1. 2005. Guide to sampling and investigation of potentially contaminated soil, Part 1 Non-Volatile and semi-volatile compounds
- Australian Standard AS 4482.2. 1999. Guide to sampling and investigation of potentially contaminated soil, Part 2: Volatile substances
- Contaminated Sites: Sampling Design Guidelines. NSW Environmental Protection Authority (EPA 2005)
- National Environment Protection (Assessment of Site Contamination) Measure 1999, Schedule B (1) Guideline on the Investigation Levels for Soil and Groundwater, National Environment Protection Council Service Corporation (NEPC 2013)

# 4 GENERAL

Sampling locations and depths should be clearly stated in a sampling analysis quality plan (SAQP) prior to commencement of fieldwork.

A health and safety plan (HSP) should be produced or Safe Work Method Statement induction completed prior to the commencement of any field work.

Soil samples should be representative of the target depth, media and environmental condition from which they are collected. Soil samples should not be influenced by the method of extraction or sampling from the soil.

Soil samples should not be retained if they have come into direct contact with machinery or sampling equipment that has not been decontaminated.

In general samples should be collected at the surface and at depth at regular intervals consistent with the lithology or contaminant transport encountered during the assessment. This may include soil profiles or horizons or areas of contamination or media.



The assessor must record all information on how the samples were taken in the geological log including refusal or exceedance of equipment reach. The geological log should clearly document the reason sampling was discontinued and a description of material if it continues to greater depths.

Surface samples should be 0 - 0.10 m or 0 - 0.15 m and samples from depth should not exceed a depth range of 0.5 m to avoid compositing effects. Some land uses may require shallower surface samples, e.g. banana lands 0.075 m, and this should be established as part of the SAQP.

As a general rule, never composite samples unless stated in the SAQP.

# 5 PROCEDURE

#### 5.1 Sample collection

All personnel who will come into contact with the soil must always use clean disposable gloves for each sample. Prevention of contamination exposure to personnel and cross-contamination of samples is paramount in soil sampling.

All sampling equipment is to be decontaminated before use and between samples

#### 5.2 Sample collection

Once collected, samples are to be transferred immediately to the appropriate sample container, ensuring that the container is filled to the top so that no head-space remains.

#### 5.3 Hand tools

Hand tools, including spatulas, trowels, shovels, spades, etc, can be used to collect samples from the land surface, walls and floors of test pits or excavations, stockpiles, etc.

The surface to be sampled is first to be cleared of any organic material, e.g. grass and roots, and the sample collected from fresh, exposed soil. Fresh soil should be exposed prior to sampling to remove any smear affects from the sampling equipment. Soil peds or clods should be removed from the auger or trowel and split so that samples can be taken from the middle of the peds or clods. The sampler should not sample from exposed surfaces which may not be representative of contamination, especially where release of volatiles may have occurred from the exposed soil.

Test pits or excavations are not to be entered unless appropriate assessment of stability has been conducted and documented. Test pits over 1 m depth are not to be entered.

#### 5.4 Test pits

The sampler should direct the excavator operator as to where the sample is to be collected and ensure the location is accurate. The sampler must be aware of the 'swing zone' of the machine and follow SOP\_PROC\_008-Vehicle and heavy machinery operations.

Sampling from excavator buckets is permissible, providing the procedures in Section 5.1 - 5.3 are adhered to by the sampler, where appropriate, and the following sampling quality controls are observed by the sampler:

- The sample must be collected from within soil clods or material which has not contacted the excavator bucket
- The bucket must be screened with a PID prior to sampling where volatiles are a contaminant of concern.

# 5.5 Soil cores

For push tubes, split spoons, etc, samples should be transferred directly to the sampling container and procedures in Section 5.1 - 5.3 adhered to by the sampler, where appropriate.

# 5.6 Augers

Samples should be collected from the auger with a trowel by cutting away the outside and collecting soil from the centre of the auger bit. Samples should then be transferred directly to the sampling container. Procedures in Section 5.1 - 5.3 must be adhered to by the sampler, where appropriate.

# 5.7 Field screening for VOCs

If volatiles are a contaminant of concern and field screening using a photo-ionisation detector (PID) is required, a sample should also be transferred to a snap-lock plastic bag. Refer to SOP\_PROC\_011- Measurement of volatiles – PIDs for field screening procedure.

# 5.8 Composite sampling

Composite sampling is used to reduce analytical costs and involves the bulking and thorough mixing of soil samples (collected as above) to form one composite sample for laboratory analysis. Generally, compositing is not encouraged and should only be undertaken if specifically stated in the SAQP. Samples should be sent to the laboratory for compositing with appropriate instructions recorded on the CoC. Composite sampling must not be undertaken where volatile substances are present, including BTEXN compounds and F1 TRHs / TRHs  $C_6 - C_9$ , or soils that have a high clay content.

Composite samples must be collected from the same soil/fill horizon and no more than four subsamples should be included in a composite sample. The sub-samples should be equal in size, from immediately adjacent sampling points, evenly spaced, and composited laterally.

# 6 SAMPLE CONTAINERS

Sample containers from a NATA laboratory, usually 125 mL to 250 mL clear glass jars, are to be used by the sampler. This will ensure the jars are decontaminated, clean and dry, and of the appropriate size and material. Ensure the appropriate preservative is present if required, and all jars have a gastight, non-absorptive seal, which allow no headspace. The laboratory should be contacted if numerous and/or specialty analytes are required, to confirm the required sample container type and size.

# 6.1 Sample labelling

Samples should be labelled clearly on the outside wall of the container with the project number, sampler's initials, sample location, depth of sample and the date. The sample location and depth should also be provided on the container lid. All labelling should be with water proof pens/markers.

The sample location number should be followed by either the sample depth or a letter, e.g. BH1 0.0 - 0.15 or TP3 A.

# 6.2 Sample handling, storage and dispatch

The soil jars, once filled with sample with no head space, are to be wiped clean and wrapped in bubble wrap/padding, and immediately placed in a cooler such as an Esky. Coolers should be kept out of direct sunlight, hot vehicles, etc, as far as practical, and appropriate cooling media added (ice or ice bricks) to ensure samples are kept below 4°C. For longer term storage, samples should be kept below 4°C in a fridge/freezer.



A chain of custody (CoC) form is to be filled out and the CoC is to be sent with the sample/s to the laboratories. The CoC/s is to be placed in a snap-lock plastic bag or plastic folder to prevent damage. All samples sent to the laboratories are to be included on the CoC/s, and if no analyses required, marked as 'Hold'.

If additional air space exists in the cooler, this should be filled with scrunched up newspaper, bubble wrap or similar to minimise movement of the samples. Coolers are to be secured with heavy tape and security seals, and clearly show the laboratory and sender contact information.

All samples, including QC samples, are to be transported to the primary and secondary laboratories. If dispatch is by courier, coolers are not to be dispatched on Fridays (or days before public holidays) unless delivery the next day has been organised.

If samples cannot be dispatched on the day of sampling with refreshed ice-blocks or ice for transport, then the samples are to be refrigerated until dispatch. The laboratory should be contacted if any delays to dispatch occur to confirm holding times available prior to extraction/analysis.

# 6.3 Sample location logging

A geological log is to be completed for each sample location by a qualified environmental scientist. Logs are to be completed for all sample locations, including surface samples and *ex situ* samples.

The log is to include:

- Job details, date, location, methods, climatic conditions
- Soil classification (material type and texture), colour, consistency or density, odour, staining, presence of artefacts, moisture content, sample number, and depth
- Depth of water inflow and/or groundwater level, if encountered, and comments regarding water if required; depth of excavation/drilling, excavation/drilling refusal and any field measurements taken or other relevant field observations.

# 7 QA DOCUMENTATION

A CoC is to be completed for all samples sent to the laboratories and/or to be analysed by the laboratories. Samples not to be analysed should be described as "Hold".

The CoC is to detail laboratory reference numbers (including quotes),site identification, the samplers initials, nature of the sample, collection time and date, analyses to be performed, sample preservation method, any relevant comments, e.g. level contamination expected, level of quality control required and dispatch information and signature.

# 7.1 QC samples

QC sampling should be documented in the SAQP, which should include trip spikes and trip blanks as prepared by the laboratory and should be organised through the laboratory prior to conducting the field work. Trip spikes and trip blanks should be held for as little time as possible prior to the field work, and should be kept below 4°C in a fridge/freezer. After sample collection, trip spikes and trip blanks are to be handled as a primary sample, and should also be included on the CoC.
APPENDIX D – DATA TABLES

#### Table A.1: Soil results

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12 July 2022			Screen	testing		Chromium Reducible Sulfur suite (mol H+/t)					
Borehole	Sample depth	pHF	pH <sub>rox</sub>	Change	Reaction	pH-KCI	: Titratable actual acidity	s <sub>cr</sub>	Net acidity	Net acidity not including ANC (mol H <sup>+</sup> /t)	
		0.1	0.1	0.1	Laborate		eporting	10	10	10	
RH1	0	0.1 5.0	0.1	<b>U.1</b>	1	<b>U.1</b>	2 21	10	10	10	
BH1	0.25	6.1	2.7	3.0	2	5.1	51	12	45		
BH1	0.5	6	1.9	1 1	1	5.8		<10	13	13	
BH1	0.5	63	5.4	0.9	1	-		-	-	-	
BH1	1	6.1	4.8	1.3	1	5.7	4	<10	13	13	
BH1	1 25	5.9	4.5	1.3	1	-	-	-	-	-	
BH1	1.23	6.1	1.8	4 3	4	5.4	6	123	129	129	
BH1	1.75	6	1.8	4.2	4	-	-	-	-	-	
BH1	2	6.3	1.8	4.5	4	-	-	-	-	-	
BH1	2.25	6.3	2.3	4.0	4	-	-	-			
BH1	2.5	7.4	2	5.4	4	5.6	4	121	125	125	
BH1	2.75	7.7	3.7	4.0	2	-	-	-	-	-	
BH2	0	6.6	3.3	3.3	3	4.9	66	<10	74	74	
BH2	0.25	6.6	3.8	2.8	2	-	-	-	-	-	
BH2	0.5	6.6	5.1	1.5	1	-	-	-	-	-	
BH2	0.75	6.3	4.9	1.4	1	-	-	-	-	-	
BH2	1	6.4	4.3	2.1	2	-	-	-	-	-	
BH2	1.25	6.3	2.1	4.2	4	-	-	-	-	-	
BH2	1.5	6.1	1.8	4.3	4	-	-	-	-	-	
BH2	1.75	6.3	2.1	4.2	4	-	-	-	-	-	
BH3	0	6.1	2.8	3.3	3	4.5	128	10	138	138	
ВНЗ	0.25	6.2	3.6	2.6	2	-	-	-	-	-	
ВНЗ	0.5	6.4	4.6	1.8	2	-	-	-	-	-	
BH3	0.75	6.4	5	1.4	1	-	-	-	-	-	
BH3	1	6.3	4.2	2.1	2	-	-	-	-	-	
BH3	1.25	6.3	1.8	4.5	4	-	-	-	-	-	
BH3	1.5	6.4	1.8	4.6	4	-	-	-	-	-	
BH3	1.75	7.1	1.8	5.3	4	-	-	-	-	-	
BH4	0	6.6	2.7	3.9	3	5.4	17	24	41	41	
BH4	0.25	6.8	3.2	3.6	3	-	-	-	-	-	
BH4	0.5	7.2	4.1	3.1	2	5.8	9	17	26	26	
BH4	1	7.2	1.4	5.8	4	5.9	2	139	142	142	
BH4	1.25	7.2	1.6	5.6	4	-	-	-	-	-	
BH4	1.5	7	2	5.0	4	5.7	3	116	120	120	
BH4	1.75	6.9	1.6	5.3	4	-	-	-	-	-	
BH4	2	6.8	1.9	4.9	4	-	-	-	-	-	
BH4	2.25	7.4	1.9	5.5	4	6	<2	94	94	94	
BH5	0	6.5	4.6	1.9	3	-	-	-	-	-	
BH5	0.5	6.7	5.3	1.4	1	-	-	-	-	-	
BH5	0.75	6.4	5.3	1.1	1	-	-	-	-	-	
BH5	1	5.6	3.3	2.3	2	-	-	-	-	-	
BH5	1.25	5.1	1.8	3.3	4	-	-	-	-	-	
BH5	1.5	5	2	3.0	4	-	-	-	-	-	
BH5	1.75	5.4	1.8	3.6	4	-	-	-	-	-	
Action criteria - dist	urbances > 1,000 m <sup>3</sup>									18	

Notes:

nd denotes laboratory limits of detection

- denotes not applicable or no criterion

Action criteria applicable to disturbances of untreated soil > 1,000 m<sup>3</sup> - Refer Section 4.1 of the Soil Management Guidelines (Dear et. al. 2014).

Performance criteria applicable to soil treated using neutralisation - Refer Section 8.2.1 of the Soil Management Guidelines (Dear et. al. 2014) for allowable variations in net acidity greater than laboratory limit of reporting.

BOLD denotes non-compliance with action / performance criteria.

#### Table A.2: Soil results

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12 July 2022			Screen	testing		Chromium Reducible Sulfur suite (mol H+/t)					
Borehole	Sample depth	pH <sub>F</sub>	pH <sub>Fox</sub>	Change	Reaction	pH-KCI	. Titratable actual acidity	S <sub>cr</sub>	Net acidity	Net acidity not including ANC (mol H* /t)	
		0.1	0.4	0.4	Laborate	ory limit of re	eporting	40	40	40	
D114	0	0.1	0.1	0.1	1	0.1	2	10	10	10	
вно	0.25	5.0	2.9	2.7	3	5.5	12	14	20	20	
вно	0.25	5.7	2.0	3.1	3	- 4.7	-	- 16	- 61	- 61	
вно	0.5	5.0	2.0	2.7	3	4.7	45	10	01	01	
вно	1	6.1	J.1	2.7	2	5.2	-	- 12	-		
вно	1 25	5.7	4.1	2.0	2	5.2	15	12	27	21	
вна	1.25	5.7	1.0	2.7	2	5.2	- 10	-	- 07	07	
вно	1.75	6.2	1.7	4.1	4	5.5	10	00	77	71	
вно	2	6.3	2	4.4	4						
вно	2 25	6.3	2	4.3	4						
вна	2.23	6.3	2	4.3	4	5.4	8	100	108	108	
вно	2.5	5.6	1.8	3.8	4	-	-	100	-	108	
вна	0	5.0	3.5	1.0	7	4.6	106	11	117	117	
вн7	0.25	5.8	3.8	2.0	2	-	-	-	-		
BH7	0.5	5.0	4 7	0.7	2						
BH7	0.75	6	4.6	1 4	2	-	-				
BH7	1	5.5	21	3.4	4		-				
BH7	1 25	5.6	1 7	3.9	4		-				
BH7	1.5	5.9	1.8	4.1	4	-	-		-	-	
BH7	1.75	6	1.6	4.4	4	-	-	-	-	-	
вня	0	5.7	2.4	3.3	3	4.8	40	<10	49	49	
вна	0.25	5.7	2.9	2.8	3	4 7	44	11	55	55	
вна	0.5	5.8	4.2	1.6	1	5.8	<2	12	12	12	
вня	0.75	5.6	3.6	2.0	1	-	-	-	-		
вна	1	5.9	2	3.9	1	-	-	-	-	-	
вна	1.25	6	2.1	3.9	4	-	-		-		
вна	1.5	5.8	2.3	3.5	4	-	-	-	-	-	
ВН8	1.75	5.8	2	3.8	4	-	-	-	-	-	
ВН9	0	5.8	2.4	3.4	3	4.6	79	18	98	98	
ВН9	0.25	5.9	2.8	3.1	3	-	-	-	-	-	
ВН9	0.5	6.2	3.8	2.4	1	5.8	<2	<10	<10	<10	
BH9	0.75	6.3	4.2	2.1	1	-	-	-	-		
BH9	1	6.4	2	4.4	1	5.6	3	23	26	26	
BH9	1.25	5.6	1.9	3.7	1	-	-	-	-	-	
BH9	1.5	5.1	1.8	3.3	1	5.2	7	77	84	84	
BH9	1.75	5.2	1.7	3.5	1	-	-	-	-	-	
BH10	0	5.4	2.6	2.8	3	4.8	42	14	56	56	
BH10	0.25	5.7	3.5	2.2	2	-	-	-	-	-	
BH10	0.5	5.4	3	2.4	2	-	-	-	-	-	
BH10	0.75	5.7	2.5	3.2	2	-	-	-	-	-	
BH10	1	5.8	2.2	3.6	4	-	-	-	-	-	
BH10	1.25	5.7	2.1	3.6	4	-	-	-	-	-	
BH10	1.5	5.5	2	3.5	4	-	-	-	-	-	
BH10	1.75	5.6	2.3	3.3	4	-	-	-	-	-	
Action criteria - dist	urbances > 1,000 m <sup>3</sup>									18	

Notes:

nd denotes laboratory limits of detection

- denotes not applicable or no criterion

Action criteria applicable to disturbances of untreated soil > 1,000 m<sup>3</sup> - Refer Section 4.1 of the Soil Management Guidelines (Dear et. al. 2014).

Performance criteria applicable to soil treated using neutralisation - Refer Section 8.2.1 of the Soil Management Guidelines (Dear et. al. 2014) for allowable variations in net acidity greater than laboratory limit of reporting.

BOLD denotes non-compliance with action / performance criteria.

#### Table A.3: Soil results

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12 July 2022			Screen	testing		Chromium Reducible Sulfur suite (mol H+/t)				
Borehole	Sample depth	pH <sub>F</sub>	pH <sub>rox</sub>	Change	Reaction	pH-KCI	: Titratable actual acidity	S <sub>cr</sub>	Net acidity	Net acidity not including ANC (mol H <sup>+</sup> /t)
					Laborat		eporting	10	10	10
RH11	0	0.1 5.8	0.1	0.1	3	0.1	Z	10	10	10
	0.25	5.0	2.7	2.0	3	0.1	4	12	10	10
BH11	0.5	5.7	3	2.7	3	5 1	32	<10	30	30
BH11	0.75	5 1	2.5	2.0	3	4.8	49	<10	57	57
BH11	1	5.5	2.0	2.0	3	5.5	8	<10	16	16
BH11	1 25	5.5	2.0	3.3	1	-	-	-	-	-
BH11	1.5	5.3	2.2	3.1	4	5.4	5	132	138	138
BH11	1.75	5.2	2.1	3.1	4	-		-	-	-
BH11	2	5.5	2	3.5	4	-	-	-	-	-
BH11	2.25	5.4	2	3.4	4	-	-	-	-	-
BH11	2.5	5.5	2	3.5	4	5.5	4	118	122	122
BH11	2.75	5.5	2.2	3.3	4	-	-	-	-	-
BH12	0	5.3	2.9	2.4	2	4.6	66	<10	74	74
BH12	0.25	5.6	3	2.6	2	-	-	-	-	-
BH12	0.5	5.6	4.2	1.4	1	-	-	-	-	-
BH12	0.75	5.5	3.6	1.9	1	-	-	-	-	-
BH12	1	5.9	2	3.9	4	-	-	-	-	-
BH12	1.25	5.4	2	3.4	4	-	-	-	-	-
BH12	1.5	5.4	2.1	3.3	4	-	-	-	-	-
BH12	1.75	5.2	2.1	3.1	4	-	-	-	-	-
BH13	0	5.3	2.1	3.2	3	4.6	87	<10	96	96
BH13	0.25	4.8	2.7	2.1	3	-	-	-	-	-
BH13	0.5	6	3	3.0	2	-	-	-	-	-
BH13	0.75	5.9	3.8	2.1	1	-	-	-	-	-
BH13	1	6	2.1	3.9	4	-	-	-	-	-
BH13	1.25	6	2.1	3.9	4	-	-	-	-	-
BH13	1.5	5.9	2	3.9	4	-	-	-	-	-
BH13	1.75	6	2.1	3.9	4	-	-	-	-	-
BH14	0	5.5	2.8	2.7	3	4.5	124	15	138	138
BH14	0.25	5.6	3.3	2.3	1	-	-	-	-	-
BH14	0.5	5.5	3.6	1.9	1	5.6	4	<10	13	13
BH14	0.75	5.9	3.4	2.5	1	-	-	-	-	-
BH14	1	5.9	2	3.9	4	5.3	7	67	74	74
BH14	1.25	6.2	2	4.2	4	-	-	-	-	-
BH14	1.5	6	2.1	3.9	4	5	11	58	69	69
BH14	1.75	6.1	2	4.1	4	-	-	-	-	-
BH15	0	5.7	3	2.7	3	4.6	108	13	121	121
BH15	0.25	5.6	3.3	2.3	3	-	-	-	-	-
BH15	0.5	6.3	3.6	2.7	1	5.8	4	<10	14	14
BH15	0.75	6.4	4.3	2.1	1	-	-	-	-	-
BH15	1	6.6	1.9	4.7	1	5.6	4	67	71	71
BH15	1.25	6.8	2.1	4.7	4	-	-	-	-	-
BH15	1.5	6.9	2	4.9	1	-	-	-	-	-
BH15	1.75	7	1.9	5.1	1	-	-	-	-	-
Action criteria - dist	urbances > 1,000 m <sup>3</sup>									18

Notes:

nd denotes laboratory limits of detection

- denotes not applicable or no criterion

Action criteria applicable to disturbances of untreated soil > 1,000 m<sup>3</sup> - Refer Section 4.1 of the Soil Management Guidelines (Dear et. al. 2014).

Performance criteria applicable to soil treated using neutralisation - Refer Section 8.2.1 of the Soil Management Guidelines (Dear et. al. 2014) for allowable variations in net acidity greater than laboratory limit of reporting.

BOLD denotes non-compliance with action / performance criteria.

12 Ju	ly 2022			Chr	ő				
Borehole	Borehole Sample depth Predominant soil type Wet		pH-KCI	Titratable actual acidity S <sub>cr</sub> Net acidity		Net acidity Net acidity not including ANC (mol H*/f)			
					Lim	it of repor	ting		cula 3)
				0.1	2	10	10	10	Cal / m
BH6	0.5	Clay - F	No	4.7	45	16	61	61	8.5
BH8	0	Clay - F	No	4.8	40	5	49	49	6.8
BH8	0.25	Clay - F	No	4.7	44	11	55	55	7.7
BH11	0.5	Clay - F	No	5.1	32	5	39	39	5.4
Statistics	-					-			-
Minimum				4.7	32	5	39	39	5.4
Mean				4.8	40.3	9.3	51.0	51.0	7.1
Median				4.75	42	8	52	52	7.2
Maximum				5.1	45	16	61	61	8.5
95%ile				5.1	44.9	15.3	60.1	60.1	8.4
Standard deviation				0.2	5.9	5.3	9.4	9.4	

Table notes:

Half LOR applied for results less than laboratory detection limits (grey shaded cells)

PE3394.22\_110 - 120 Carrs Dr\_ASSI data

12 Jul	y 2022	Chr	omium Red	ucible Sulfur	suite (mol H	l+/t)	ő		
Borehole	Borehole Sample depth Predominant soil type Wet		Wet	pH-KCI	Titratable actual acidity	° S	Net acidity	Net acidity not including ANC (mol H <sup>+</sup> /t)	lated liming rate (kg CaC
					Lim	it of repor	ting	40	alcu m³)
BH1	0	Clay - N	Νο	0.1 5.1	2 31	10	43	43	0 <u></u>
BH4	0	Clay - N	No	5.4	17	24	41	41	5.7
BH7	0	Clay - N	No	4.6	106	11	117	117	16.3
BH12	0	Clay - N	No	4.6	66	5	74	74	10.3
BH13	0	Clay - N	No	4.6	87	5	96	96	13.4
BH14	0	Clay - N	No	4.5	124	15	138	138	19.2
BH15	0	Clay - N	No	4.6	108	13	121	121	16.8
BH2	0	Clay - N	No	4.9	66	5	74	74	10.3
BH3	0	Clay - N	No	4.5	128	10	138	138	19.2
BH9	0	Clay - N	No	4.6	79	18	98	98	13.6
BH10	0	Clay - N	No	4.8	42	14	56	56	7.8
BH4	0.5	Clay - N	No	5.8	9	17	26	26	3.6
BH9	0.5	Clay - N	No	5.8	1	5	5	5	0.7
BH11	0.75	Clay - N	No	4.8	49	5	57	57	7.9
Statistics					-		-	-	
Minimum				4.5	1	5	5	5	0.7
Mean				4.9	67.8	11.3	80.1	80.1	11.1
Median				4.6	66	11	74	74	10.3
Maximum				5.8	128	24	138	138	19.2
95%ile				5.8	125.6	20.4	138.0	138.0	19.2
Standard deviation				0.5	42.7	6.2	42.4	42.4	

Table notes:

Half LOR applied for results less than laboratory detection limits (grey shaded cells)

PE3394.22\_110 - 120 Carrs Dr\_ASSI data

12 Jul	y 2022		Chr	omium Red	ucible Sulfur	suite (mol H	l+/t)	ő	
Borehole	Sample depth	Predominant soil type	Wet	pH-KCI	Titratable actual acidity	Titratable actual acidity S <sub>cr</sub> Net acidity			ulated liming rate (kg CaC
				0.1	2	10	10	10	Calc / m³)
BH8	0.5	Sand - N	Yes	5.8	1	12	12	12	1.7
BH1	0.5	Sand - N	Yes	5.8	4	5	13	13	1.8
BH14	0.5	Sand - N	Yes	5.6	4	5	13	13	1.8
BH15	0.5	Sand - N	Yes	5.8	4	5	14	14	1.9
BH4	1	Sand - N	Yes	5.9	2	139	142	142	19.8
BH9	1	Sand - N	Yes	5.6	3	23	26	26	3.6
BH11	1	Sand - N	No	5.5	8	5	16	16	2.2
BH14	1	Sand - N	Yes	5.3	7	67	74	74	10.3
BH1	1	Sand - N	Yes	5.7	4	5	13	13	1.8
BH6	1	Sand - N	Yes	5.2	15	12	27	27	3.8
BH15	1	Sand - N	Yes	5.6	4	67	71	71	9.9
BH1	1.5	Sand - N	Yes	5.4	6	123	129	129	17.9
BH4	1.5	Sand - N	Yes	5.7	3	116	120	120	16.7
BH6	1.5	Sand - N	Yes	5.3	10	88	97	97	13.5
BH9	1.5	Sand - N	Yes	5.2	7	77	84	84	11.7
BH11	1.5	Sand - N	Yes	5.4	5	132	138	138	19.2
BH14	1.5	Sand - N	Yes	5	11	58	69	69	9.6
BH4	2.25	Sand - N	Yes	6	1	94	94	94	13.1
BH1	2.5	Sand - N	Yes	5.6	4	121	125	125	17.4
BH6	2.5	Sand - N	Yes	5.4	8	100	108	108	15.0
BH11	2.5	Sand - N	Yes	5.5	4	118	122	122	17.0
Statistics									
Minimum				5	1	5	13	13	1.8
Mean				5.5	5.7	68.0	74.8	74.8	10.4
Median				5.55	4	72	79	79	11.0
Maximum				6	15	139	142	142	19.8
95%ile				5.9	11.2	132.4	138.2	138.0	19.2
Standard deviation				0.3	3.4	49.8	47.9	47.9	

Table notes:

Half LOR applied for results less than laboratory detection limits (grey shaded cells)

E

PE3394.22\_110 - 120 Carrs Dr\_ASSI data

APPENDIX E – SOIL PROFILE DESCRIPTIONS

P

#### Table A. Soil profile description and sample analysis logs

Client		Fostorly Do	int Environmental			Site Address		120 Carrs Dri	rive, Yamba, New	Commenced	12 July 2022	022		
Client:		Easterry PO	intenvironmental			Sile Address:		South Wales	S	Completed:	12 July 2022			
Project:		Acid Sulfat	te Soil Investigation and Manage	ement Plan		RPD:		Lot 2 DP7335 DP1280863	507 and Lot 32	Logged by:	Chris Butler	]	Key Results	
Project Number:		PE3394.22					Equipment T	ype:	Track mounted rig solid stem augers	Checked by:	Sean Gardiner			
BOREHOLE	FILL/NATURAL	DEPTH (m)	MATERIAL CLASSIFICATION	MATERIAL CONSTITUENTS	COLOUR	OTHER MATERIALS	SEEPAGE	ODOUR	FIELD SCREEN	I SAMPLE DEPTH	CHROMIUM SUITE SAMPLE DEPTH	Titratable actual acidity results (mol H <sup>+</sup> /t)	S <sub>cr</sub> (potential acidity)	Net acidity not including ANC (mol H*/t)
BH1	Natural	0.0	Sandy Light Clay	Fine to medium grained sand, moist	Brown	Organics	Nil	Nil	0.0	- 0.25	0.0 - 0.25	31	12	43
		0.25	Sandy Light to Medium Clay	Fine to medium grained sand, moist	Brown Vollow brown	Trace organics	Nil	Nil	0.2	5 - 0.5	- 0.5 0.75	-	-	- 12
		0.5	Janu	The to mediant grained, wet		Trace site	163	INI	0.75	5 - 1.0	-	-	-	-
		1.05							1.0	- 1.25	1.0 - 1.25	4	<10	13
		1.25	Sand	Fine to medium grained, wet	Grey	Trace silt	Nil	Nil	1.2	5 - 1.5 - 1 75	- 15-175	- 6	- 123	- 129
									1.75	5 - 2.0	-	-	-	-
									2.0	- 2.25	-	-	-	-
									2.2	- 2.5 - 2.75	2.5 - 2.75	- 4	- 121	- 125
									2.75	5 - 3.0	-	-	-	
DU0	Netwol	3.0	Borehole terminated	Molet	Deduction	Troop fine project cond	ND	NB		0.05	0.0.005		.10	74
внг	Natural	0.0	Sandy Light to Medium Clay	Fine to medium grained sand, moist	Grey yellow orange	-	Nil	Nil	0.0	- 0.25 5 - 0.4	- 0.0 - 0.25	- 00	-	-
		0.40	Clayey Sand	Fine to medium grained sand, moist	Grey yellow orange	-	Nil	Nil		-	-	-	-	-
		0.50	Sand	Fine to medium grained, wet	Grey	- Troco silt	Yes	Nil	0.5	- 0.75	-	-		
		2.0	Borehole terminated	rine to medium grained, wet	Gley	IIdce sil	INII	INII	1.23	5 - 1.5	-	-	-	-
BH3	Natural	0.0	Silty Medium Clay	Moist	Dark grey	Trace fine grained sand	Nil	Nil	0.0	- 0.25	0.0 - 0.25	128	10	138
		0.25	Sandy Medium Clay	Fine to medium grained sand, abundant organics, moist	Grey orange brown mottled	-	Nil	Nil	0.2	5 - 0.5	-	-	-	-
		0.50	Sanu	The glained, wet	Tellow brown	-	163	INI	0.75	5 - 1.0	-	-	-	-
									1.0	) - 1.2	-	-	-	-
		1.20	Sand	Fine grained, wet	Grey	-	Nil	Nil	1.2	5 - 1.5 - 1.75		-		
									1.75	5 - 2.0	-	-	-	-
		2.0	Borehole terminated	<b>-</b>		I				0.05		17		
BH4	Natural	0.0	sandy Medium Clay	Fine to coarse grained sand, moist to very moist	BLOMU	-	INII	NII	0.0	- 0.25 5 - 0.5	- 0.0 - 0.25	-	- 24	-
		0.5	Sandy Heavy Clay	Fine to medium grained sand, moist	Brown with orange mottles	-	Nil	Nil	0.5	- 0.75	0.5 - 0.75	9	17	26
			Cille Const	Fire to people project and wet	Crew		N	N.17	0.75	5 - 0.9	-	-	-	-
		0.9	Sity sand	Fine to coarse grained sand, wet	Gley	-	Yes	INII	1.0	- 1.25 5 - 1.5	-	- 2	-	- 142
									1.5	- 1.75	1.5 - 1.75	3	116	120
									1.75	5 - 2.0	-	-	-	-
		3.0							2.0	- 2.25 5 - 2.5	2.25 - 2.5	<2	- 94	- 94
		3.0	Borehole terminated	·										
BH5	Natural	0.0	Clayey Sand	Fine to coarse grained sand, very moist	Dark grey Brown grey with grange	-	Nil	Nil	0.0	- 0.25	-	-	-	-
		0.4	Jana	The to median granea, very most	mottles		TNII .	INII I	0.75	5 - 0.9	-	-	-	-
		0.9	Sand	Fine to medium grained, wet	Brown grey with orange	-	Yes	Nil	1.0	) - 1.1	-	-	-	-
		1.1	Sand	Fine to medium grained, wet	Grey	-	Nil	Nil	1.2	5 - 1.5 - 1.75	-	-	-	-
									1.75	5 - 2.0	-	-	-	-
		2.0	Perchala terminated						2.0	- 2.25	-	-	-	-
BH6	Fill	0.0	Clayey Sand	Fine to medium grained sand, moist	Orange grey brown	-	Nil	Nil	0.0	0 - 0.2	0.0 - 0.2	12	14	26
		0.2	Sandy Light Clay	Fine to medium grained sand, moist	Grey black	-	Nil	Nil	0.25	5 - 0.5	-	-	-	-
									0.5	- 0.75	0.5 - 0.75	45	16	61
	Natural	0.8	Clayey Sand	Fine to coarse grained sand, wet	Brown grey	-	Yes	Nil	0.7.		-	-	-	-
		1.0	Sand	Fine to coarse grained, wet	Brown grey with orange	-	Nil	Nil	1.0	- 1.25	1.0 - 1.25	15	12	27
		15	Sand	Fine to coarse grained, wet	Grev	-	Nil	Nil	1.2	5 - 1.5 - 1 75	- 15-175	- 10	- 88	- 97
			ound		0.09				1.75	5 - 2.0	-	-	-	-
									2.0	- 2.25	-	-	-	-
									2.2	- 2.5 - 2.75	- 2.5 - 2.75	- 8	- 100	- 107
									2.75	5 - 3.0	-	-	-	-
DU7	Notural	3.0	Borehole terminated	Fina to madium grained cand, maint	Dork brown	1	NG	NB	0.0	0.25	0.0.025	104	11	117
BIT	Natural	0.25	Clayey Sand	Fine to coarse grained sand, very moist	Yellow brown	-	Nil	Nil	0.2	5 - 0.4		-	-	-
		0.4	Sand	Fine to coarse grained, wet	Grey yellow brown	-	Yes	Nil	0.5	- 0.75	-	-	-	-
									0.75	5 - 1.0 - 1.25	-	-	-	-
		1.25	Sand	Fine to coarse grained, wet	Grey	-	Nil	Nil	1.2	5 - 1.5		-	-	-
									1.5	- 1.75	-	-	-	-
		2.0	Borehole terminated		1	1	1	1	1.75	5 - 2.0	-	-	-	-
BH8	Fill	0.0	Sandy Light Clay	Fine to medium grained sand, moist	Dark grey with brown mottles	-	Nil	Nil	0.0	- 0.25	0.0 - 0.25	40	<10	49
	Natural	0.25	Silty Sandy Heavy Clay	Fine to medium grained sand, moist	Grey with orange mottles	-	Nil	Nil	0.25	5 - 0.5	0.25 - 0.5	44	11	55
	natural	0.5	Sand	nine to mediam grained, wet	Sicy		res	INIÍ	0.75	5 - 1.0	-	-	-	-
									1.0	- 1.25	-	-	-	-
									1.25	5 - 1.5 - 1.75				-
									1.75	5 - 2.0	-	-	-	
1	1	2.0	Borehole terminated											



#### Table A. Soil profile description and sample analysis logs

								110 - 120 C	Commenced	12 July 2022	2022		
Client:		Easterly F	Point Environmental			Site Address:		New South	Wales Completed:	12 July 2022			
Project:		Acid Sulf	ate Soil Investigation and Mana	gement Plan		RPD:		Lot 2 DP733 DP1280863	3507 and Lot 32 B Logged by:	Chris Butler	Key Results		
Project Numbe	er:	PE3394.2	2				Equipment	t Type:	Track mounted rig solid stem augers	Sean Gardiner			
BOREHOLE	Fill/Natural	DEPTH (m)	MATERIAL CLASSIFICATION	MATERIAL CONSTITUENTS	COLOUR	OTHER MATERIALS	SEEPAGE	ODOUR	FIELD SCREEN SAMPLE DEPTH	CHROMIUM SUITE SAMPLE DEPTH	Titratable actual acidity results (mol H <sup>+</sup> /t)	S <sub>cr</sub> (potential acidity)	Net acidity not including ANC (mol H*/t)
BH9	Natural	0.0	Sandy Light Clay	Fine to medium grained, sand, moist	Dark grey	Trace tree roots and	Nil	Nil	0.0 - 0.25	0.0 - 0.25	79	18	98
		0.25	Sandy Medium Clay	Fine to medium grained sand, moist to very moist	Grey with orange mottles	-	Nil	Nil	0.25 - 0.5	-	-	-	-
		0.7	Sand	Fine to medium grained, wet	Brown	-	Yes	Nil	0.5 - 0.7	0.5 - 0.7	<2	<10	<10
		1.0	Sand	Fine to medium grained, wet	Grey	Trace of silt	Nil	Nil	1.0 - 1.25	1.0 - 1.25	3	23	26
									1.25 - 1.5	-	-	-	-
									1.5 - 1.75	1.5 - 1.75	-	-	- 84
		2.0	Borehole terminated				1	1	1.75 2.0				
BH10	Natural	0.0	Sandy Light to Medium Clay	Fine to medium grained sand, moist	Dark grey	Trace tree roots	Nil	Nil	0.0 - 0.25	0.0 - 0.25	42	14	56
		0.25	Clayey Sand	Fine to medium grained sand, wet	Grey brown	-	Yes	Nil	0.25 - 0.4	-	-	-	-
		0.4	sand	Fine to medium grained, wet	Yellow brown		INII	INII	0.75 - 1.0	-	-	-	-
		0.9	Sand	Fine to medium grained, wet	Grey	-	Nil	Nil	1.0 - 1.25	-	-	-	-
									1.25 - 1.5	-	-	-	-
									1.5 - 1.75	-	-	-	-
		2.0	Borehole terminated						1.75 - 2.0	-	-	-	-
BH11	Fill	0.0	Sand	Fine to medium grained, moist	Grey	-	Nil	Nil	0.0 - 0.25	0.0 - 0.25	4	12	16
		0.25	Sandy Light Clay	Fine to medium grained sand, moist	Grey with dark grey mottles	-	Nil	Nil	0.25 - 0.5	-	-	-	-
	N a true l	0.75	Condu Linkt Clau	Fine to provide a construction	Dark may	Troop or or other	N.17	N.I.I	0.5 - 0.75	0.5 - 0.75	32	<10	39
	Naturai	0.75	Sandy Light Clay	Fine to medium grained sand, moist	Grev	-	NI	Nil	10-12	1.0 - 1.2	8	<10	16
		1.2	Sand	Fine to medium grained, moist	Light grey	-	Nil	Nil	1.25 - 1.5	-	-	-	-
		1.5	Sand	Fine to medium grained, wet	Light grey	-	Yes	Nil	1.5 - 1.75	1.5 - 1.75	5	132	138
									1.75 - 2.0	-	-	-	-
									2.0 - 2.25	-	-	-	-
									2.5 - 2.75	2.5 - 2.75	4	118	122
									2.75 - 3.0	-	-	-	-
BU12	Natural	3.0	Borehole terminated	1	Dreum	Madarata areanias	NB	NB	0.0.025	0.0.0.05		10	74
BHIZ	Naturai	0.0 0.25	Sand	Fine to coarse grained, wet	Brown		Yes	Nil	0.0 - 0.25	0.0 - 0.25	- 00	<10	
		0.20	ound .	The to boarso gramoa, not	5.0111				0.5 - 0.75	-			
									0.75 - 1.0	-	-	-	-
		1.0	Sand	Fine to coarse grained, wet	Grey	-	Nil	Nil	1.0 - 1.25	-	-	-	-
									1.25 - 1.5	-	-	-	-
									1.75 - 2.0	-	-	-	-
		2.0	Borehole terminated				-	-					-
BH13	Natural	0.0	Sandy Light Clay	Fine to medium grained sand, very moist	Dark brown	-	Nil	Nil	0.0 - 0.25	0.0 - 0.25	87	<10	96
		0.25	Sand	Fine to coarse grained, wet	Brown grey	-	Yes	Nil	0.25 - 0.5	-		-	-
									0.75 - 1.0	-	-	-	-
									1.0 - 1.25	-	-	-	-
									1.25 - 1.5	-	-	-	
									1.75 - 2.0	-		-	
		2.0	Borehole terminated		•	1		1	1		ł		
BH14	Natural	0.0	Sandy Light Clay	Fine to medium grained sand, very moist	Dark brown	-	Nil	Nil	0.0 - 0.2	0.0 - 0.2	124	15	138
		0.2	Sandy Light Clay Sand	Fine to medium grained sand, very moist Fine to coarse grained, wet	Grey with orange mottles Grey orange	-	Nil Yes	Nil	0.25 - 0.5 0.5 - 0.75	- 0.5 - 0.75	- 4	- <10	- 13
		1.0	Count	First the second second second					0.75 - 1.0	-	-	-	-
		1.0	sand	Fine to coarse grained, wet	Grey	-	Nil	Nil	1.0 - 1.25	1.0 - 1.25	-	6/	- /4
									1.5 - 1.75	1.5 - 1.75	11	69	69
1							1		1.75 - 2.0	-	-	-	-
DUITE	Noturo	2.0	Borehole terminated	Fina to modium grained cand was maint	Dark brown	1	N 121	N 121	0.0.005	0.0.0.05	100	10	101
DHID	ivatural	0.25	Sandy Light Clay	Fine to medium grained sand, very moist Fine to medium grained sand, very moist	Grey with grange mottles	-	NII	NII	0.25 - 0.5	0.0 - 0.25	108	- 13	-
		0.5	Sand	Fine to coarse grained, wet	Grey brown	-	Yes	Nil	0.5 - 0.75	0.5 - 0.75	4	<10	14
							1		0.75 - 1.0	-	-	-	-
									1.0 - 1.25	1.0 - 1.25	4	67	71
		1.5	Sand	Fine to coarse grained, wet	Grev	-	Nil	Nil	1.20 - 1.0	-	-	-	-
									1.75 - 2.0	-	-	-	-
1		2.0	Borehole terminated										



APPENDIX F - LABORATORY CERTIFICATES OF ANALYSIS



# **SAMPLE RECEIPT NOTIFICATION (SRN)**

Work Order	EB2220520		
Client Contact Address	E <b>PRECISE ENVIRONMENTAL PTY LTD</b> MR CHRIS BUTLER PO BOX 4424 ROBINA TOWN CENTRE QLD, AUSTRALIA 4230	Laboratory : Contact : Address :	Environmental Division Brisbane Nidhi Bhimani 2 Byth Street Stafford QLD Australia 4053
E-mail Telephone Facsimile	ail : mail@preciseenvironmental.com.au phone : simile :		nidhi.bhimani@alsglobal.com +61-7-3243 7222 +61-7-3243 7218
Project Order number C-O-C number Site Sampler	PE3394.22 PE3394.22   CHRIS BUTLER, SEAN GARDINER	Page : Quote number : QC Level :	1 of 4 EB2017PREENV0003 (EN/222) NEPM 2013 B3 & ALS QC Standard
Dates Date Samples Received Client Requested Due Date	: 14-Jul-2022 11:35 : 21-Jul-2022	Issue Date Scheduled Reporting Dat	: 14-Jul-2022 te : <b>21-Jul-2022</b>
Delivery Details Mode of Delivery No. of coolers/boxes Receipt Detail	: Carrier : 4 : HARD ESKY	Security Seal Temperature No. of samples received	: Intact. : 3.8, 5.0, 3.4, 4.4°C - Ice present / 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 be advised that the container for "BH10 1.75" (ALS ID#24) was received, labelled as "10". As all other "BH10" samples have been accounted for, this container will be reported as this sample. If you wish to discuss this further, please contact Client Services at ALSEnviro.Brisbane@alsglobal.com.
- SPLIT WORK ORDER: It should be noted that ALS has split this work order over the following work orders EB2220520 and EB2220427 due to the size of the sample numbers. For any further information regarding this processing of samples please contact ALS client services division on ALSEnviro.Brisbane@alsglobal.com
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.
- 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.
- 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 laboratory will process these samples unless instructions are received from
  you indicating you do not wish to proceed. The absence of this summary table indicates that all
  samples have been received within the recommended holding times for the analysis requested.



#### Sample Container(s)/Preservation Non-Compliances

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

\037
I Screening Analysis

#### • 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.

033 1 Suite for Acid Sulphate Soils 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 - E/ Chromiur	SOIL - E/ ASS Field
EB2220520-001	12-Jul-2022 00:00	BH8 0.0		✓
EB2220520-002	12-Jul-2022 00:00	BH8 0.25		✓
EB2220520-003	12-Jul-2022 00:00	BH8 0.50		✓
EB2220520-004	12-Jul-2022 00:00	BH8 0.75		✓
EB2220520-005	12-Jul-2022 00:00	BH8 1.00		✓
EB2220520-006	12-Jul-2022 00:00	BH8 1.25		✓
EB2220520-007	12-Jul-2022 00:00	BH8 1.50		✓
EB2220520-008	12-Jul-2022 00:00	BH8 1.75		✓
EB2220520-009	12-Jul-2022 00:00	BH9 0.0		✓
EB2220520-010	12-Jul-2022 00:00	BH9 0.25		✓
EB2220520-011	12-Jul-2022 00:00	BH9 0.50		✓
EB2220520-012	12-Jul-2022 00:00	BH9 0.75		✓
EB2220520-013	12-Jul-2022 00:00	BH9 1.00		✓
EB2220520-014	12-Jul-2022 00:00	BH9 1.25		✓
EB2220520-015	12-Jul-2022 00:00	BH9 1.50		✓
EB2220520-016	12-Jul-2022 00:00	BH9 1.75		✓
EB2220520-017	12-Jul-2022 00:00	BH10 0.0		✓
EB2220520-018	12-Jul-2022 00:00	BH10 0.25		1
EB2220520-019	12-Jul-2022 00:00	BH10 0.50		✓
EB2220520-020	12-Jul-2022 00:00	BH10 0.75		✓
EB2220520-021	12-Jul-2022 00:00	BH10 1.00		✓
EB2220520-022	12-Jul-2022 00:00	BH10 1.25		✓
EB2220520-023	12-Jul-2022 00:00	BH10 1.50		✓
EB2220520-024	12-Jul-2022 00:00	BH10 1.75		✓
EB2220520-025	12-Jul-2022 00:00	BH11 0.0	✓	✓
EB2220520-026	12-Jul-2022 00:00	BH11 0.25		✓
EB2220520-027	12-Jul-2022 00:00	BH11 0.50	✓	✓
EB2220520-028	12-Jul-2022 00:00	BH11 0.75		✓
EB2220520-029	12-Jul-2022 00:00	BH11 1.00	✓	✓
EB2220520-030	12-Jul-2022 00:00	BH11 1.25		✓
EB2220520-031	12-Jul-2022 00:00	BH11 1.50	✓	✓
EB2220520-032	12-Jul-2022 00:00	BH11 1.75		✓
EB2220520-033	12-Jul-2022 00:00	BH11 2.00		✓
EB2220520-034	12-Jul-2022 00:00	BH11 2.25		1
EB2220520-035	12-Jul-2022 00:00	BH11 2.50	✓	✓



			SOIL - EA033 Chromium Suite for Acid Sulphate Soils	SOIL - EA037 ASS Field Screening Analysis
EB2220520-036	12-Jul-2022 00:00	BH11 2.75		✓
EB2220520-037	12-Jul-2022 00:00	BH12 0.0		✓
EB2220520-038	12-Jul-2022 00:00	BH12 0.25		✓
EB2220520-039	12-Jul-2022 00:00	BH12 0.50		✓
EB2220520-040	12-Jul-2022 00:00	BH12 0.75		✓
EB2220520-041	12-Jul-2022 00:00	BH12 1.00		✓
EB2220520-042	12-Jul-2022 00:00	BH12 1.25		✓
EB2220520-043	12-Jul-2022 00:00	BH12 1.50		✓
EB2220520-044	12-Jul-2022 00:00	BH12 1.75		✓
EB2220520-045	12-Jul-2022 00:00	BH13 0.0		✓
EB2220520-046	12-Jul-2022 00:00	BH13 0.25		✓
EB2220520-047	12-Jul-2022 00:00	BH13 0.50		✓
EB2220520-048	12-Jul-2022 00:00	BH13 0.75		✓
EB2220520-049	12-Jul-2022 00:00	BH13 1.00		✓
EB2220520-050	12-Jul-2022 00:00	BH13 1.25		✓
EB2220520-051	12-Jul-2022 00:00	BH13 1.50		✓
EB2220520-052	12-Jul-2022 00:00	BH13 1.75		✓
EB2220520-053	12-Jul-2022 00:00	BH14 0.0		✓
EB2220520-054	12-Jul-2022 00:00	BH14 0.25		✓
EB2220520-055	12-Jul-2022 00:00	BH14 0.50		✓
EB2220520-056	12-Jul-2022 00:00	BH14 0.75		✓
EB2220520-057	12-Jul-2022 00:00	BH14 1.00		✓
EB2220520-058	12-Jul-2022 00:00	BH14 1.25		✓
EB2220520-059	12-Jul-2022 00:00	BH14 1.50		✓
EB2220520-060	12-Jul-2022 00:00	BH14 1.75		✓
EB2220520-061	12-Jul-2022 00:00	BH15 0.0	✓	✓
EB2220520-062	12-Jul-2022 00:00	BH15 0.25		✓
EB2220520-063	12-Jul-2022 00:00	BH15 0.50	✓	✓
EB2220520-064	12-Jul-2022 00:00	BH15 0.75		✓
EB2220520-065	12-Jul-2022 00:00	BH15 1.00	1	✓
EB2220520-066	12-Jul-2022 00:00	BH15 1.25		1
EB2220520-067	12-Jul-2022 00:00	BH15 1.50		✓
EB2220520-068	12-Jul-2022 00:00	BH15 1.75		✓

# Proactive Holding Time Report

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



#### **Requested Deliverables**

#### **RESULTS & INVOICE**

- \*AU Certificate of Analysis NATA (COA)
- \*AU Interpretive QC Report DEFAULT (Anon QCI Rep) (QCI)
- \*AU QC Report DEFAULT (Anon QC Rep) NATA (QC)
- A4 AU Sample Receipt Notification Environmental HT (SRN)
- A4 AU Tax Invoice (INV)
- Chain of Custody (CoC) (COC)
- EDI Format XTab (XTAB)

Email Email Email Email Email Email Email mail@preciseenvironmental.com.au mail@preciseenvironmental.com.au mail@preciseenvironmental.com.au mail@preciseenvironmental.com.au mail@preciseenvironmental.com.au mail@preciseenvironmental.com.au

															Envir Brisb	onmental Division ane
ALS	CHAIN OF CUSTODY ALS Laboratory: please tick →	CHAIN OF CUSTODY ALS Laboratory: please tick →	<ul> <li>□ Sydney: 277 Woodpa</li> <li>Ph. 02 8784 8555 E:sam</li> <li>□ Newcastle: 5 Rosegu</li> <li>Ph:02 4968 9433 E:sample</li> </ul>	rk Rd, Smithfiel ples.sydney@a m Rd, Warabro ples newcastleg	ld NSW 2176 □ Brisbane: 32 Isenviro.com Ph 07 3243 7272 iok NSW 2304 □ Townsville: @alsenviro.com Ph 07 4796 0603	2 Shand St, Sta ? E:sampics.bri 14-15 Desma ) E: townsvillo.or	afford QLD 4053 isbane@alsenvird Cl, Bohle QLO 48 wronmental@alsen	□ 5.com Ph:( 818 □ Mrp.com Ph.	Melbourn 03 8549 % Adelaide: . 08 8359 (	ne: 2-4 Westall Rd 600 E. samples.m : 2-1 Burnta Rd. P 0890 E adelaide@	), Springvale V telbourne@als ?ooraka SA 50 )alsenviro.com	C 3171 anviro com 95	□ Perth: 10 Ph: 08 9209 □ Launceste Ph: 03 6331	Hod W 7655 E on: 27 2168 £	Ē	B2220520
CLIENT:	PRECISE ENVIRONMENTAL			TURNARO	OUND REQUIREMENTS :	Stand	fard TAT (List	due date):					FOR	ABO		
OFFICE:	7/14 FREMANTLE ST, BURLEIGH H	EADS 4220		(Standard T/	AT may be longer for some tests		Standard or urg	gent TAT (List	due dat	e):			Custor	ly.Seal		
PROJECT:	PE3394.22			ALS QUO	TE NO.: BI	N031/16 v4				COC SEQUE		R (Circle)	Free in	e¥fro: ?		
ORDER NUMBER:	PE3394.22								cod	: 1 2	34	56	7 Rando	ng San		li ten katika milik
PROJECT MANAGER:	CHRIS BUTLER		CONTACT:	0431 565 21	0				OF	: 12	34	56	7 Others	:omme		
SAMPLER:	CHRIS BUTLER / SEAN GARDINER		SAMPLER N	OBILE: 040	9 827 396	RELINQU	ISHED BY:		RE	CEIVED BY:			RELINQUIS	HED I		
COC emailed to ALS? (	YES / NO)		EDD FORM	AT (or defau	ilt):	CHRIS BL	ITLER							•	Telepho	one : + 61-7-3243 7222
Email Reports to: mail(	@preciseenvironmental.com.au					DATE/TIM	1E: 🤇	D_ But	Luc. DA'	TE/TIME:			DATE/TIME	i:		
Mail Invoice to: PQ Box	4424, Robina Town Centre 4230					13.07.2	2 9AM					<u>-</u> .				
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSAL	L:			- 10 10											
ALS USE ONLY	SAMPLE DETAILS	X: Solid(S)	CONTAINER INF	ORMATION	4	ANALYSIS	S REQUI	RED including	g SUITES () tal (unfiltered bo	IB. Suite Coo ttle required) or	des must be list Dissolved (field	ed to attract s	suite price) puired).	Additional Information		
							6	X S								Comments on likely contarninant levels, dilutions, or samples requiring specific QC analysis etc.
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVA (refer to codes belo	% AT TOTAL BOTTLES Ea037 (pHF and pHFOX) EA033 (Chromium suite)										
1	BH8	0.0	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
2	BH8	0.25	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x	_							· · · · · · · · · · · · · · · · · · ·
3	BH8	0.50	12.07.22	s	BAG/<4°C		1	x					any factor and the state			аналити и манениято со з 3 24
4	BH8	0.75	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x						د نی جمعیدی ا <sup>ند او</sup> ر معمدیا		
5	вня	1.00	12.07.22	s	BAG/<4°C		1	x				ct				
6	вна	1.25	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x				-	Assoc	. Batc	140.	
7	BH8	1.50	12.07.22	s	BAG/<4 <sup>0</sup> C	_	1	x			E	<u>B22</u>	200	+ Z <i>t</i>	1	
\$	вна	1.75	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
							_									
											-					
															-	
						TOTA	L 8									
Water Container Codes: V = VOA Vial HCI Preserve Z = Zinc Acatate Preserved	P = Unpreserved Plastic; N = Nitric Preserv d; VB = VOA Viat Sodium Bisulphate Preser Bottle; E = EDTA Preserved Bottlee; ST = S	ed Plastic; ORC = Nitric Preserved ORC; Si ved; VS = VOA Vial Sulfuric Preserved; AV = Sterije Bottle: ASS = Plastic Ban, for Arid Sul	H = Sodium Hydroxide/Cd Prese Airfreight Unpreserved Vial SG thate Soils: B = Unpreserved B:	arved; S = Soc = Sulfuric Pre	dium Hydroxide Preserved Plastic; eserved Amber Glass; H = HCl p	AG = Amber preserved Plas	Glass Unpreser stic; HS = HCI p	ved; AP - Airfre reserved Specia	ight Unpn ation bott	eserved Plastic le; SP = Sulfuric	Preserved Pla	astic; F=Fo	rmaldehyde Pr	eserved Glass	s;	· · · · · · · · · · · · · · · · · · ·



V = VOA Vial HCI Preserved, VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; Av = Alfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCI preserved Plastic; HS = HCI preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ST = Sterile Bottle; ST = Sterile Bottle; Av = Alfreight Unpreserved Bag.



#### CHAIN OF CUSTODY CHAIN OF CUSTODY ALS Laboratory: please tick 🔿

 Sydney: 277 Woodpark Rd. Smithfeld NSW 2176
 Brisbane: 32 Shand St, Stafford QLD 4053
 Ph. 02 8784 8555 E samples brisbane@alsenviro.com
 Ph.07 3243 7222 E samples brisbane@alsenviro.com Newcastle: 5 Rosegum Rd, Warabrook NSW 2304
D Townsville: 14-15 Desma Cl, Bohle GLD 4818
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Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph/03 8549 9600 El samples.melbourne@alsenvro.com Adelaide: 2-1 Burma Rd, Pooraka SA 5095
 Ph; 08 8359 0890 E:adelaide@alser.viro.com

Perth 10 Hod Way, Malaga WA 6090 Ph: 08 9202 7655 E samples.perth@alsenviro.com □ Launceston: 27 Wellington St. Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	PRECISE ENVIRONMENTAL			TURNAR	OUND REQUIREMENTS :	Stand	ard TAT (List	due date):						FOR	LABORAT	RY USE O	NLY (Circle	
OFFICE:	7/14 FREMANTLE ST, BURLEIGH H	HEADS 4220		(Standard T. e.g., Ultra Ti	AT may be longer for some tests race Organics)	Non S	itandard or ur	gent TAT (List	due date	):				Cush	ndy Seal Intacl	?1	(and a lat	Yes No + N
PROJECT:	PE3394.22			ALS QUO	DTE NO.: B	N031/16 v4				COC SEQU	ENCE NU	IBER (C	rcie)	recei	ke / frozen ke pt?	DICKS Preser	TUDON	Yes No. N
ORDER NUMBER:	PE3394.22								COC:	12	3	5	6	7 Ranc	iom Sample T	emperature or	i Receipt:	C Sector
PROJECT MANAGER	CHRIS BUTLER	· · · · · · · · · · · · · · · · · · ·	CONTACT:	0431 565 21					OF:	12	3	5	6	7 Othe	r comment:			Contract Line Contra
SAMPLER:	CHRIS BUTLER / SEAN GARDINER	2	SAMPLER N	IOBILE: 040	09 827 396	RELINQUI	SHED BY:		REC	EIVED BY:			1	RELINQU	ISHED BY:		RECI	EIVED BY:
COC emailed to ALS?	(YES / NO)		EDD FORM	AT (or defau	uit):	CHRIS BU	TLER						ĺ.		-			
Email Reports to: mai	I@preciseenvironmental.com.au							D_ Sut	β <u>س</u> DAI	E/TIME:			ľ	DATE/TIN	16:		DATE	27 IME:
Mail Invoice to: PO Bo	ox 4424, Robina Town Centre 4230					13.07.22	9411											
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSA	L:															<del>.</del>	
ALS USE ONLY	SAMPLE DETAILS	Water(W)	MATRI	X: Solid(S)	CONTAINER IN	FORMATION		ANALYSIS Where N	5 REQUIR Ielais are rec	RED includi	ng SUITE: otal (unfiltere	5 (NB. Suite 1 bottle requir	e Code ed) or D	s must be li Issolved (fiel	isted to attract Id filtered bottle re	suite price) quired).	Ac	Iditional Information
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVA (rafer to codes belo	TIVE bw)	TOTAL BOTTLES	EA037 (pHF and pHFOX)	EA033 (Chromium suite)								Comments o dilutions, or s analysis etc.	n likely contaminant levels, amples requiring specific QC
17	BH10	0.0	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x										
18	ВН10	0.25	12.07.22	s	BAG/<4°C		1	x										
19	BH10	0.50	12.07.22	\$	BAG/<4°C		1	x										
20	BH10	0.75	12.07.22	s	BAG/<4 <sup>0</sup> C		1	×										
21	BH10	1.00	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x			1							
22	BH10	1.25	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								-		
23	BH10	1.50	12.07.22	s	BAG/<4 <sup>0</sup> C		1	×								<u> </u>		
24	BH10	1.75	12.07.22	s	BAG/<4 <sup>0</sup> C	•	1	×										
	-								<u> </u>									
										-	-	_				-	+	
				<u> </u>														
												_						
	· · · · · · · · · · · · · · · · · · ·															<u> </u>		
						τοτα	8										1	
Water Container Codes:	P = Unpreserved Plastic; N = Nitric Preserved	ved Plastic; ORC = Nitric Preserved ORC; S	6H = Sodium Hydroxide/Cd Prese	erved: S = So	dium Hydroxide Preserved Plastic	AG = Amber	Glass Unprese	rved; AP - Airfrei	ight Unpre	served Plasti	i Broconvor	Direction 5	= Form	osidebrde B	Presented Glass			

V = VOA Vial HCI Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Solis; B = Unpreserved Bag.

ALS	CHAIN OF CUSTODY ALS Laboratory: please tick →	AIN OF CUSTODY CHAIN OF CUSTODY Laboratory: please tick → ALS Laboratory: please tick → ALS Lab								□ Perth. 1 Ph: 08 920 □ Launce Ph: 03 633	0 Hod Way, Mal 9 7655 E: sampl ston: 27 Welling 31 2158 E: launs	aga WA 6090 es.perth@alse gton St, Launce eston@alsenv	nýro.com slon TAS 7250 ra.com			
CLIENT:	PRECISE ENVIRONMENTAL			TURNAR	OUND REQUIREMENTS :	Standa	ard TAT (Lis	due date):					FO	LABORATO	DRY USE O	NLY (Circle)
OFFICE:	7/14 FREMANTLE ST, BURLEIGH H	EADS 4220		(Standard T. e.c., Ultra T	AT may be longer for some tests ace Organics)	□ Non S	andard or u	gent TAT <b>(Lis</b>	t due date	»):			Cus	ody Seal Intact	2.	Yes No internet
PROJECT:	PE3394.22			ALS QUO	TE NO.: B	N031/16 v4				COC SEQU	ENCE NUM	BER (Circle	a) Free	ice/frozen.ce lpt?	bricks preser	lupon Yes. No term 1
ORDER NUMBER:	PE3394.22								coc	<b>∺12</b>	34	56	7 Ran	dom Sample Te	mperature or	Receipt:
PROJECT MANAGER:	CHRIS BUTLER		CONTACT: 0	431 565 21	0				OF:	1 2	3 4	5 6	7 Ойн	r comment –		
SAMPLER:	CHRIS BUTLER / SEAN GARDINER		SAMPLER M	OBILE: 040	9 827 396	RELINQUIS	HED BY:		REC	EIVED BY:			RELINQU	ISHED BY:		RECEIVED BY:
COC emailed to ALS?	(YES / NO)		EDD FORMA	T (or defau	ilt):	CHRIS BU	LER	~ -								
Email Reports to: mail	@preciseenvironmental.com.au					DATE/TIME	t C	D_ But	DAT DAT	e/Time:			DATE/TIN	IE:		DATE/TIME:
Mail Invoice to: PO Bo	x 4424, Robina Town Centre 4230					13.07.22	9AM									
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSAL	-:														
ALS USE ONLY	SAMPLE DETAILS	Water(W)	MATRI	(: Solid(S)		ORMATION		ANALYSI: Where J	S REQUI	RED includii aquired, specify T	ng SUITES iotal (unfiltered	(NB. Suite Co bottle required) (	odes must be l or Dissolved (fie	isted to attract : Id filtered bottle re-	suile price) quired).	Additional Information
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVA (refer to codes belo	TIVE w)	TOTAL BOTTLES	EA037 (pHF and pHFOX)	X EA033 (Chromium suite)							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
25	BH11	0.0	12.07.22	s	BAG/<4°C		1	x	x							
26	BH11	0.25	12.07.22	s	BAG/<4°C		1	x								
27	BH11	0.50	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x	x							
28	BH11	0.75	12.07.22	\$	BAG/<4 <sup>0</sup> C		1	x								
29	BH11	1.00	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x	x							
30	BH11	1.25	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
31	BH11	1.50	12.07.22	8	BAG/<4 <sup>0</sup> C	_	1	x	х							
32	BH11	1.75	12.07.22	s	BAG/<4°C		1	x				1				
33	BH11	2.00	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								· ·
34	BH11	2.25	12.07.22	s	BAG/<4°C		1	x								
35	BH11	2.50	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x	x							······································
36	BH11	2.75	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
															1	
											+			+		-
Water Container Cortes	P = Uppreserved Plastic: N = Nitric Process	ed Plastic: ORC ≖ Nitric Preserved ORC: SH	= Sadum Hydroxide/Cd Preset	ved; S = Sou	fum Hydroxide Preserved Plastic	TOTAL	12 lass Unprese	rved; AP - Airfre	ight Unpre	served Plastic				<u> </u>		
V = VOA Vial HCI Preserve Z = Zinc Acetate Preserve	ed; VB = VOA Vial Sodium Bisulphate Preser d Bottle; E = EDTA Preserved Bottles; ST = S	ved; VS = VOA Vial Sulfuric Preserved; AV = . sterile Bottle; ASS = Plastic Bag for Acid Sulp	Airfreight Unpreserved Vial SG hate Soils; B = Unpreserved Ba	Sulfuric Pre	eserved Amber Glass; H = HCl p	reserved Plast	; HS = HCI	preserved Speci	ation bottle	e; SP = Sulfurk	c Preserved F	Plastic; F = F	ormaldehyde f	Preserved Glass	s;	

	CHAIN OF CUSTODY	CHAIN OF CUSTODY	Sydney: 277 Woodpar Div 02 9784 8555 E comp	k Rd, Smithfiel	d NSW 2176 Disbane: 3 Isonuiro com Ph/07 3243 722	2 Shand St. Slat	ford QLD 4053	n com Ph (	Melbourne 13.8549 96	: 2-4 Westall F 10 F : samples	d, Soringvale nelhourne@el	/IC 3171 senviro com	□ Perth 10 Pb: 08 9209	Hod Way, Mai 7655 Et sampl	aga WA 6090 as nadh@alser	1/670.000
ALS	ALS Laboratory: please tick →	ALS Laboralory: please tick ᢣ	<ul> <li>Ph. 02 8784 6363 E samp</li> <li>Newcastle: 5 Rosegur</li> <li>Ph:02 4968 9433 E samp</li> </ul>	n Rd, Warabro ies.newcastle@	iok NSW 2304 I Townsville: galsenviro.com Ph:07 4796 0600	14-15 Desma C 5: townsville env	L Bohle QLD 4 stonmental@alser	818 ⊒ ⊯urccom Ph:	Adelaide: 08 8359 0	2-1 Burma Ró, 390 E:adetaide	Pooraka SA 5 @alsenviro.co	)95 11	Launces Ph: 03 6331	ton: 27 Welling I 2158 E' launc	ton St. Launce eston@alsenvi	ston TAS 7250 re.com
CLIENT:	PRECISE ENVIRONMENTAL			TURNARO	OUND REQUIREMENTS :	Stand	ard TAT (List	due date):					FOR	LABORATO	ORY USE O	ŧLY⊹(Circle)
OFFICE:	7/14 FREMANTLE ST, BURLEIGH H	IEADS 4220		(Standard TA e.g., <u>Ultra Tr</u>	AT may be longer for some tests ace Organics}	🛛 Non S	tandard or un	gent TAT (List	due date	):			Cueto	dy Seal Intact	? ( <b>2</b> ( 0) ( )	Yes No NA
PROJECT:	PE3394.22			ALS QUO	TE NO.: B	N031/16 v4				COC SEQU	ENCE NUME	ER (Circle	) Free (	ce / frozen ice x?	bricks presen	Lupon Yes No N/A
ORDER NUMBER:	PE3394.22								coc	12	34	56	7 Rand	om Sample Te	mperature on	Receipt
PROJECT MANAGER:	CHRIS BUTLER		CONTACT: 0	1431 565 21	0				OF:	1 2	3 4	56	7 Other	comment:		
SAMPLER:	CHRIS BUTLER / SEAN GARDINER		SAMPLER M	OBILE: 040	9 827 396	RELINQUI	SHED BY:		REC	EIVED BY:			RELINQUI	SHED BY:		RECEIVED BY:
COC emailed to ALS?	(YE\$ / NO)		EDD FORMA	T (or defau	lt):	CHRIS BU		~ ~ ~						_		
Email Reports to: mail	@preciseenvironmental.com.au						≝	D_But	Luc DAT	E/TIME:			DATE/TIM	=:		DATE/TIME:
Mail Invoice to: PO Bo:	x 4424, Robina Town Centre 4230					13.07.22	9AM				_					
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSAI	L:														
ALS USE ONCY ALS USE ONCY Water(W) MATRIX: Solid(S) MATRIX: Solid(S) MATRIX: Solid(S) MATRIX: Solid(S) MATRIX: Solid(S) Mere Metals are required, specify Total (unlitered bother required) or Dissolved (field filtered bother required).												Additional Information				
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	ATE / TIME XI W TYPE & PRESERVATIVE (refer to codes below) 12.07.22 & S BAG/<4°C 1 X								Comments on likely contaminent levels, diutions, or semples requiring specific QC analysis etc.				
37	BH12	0.0	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x					-			
3%	BH12	0.25	12.07.22	S	BAG/<4 <sup>0</sup> C		1	x								
39	BH12	0.50	12.07.22	S	BAG/<4°C		1	x								
40	BH12	0.75	12.07.22	s	BAG/<4°C		1	x								
41	BH12	1.00	12.07.22	s	BAG/<4 <sup>°</sup> C		1	x								
42	BH12	1.25	12.07.22	s	BAG/<4°C		1	x								
43	BH12	1.50	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
44	BH12	1.75	12.07.22	s	BAG/<4°C		1	x								
							-									
							1					1				
										1					+	
						TOTAL	8									
Water Container Codes: V = VOA Vial HCI Preserve Z = Zinc Acetate Preserved	P = Unpreserved Plastic; N = Nitric Preserv d; VB = VOA Vial Sodium Bisulphate Preser l Bottle; E = EDTA Preserved Bottles; ST = 5	ed Plastic; ORC = Nitric Preserved ORC; SH rved; VS = VOA Viat Suffuric Preserved; AV = A Sterile Bottle; ASS = Plastic Bag for Acid Sulph	= Sodium Hydroxide/Cd Presei Airfreight Unpreserved Vial SG ate Soils; B = Unpreserved Ba	rved; S = Sod = Sulfuric Pre g.	ium Hydroxide Preserved Plastic; served Amber Glass; H = HCl p	AG = Amber 0 preserved Plast	aass Unpreser ic; HS ≖ HCl p	veo; AP - Aifrei ireserved Specia	gnt Unpre ation bottle	served Plastic ; SP = Sulfuri	Preserved F	lastic; F = Fo	ormaldehyde P	reserved Glass	s;	

	CHAIN OF CUSTODY ALS Laboratory: please tick →	CHAIN OF CUSTODY ALS Laboratory: please tick →	☐ Sydney 277 Woodpar Ph 02 8784 8555 E samp ☐ Newcastle: 5 Rosegun Ph 02 4968 9433 E:sampl	k Rd, Smithfiel es.sydney@a h Rd, Warabro es.newcastle@	Id NSW 2176 Brisbane 32 Ilsenviro.com Ph:07 3243 7222 lok NSW 2304 Townsville: Qelsenviro.com Ph:07 4796 0600	Shand St. Staf E:samples bris 14-15 Desma C E: townsvillo env	forð QLD 4053 bane@alsenvir I, Bohle QLD 4 ronmentat@alsoi	(1) ocom Ph0 818 D. two.com Ph:	Melbourne 13 8549 960 Adelaide: ( 08 8369 08	<ul> <li>2-4 Westali Ro</li> <li>D E samples n</li> <li>2-1 Burma Rd, F</li> <li>890 Etadelaide@</li> </ul>	d, Springvale \ teloourne@ak Pooraka SA 50 galsenviro.com	/IC 3171 senviro.com 195 11	□ Perth: 10 Ph: 08 9209 □ Launces Ph: 03 6331	Hod Way, Mak 7655 C: samol ton: 27 Welling I 2158 E: launo	aga WA 6090 es.perth@alser on St, i.aunce eston@alsenvi	tx/ro.com ston TAS 7250 10.com
CLIENT:	PRECISE ENVIRONMENTAL			TURNAR	OUND REQUIREMENTS :	Standa	nd TAT (List	due date):					FOR	LABORATC	RY USE OF	ILY=(Circle)
OFFICE:	7/14 FREMANTLE ST, BURLEIGH 8	HEADS 4220		(Standard T/	AT may be longer for some tests		andard or ur	aent TAT (List	due date	):			Custo	dy Seal-Intacl		Yes No
PROJECT:	PE3394.22			ALS QUO	TE NO.: B!	1031/16 v4		· · ·		COC SEQUE		ER (Circle	Freei	ce∕frozenice √2	bricks presen	lupon Yes No No
ORDER NUMBER:	PE3394.22								COC:	1 2	34	56	7 Randi	om Sample Te	mperature on	Receipt: -
PROJECT MANAGER:	CHRIS BUTLER		CONTACT: 0	431 565 21	0				OF:	12	34	56	7 Other	comment		
SAMPLER:	CHRIS BUTLER / SEAN GARDINER	2	SAMPLER M	081LE: 040	9 827 396	RELINQUIS	HED BY:		REC	EIVED BY:			RELINQUI	SHED BY:		RECEIVED BY:
COC emailed to ALS?	(YES / NO)		EDD FORMA	T (or defau	itt):	CHRIS BUT	LER						1			
Email Reports to: mail	@preciseenvironmental.com.au					DATE/TIME	- C	D_ But	DATI	E/TIME:			DATE/TIM	E:		DATE/TIME:
Mail Invoice to: PO Bo	x 4424, Robina Town Centre 4230					13.07.22	9AM									
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSA	L:														
ALS USE ONLY	SAMPLE DETAILS	Water(W)	MATRIX	:Solid(S)	CONTAINER INF	ORMATION		ANALYSIS Where M	REQUIR	RED includin	g SUITES ( tal (unfiltered b	NB. Suite Co sttle required) p	des must be lis Dissolved (field	sted to attract s I filtered bottle req	uite price) µired).	Additional Information
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVAI (refer to codes belo	ive <sub>v</sub> )	TOTAL BOTTLES	EA037 (pHF and pHFOX)	EA033 (Chromium suite)							Comments on likely contaminant levels, diutions, or samples requiring specific QC analysis etc.
45	BH13	0.0	12.07.22	s	BAG/<4°C		1	x								
46	BH13	0.25	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
47	BH13	0.50	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
46	BH13	0.75	12.07.22	s	BAG/<4°C		1	×								
49	BH13	1.00	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
50	BH13	1.25	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
51	BH13	1.50	12.07.22	8	BAG/<4°C		1	x								
52	BH13	1.75	12.07.22	s	BAG/<4°C		1	x								
											-		-	-		
														1		······································
													1		-	
Water Container Codes;	P = Unpreserved Plastic; N = Nitric Preserv	red Plastic; ORC = Nitric Preserved ORC; SH	= Sodium Hydroxide/Cd Preser	ved; S = Sod	lium Hydroxide Preserved Plastic; ,	TOTAL	8 ass Unpreser	ved; AP - Airfreix	ght Unpres	served Plastic						
V = VOA Vial HCI Preserve Z = Zinc Acetate Preserved	d; VB = VOA Vial Sodium Bisulphate Prese   Bottle: E = EDTA Preserved Bottles: ST = 3	rved; VS = VOA Vial Sulfuric Preserved; AV = A Sterile Bottle; ASS = Plastic Bag for Acid Sulph	Nirfreight Unpreserved Vial SG = ate Soils; B = Unpreserved Bag	Sulfuric Pre	served Amber Glass; H = HCl pr	eserved Plasti	; HS = HCI p	reserved Specia	tion bottle;	SP = Sulfuric	Preserved Pl	astic; F=Fo	rmaldehyde Pr	eserved Glass		

ALS	CHAIN OF CUSTOD	CHAIN OF CUSTODY ALS Leboratory: please tick →	<ul> <li>☐ Sydney: 277 Woodpat</li> <li>Ph. 02 8784 8555 E.samp</li> <li>☐ Newcastle: 5 Rosegur</li> <li>Ph:02 4968 9433 E:samp</li> </ul>	k Rd, Smithfiol bles.sychey@a n Rd. Warabro bles.newcasile@	Id NSW 2176 D Brisbane. 32 Ilsenviro.com Ph.07 3243 7222 lok NSW 2304 D Townsville: gelsenviro.com Ph.07 4796 0600	? Shand SI, Sta E:samples.bri 14-15 Desma f E: townsville.en	fford QLD 4053 sbane@alsenvir Cl, Bohle QLD 4 wronmenta*@alset	D.com Ph:0 818 D J nvroisom Ph.	Melbourne: 2- 03 8549 9600 L Adelaide: 2-1 08 8359 0890	-4 Westall Ro E: samples.m Burma Rd, F E:adeiaide@	l, Springvalo V ielbourne@als ?ooraka SA 50 galsenviro cor	IC 3171 enviro.com 95 1	□ Perth: 10 Ph: 08 9209 □ Launces Ph: 03 633	) Hod Way, Mal 7655 E: sample ton: 27 Welling 1 2158 E: launce	aga WA 6090 as.perth@alsen ton St, Launces aston@alsenvir	wiro.com stor TAS 7250 o.com
CLIENT:	PRECISE ENVIRONMENTAL	· · · · · · · · · · · · · · · · · · ·		TURNAR	OUND REQUIREMENTS :	Stand	ard TAT (List	t due date):					FOR	LABORATC	RY USE ON	ILY (Circle)
OFFICE:	7/14 FREMANTLE ST, BURLEIGH	HEADS 4220		(Standard T/ e.g., Ultra Tr	AT may be longer for some tests race Organics)	Non S	tandard or ur	gent TAT (List	due date):				Custo	dy Seat Intacl	$c \sim 10$	Yes No. No.
PROJECT:	PE3394.22			ALS QUO	TE NO.: BI	N031/16 v4			c	OC SEQUE	NCE NUMB	ER (Circle	) Free	ce / frozen ice x?	bricks present	Cupon Yes No NVA
ORDER NUMBER:	PE3394.22				- <b>m</b> , n				COC:	12	34	56	7 Rand	om Sample Te	no erutsredm	Receipt
PROJECT MANAGER:	CHRIS BUTLER		CONTACT: (	431 565 21	0		-		OF:	12	3 4	56	7 Othe	comment		
SAMPLER:	CHRIS BUTLER / SEAN GARDINE	R	SAMPLER N	IOBILE: 040	9 827 396	RELINQUI	SHED BY:		RECEIV	VED BY:			RELINQUI	SHED BY:		RECEIVED BY:
COC emailed to ALS?	(YES / NO)		EDD FORMA	T (or defau	ilt):	CHRIS BU	TLER									
Email Reports to: mail	@preciseenvironmental.com.au					DATE/TIM	= C	D_Butt	DATE/1	FIME:			DATE/TIM	E:		DATE/TIME:
Mail Invoice to: PO Bo	x 4424, Robina Town Centre 4230					13.07.22	9AM									
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSA	AL:														
ALS USE ONLY	SAMPLE DETAILS	Water(W)	MATRI	K: Solid(S)	CONTAINER INF	ORMATION		ANALYSIS Where M	REQUIREI	D includin ed, specify To	g SUITES ( tal (unfillered b	NB. Suite Co (the required) o	edes must be li e Dissolved (fiel	sted to attract s i filtered bottle rec	suite price) (uired).	Additional Information
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVAI (refer to codes belo	rive w)	TOTAL BOTTLES	EA037 (pHF and pHFOX)	EA033 (Chromium suite)							Comments on likely contaminant levels, diutions, or samples requiring specific QC analysis etc.
53	BH14	0.0	12.07.22	s	BAG/<4 <sup>0</sup> C		1	×								
34	BH14	0.25	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
55	BH14	0.50	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
56	BH14	0.75	12.07.22	8	BAG/<4 <sup>0</sup> C		1	x								
57	BH14	1.00	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
56	BH14	1.25	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x						1		
59	BH14	1.50	12.07.22	s	BAG/<4°C		1	x								
60	BH14	1.75	12.07.22	s	BAG/<4°C		1	x	-							
								1								
													-			· · · ·
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Water Confainer Confac	P - Unnescued Plastic: N = Nitro Proces	L reed Plastic: OBC = Niric Preserved OBC: St	H = Sedum Hwitoxide/Cd Prese	rved: S = Soc	fum Hydroxide Preserved Plastic:	TOTA	8 Slass Unpreser	rved: AP - Airfreik	aht Unpresen	ved Plastic						,

Wener vormemer vormemer + = unpreserved inastic; n = nutric preserved inastic; OKC = nutric preserved or (1); SH = Sodum Hydroxone (2); SH = Sodum H

•	CHAIN OF CUSTODY	CHAIN OF CUSTODY	Sydney: 277 Woodpa: Pb. 02 9794 9555 E common Db. 02 9794 9794 9794 9794 9794 9794 9794 979	k Rd, Smithfiel	d NSW 2176 Dirisbane: 3.	2 Shand St, Sl	lafford QLD 4053	D Phil	Melbourne:	2-4 Westall Ro	l, Springvale \	1C 3171	□ Perth: 10 Pb: 08 9209	Hod Way, Mala 7655 E. sample	iga WA 6090 s potib@alsan:	in com	
	ALS Laboratory: please tick 🗲	ALS Laboratory: please fick 🗲	Fit: 02 0164 coos 2.55mp Fit: 02 0164 coos 2.55mp Ph:02 4968 9433 Etsamp	n Rd, Warabro les.newcastle@	ok NSW 2304 (1) Townsville: galsenviro.com Ph:07 4796 0600	. 14-15 Dosma D E: townsville o	CI, Bohle QLD 48	118 🗆 wro.com Ph	Adelaide: 2 08 8359 08	-1 Burma Rd, - 90 E:adelaide@	ooraka SA 50 alsenviro.cor	95 1	□ Launcest Ph: 03 6331	on: 27 Welling 2158 E: launce	on St. Launcest ston@alsen.vro	on TAS 7250 .com	
CLIENT:	PRECISE ENVIRONMENTAL			TURNARC	OUND REQUIREMENTS :	🛛 Stan	idard TAT (List	due date):					FOR	LABORATO	RY USE ON	Y (Circle)	
OFFICE:	7/14 FREMANTLE ST, BURLEIGH HE	ADS 4220		(Standard TA e.q., Ultra Tra	(T may be longer for some tests ace Organics)	🗇 Non	Standard or urg	ent TAT (List	t due date)	•			Custo	dy Seal Intacia		YesNo:	
PROJECT:	PE3394.22			ALS QUO	TE NO.: B	N031/16 v4				COC SEQUE	NCE NUMB	ER (Circle)	Free k	se / frozen ke t?	brieks present	lpon Yes No	, ENA
ORDER NUMBER:	PE3394.22								COC:	12	34	56	7 Rendo	m Sample Te	mperature on E	eceipt. C	
PROJECT MANAGER:	CHRIS BUTLER		CONTACT: 0	431 565 210	D				OF:	12	34	56	7 Other	comment			
SAMPLER:	CHRIS BUTLER / SEAN GARDINER		SAMPLER M	OBILE: 040	9 827 396	RELINQU	JISHED BY:		RECE	EIVED BY:			RELINQUIS	SHED BY:		RECEIVED BY:	
COC emailed to ALS? (	YES / NO)		EDD FORMA	T (or defau	lt):	CHRIS BI											
Email Reports to: mail	@preciseenvironmental.com.au							2_ But	לאב, DATE	TIME:			DATE/TIME			DATE/TIME:	
Mail Invoice to: PO Bo	4424, Robina Town Centre 4230					13.07.2	Z 9AM										
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSAL:																
ALS USE ONLY -	SAMPLE DETAILS	Water(W)	MATRD	K: Solid(S)	CONTAINER INF	ORMATIO	N	ANALYSIS	5 REQUIR Actais are req	ED including	g SUITES ( tal (unfiltered bo	NB. Suite Co #ble required} or	des must be lis Dissolved (field	ted to attract s filtered bottle req	uite price) uired).	Additional Informat	tion
																Comments on likely contaminant	levels,
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVA (refer to codes belo	ŤIVE w)	TOTAL BOTTLES	EA037 (pHF and pHFOX)	EA033 (Chromium suite)						c a	ilutions, or samples requiring spo inalysis etc.	Somo QC
61	BH15	0.0	12,07.22	s	BAG/<4°C		1	x	x								
62	BH15	0.25	12.07.22	S	BAG/<4 <sup>0</sup> C		1	x									
63	BH15	0.50	12.07.22	S	BAG/<4 <sup>0</sup> C		1	x	x								
64	BH15	0.75	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x									
65	BH15	1.00	12.07.22	ş	BAG/<4 <sup>0</sup> C		1	x	x								
66	BH15	1.25	12.07.22	5	BAG/<4°C		1	x									
67	BH15	1.50	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								· · · · · · · · · · · · · · · · · · ·	
68	BH15	1.75	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x									
		- i gitangan gulayan tika kata an ana cara ana dina ka	anga samu mananga pananganga tanih aya wita		n n n n y - n n je sa gegen hje tegen enge i gene enger ne	- 1000 - 111 - 11 - 11 - 11 - 11 - 11 -						L					
				and the production N		TOTA	NL 8										
Water Container Codes: V = VOA Vial HCI Preserved Z = Zinc Acetate Preserved	P = Unpreserved Plastic; N = Nitric Preserved t; VB = VOA Vial Sodium Bisulphate Preserve Bottle; E = EDTA Preserved Bottles; ST = Str	d Plastic; ORC = Nitric Preserved ORC; SH = ed; VS = VOA Vial Sulfuric Preserved; AV = A erile Bottle; ASS = Plastic Bag for Acid Sulph	= Sodium Hydroxide/Cd Preser irfreight Unpreserved Vial SG = ate Soils; B = Unpreserved Bar	ved; S = Sodi = Sulfuric Pres 1.	ium Hydroxide Preserved Plastic; served Amber Glass; H = HCl p	AG = Amber reserved Plas	Glass Unpreserv stic; HS = HCl pr	ed; AP - Airfrei eserved Specia	ight Unprese ation bottle;	erved Plastic SP = Sulfuric I	Preserved Pla	astic; F≖Fo	maldehyde Pri	eserved Glass			



## **CERTIFICATE OF ANALYSIS**

Work Order	EB2220520	Page	: 1 of 16
Client	: PRECISE ENVIRONMENTAL PTY LTD	Laboratory	Environmental Division Brisbane
Contact	: MR CHRIS BUTLER	Contact	: Nidhi Bhimani
Address	: PO BOX 4424	Address	: 2 Byth Street Stafford QLD Australia 4053
	ROBINA TOWN CENTRE QLD, AUSTRALIA 4230		
Telephone	:	Telephone	: +61-7-3243 7222
Project	: PE3394.22	Date Samples Received	: 14-Jul-2022 11:35
Order number	: PE3394.22	Date Analysis Commenced	: 19-Jul-2022
C-O-C number	:	Issue Date	: 21-Jul-2022 15:20
Sampler	: CHRIS BUTLER, SEAN GARDINER		Hac-MRA NATA
Site	:		
Quote number	: EN/222		Accreditation No. 825
No. of samples received	: 68		Accredited for compliance with
No. of samples analysed	: 68		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



#### **General Comments**

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

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

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

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

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

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

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- SPLIT WORK ORDER: It should be noted that ALS has split this work order over the following work orders EB2220520 and EB2220427 due to the size of the sample numbers. For any further information regarding this processing of samples please contact ALS client services division on ALSEnviro.Brisbane@alsglobal.com
- 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: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 Slight; 2 Moderate; 3 Strong; 4 Extreme
- 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'.
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.

# Page : 3 of 16 Work Order : EB2220520 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH8	BH8	BH8	BH8	BH8
, ,				0.0	0.25	0.50	0.75	1.00
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220520-001	EB2220520-002	EB2220520-003	EB2220520-004	EB2220520-005
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
øpH (F)		0.1	pH Unit	5.7	5.7	5.8	5.6	5.9
Ø pH (Fox)		0.1	pH Unit	2.4	2.9	4.2	3.6	2.0
Ø Reaction Rate		1	-	3	3	1	1	1

# Page : 4 of 16 Work Order : EB2220520 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH8	BH8	BH8	BH9	BH9
(				1.25	1.50	1.75	0.0	0.25
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220520-006	EB2220520-007	EB2220520-008	EB2220520-009	EB2220520-010
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
øpH (F)		0.1	pH Unit	6.0	5.8	5.8	5.8	5.9
øpH (Fox)		0.1	pH Unit	2.1	2.3	2.0	2.4	2.8
Ø Reaction Rate		1	-	4	4	4	3	3

# Page : 5 of 16 Work Order : EB2220520 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH9	BH9	BH9	BH9	BH9
				0.50	0.75	1.00	1.25	1.50
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220520-011	EB2220520-012	EB2220520-013	EB2220520-014	EB2220520-015
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
øpH (F)		0.1	pH Unit	6.2	6.3	6.4	5.6	5.1
Ø pH (Fox)		0.1	pH Unit	3.8	4.2	2.0	1.9	1.8
Ø Reaction Rate		1	-	1	1	1	1	1

# Page : 6 of 16 Work Order : EB2220520 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH9	BH10	BH10	BH10	BH10
, ,				1.75	0.0	0.25	0.50	0.75
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220520-016	EB2220520-017	EB2220520-018	EB2220520-019	EB2220520-020
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
øpH (F)		0.1	pH Unit	5.2	5.4	5.7	5.4	5.7
Ø pH (Fox)		0.1	pH Unit	1.7	2.6	3.5	3.0	2.5
Ø Reaction Rate		1	-	1	3	2	2	2

# Page : 7 of 16 Work Order : EB2220520 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH10	BH10	BH10	BH10	BH11
(				1.00	1.25	1.50	1.75	0.0
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220520-021	EB2220520-022	EB2220520-023	EB2220520-024	EB2220520-025
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
рН КСІ (23А)		0.1	pH Unit					6.1
Titratable Actual Acidity (23F)		2	mole H+ / t					4
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S					<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S					0.020
acidity - Chromium Reducible Sulfur		10	mole H+ / t					12
(a-22B)								
EA033-E: 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					16
Liming Rate		1	kg CaCO3/t					1
Net Acidity excluding ANC (sulfur units)		0.02	% S					0.02
Net Acidity excluding ANC (acidity units)		10	mole H+ / t					16
Liming Rate excluding ANC		1	kg CaCO3/t					1
EA037: Ass Field Screening Analysis								
ØpH (F)		0.1	pH Unit	5.8	5.7	5.5	5.6	5.8
ø pH (Fox)		0.1	pH Unit	2.2	2.1	2.0	2.3	2.7
Ø Reaction Rate		1	-	4	4	4	4	3

# Page : 8 of 16 Work Order : EB2220520 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH11 0.25	BH11 0.50	BH11 0.75	BH11 1.00	BH11 1.25
		Sampli	ing date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220520-026	EB2220520-027	EB2220520-028	EB2220520-029	EB2220520-030
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit		5.1		5.5	
Titratable Actual Acidity (23F)		2	mole H+ / t		32		8	
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S		0.05		<0.02	
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S		0.011		0.014	
acidity - Chromium Reducible Sulfur		10	mole H+ / t		<10		<10	
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-		1.5		1.5	
Net Acidity (sulfur units)		0.02	% S		0.06		0.02	
Net Acidity (acidity units)		10	mole H+ / t		39		16	
Liming Rate		1	kg CaCO3/t		3		1	
Net Acidity excluding ANC (sulfur units)		0.02	% S		0.06		0.02	
Net Acidity excluding ANC (acidity units)		10	mole H+ / t		39		16	
Liming Rate excluding ANC		1	kg CaCO3/t		3		1	
EA037: Ass Field Screening Analysis								
Ø pH (F)		0.1	pH Unit	5.7	5.0	5.1	5.5	5.5
ø pH (Fox)		0.1	pH Unit	2.8	3.0	2.5	2.6	2.2
Ø Reaction Rate		1	-	3	3	3	3	1

# Page : 9 of 16 Work Order : EB2220520 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)	Sample ID			BH11 1.50	BH11 1.75	BH11 2.00	BH11 2.25	BH11 2.50
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220520-031	EB2220520-032	EB2220520-033	EB2220520-034	EB2220520-035
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit	5.4				5.5
Titratable Actual Acidity (23F)		2	mole H+ / t	5				4
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	0.212				0.189
acidity - Chromium Reducible Sulfur		10	mole H+ / t	132				118
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5				1.5
Net Acidity (sulfur units)		0.02	% S	0.22				0.19
Net Acidity (acidity units)		10	mole H+ / t	138				122
Liming Rate		1	kg CaCO3/t	10				9
Net Acidity excluding ANC (sulfur units)		0.02	% S	0.22				0.19
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	138				122
Liming Rate excluding ANC		1	kg CaCO3/t	10				9
EA037: Ass Field Screening Analysis								
øpH (F)		0.1	pH Unit	5.3	5.2	5.5	5.4	5.5
ø pH (Fox)		0.1	pH Unit	2.2	2.1	2.0	2.0	2.0
Ø Reaction Rate		1	-	4	4	4	4	4

# Page : 10 of 16 Work Order : EB2220520 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: <b>SOIL</b> (Matrix: <b>SOIL</b> )			Sample ID	BH11 2.75	BH12 0.0	BH12 0.25	BH12 0.50	BH12 0.75
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220520-036	EB2220520-037	EB2220520-038	EB2220520-039	EB2220520-040
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)		0.1	pH Unit	5.5	5.3	5.6	5.6	5.5
øpH (Fox)		0.1	pH Unit	2.2	2.9	3.0	4.2	3.6
Ø Reaction Rate		1	-	4	2	2	1	1

# Page : 11 of 16 Work Order : EB2220520 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH12 1 00	BH12 1 25	BH12 1 50	BH12	BH13
		0 a mare li	na data (tima	12 14 2022 00:00		10, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	1.73	
		Sampli	ng date / time	12-Jui-2022 00:00	12-JUI-2022 00:00	12-Jul-2022 00:00	12-Jul-2022 00:00	12-Jul-2022 00:00
Compound	CAS Number	LOR	Unit	EB2220520-041	EB2220520-042	EB2220520-043	EB2220520-044	EB2220520-045
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
øpH (F)		0.1	pH Unit	5.9	5.4	5.4	5.2	5.3
øpH (Fox)		0.1	pH Unit	2.0	2.0	2.1	2.1	2.1
Ø Reaction Rate		1	-	4	4	4	4	3

# Page : 12 of 16 Work Order : EB2220520 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: <b>SOIL</b> (Matrix: <b>SOIL</b> )			Sample ID	BH13 0.25	BH13 0.50	BH13 0.75	BH13 1.00	BH13 1.25
		Samplii	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220520-046	EB2220520-047	EB2220520-048	EB2220520-049	EB2220520-050
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
øpH (F)		0.1	pH Unit	4.8	6.0	5.9	6.0	6.0
øpH (Fox)		0.1	pH Unit	2.7	3.0	3.8	2.1	2.1
Ø Reaction Rate		1	-	3	2	1	4	4

# Page : 13 of 16 Work Order : EB2220520 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH13 1.50	BH13 1.75	BH14 0.0	BH14 0.25	BH14 0.50
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220520-051	EB2220520-052	EB2220520-053	EB2220520-054	EB2220520-055
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
øpH (F)		0.1	pH Unit	5.9	6.0	5.5	5.6	5.5
øpH (Fox)		0.1	pH Unit	2.0	2.1	2.8	3.3	3.6
Ø Reaction Rate		1	-	4	4	3	1	1
# Page : 14 of 16 Work Order : EB2220520 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL			Sample ID	BH14	BH14	BH14	BH14	BH14
				0.75	1.00	1.25	1.50	1.75
Sampling date / time				12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220520-056	EB2220520-057	EB2220520-058	EB2220520-059	EB2220520-060
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)		0.1	pH Unit	5.9	5.9	6.2	6.0	6.1
øpH (Fox)		0.1	pH Unit	3.4	2.0	2.0	2.1	2.0
Ø Reaction Rate		1	-	1	4	4	4	4

# Page : 15 of 16 Work Order : EB2220520 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH15 0.0	BH15 0.25	BH15 0.50	BH15 0.75	BH15 1.00
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220520-061	EB2220520-062	EB2220520-063	EB2220520-064	EB2220520-065
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit	4.6		5.8		5.6
Titratable Actual Acidity (23F)		2	mole H+ / t	108		4		4
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.17		<0.02		<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S	0.020		0.016		0.107
acidity - Chromium Reducible Sulfur		10	mole H+ / t	13		<10		67
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5		1.5		1.5
Net Acidity (sulfur units)		0.02	% S	0.19		0.02		0.11
Net Acidity (acidity units)		10	mole H+ / t	121		14		71
Liming Rate		1	kg CaCO3/t	9		1		5
Net Acidity excluding ANC (sulfur units)		0.02	% S	0.19		0.02		0.11
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	121		14		71
Liming Rate excluding ANC		1	kg CaCO3/t	9		1		5
EA037: Ass Field Screening Analysis								
Ø pH (F)		0.1	pH Unit	5.7	5.6	6.3	6.4	6.6
ø pH (Fox)		0.1	pH Unit	3.0	3.3	3.6	4.3	1.9
Ø Reaction Rate		1	-	3	3	1	1	1

# Page : 16 of 16 Work Order : EB2220520 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH15	BH15	BH15	 
( ··· ··· ··· · · · · · · · · · · · · ·				1.25	1.50	1.75	 
		Samplii	ng date / time	12-Jul-2022 00:00	12-Jul-2022 00:00	12-Jul-2022 00:00	 
Compound	CAS Number	LOR	Unit	EB2220520-066	EB2220520-067	EB2220520-068	 
				Result	Result	Result	 
EA037: Ass Field Screening Analysis							
øpH (F)		0.1	pH Unit	6.8	6.9	7.0	 
ø pH (Fox)		0.1	pH Unit	2.1	2.0	1.9	 
Ø Reaction Rate		1	-	4	1	1	 



## **QUALITY CONTROL REPORT**

Work Order	EB2220520	Page	: 1 of 4
Client	PRECISE ENVIRONMENTAL PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MR CHRIS BUTLER	Contact	: Nidhi Bhimani
Address	: PO BOX 4424	Address	: 2 Byth Street Stafford QLD Australia 4053
	ROBINA TOWN CENTRE QLD, AUSTRALIA 4230		
Telephone	:	Telephone	: +61-7-3243 7222
Project	: PE3394.22	Date Samples Received	: 14-Jul-2022
Order number	: PE3394.22	Date Analysis Commenced	: 19-Jul-2022
C-O-C number	:	Issue Date	21-Jul-2022
Sampler	: CHRIS BUTLER, SEAN GARDINER		Hac-MRA NATA
Site	:		
Quote number	: EN/222		Accreditation No. 825
No. of samples received	: 68		Accredited for compliance with
No. of samples analysed	: 68		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



#### **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.

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 (%)
EA033-A: Actual Ac	idity (QC Lot: 4467835)								
EB2220449-016	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 KCI (23A)		0.1	pH Unit	8.4	8.5	0.0	0% - 20%
EB2220520-063	BH15 0.50	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	4	5	0.0	No Limit
		EA033: pH KCI (23A)		0.1	pH Unit	5.8	5.7	0.0	0% - 20%
EA033-B: Potential	Acidity (QC Lot: 4467835)								
EB2220449-016	Anonymous	EA033: Chromium Reducible Sulfur (22B)		0.005	% S	0.042	0.045	7.2	No Limit
	EA033: acidity - Chromium Reducible Sulfur		10	mole H+ / t	26	28	7.2	No Limit	
FB2220520-063	BH15 0 50	(a-22B) EA033: Chromium Reducible Sulfur (22B)		0.005	% S	0.016	0.015	0.0	No Limit
		EA033: acidity - Chromium Reducible Sulfur		10	mole H+ / t	<10	<10	0.0	No Limit
		(a-22B)							
EA037: Ass Field S	creening Analysis (QC Lo	t: 4465711)							
EB2220520-001	BH8 0.0	EA037: pH (F)		0.1	pH Unit	5.7	5.7	0.0	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	2.4	2.4	0.0	0% - 20%
EB2220520-011	BH9 0.50	EA037: pH (F)		0.1	pH Unit	6.2	6.3	0.0	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	3.8	3.8	0.0	0% - 20%
EA037: Ass Field S	creening Analysis (QC Lo	t: 4465712)							
EB2220520-021	BH10 1.00	EA037: pH (F)		0.1	pH Unit	5.8	5.7	0.0	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	2.2	2.2	0.0	0% - 20%
EB2220520-031	BH11 1.50	EA037: pH (F)		0.1	pH Unit	5.3	5.2	1.9	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	2.2	2.2	0.0	0% - 20%

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Work Order	EB2220520
Client	: PRECISE ENVIRONMENTAL PTY LTD
Project	: PE3394.22



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 Sc	reening Analysis (QC Lot: 4	465713)									
EB2220520-041 BH12 1.00	EA037: pH (F)		0.1	pH Unit	5.9	6.0	0.0	0% - 20%			
		EA037: pH (Fox)		0.1	pH Unit	2.0	2.0	0.0	0% - 50%		
EB2220520-051	BH13 1.50	EA037: pH (F)		0.1	pH Unit	5.9	5.9	0.0	0% - 20%		
		EA037: pH (Fox)		0.1	pH Unit	2.0	2.0	0.0	0% - 20%		
EA037: Ass Field Sc	reening Analysis (QC Lot: 4	465714)									
EB2220520-061	BH15 0.0	EA037: pH (F)		0.1	pH Unit	5.7	5.8	0.0	0% - 20%		
		EA037: pH (Fox)		0.1	pH Unit	3.0	2.9	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.

Sub-Matrix: SOIL	Matrix: SOIL				Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Acceptable Limits (%)		
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EA033-A: Actual Acidity (QCLot: 4467835)									
EA033: pH KCI (23A)			pH Unit		4.4 pH Unit	102	91.0	107	
EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	19 mole H+ / t	89.9	70.0	124	
EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02					
EA033-B: Potential Acidity (QCLot: 4467835)									
EA033: Chromium Reducible Sulfur (22B)		0.005	% S	<0.005	0.246 % S	91.4	77.0	121	
EA033: acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	<10					

### 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.



## QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EB2220520	Page	: 1 of 5
Client		Laboratory	: Environmental Division Brisbane
Contact	: MR CHRIS BUTLER	Telephone	: +61-7-3243 7222
Project	: PE3394.22	Date Samples Received	: 14-Jul-2022
Site	:	Issue Date	: 21-Jul-2022
Sampler	: CHRIS BUTLER, SEAN GARDINER	No. of samples received	: 68
Order number	: PE3394.22	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.

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

#### **Outliers : Analysis Holding Time Compliance**

• NO Analysis Holding Time Outliers exist.

#### **Outliers : Frequency of Quality Control Samples**

• <u>NO</u> 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 <u>VOC in soils</u> 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	n: 🗴 = Holding time	e breach ; 🗸 = With	in holding time
Method		Sample Date	E	xtraction / Preparation		Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-A: Actual Acidity								
Snap Lock Bag - frozen (EA033)								
BH11 - 0.0,	BH11 - 0.50,	12-Jul-2022	20-Jul-2022	12-Jul-2023	1	20-Jul-2022	18-Oct-2022	✓
BH11 - 1.00,	BH11 - 1.50,							
BH11 - 2.50,	BH15 - 0.0,							
BH15 - 0.50,	BH15 - 1.00							
EA033-B: Potential Acidity								
Snap Lock Bag - frozen (EA033)								
BH11 - 0.0,	BH11 - 0.50,	12-Jul-2022	20-Jul-2022	12-Jul-2023	1	20-Jul-2022	18-Oct-2022	✓
BH11 - 1.00,	BH11 - 1.50,							
BH11 - 2.50,	BH15 - 0.0,							
BH15 - 0.50,	BH15 - 1.00							
EA033-C: Acid Neutralising Capacity								
Snap Lock Bag - frozen (EA033)								
BH11 - 0.0,	BH11 - 0.50,	12-Jul-2022	20-Jul-2022	12-Jul-2023	1	20-Jul-2022	18-Oct-2022	✓
BH11 - 1.00,	BH11 - 1.50,							
BH11 - 2.50,	BH15 - 0.0,							
BH15 - 0.50,	BH15 - 1.00							
EA033-D: Retained Acidity								
Snap Lock Bag - frozen (EA033)								
BH11 - 0.0,	BH11 - 0.50,	12-Jul-2022	20-Jul-2022	12-Jul-2023	1	20-Jul-2022	18-Oct-2022	✓
BH11 - 1.00,	BH11 - 1.50,							
BH11 - 2.50,	BH15 - 0.0,							
BH15 - 0.50,	BH15 - 1.00							
EA033-E: Acid Base Accounting								
Snap Lock Bag - frozen (EA033)								
BH11 - 0.0,	BH11 - 0.50,	12-Jul-2022	20-Jul-2022	12-Jul-2023	1	20-Jul-2022	18-Oct-2022	<ul> <li>✓</li> </ul>
BH11 - 1.00,	BH11 - 1.50,							
BH11 - 2.50,	BH15 - 0.0,							
BH15 - 0.50,	BH15 - 1.00							

Page	: 3 of 5
Work Order	EB2220520
Client	: PRECISE ENVIRONMENTAL PTY LTD
Project	: PE3394.22



Matrix: SOIL					Evaluation	: × = Holding time	breach ; ✓ = With	in holding time
Method		Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA037: Ass Field Screening Analysis								
Snap Lock Bag - frozen (EA037)								
BH8 - 0.0,	BH8 - 0.25,	12-Jul-2022	19-Jul-2022	08-Jan-2023	1	19-Jul-2022	08-Jan-2023	✓
BH8 - 0.50,	BH8 - 0.75,							
BH8 - 1.00,	BH8 - 1.25,							
BH8 - 1.50,	BH8 - 1.75,							
BH9 - 0.0,	BH9 - 0.25,							
BH9 - 0.50,	BH9 - 0.75,							
BH9 - 1.00,	BH9 - 1.25,							
BH9 - 1.50,	BH9 - 1.75,							
BH10 - 0.0,	BH10 - 0.25,							
BH10 - 0.50,	BH10 - 0.75,							
BH11 - 0.0,	BH10 - 1.00, BH10 - 1.25,							
BH10 - 1.50,	BH10 - 1.75,							
BH11 - 0.25,								
BH11 - 0.50,	BH11 - 0.75,							
BH11 - 1.00,	BH11 - 1.25,							
BH11 - 1.50,	BH11 - 1.75,							
BH11 - 2.00,	BH11 - 2.25,							
BH11 - 2.50,	BH11 - 2.75,							
BH12 - 0.0,	BH12 - 0.25,							
BH12 - 0.50,	BH12 - 0.75,							
BH12 - 1.00,	BH12 - 1.25,							
BH12 - 1.50,	BH12 - 1.75,							
BH13 - 0.0,	BH13 - 0.25,							
BH13 - 0.50,	BH13 - 0.75,							
BH13 - 1.00,	BH13 - 1.25,							
BH13 - 1.50,	BH13 - 1.75,							
BH14 - 0.0,	BH14 - 0.25,							
BH14 - 0.50,	BH14 - 0.75,							
BH14 - 1.00,	BH14 - 1.25,							
BH14 - 1.50,	BH14 - 1.75,							
BH15 - 0.0,	BH15 - 0.25,							
BH15 - 0.50,	BH15 - 0.75,							
BH15 - 1.00,	BH15 - 1.25,							
BH15 - 1.50,	BH15 - 1.75							



## **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				ot within specification ; $\checkmark$ = Quality Control frequency within specification.			
Quality Control Sample Type		C	Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
ASS Field Screening Analysis	EA037	7	68	10.29	10.00	$\checkmark$	NEPM 2013 B3 & ALS QC Standard
Chromium Suite for Acid Sulphate Soils	EA033	2	14	14.29	10.00	$\checkmark$	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Chromium Suite for Acid Sulphate Soils	EA033	1	14	7.14	5.00	$\checkmark$	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chromium Suite for Acid Sulphate Soils	EA033	1	14	7.14	5.00	$\checkmark$	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
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.
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
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house



## **SAMPLE RECEIPT NOTIFICATION (SRN)**

Work Order	EB2220427		
Client Contact Address	E <b>PRECISE ENVIRONMENTAL PTY LTD</b> E MR CHRIS BUTLER E PO BOX 4424 ROBINA TOWN CENTRE QLD, AUSTRALIA 4230	Laboratory : Contact : Address :	Environmental Division Brisbane Nidhi Bhimani 2 Byth Street Stafford QLD Australia 4053
E-mail Telephone Facsimile	mail@preciseenvironmental.com.au  	E-mail : Telephone : Facsimile :	nidhi.bhimani@alsglobal.com +61-7-3243 7222 +61-7-3243 7218
Project Order number C-O-C number Site Sampler	: PE3394.22 : PE3394.22 : : : CHRIS BUTLER, SEAN GARDINER	Page : Quote number : QC Level :	1 of 3 EB2017PREENV0003 (EN/222) NEPM 2013 B3 & ALS QC Standard
Dates Date Samples Received Client Requested Due Date	: 14-Jul-2022 11:35 : 20-Jul-2022	Issue Date Scheduled Reporting Da	: 14-Jul-2022 te : <b>20-Jul-2022</b>
Delivery Details Mode of Delivery No. of coolers/boxes Receipt Detail	: Carrier : 4 : HARD ESKY	Security Seal Temperature No. of samples received	: Intact. : 3.8, 5.0, 3.4, 4.4°C - Ice present / analysed : 64 / 64

### **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 be advised that sample "BH4 0.75, BH5 2.00 and BH5 2.25" was not received at the laboratory (denoted SNR on the scanned COC).
- SPLIT WORK ORDER: It should be noted that ALS has split this work order over the following work orders EB2220520 and EB2220427 due to the size of the sample numbers. For any further information regarding this processing of samples please contact ALS client services division on ALSEnviro.Brisbane@alsglobal.com
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.
- 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.
- 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 laboratory will process these samples unless instructions are received from
  you indicating you do not wish to proceed. The absence of this summary table indicates that all
  samples have been received within the recommended holding times for the analysis requested.



#### Sample Container(s)/Preservation Non-Compliances

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

\037
I Screening Analysis

#### • 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.

033 1 Suite for Acid Sulphate Soils 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 - E/ Chromiur	SOIL - E/ ASS Field
EB2220427-001	12-Jul-2022 00:00	BH1 0.0	1	✓
EB2220427-002	12-Jul-2022 00:00	BH1 0.25		✓
EB2220427-003	12-Jul-2022 00:00	BH1 0.50	✓	✓
EB2220427-004	12-Jul-2022 00:00	BH1 0.75		✓
EB2220427-005	12-Jul-2022 00:00	BH1 1.00	1	✓
EB2220427-006	12-Jul-2022 00:00	BH1 1.25		✓
EB2220427-007	12-Jul-2022 00:00	BH1 1.50	✓	✓
EB2220427-008	12-Jul-2022 00:00	BH1 1.75		✓
EB2220427-009	12-Jul-2022 00:00	BH1 2.00		✓
EB2220427-010	12-Jul-2022 00:00	BH1 2.25		✓
EB2220427-011	12-Jul-2022 00:00	BH1 2.50	✓	✓
EB2220427-012	12-Jul-2022 00:00	BH1 2.75		✓
EB2220427-013	12-Jul-2022 00:00	BH2 0.0		✓
EB2220427-014	12-Jul-2022 00:00	BH2 0.25		✓
EB2220427-015	12-Jul-2022 00:00	BH2 0.50		✓
EB2220427-016	12-Jul-2022 00:00	BH2 0.75		✓
EB2220427-017	12-Jul-2022 00:00	BH2 1.00		✓
EB2220427-018	12-Jul-2022 00:00	BH2 1.25		✓
EB2220427-019	12-Jul-2022 00:00	BH2 1.50		✓
EB2220427-020	12-Jul-2022 00:00	BH2 1.75		✓
EB2220427-021	12-Jul-2022 00:00	BH3 0.0		✓
EB2220427-022	12-Jul-2022 00:00	BH3 0.25		✓
EB2220427-023	12-Jul-2022 00:00	BH3 0.50		✓
EB2220427-024	12-Jul-2022 00:00	BH3 0.75		✓
EB2220427-025	12-Jul-2022 00:00	BH3 1.00		✓
EB2220427-026	12-Jul-2022 00:00	BH3 1.25		✓
EB2220427-027	12-Jul-2022 00:00	BH3 1.50		✓
EB2220427-028	12-Jul-2022 00:00	BH3 1.75		✓
EB2220427-029	12-Jul-2022 00:00	BH4 0.0	✓	✓
EB2220427-030	12-Jul-2022 00:00	BH4 0.25		✓
EB2220427-031	12-Jul-2022 00:00	BH4 0.50	✓	✓
EB2220427-033	12-Jul-2022 00:00	BH4 1.00	1	✓
EB2220427-034	12-Jul-2022 00:00	BH4 1.25		✓
EB2220427-035	12-Jul-2022 00:00	BH4 1.50	✓	✓
EB2220427-036	12-Jul-2022 00:00	BH4 1.75		✓



			SOIL - EA033 Chromium Suite for Acid Sulphate Soils	SOIL - EA037 ASS Field Screening Analysis
EB2220427-037	12-Jul-2022 00:00	BH4 2.00		✓
EB2220427-038	12-Jul-2022 00:00	BH4 2.25	✓	✓
EB2220427-039	12-Jul-2022 00:00	BH5 0.0		✓
EB2220427-040	12-Jul-2022 00:00	BH5 0.50		✓
EB2220427-041	12-Jul-2022 00:00	BH5 0.75		✓
EB2220427-042	12-Jul-2022 00:00	BH5 1.00		✓
EB2220427-043	12-Jul-2022 00:00	BH5 1.25		✓
EB2220427-044	12-Jul-2022 00:00	BH5 1.50		✓
EB2220427-045	12-Jul-2022 00:00	BH5 1.75		✓
EB2220427-048	12-Jul-2022 00:00	BH6 0.0	✓	✓
EB2220427-049	12-Jul-2022 00:00	BH6 0.25		✓
EB2220427-050	12-Jul-2022 00:00	BH6 0.50	✓	✓
EB2220427-051	12-Jul-2022 00:00	BH6 0.75		✓
EB2220427-052	12-Jul-2022 00:00	BH6 1.00	✓	✓
EB2220427-053	12-Jul-2022 00:00	BH6 1.25		✓
EB2220427-054	12-Jul-2022 00:00	BH6 1.50	✓	✓
EB2220427-055	12-Jul-2022 00:00	BH6 1.75		✓
EB2220427-056	12-Jul-2022 00:00	BH6 2.00		✓
EB2220427-057	12-Jul-2022 00:00	BH6 2.25		✓
EB2220427-058	12-Jul-2022 00:00	BH6 2.50	✓	✓
EB2220427-059	12-Jul-2022 00:00	BH6 2.75		✓
EB2220427-060	12-Jul-2022 00:00	BH7 0.0		✓
EB2220427-061	12-Jul-2022 00:00	BH7 0.25		✓
EB2220427-062	12-Jul-2022 00:00	BH7 0.50		✓
EB2220427-063	12-Jul-2022 00:00	BH7 0.75		✓
EB2220427-064	12-Jul-2022 00:00	BH7 1.00		✓
EB2220427-065	12-Jul-2022 00:00	BH7 1.25		✓
EB2220427-066	12-Jul-2022 00:00	BH7 1.50		✓
EB2220427-067	12-Jul-2022 00:00	BH7 1.75		✓

## Proactive Holding Time Report

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

### **Requested Deliverables**

### **RESULTS & INVOICE**

<ul> <li>*AU Certificate of Analysis - NATA (COA)</li> </ul>	Email	mail@preciseenvironmental.com.au
<ul> <li>*AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)</li> </ul>	Email	mail@preciseenvironmental.com.au
<ul> <li>*AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)</li> </ul>	Email	mail@preciseenvironmental.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	mail@preciseenvironmental.com.au
- A4 - AU Tax Invoice (INV)	Email	mail@preciseenvironmental.com.au
- Chain of Custody (CoC) (COC)	Email	mail@preciseenvironmental.com.au
- EDI Format - XTab (XTAB)	Email	mail@preciseenvironmental.com.au

SAMPLE RECEIF	T INFORMATION 8	BOTTLE TYPE



WORKORDER No:

							· · ·				To b	e con	nplete	d by S	ample	Red	/	13/0	7/22								f				Sample	as cha	ckad la	ahelle			
	•	So	ting <sup>•</sup>	Times				Terr	nperatu	ure De	tails (re	ecord if NOT	on COC)	<u> </u>	•			Pac	kagi	ing					Cou	rier D	etails	Mandatory fo	r Quarai	ntine)	trays b	y:	oncu, n	usene	u unu	parn	
Time	(Only	/ record	for BF	, Mobil	& URS	5)		Sam	ole Te			6	°C					$\square$	Pa		aina T	vpe		No.	Con N	lote:	-	5-			Initial:						
Time	Placed	in Fride	enceu						Chillin	n Met	hod -	Circle		Sec	Circle	ear ir belov	itact?	╞		Har	d Esh			4		ຄິ		13/2	lad								
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Sortin	g to Frid	lge Tar	get Tin	ne <1 Ho	our				e <b>/</b> /Ice	Brick	s / No	o Chill	ing	NA (N	lo secu	rity se	al use	;d) -		(	Other	·			on th	is form if IS/ANGE	they ar EL by Sa	e entered o ample Reco	lirectly pt sta	into ff.							
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voc	analys	s may	be co	mprom	nised a	as sa	ample	conta	ainers	conta	ined	heads	space	(list):								<u> </u>			¥							Brist	ronme bane	intai		ion	
Detai	ls of ar	y sam	oles d	amage	d dur	ing tr	ransit	:																		ŧ						W	ork Ord	er Ref	erence	, ,	
Othe	r Inform	ation (	eg. W	ere bo	tties r	recei	ved th	nat we	eren't d	compl	etely	filled)	(eg. lí	samp	le tem	berat	ure is	abo	ve 6	'C a	dd furtl	ner c	detail	here -	- Interr	al use	only -	Not for S	SRN)	:		E	:B2	220	J42	27	
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	Preci	sC	Đ	hvire		1	νt	51	59	7.0	ld																								A.		- A
Metals	Botties: F	= Field fil	tered. T	= Total. I	N/S = N	ot Spe	cified.						<u> </u>																·				IIIK				
Cyanide Bottles: Tr = Treated, meaning the client has ticked the pre-treated box on the bottle. Un = Untreated, meaning the box is not ticked. Ferrous Iron, Hexavalent Chromium & Geosmin and MIB: F = Field filtered. N/S = Not Specified. Soil Bags: S = Small. M = Medium (~500mL asbestos or PSD bag). L = Large (~6kg FMT bag)															felepho	one - + 61•	7-3243	7222																			
Soil Ba	gs: S = Sr	nall. M =	Medium	(~500mL	asbesto	os or P	PSD bag	g). L = L	arge (~6	kg FMT	bag)																										)
		-s							-G		-0		-P						-RF			-R	GF		-B					-M	-TC		-VOC				
		Bag											Plastic	Plastic	Bacto				-RT			-R	GT		NaOH	0.5L Glass	Fluo	Fluoro HGI -DOC Viat DUST							Other		
	Soil Jar	Plastic	N	lat Green	N	Nat Vhite	UT Nut	trients	Green	Glass C	range	Giass Purp	Purp	Grey (PFOS /	Black / Thio	6	0mL Niti	ric Rec	ч	60n	ni Lah Aci	dified	Na C	OH Hexa hrome	CN Blue	Brown CIRCLE	Yello (Suffic	w Orang	e F Ma	<sup>:</sup> e <sup>2+</sup> Iroon	Vial			EDA Viai	Endo- Toxin	CuSO4	
Lab No.	125mL 250mL	Green							Vial (Geos			(O&G)	250mL	PEUAJ	Grey									Blue 60mL	60mL	Lab Preserved	250m	nL 125m	. 6	OmL	H₂SO₄ Purple	H <sub>2</sub> SO Purpl	H.S Y/N	1	Tube	UnPres	
	Fro	izen Ket	41	E00ml 0	50ml	00mL	Light	Turquoi	u nije j	100	500	250ML	125mL	60ml	250mL	5	D		<u>-</u>		D		_		250mL	Or Pre-	UHS	·(Sulfite	·)	<u> </u>	40mL	40ml	L	40mL		2.5L	
	D	ry		500111L 2:	SUML	1L	(T)	(F)	This Ba	mL	mL	1L	60mL	250ml	SUOML	-		<u> </u>	<u> </u>	F						preserveu		1	F						$\square$	4L	
						ta de				eallowsh		armercade	In of bottle	types rece	wed withou	specity	vud rue e:		Tiper ior	eachs	ampie. win	n using	g inis iun		ne doxes n	atoning the	containers	received for t					·				
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ALS	CHAIN OF CUSTODY ALS Laboratory: please tick ->	CHAIN OF CUSTODY	Sydney: 277 Woodpark Rd, Smithfield NSW 2176       Brisbane 32 Shand SL, Stafford QLD 4053       Melbourne: 24 Westel Rd, Springvale VIC 3171       Perth: 10 Hod Way, Mair         Ph: 02 8784 8655 Examples sysney@alsenviro.com       Ph 07 3243 7222 E samples brisbane@alsenviro.com       Ph 03 8549 9600 E samples melbourne@alsenviro.com       Ph 03 6331 2158 E launce         Ph 03 4549 9600 E tomesnie encommant@alsenviro.com       Ph 03 8549 9600 E samples melbourne.com       Ph 03 8549 9600 E samples melbourne.com       Ph 03 8549 9600 E samples melbourne@alsenviro.com       Ph 03 6331 2158 E launce         Ph 03 6559       TIBBNADOLIND BCOUNDERC								∦e Ne gt ce	Environmental Division Brisbane Work Order Reference EB222042					
LIENT:	PRECISE ENVIRONMENTAL			TURNARC		Standard TAT	(List due d	ate):					FOR	LABORAT	Ô		
DFFICE:	7/14 FREMANTLE ST, BURLEIGH I	HEADS 4220		e.g. Ultra Tr	ace Organics)	Non Standard	or urgent T/	AT (List due	date):				Custo Ecentri	lySealUntac æV frozen id			"A I
	PE3394.22			ALS QUO	IE NO.: BNU	131/16 94			COC SE			(Circle)	receip	h			<u> </u>
ROJECT MANAGER:	CHRIS BUTLER		CONTACT:	0431 565 21	0				DE: 1	23	4	56	7 Olhan	noomment:			
AMPLER:	CHRIS BUTLER / SEAN GARDINER	2	SAMPLER N	OBILE: 040	9 827 396	RELINQUISHED B	Y:		RECEIVED B	/: /:	<u> </u>		RELINQUI	SHED BY:	<u>83</u>		• • •
OC emailed to ALS? (	(YES / NO)		EDD FORM	AT (or defau	lt):	CHRIS BUTLER										E-l hand ( 61-7-3243	7000
nail Reports to: mail(	@preciseenvironmental.com.au	· · · · · · · · · · · · · · · · · · ·				DATE/TIME:	Q	Butter	DATE/TIME:				DATE/TIME	:		elephone + elfor-3245	,
ail Invoice to: PO Bo	x 4424, Robina Town Centre 4230					13.07.22 9AM									<u> </u>		
MMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSA	L:															
in line of the	SAMPLE DETAILS	Water(W)	MATRI	X: Solid(S)	CONTAINER INFO	RMATION	AN	ALYSIS RE Where Metals	QUIRED inclu	ding SUI y Total (unfi	ITES (NB	. Suite Code required) or D	as must be lis Nasolved (field	ied to attract	suite price) quired).	Additional Informa	ation
LABID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVATIN (refer to codes below)	TOTAL BOTTLES	EA037 (pHF and pHFOX)	EAR2 (Chromine outbo)							(a	Comments on likely contaminar ditutions, or samples requiring s analysis etc.	nt levels, specific QC
1	BH1	0.0	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x		(								
2	BH1	0.25	12.07.22	S	BAG/<4 <sup>0</sup> C	1	x										
3	BH1	0.50	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x		¢								
4	BH1	0.75	12.07.22	s	BAG/<4 <sup>0</sup> C	1	×										
5	BH1	1.00	12.07.22	8	BAG/<4°C	1	×	. ,	<				Ç	DI I		ATCH	]
6	BH1	1.25	12.07.22	S.	BAG/<4°C	1	x		÷••					B there 5	HA REAMES / Jr.		
7	BH1	1.50	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x	: ,	(				est	Asso	ю. Баt	ch No.	
8	BH1 _	1.75	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x			+	•	E	B22	205	20		
9	BH1	2.00	12.07.22	8	BAG/<4 <sup>0</sup> C	1	×					6					4
10	BH1	2.25	12.07.22	s	BAG/<4 <sup>0</sup> C	1	×			+						· · · · · · · · · · · · · · · · · · ·	
	BH1	2,50	12,07.22	s	BAG/<4°C	1	×	· · · · ·		+				-			
12	BH1	2.55	12.07 22		BACINO	4				-				~.			
?, <del>6.</del>		2.13			DAGIN4 U		^	·							- <b>1988</b> (	2	
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weng 1995 1													Ť		· ·	ž	
						TOTAL 12								1	1	-	

	CHAIN OF CUSTODY	CHAIN OF CUSTODY	Sydney: 277 Woodpark Ph: 02 8784 8555 E: sample	Rd, Smithfie ടെ swinevനിദ	id NSW 2176 Disbane: 3:	2 Shand SI, Staf 2 Fisamples bris	ford QLD 4053	⊡ I o.com Ph:0	Melbourne 13 8549 960	. 2-4 Westall R 10 F: samples r	d, Springvale <sup>v</sup> oelbourne@al	VIC 3171 servito com	Perth 1     Ph 08 9209	) Hod Way, Mai 17655 F: sampl	aga WA 6090 es perib@alse	nvita com
	ALS Laboratory: please fick →	ALS Laboratory: please tick →	<ul> <li>E) Newcastle: 5 Rosegum</li> <li>Ph:02 4968 9433 E:sample</li> </ul>	Rd, Warabro	bok NSW 2304	14-15 Desma C E: townsville.env	t, Bohle QLD 4 ronmontal@alsor	818 □ a twino.com Ph:	Adelaide: 2 08 8359 08	2-1 Burma Rd, I 390 E:adela-del	Pooraka SA 5/ @alsenviro.com	095 11	Launces Ph: 03 633	Ion: 27 Welling 1 2158 E: launc	ton SI, Launce eston@alsenv	ro.com
CLIENT:	PRECISE ENVIRONMENTAL			TURNAR	OUND REQUIREMENTS :	🛛 Standa	urd TAT (List	due date):					EOR	LABORATO	RY USE O	NLY (Circle)
OFFICE:	7/14 FREMANTLE ST, BURLEIGH H	EADS 4220		(Standard I. e.g. Ultra Ti	a i may be longer for some tests race Organica)	Non S	andard or ur	gent TAT (List	due date	):			Cust	xiy Seal Intacl		Yes I No. SANA
PROJECT:	PE3394.22			ALS QUO	TE NO.: B	N031/16 v4				COC SEQUI	ENCE NUMB	ER (Circle	) recei	d?	onicks preser	upon Yes No
ORDER NUMBER:	PE3394.22								COC:	1 2	34	56	7 Rand	om Sample Te	mperatura of	Receipt
PROJECT MANAGER:	CHRIS BUTLER		CONTACT: 0	131 565 21	0				OF:	1 2	34	5 6	7 Othe	comment		
SAMPLER:	CHRIS BUTLER / SEAN GARDINER		SAMPLER M	DBILE: 040	19 827 396	RELINQUIS	HED BY:		REC	EIVED BY:			RELINQUI	SHED BY:		RECEIVED BY:
COC emailed to ALS?	(YES / NO)		EDD FORMA	(or defau	ilt):	CHRIS BUT		<u>ъ о 4</u>					DATE	<b>F</b> .		
Email Reports to: mail	wpreciseenvironmental.com.au					12 07 22		l_ Sull	աղ, ԵАП	C/ 1 IN/IC.			DATE/TIM	<b>E</b> .		DATE/TIME.
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSAL	:				15.07.22										<b>I</b>
	8	· · · · · · · · · · · · · · · · · · ·	· · · -											<u> </u>		
ALS USE ONLY	SAMPLE DETAILS	Water(W)	MATRIX	: Solid(S)	CONTAINER INF	ORMATION		ANALY 515 Where Mr	etais are rec	LED Includin	d SUILES ( stal (unfiltered b	NB. Suite Co office required) o	ndes must be li In Dissolved (fick	sted to attract a	suite price) juired).	Additional Information
	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVA (refer to codes belo	rive wj	TOTAL BOTTLES	EA037 (pHF and pHFOX)	EA033 (Chromium sulta)							Comments on likely contaminant levéts, dilutions, or samples requiring specific QC analysis etc.
13	BH2	0.0	12.07.22	5	BAG/<4 <sup>0</sup> C		1	x								
14	BH2	0.25	12.07.22	5	BAG/<4°C		1	x								
15	BH2	0.50	12.07.22	s	BAG/<4°C		1	x								
16	BH2	0.75	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
17	BH2	1.00	12.07.22	s	BAG/<4°C		1	x								
18	BH2	1.25	12.07.22	s	BAG/<4°C		1	x								
19	BH2	1.50	12.07.22	s	BAG/<4°C		1	x	·							
20	BH2	1.75	12.07.22	s	BAG/<4°C		1	x								
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				n pe ac é sur		TOTAL	8									
Water Container Codes: V = VOA Vial HCI Preserve Z = Zinc Acetate Preserved	P = Unpreserved Plastic; N = Nitric Preserve d; VB = VOA Vial Sodium Bisulphate Preserv Bottle; E = EDTA Preserved Bottles; ST = S	d Plastic; ORC = Nitric Preserved ORC; S⊢ ed; VS = VOA Vial Sulfuric Preserved; AV = terile Bottie; ASS = Plastic Bag for Acid Suln	I = Sodium Hydroxide/Cd Preserv Airfreight Unpreserved Vial SG = hate Soils; B = Unpreserved Bag	ed; S = Soc Sulfuric Pre	lium Hydroxide Preserved Plastic; served Amber Glass; H ≖ HCl p	AG = Amber G reserved Plastic	lass Unpreser ;; HS = HCI p	ved; AP - Airfreig reserved Specia	ght Unpres tion bottle;	erved Plastic SP = Sulfuric	I Preserved Pl	astic; F = Fc	rmaldehyde P	reserved Glass	:	L

	CHAIN OF CUSTODY	CHAIN OF CUSTODY	<ul> <li>Bydney: 277 Woodpark Rd, Smithfield NSW 2176</li> <li>Brisbane: 32 Shand St, Stafford OLD 4053</li> <li>Molbourne: 2-4 Westall Rd, Springvale VIC 3171</li> <li>Ph: 02 8784 8555 E samples sydney@alsenviro.com</li> <li>Ph:07 3213 7227 E samples brisbane@alsenviro.com</li> <li>Ph:03 2549 9603 E: samples melbourne@alsenviro.com</li> </ul>									Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com				
ALS Laboratory: please tick → ALS La														ston TAS 7250 ro.com		
CLIENT:	PRECISE ENVIRONMENTAL			TURNAR	DUND REQUIREMENTS : St	andard TA	T (List	due date):					FOI	LABORAT	DRY USE O	VLY (Circle)
OFFICE:	7/14 FREMANTLE ST, BURLEIGH HI	EADS 4220		(Standard T) e.g., Ultra Tr	AT may be longer for some tests  ace Organics)	n Standa	rd or ur	gent TAT (List	due date	):			Cus	odysceallintact	21 - A	Yes No. Caran
PROJECT:	PE3394.22	-		ALS QUO	TE NO.: BN031/16	4				COC SEQU	ENCE NUME	ER (Circk	») Free	ipt?" ipt?"	i bricks presen	Kuponi Yessin KNo N
ORDER NUMBER:	PE3394.22								coc:	12	34	56	7 Rab	dom Sample T	emperature on	Receipt:
PROJECT MANAGER:	CHRIS BUTLER		CONTACT:	0431 565 21	0				OF:	1 2	3 4	5 6	7 000	ar.comment⁼ .		
SAMPLER:	CHRIS BUTLER / SEAN GARDINER		SAMPLER N	OBILE: 040	9 827 396 RELING	UISHED	BY:		REC	EIVED BY:			RELINQU	ISHED BY:		RECEIVED BY:
COC emailed to ALS?	(YES / NO)		EDD FORM	AT (or defau	It): CHRIS	BUTLER	_	$\mathbf{x}$					DATECT	45.		
Email Reports to: mail	@preciseenvironmental.com.au				12 07	1ME:	$^{\prime}$	V_ Sut	ba_ DAN	=/ 1 IIVI <del>E</del> :			DATE/TIK	//E:		DATE/TIME:
Mail Invoice to: PU Bo	x 4424, Kobina Town Centre 4230				13.07	22 9AN										
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSAL	: 			<u>.                                    </u>											
ALSUSEIONIN	SAMPLE DETAILS	Water(W)	MATRI	X: Solid(S)	CONTAINER INFORMATI	ON		ANALYSIS Where M	REQUIR	ED includir	ig SUITES Ital (unfiltered i	(NB. Suite Co ottle required)	odes must be i or Dissolved (fie	listed to attract Id filtered botte re	suite price) quired).	Additional Information
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)		TOTAL BOTTLES	EA037 (pHF and pHFOX)	EA033 (Chromium suite)							Comments on IKely contaminant levels. ditulions, or samples requiring specific QC analysis etc.
21	BH3	0.0	12.07.22	S	BAG/<4°C		1	x								
22	BH3	0.25	12.07.22	s	BAG/<4°C		1	x				ļ				
23	BH3	0.50	12.07.22	8	BAG/<4 <sup>0</sup> C		1	x	-							
24	BH3	0.75	12.07.22	s	BAG/<4°C		1	x							_	
25	BH3	1.00	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x	-							
26	внз	1.25	12.07.22	8	BAG/<4°C		1	×								
27	внз	1.50	12.07.22	s	BAG/<4°C		1	x								
28	внз	1.75	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
						_										
	·····							-	-		1					
Nagi (B. Arti) Republicasi po		en e	a		<b>T</b>	TAL	8									
Water Container Codes: V = VOA Vial HCI Preserve Z = Zinc Acetate Preserved	P = Unpreserved Plastic; N = Nitric Preserve d; VB = VOA Vial Sodium Bisulphate Preserv i Botlle; E = EDTA Preserved Bottles; ST = S	nd Plastic; ORC = Nitric Preserved ORC; SH red: VS = VOA Vial Sulfuric Preserved; AV = A terile Bottle; ASS = Plastic Bag for Acid Sulph	= Sodium Hydroxide/Cd Prese infreight Unpreserved Vial SG ate Soils; B = Unpreserved Ba	rved; S=Soc = Sulfunic Pre Ig.	lium Hydroxide Preserved Plastic; AG = Amb served Amber Glass; H = HCl preserved P	er Glass Ü lastic; HS	= HCi p	ved; AP - Airfrei reserved Specia	ght Unpres ition bottle;	erved Plastic SP = Sulfuric	Preserved P	lastic; F = F	ormaldehyde F	Preserved Glas	s;	

CLIENT:	CHAIN OF CUSTODY CHAIN OF CUSTODY <sup>II</sup> Sydney. 277 Woodpark Rd. Smithfeld NSW 2176         Ph 02 3784 8555 E samples. sydney@aisenviro.com         Ph 02 3784 8555 E samples. sydney@aisenviro.com         Ph 02 3784 8555 E samples.sydney@aisenviro.com         Ph 03 8590 0000 E sadelaide: 2-1 Burma Rd, Pooraka SA 5095         Ph: 02 4666 9433 E samples.sydney@aisenviro.com         Ph: 02 4666 9438 E samples.sydney@aisenviro.com         Ph: 03 8359 0000 E sadelaide: 2-1 Burma Rd, Pooraka SA 5095         Ph: 03 8359 0000 E sadelaide: 2-1 Burma Rd, Pooraka SA 5095         Ph: 03 8359 0000 E sadelaide: 2-1 Burma Rd, Pooraka SA 5095         Ph: 03 8359 0000 E sadelaide: 2-1 Burma Rd, Pooraka SA 5095         Ph: 03 8359 0000 E sadelaide: 2-1 Burma Rd, Pooraka SA 5095         Ph: 03 8359 0000 E sadelaide: 2-1 Burma Rd, Pooraka													Perth. 10 Hod Way, Malaga WA 6090 Pr. 06 9209 7655 E: samples perth@alsenvro.com E Laureston: 27 Welkington St, Lauriceston TAS 7250 Ph. 06 6331 2158 E: laureston@alsenvtro.com Ph. 06 6331 2158 E: laureston@alsenvtro.com							
	PRECISE ENVIRONMENTAL			TURNAR	DUND REQUIREMENTS :	Standard TAT	List due	date):					FOR	LABORAT	ORY USE ON	ILY (Circle)					
OFFICE:	7/14 FREMANTLE ST, BURLEIGH H	EADS 4220		e.g., Ultra Tr	ace Organics)	Non Standard	or urgent 1	TAT (List du	e date):				Cust	ody Seel Intec	12	Yes No	NA.				
PROJECT:	PE3394.22			ALS QUO	TE NO.: BN031/	/16 v4				OC SEQUE	NCE NUMB	ER (Circle	recel	pl?	S DINCKS preserv	upony Yes No	N/A				
	PE3394.22		CONTACT	424 565 24	•				COC:	1 2	3 4	56	7 Rand	iom Sample T	emperatura on	Receipt 20					
SAMPLER	CHRIS BUTLER / SEAN GARDINER		SAMPLER N	OBILE: 040	9 827 396 BFI		<i>.</i>		RECEIV		3 4	3 0				RECEIVED BY	<u>di ba</u>				
COC emailed to ALS? (	YES / NO)		EDD FORM	T (or defau	It): CHI	RIS BUTLER	-														
Email Reports to: mall@	preciseenvironmental.com.au				DAT	TE/TIME:	$\sim$	Butter	DATE/T	IME:			DATE/TIM	iE:		DATE/TIME:					
Mail Invoice to: PO Box	4424, Robina Town Centre 4230				13.	.07.22 9AM							1								
COMMENTS/SPECIAL H	IANDLING/STORAGE OR DISPOSAL	:																			
ALS USE ONLY	SAMPLE DETAILS	Water(W)	MATRI	X: Solid(S)	CONTAINER INFORM	IATION	A	NALYSIS R Where Mota	EQUIRED As are require	) including d, specify Tot	g SUITES (f nel (unfiltered bo	NB. Suite Co ttie required) o	des must be li Dissolved (fiel	sled to attract d filtered bottle re	suite price) quired).	Additional Information					
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES		EAUST (PHF and PHFUX)	EA033 (Chromium suite)							Comments on likely contaminant levels, diutions, or samples requiring specific QC analysis etc.	0				
29	BH4	0.0	12.07.22	s	BAG/<4°C	1	:	x	x												
30	BH4	0.25	12.07.22	s	BAG/<4°C	1	:	x			·										
31	BH4	0.50	12.07.22	s	BAG/<4°C	1		x	x							-					
32	BH4	0.75	12.07.22	5	BAG/<4°C	1		x								· · · · · · · · · · · · · · · · · · ·					
33	BH4	1.00	12.07.22	s	BAG/<4°C	1		x	x												
34	BH4	1.25	12.07.22	s	BAG/<4 <sup>0</sup> C	1		x				-									
35	BH4	1.50	12.07.22	s	BAG/<4 <sup>0</sup> C	1		x	x												
36	BH4	1.75	12.07.22	s	BAG/<4 <sup>0</sup> C	1		x													
37	BH4	2.00	12.07.22	s	BAG/<4 <sup>0</sup> C	1		x													
38	BH4	2.25	12.07.22	s	BAG/<4 <sup>0</sup> C	1		x	x												
			·····		······									1							
			n an tain an ta			TOTAL 10								1							



#### CHAIN OF CUSTODY CHAIN OF CUSTODY ALS Laboratory: please fick -> ALS Laboratory: please tick ->

Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E samples.sydney@aisenviro.com FI Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 D Townsville: 14-55 Desma Ct, Bohle QLD 4818 Ph:02 4969 9433 E:samples newcastie@alserviro.com

Brisbane: 32 Shand St, Stafford QLD 4053 Ph 07 3243 7222 E samples.brisbane@alsenviro.com Ph:07 4796 0600 F, townsville environmental@elsenviro.com Melbourne: 2-4 Westa'l Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com Adelaide: 2-1 Burma Rd. Pooraka SA 5095 Ph. 08 8359 0890 E:adelaide@alsenv.ro.com

🗆 Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E, samples.perth@alsenviro.com Launceston: 27 Weilington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	PRECISE ENVIRONMENTAL			TURNAR	OUND REQUIREMENTS :	Standard TAT	(List due	date):						FORL	ABORATO	RYUŚEON	LY (Circle)	18. A.	
OFFICE:	7/14 FREMANTLE ST, BURLEIGH	HEADS 4220		(Standard T. e.g., Ultra Ti	AT may be longer for some tests race Organics)	Non Standard	or urgent <sup>-</sup>	TAT (List du	ue date):					Custody	/Seel Intect?	( Brees	zey:	a Nor a	
PROJECT:	PE3394.22			ALS QUO	DTE NO.: BI	1031/16 v4			C	OC SEQUE	NCE NUMB	ER (Circl	le)	Free ice receipt?	r/frozenijce`l	oricks present	upon Yes	No No	2 PN/
ORDER NUMBER:	PE3394.22								COC:	12	34	56	6	7 Randon	n Sample Ter	nperature on	Receipt	1.20	
PROJECT MANAGER:	CHRIS BUTLER		CONTACT: (	0431 565 21	10				OF;	12	34	56	6	7 Other of	omment?				
SAMPLER:	CHRIS BUTLER / SEAN GARDINER	R	SAMPLER N	OBILE: 040	09 827 396	RELINQUISHED B	Y:		RECE	VED BY:			R	ELINQUISH	HED BY:		RECEIVED	BY:	
COC emailed to ALS?	(YES / NO)		EDD FORMA	AT (or defau	ult):	CHRIS BUTLER	-	-	ļ										
Email Reports to: mail	@preciseenvironmental.com.au					DATE/TIME:	O	Butte	DATE/	TIME:			D4	ATE/TIME:			DATE/TIME	:	
Mail Invoice to: PO Bo	x 4424, Robina Town Centre 4230					13.07.22 9AM													
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSA	L:																	
ALSUSE ONEY.	SAMPLE DETAILS	Water(W)	MATRI	X: Solid(S)	CONTAINER INF	ORMATION	AI	NALYSIS R Where Meta	REQUIRE	D includin ed, specify To	g SUITES i tal (unfiltered b	NB. Suite C	Codes n ) or Disa	must be liste solved (field fil	id to attract su litered bottle requ	uite price) Ired).	Addition	al Information	
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVAI (refer to codes beio	W. AVIAL BOTTLES		EA037 (pHF and pHFOX)	EA033 (Chromium suite)	-							Commenta on likely d diutions, or samples analysis etc.	contaminant leve	s, . QC
39	BH5	0.0	12.07.22	s	BAG/<4 <sup>0</sup> C	1		x											
40	BH5	0.50	12.07.22	s	BAG/<4 <sup>0</sup> C	1		x											
41	BH5	0.75	12.07.22	s	BAG/<4 <sup>0</sup> C	1		x											
42	BH5	1.00	12.07.22	s	BAG/<4 <sup>0</sup> C	1		x											
43	BH5	1.25	12.07.22	s	BAG/<4 <sup>0</sup> C	1		x											
44	BH5	1.50	12.07.22	s	BAG/<4 <sup>0</sup> C	1		x											
43	BH5	1.75	12.07.22	s	BAG/<4 <sup>0</sup> C	1		x											
46	BH5	2.00	12.07.22	s	BAG/<4°C	1		x											
47	BH5	2.25	12.07.22	s	BAG/<4 <sup>0</sup> C	1		x											
																	-		
															-			* 482.17	
· · ·																		-	
													+						
						TOTAL 9											· · ·		
Water Container Codes:	P = Unpreserved Plastic: N = Nitric Preserv	ad Plastic OPC = Nitric Preserved ORC S	H = Sodium Hydroxide/Cd Prese	rved: S = Sov	dium Hydrovide Preserved Plastic	AG = Amber Glass Unru	reserved: A	P - Airfreight	t Liprveser	ved Plastic	L								

	CHAIN OF CUSTODY ALS Laboratory: please tick →	CHAIN OF CUSTODY ALS Laboratory: please tick →	■ Sydney: 277 Woodpa Phr 02 8784 8555 Ersam [1] Newcastle: 5 Rosegu Dirio0 4082 0422 Ersam	rk Rd, Smithfie ples sydney@a m Rd, Warabro	id NSW 2176 Disbane: 33 Isen vro.com Ph:07 3243 7222 iok NSW 2304 Disbane: 30 Ph:07 426 0500	Shand St. Stat Samples.bris 14-15 Desma C	ford QLD 4053 bane@alsenvir it, Bohle QLD 4	D.com Ph:0	Melbourne 03 8549 960 Adelaide: 2	. 2-4 Westall R( 10 E: samples.n 2-1 Burma Rd, F	d, Sonngvale \ telbourne@al: Pooraka SA 50	riC 3171 seriviro com 195	<ul> <li>Perth. 10</li> <li>Ph. 05 9209</li> <li>Launces</li> <li>Ph. 03 633</li> </ul>	0 Hod Way, Mal 9 7655 E. sampi ston: 27 Welling 1 2158 E. Saund	laga WA 6090 les.porth@alse gton St, Launce eston@alsen	nviro.com Iston TAS 7250	
			HILUZ YOUG SHOG ELSANI	TUDNAD					00 000% 00	ian C anaiamak	galaan vire.cor		FOR	1-ABORATI		NIX (Circle)	
OFFICE:	7/14 FREMANTLE ST. BURLEIGH H	FADS 4220		(Standard T	AT may be longer for some tests			uue date):	duo datai	<b>b</b> .			Cluste	dv Seal Intact		Yes No.	TN/A
PROJECT:	PE3394.22			ALS QUO	TENO.: B	N031/16 v4			due dute	COC SEQUE		ER (Circle	) Free	ke/fiozen ke	bricks prese	tupon - Yesa No	
ORDER NUMBER:	PE3394.22								coc:	12	34	56	7 Rand	iom Sample Te	imperature o	Receipt:	
PROJECT MANAGER:	CHRIS BUTLER		CONTACT:	0431 565 21	0				OF:	1 2	34	56	7 Othe	comment			
SAMPLER:	CHRIS BUTLER / SEAN GARDINER		SAMPLER N	OBILE: 040	9 827 396	RELINQUI	SHED BY:		REC	EIVED BY:			RELINQU	ISHED BY:		RECEIVED BY:	
COC emailed to ALS?	(YES / NO)		EDD FORM/	AT (or defau	ilt):	CHRIS BU	LER										
Email Reports to: mail	@preciseenvironmental.com.au					DATE/TIME	" C	D_But	DATE	E/TIME:			DATE/TIM	IE:		DATE/TIME:	
Mail Invoice to: PO Bo	x 4424, Robina Town Centre 4230					13.07.22	9AM										
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSAL	;															
ALS USE ONLY	SAMPLE DETAILS	Water(W)	MATRI	X: Solid(S)	CONTAINER INF	ORMATION		ANALYSIS Where M	S REQUIR Istals are req	ED includin juired, specify To	g SUITES ( tal (unfiltered b	NB. Suite Co xtle required) o	des must be li r Dissolved (fiel	isted to attract : d filtered bottle re	suite price) quired).	Additional Informatio	n
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVA (refer to codes belo	FIVE w)	TOTAL BOTTLES	EA037 (pHF and pHFOX)	EA033 (Chromium suite)							Comments on likely contaminant lev dilutions, or samples requiring specif analysis etc.	ils, ic QC
48	BH6	0.0	12.07.22	S	BAG/<4°C		1	x	x								
49	BH6	0.25	12.07.22	5	BAG/<4°C		1	x									
56	BH6	0.50	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x	x								
51	BH6	0.75	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x									
52	BH6	1.00	12.07.22	8	BAG/<4 <sup>0</sup> C		1	x	×								
53	BH6	1.25	12.07.22	8	BAG/<4 <sup>0</sup> C		1	x									
54	BH6	1.50	12.07.22	8	BAG/<4°C		1	x	x								
55	BH6	1.75	12.07.22	s	BAG/<4°C		1	x									
56	BH6	2.00	12.07.22	s	BAG/<4 <sup>°</sup> C		1	x									
57	BH6	2.25	12.07.22	s	BAG/<4°C		1	x									
54	BH6	2.50	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x	x								
69	BH6	2.75	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x				-					
							-								1		
						TOTAL	12						1				
Water Container Codes: V = VOA Vial HCI Preserve	P = Unpreserved Plastic; N = Nitric Preserve d; VB = VOA Vial Sodium Bisulphate Preserv Battle; E = EDTA Preserved Battler; ST = S	d Plastic; ORC = Nitric Preserved ORC; S ed; VS = VOA Vial Sulfuric Preserved; AV =	H = Sodium Hydroxide/Cd Prese Airfreight Unpreserved Vial SG	rved; S=Soc = Sulfuric Pre	lium Hydroxide Preserved Plastic; served Amber Glass; H = HCl p	AG = Amber G reserved Plasti	ilass Unpreser c; HS = HCl p	ved; AP - Airfrei reserved Specia	ight Unpres ation bottle;	erved Plastic SP = Sulfuric	reserved Pi	astic; F = Fo	rmaldehyde P	reserved Glass	s;		

	CHAIN OF CUSTODY ALS Laboratory: please tick →	CHAIN OF CUSTODY ALS Laboratory: please tick →	Sydney: 277 Woodpar Ph: 02 8784 8555 Etsamp Newcastle: 5 Roseguin Ch. 02 6262 0420 Streams	k Rd, Smithfiel les.sydney@a n Rd, Warabro	Id NSW 2176 EJ Brisbane: 3 Ilsenviro com Ph:07 3243 722: pok NSW 2304 E Townsville:	2 Shand St. Sla 2 Eisamples.bri 14-15 Desma	afford QLD 4053 sbane@alsonvir Cl, Bohie QLD 4	0.com Ph:0 318 D	Melbourne: 03 8549 9600 Adelaide: 2-	2-4 Westall Ro E samples.m 1 Burma Rd, P	l. Springvale \ elbourne@ate tooraka SA 50	ric 3171 senviro.com 195	□ Perth: 10 Ph <sup>:</sup> 08 9209 □ Launces	Hod Way, Main 7655 E: sample ton: 27 Welling	aga WA 6090 es perth@alse ton St, Launce	nviro.com selon TAS 7250
			Ph 02 4968 9436 Etsamol	es.newcastre@	Dunip Recurrence -	J c. townsville er	wronnienial@alsei	wraidem F'f'	08 8359 08	u ⊨ adelaide@	jaisen viro.com	n	Ph 03 633		eston@aisenv	iro.com
OFFICE:	7/14 EREMANTI E ST. BURI FIGH H	FADS 4220	·····	(Standard T/	AT may be longer for some tests		iard IAI (List	due date):	لأمقعام مرباد					dv Seal Intert	MI USEO	No No
PROJECT:	PF3394 22			e.g Ultra Tr	race Organics) ITE NO · B	N031/16 v4		jen i Ali <b>(Lis</b> i	uue date)	COC SEQUE	NCE NUMB	FR (Circle	, Free	ce / frozen ke	bricks prese	Cupen No N/A
ORDER NUMBER:	PE3394.22			1120 400					COC:	1 2	3 4	5 6	7 Rand	x? om Sample Te	imperature of	1Receipt
PROJECT MANAGER:	CHRIS BUTLER		CONTACT: 0	431 565 21	0				OF:	1 2	34	56	7 Other	cómment:		
SAMPLER:	CHRIS BUTLER / SEAN GARDINER		SAMPLER M	OBILE: 040	09 827 396	RELINQU	SHED BY:		RECE	IVED BY:			RELINQUI	SHED BY:		RECEIVED BY:
COC emailed to ALS?	( YES / NO)		EDD FORMA	T (or defau	iit):	CHRIS BU	TLER									
Email Reports to: mail	@preciseenvironmental.com.au					DATE/TIM	E: (	D_ But	Lu DATE	TIME:			DATE/TIM	E:		DATE/TIME:
Mail Invoice to: PO Bo	x 4424, Robina Town Centre 4230					13.07.22	2 9AM									
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSAL	L:														
ALSUSEONUT	SAMPLE DETAILS	Water(W)	MATRIX	(: Solid(S)		ORMATION	1	ANALYSIS Where M	REQUIRI	ED including	g SUITES (i al (unfiltered bo	NB. Suite Co xtie required) o	ides must be lis r Dissolved (fiek	sted to attract s I filtered bottle rec	suile price) (uired).	Additional Information
LAB (D	SAMPLE (D	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVA (refer to codes beig	TIVE W)	TOTAL BOTTLES	EA037 (pHF and pHFOX)	EA033 (Chromium suite)							Commente on likely contaminant levels, diutions, or samples requiring specific QC analysis etc.
60	BH7	0.0	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
61	вн7	0.25	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
62	BH7	0.50	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
63	BH7	0.75	12.07.22	s	BAG/<4°C		1	x								
64	BH7	1.00	12.07.22	s	BAG/<4 <sup>0</sup> C		1	х								
65	BH7	1.25	12.07.22	s	BAG/<4°C		1	×								
66	BH7	1.50	12.07.22	s	BAG/<4°C		1	x								
67	BH7	1.75	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
														+		
													-			
														+		
														1	-	
Water Container Codee	P = Unneserved Plastic: N = Nitric Preserve	ad Plastic: OBC = Nitric Preserved OPC SH	# Sodium Hydrovide/Cd Preserv	ved: S = Sod	ium Hydroxida Preserved Pisetia		8 Blass Uppreser	ed: AP - Airfrei	nhi Unorece	nred Plastic						
V = VOA Vial HCI Preserve 7 = Zinc Acetate Preserved	d: V8 = VOA Vial Sodium Bisulphate Present Bottle: F = FDTA Preserved Bottles: ST = S	ved; VS = VOA Vial Sulfuric Preserved; AV = /	Airfreight Unpreserved Vial SG =	Sulfuric Pre	served Amber Glass; H = HCl p	reserved Plasi	ic; HS = HCI p	eserved Specia	tion bottle; (	SP = Sulfuric I	Preserved Pla	astic; F=Fo	rmaldehyde Pr	eserved Glass	:	

	CHAIN OF CUSTODY ALS Laboratory: please tick →	CHAIN OF CUSTODY ALS Leborelory: please tick →	□ Sydney, 277 Woodg Phr 02 8784 8555 E.sar □ Newcastle: 5 Roseg Ph.02 4968 9433 E.san	ark Rd, Smithf nples sydney@ um Rd, Warab nples.newcastk	ield NSW 2176 ☐ Brisbane: 32 SF @alsenviro.com Ph:07 3243 7222 E s orok NSW 2304 ☐ Townsville: 14 e@alsenviro.com Ph:07 4796 0600 E:	and St, Staffor amples brisba 15 Desma Ct, I ownsvile.enviror	d QLD 4053 no@alsen vij 3ohle QLD 4 mental@alse	D.com Ph. 818 (J. viro.com Ph	Melbou 03 8549 Adelaic 08 835	irne: 2-4 Westall F 9600 E: samples, le: 2-1 Burma Rd, 9 0890 E, adelaide	Rd, Springvale V .melbourne@als . Pooraka SA 50 @alsenviro.con	IC 3171 enviro com 95	□ Perth: Ph: 08 92 □ Laune Ph: 03 63	10 Hod Way, M 09 7655 E: sam aston: 27 Wellin 31 2158 E: laur	ala Die ngt ce	Environmental Divi Brisbane Work Order Referen EB22204
CLIENT:	PRECISE ENVIRONMENTAL			TURNA	ROUND REQUIREMENTS : [	] Standard	TAT (List	due date):		-			FO	RLABORAT	Ò	
OFFICE:	7/14 FREMANTLE ST, BURLEIGH }	HEADS 4220		(Standard e.g., Ultra	TAT may be longer for some tests Trace Organics)	Non Star	idard or u	gent TAT (List	due d	ate):			Cu	tody Seal Intac	12	
PROJECT:	PE3394.22			ALS QU	OTE NO.: BN03	1/16 v4				COC SEQU		ER (Circle)	E.C.	lce/frozenic	6	
ORDER NUMBER:	PE3394.22								- C	DC: 1 2	34	56	7 Bar	dom:Sample J	200 00	
PROJECT MANAGER	CHRIS BUTLER		CONTACT:	0431 565 2	10				- c	DF: 1 2	34	56	7 Q16	er comment.		
SAMPLER:	CHRIS BUTLER / SEAN GARDINER	2	SAMPLER	MOBILE: 04	109 827 396 R	LINQUISH	ED BY:		RI	CEIVED BY:			RELING	ISHED BY:	1.005	
COC emailed to ALS?	(YES / NO)		EDD FORM	AT (or defa	ult): C	IRIS BUTL	ER									
Email Reports to: mai	l@preciseenvironmental.com.au				D,	TE/TIME:	6	D But	<u>ເມ່</u> ວ/	ATE/TIME:			DATE/TI	AE:		"elephone ' + 61-7-3243 7227
Mail Invoice to: PO Bo	x 4424, Robina Town Centre 4230				1	3.07.22 9	ам 🗲		1							
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSA	L:														
ASUSEON	SAMPLE DETAILS	Water(W)	MATR	IX: Solid(S)	CONTAINER INFOR	MATION		ANALYSIS Where M	i REQU	JIRED includir	ng SUITES (N	IB. Suite Co	des must be Dissolved (fi	listed to attract	suite price)	Additional Information
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	¢.	TOTAL BOTTLES	EA037 (pHF and pHFOX)	EA033 (Chromium suite)						¢	Comments on likely contaminant levels dilutions, or samples requiring specific analysis etc.
1	BH1	0.0	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x	x						1	
2	BH1	0.25	12.07.22	S	BAG/<4 <sup>0</sup> C		1	x					•			
3	BH1	0.50	12.07.22	s	BAG/<4 <sup>o</sup> C		1	x	x							
4	BH1	0.75	12.07.22	8	BAG/<4°C		1	x							+	
5	BH1	1.00	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x	x				<hr/>		12	TCH
6	BH1	1.25	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x -					8	n ison i	R head 7	
7	BH1	1.50	12.07.22	s	BAG/<4 <sup>0</sup> C		1		x			<u> </u> ]	est	Asso	E. Bate	th No.
8	BH1 m	1.75	12.07.22	s	BAG/<4 <sup>0</sup> C		1			-		−₽	B2;	2205	520	
9	BH1	2.00	12.07.22	s	BAGICA <sup>O</sup> C		1	x				<u>k</u>				
10	BH1	2,25	12,07.22		BAGIMOC		1									¥
	BH1	2 50	12 07 22		BAGINE C		<u> </u>							-		
17	BH1	2.50	12.07.00						^	+						
1 &		2.75	12.07.22	s	BAG/<4°C	-	1 ह्वांच्युन	X 2-5, 24 38	1 BA	N 57977 M						· · ·
							<u></u>									
							~	~~************************************	44 24	4 8321 5			1	¢	,	4 · · · · · · · · · · · · · · · · · · ·
						TOTAL	12					6	· · .	1	· · · -	

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	CHAIN OF CUSTODY ALS Laboratory: please tick →	CHAIN OF CUSTODY ALS Laboratory: please tick →	<ul> <li>Sydney: 277 Woodp</li> <li>Ph: 02 8784 8555 Eisar</li> <li>Newcastle: 5 Roseg</li> <li>Ph:02 4968 9433 Eisar</li> </ul>	ark Rd, Smithliel nples.sydnay@at um Rd, Warabro uples.newcastle@	d NSW 2176 Disbane: 32 senviro.com Ph:07 3243 7222 ok NSW 2304 Disbane: 32 valsenviro.com Ph:07 4796 0600	Shand St, S E-samples.c 14-15 Desma E: townsville.c	lafford QLD 4053 risbane@alsen vii i Ct. Bohle QLD 4 rwronmenta!@alse	ocom Ph:03 818 E Av avroicom Ph:0	lelbourn 8549 96 delaide: 8 8359 0	ie: 2-4 Weslal 500 El sample : 2-1 Burma R 0890 Eladelan	l Rd, Springval s.melbourne@ d. Pooraka SA te@alsenviro.	e VIC 3171 Jalsenviro.com 5095 com	<ul> <li>□ Perth: 1</li> <li>Ph: 08 920</li> <li>□ Launce</li> <li>Ph. 03 63:</li> </ul>	10 Hod Way, Mala 19 7655 E: sample iston: 27 Wellingt 31 2158 E: launce	ga WA 6090 s.perth@alse on St, Launce ston@alsenvi	in viro.com saton TAS 7250 fro.com
CLIENT:	PRECISE ENVIRONMENTAL			TURNARC	UND REQUIREMENTS :	🛛 Star	dard TAT (Lis	due date):					EO	R LABORATO	RY USE O	NLY (Circle) = 💡
OFFICE:	7/14 FREMANTLE ST, BURLEIGH	HEADS 4220		(Standard TA e.g., Ultra Tra	T may be longer for some tests ace Organics)	□ Non	Standard or u	gent TAT <b>(List d</b>	iue date	e):			Cus	tody Seal Intact?		Yes No.
PROJECT:	PE3394.22	· · · · ·		ALS QUO	TE NO.: BN	1031/16 v4				COC SEC	UENCE NU	BER (Circl	e) Free	sice/frozenice iot?	oricks preser	ntupon yes No A
ORDER NUMBER:	PE3394.22								coc	. 1 2	3 4	1 5 6	7 Ran	dom Sample Te	nperature or	Receipt.
PROJECT MANAGER:	CHRIS BUTLER		CONTACT	0431 565 21	0				OF:	: 1 2	3 4	1 5 6	7 Oth	er comment = 10	a na se se	
SAMPLER:	CHRIS BUTLER / SEAN GARDINER	2	SAMPLER	MOBILE: 040	9 827 396	RELINQU	ISHED BY:		REC	CEIVED BY	:		RELINQU	JISHED BY:		RECEIVED BY:
COC emailed to ALS?	( YES / NO)		EDD FORM	IAT (or defau	lt):	CHRIS B	UTLER									
Email Reports to: mail	@preciseenvironmental.com.au					DATE/TI	1E: (	D_ Butte	ر. DAT	TE/TIME:			DATE/TIN	VE:		DATE/TIME:
Mail Invoice to: PO Bo	x 4424, Robina Town Centre 4230					13.07.2	2 9AM									
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSA	۱L:														· ···
ALS USE ONCY	SAMPLE DETAILS	Water(W)	MATR	IX: Solid(S)	CONTAINER INF	ORMATIO	N	ANALYSIS F	REQUII tals are re	RED incluc	ling SUITE: Total (unfiltere	<b>5 (NB. Suite C</b> d bottle required)	odes must be or Dissolved (fir	listed to attract s eld filtered bottle req	uite price) uired).	Additional Information
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE /TIME	MATRIX	TYPE & PRESERVAT (refer to codes below	IVE N)	TOTAL BOTTLES	EA037 (pHF and pHFOX)	EA033 (Chromium sulte)							Comments en likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
13	BH2	0.0	12.07.22	s	BAG/<4°C		1	x								
14	BH2	0.25	12.07.22	s	BAG/<4°C		1	x								
15	BH2	0.50	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
16	BH2	0.75	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x				-				
17	BH2	1.00	12.07.22	s	BAG/<4°C		1	x								
18	BH2	1.25	12.07.22	s	BAG/<4 <sup>0</sup> C		1	×								
19	BH2	1.50	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x		1	-					
20	BH2	1.75	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
													-	-		
				-						1						1
											-					
											+		+			
						tot,	8			-						

Water container cades: P = uppreserved Plastic; N = Nitric Preserved Plastic; UKC = Nitric Preserved CV; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide/Cd Preserved Plastic; AS = Amber Glass; H = HCI preserved Plastic; SH = Static Plasti

ALS	CHAIN OF CUSTODY ALS Laboratory: please tick →	CHAIN OF CUSTODY ALS Leboratory: please tick →	<ul> <li>Sydney: 277 Woodpark</li> <li>Ph. 02 8784 8555 Eisampl</li> <li>Newcastle: 5 Rosegum</li> <li>Ph:02 4968 9433 Eisample</li> </ul>	k Rd, Smithfiel les sydney@a Rd, Warabro es.newcastleg	d NSW 2176 Erisbane: 3 Isenviro.com Ph:07 3243 722 ok NSW 2304 Townsville: galsenviro.com Ph:07 4796 0600	2 Shand SI, Sia 2 E.samples.bri 14-15 Desma 3 E. townsville.er	fford QLD 4053 sbano@alsen.vir Cl, Bohle QLD 4 vironmental@alse	D Me o.com Ph:03 818 D Ad ™ro.com Ph:08	elbourne: ) 8549 9600 delaide: 2- 6 8359 089	2-4 Westall R DE: samples i -1 Burma Rd, 90 E:adelaidei	d, Springvale V nelbourne@al Pooraka SA 50 @alsenviro.cor	/IC 3171 senviro.com 195 n	<ul> <li>Perth: 10</li> <li>Ph: 08 9209</li> <li>Launces</li> <li>Ph: 03 633</li> </ul>	) Hod Way, Ma 9 7655 E: samp ston: 27 Wolling 1 2158 E: laure	laga WA 6090 les perlh@alse gton St, Launce seston@alsenvi	nviro.com skon TAS 7250 ro.com
CLIENT:	PRECISE ENVIRONMENTAL			TURNARO	UND REQUIREMENTS :	Stand	ard TAT (List	due date):					FOR	LABORAT	DRY/USE/O	NUY (Circle)
OFFICE:	7/14 FREMANTLE ST, BURLEIGH	HEADS 4220		(Standard TA	AT may be longer for some tests ace Organics)	Non:	standard or ur	gent TAT (List du	ue date):	:			Custo	xiy Seal Intaci	2	Yes, Notern
PROJECT:	PE3394.22			ALS QUO	TE NO.: B	N031/16 v4				COC SEQU	ENCE NUMB	ER (Circle)	Free	ice / frozen ice ol?	bricks preser	Kupon Yes a r No. 7 -
ORDER NUMBER:	PE3394.22								COC:	1 2	34	56	7 Rand	om Sample T	emperature or	Receipt
PROJECT MANAGER:	CHRIS BUTLER		CONTACT: 0	431 565 21	0				OF:	1 2	34	56	7 Othe	oommente ≈		
SAMPLER:	CHRIS BUTLER / SEAN GARDINER	<del>،</del>	SAMPLER M	OBILE: 040	9 827 396	RELINQU	SHED BY:		RECE	IVED BY:			RELINQUI	SHED BY:		RECEIVED BY:
COC emailed to ALS?	( YES / NO)		EDD FORMA	T (or defau	it):	CHRIS BL	TLER							-		
Email Reports to: mail	@preciseenvironmental.com.au							D_ Sutte		TIME:			DATE/TIM	E		DATE/TIME:
Mail Invoice to: PO Bo	x 4424, Robina Town Centre 4230					13.07.2	9AIVI						<u>i</u>			
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSA	.L:														
ALSUSEONU	SAMPLE DETAILS	Water(W)	MATRIX	(: Solid(S)	CONTAINER INI	ORMATION		ANALYSIS R	REQUIRE	ED includir Jired, specify To	ig SUITES ( Mal (unfiltered b	NB. Suite Con ottle required) or	des must be li Dissolved (fi <del>el</del>	sted to attract d filtered bottle re	suite price) quired).	Additional Information
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVA (refer to codes bek	TIVE w/	TOTAL BOTTLES	EA037 (pHF and pHFOX)	EA033 (Chromium suite)							Comments on likely contaminent levels, ditutions, or samples requiring specific QC analysis etc.
21	ВНЗ	0.0	12.07.22	8	BAG/<4 <sup>0</sup> C		1	x								
22	внз	0.25	12.07.22	s	BAG/<4°C		1	x								
23	внз	0.50	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x				1				
24	внз	0.75	12.07.22	s	BAG/<4°C		1	x								
25	внз	1.00	12.07.22	s	BAG/<4 <sup>0</sup> C		1	x								
26	внз	1.25	12.07.22	5	BAG/<4 <sup>0</sup> C		1	x								
27	внз	1.50	12.07.22	5	BAG/<4 <sup>0</sup> C		1	x								
20	внз	1.75	12.07.22	s	BAG/<4°C		1	x								
											1					
			· · · · · · · · · · · · · · · · · · ·			τοτα	8									
Woter Container Coden:	D = Langenerical Display, N = Nitrie Present	and Blandin: OBC - Niltin Brocopied OBC: S	H = Sodium Hwirovide/Cd Breset	ued: S = Soc	ium Hydrovide Preserved Plastic	AG = Amber	Blass Linnrese	t ved: AP - Airfreinit	t Unntese	erved Plastic	L		-l		-L.	I

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ONC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved; SH = Nitric Preserved Plastic; N = Vitric Preserved Plastic; SH = HCl preserved Plastic; SH = Altrice Preserved Plastic; SH = Altrice Preserved Plastic; SH = HCl pr

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#### CHAIN OF CUSTODY CHAIN OF CUSTODY

ALS Laboratory: please tick -> ALS Laboratory: please tick ->

□ Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph. 02 8724 8555 E, samples.sydney@aisenviro.com □ Newcastle: 5 Rossegum Rd, Warabrook NSW 2304 Ph.02 4968 9435 E: samples.newcastle@alsenviro.com

Brishane: 32 Shand St; Stafford QLD 4053
Pn 07 3243 7222 Examples brisbane@alsenwire.com
 Townsville: 14-15 Desma Ct; Bohle QLD 4818
Ph 07 4796 0600 E; townadlie environmente@elsenwire.com

■ Melbourne: 2-4 Westall Rd, Springvale VIC 3171
 Ph:03 8549 9600 E samples melbourne@alsenviro.com
 ■ Adelaide: 2-1 Burna Rd, Pocraka SA 5095
 Ph: 08 8359 0E adelaide@alsenviro.com

Perth: 10 Hod Way, Malaga WA 6090
Ph: 06 9209 7655 E: samples.perth@alsenviro.com
Launceston; 27 Wellington St, Launceston TAS 7250

Ph. 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	PRECISE ENVIRONMENTAL		TURNAROUND REQUIREMENTS :	Standard TAT (List due date):		FOR LABORATORY, USE ONLY	Circle)
OFFICE:	7/14 FREMANTLE ST, BURLEIGH HEADS 4220		(Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	Non Standard or urgent TAT (List du	e date):	Clistody Seal Intact?	Yes No
PROJECT:	PE3394.22		ALS QUOTE NO .:	BN031/16 v4	COC SEQUENCE NUMBER (Circle)	Free Ice/ frozen ice bricks present upor receipt?	Yes No.
ORDER NUMBER:	PE3394.22				COC; 1 2 3 4 5 6	7 Random Sample Temperature on Rese	pC
PROJECT MANAGER	MANAGER: CHRISBUTLER CON		431 565 210		OF: 1 2 3 4 5 6	7 Other comment	
SAMPLER:	CHRIS BUTLER / SEAN GARDINER	SAMPLER M	OBILE: 0409 827 396	RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
COC emailed to ALS?	? ( YES / NO)	EDD FORMA	T (or default):	CHRIS BUTLER			
Email Reports to: ma	il@preciseenvironmental.com.au			DATE/TIME: Deutee	DATE/TIME:	DATE/TIME:	DATE/TIME:
Mail Invoice to: PO Be	ox 4424. Robina Town Centre 4230			13.07.22 9AM	1		

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

MALS USE ONLY	SAMPLE DETAILS	Water(W)	MATRIX	(: Solid(S)	CONTAINER INFORMATION		ANALYS	SIS REQUIR e Metals are req	ED including	I SUITES (NE	i. Suite Codes m required) or Disso	nust be listed slved (field filts	d to attract suite	price) d).	Additional Information
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EA037 (pHF and pHFOX)	EA033 (Chromium suite)							Comments on likely contaminant levels, dikuliona, or samples requiring specific QC analysis etc.
29	BH4	0.0	12.07.22	s	BAG/<4°C	1	x	x							
30	BH4	0.25	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x								
31	BH4	0.50	12.07.22	s	BAG/<4°C	1	x	x							
SNK	BH4	0.75	12.07.22	s	BAG/<4°C	1	x								
33	BH4	1.00	12.07.22	s	BAG/<4°C	1	x	x							
34	BH4	1.25	12.07.22	s	BAG/<4°C	1	x								
35	BH4	1.50	12.07.22	5	BAG/<4 <sup>0</sup> C	1	x	x							
36	BH4	1.75	12.07.22	s	BAG/<4°C	1	x								
37	BH4	2.00	12.07.22	8	BAG/<4 <sup>0</sup> C	1	x								
38	BH4	2.25	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x	x			-				
	in and a second seco	a statistica da construcción de la construcción de la construcción de la construcción de la construcción de la La construcción de la construcción d			TOTAL	10									

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



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#### CHAIN OF CUSTODY CHAIN OF CUSTODY

ALS Laboratory: please tick 🔿 ALS Laboratory: please tick 🔿

□ Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E.samples.sydney@alsenviro.com Nowcastle: 5 Rosegum Rd, Warabrook NSW 2304
 Ph:02 4968 9433 E.samples.newcastle@alsenviro.com

B Brisbane: 32 Shand St, Slafford QLD 4053 Ph.07 3243 7222 Etsamples.brisbane@alsenviro.com Townsville: 14-15 Desma Ct, Bohle QLD 4818
 Ph:07 4796 0500 E: townsville environmental@alserviro.com D Melbourne 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alservice.com Adelaide: 2-1 Burma Rd. Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com

Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsen.viro.com Launceston: 27 Wellington St. Launceston TAS 7250
 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	PRECISE ENVIRONMENTAL		TURNAROUND REQUIREME	NTS : 🔲 Standard TAT (List due date):		FOR LABORATORY USE ONLY	(Circle)
OFFICE:	7/14 FREMANTLE ST, BURLEIGH HEADS 4220		(Standard TAT may be longer for so e.g., Ultra Trace Organics)	me tests D Non Standard or urgent TAT (List d	lue date):	Custody Seal Intact?	Yes No.
PROJECT:	PE3394.22		ALS QUOTE NO .:	BN031/16 v4	COC SEQUENCE NUMBER {Circle	Freelice / frozen jos bricks protent upo receipt?	Yes No
ORDER NUMBER:	PE3394.22				COC: 1 2 3 4 5 6	7 Randdin Sample Temperature on Rece	ptC
PROJECT MANAGER	R: CHRIS BUTLER	CONTACT: (	431 565 210		OF: 1 2 3 4 5 6	7 Other comment	
SAMPLER:	CHRIS BUTLER / SEAN GARDINER	SAMPLER N	OBILE: 0409 827 396	RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
COC emailed to ALS	? (YES / NO)	EDD FORMA	T (or default):	CHRIS BUTLER			
Email Reports to: ma	ail@preciseenvironmental.com.au			DATE/TIME: Date	DATE/TIME:	DATE/TIME:	DATE/TIME:
Mail Invoice to: PO B	lox 4424. Robina Town Centre 4230			13.07.22 9AM	1		

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALSUSE ONLY	SAMPLE DETAILS	Water(W)	MATRI	X: Solid(S)	CONTAINER INFORMATION	4	ANALY:	SIS REQUIR re Metals are rec	(ED includii quired, specify T	ng SUITES i otal (unfiltered b	NB. Suite Coo attle required) or	les must be lis Dissofved (field	sted to attract su i filtered bottle requi	ite price) ired).	Additional Information
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EA037 (pHF and pHFOX)	EA033 (Chromium suite)							Comments on likely contaminant levels, diutions, or samples requiring specific OC analysis etc.
39	BH5	0.0	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x								:
40	BH5	0.50	12.07.22	BAG/<4 <sup>0</sup> C	1	×									
41	BH5	0.75	12.07.22	s	BAG/<4 <sup>0</sup> C	1	×								
42	BH5	1.00	12.07.22	8	BAG/<4 <sup>0</sup> C	1	×								
43	BH5	1.25	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x								
44	BH5	1.50	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x				-				
43	BH5	1.75	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x								
SNR	BH5	2.00	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x								
SNR	BH5	2.25	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x								
							_								
in president and an and December 2010 - Alexandre					АТОТ	1 9								-	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC, SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AB = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; F = Formaldehyde Preserved Val SG = Sulturic Preserved Val SG = Sulturic Preserved Val SG = Sodium Hydroxide Preserved Val SG = Sodium Hydroxide Preserved Val SG = Sulturic Preserved Plastic; H = HCl pres



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#### CHAIN OF CUSTODY CHAIN OF CUSTODY

ALS Laboratory: please tick -> ALS Laboratory: please tick 🔿 Sydney: 277 Woodpark Rd. Smithfield NSW 2176 Phr 02 8784 8555 Eisamples.sydney@alsenviro.com Newcastle: 5 Rosegum Rd, Warabrook NSW 2304
 Townsville: 14-15 Desma Ct, Bohle QLD 4818

Brisbane: 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E.samples.brisbane@alsenviro.com Ph:02 4968 9433 E:samples.newcastle@alsenviro.com Ph.07 4796 0600 E: townsvtlle.enviro.mentat@alsenviro.com

Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph.03 8549 9600 E: samples.melbcurne@alsenvro.com D Adelaide: 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adeiaide@alsenviro.com

Perth: 10 Hod Way, Malaga WA 6090 Ph: 06 9209 7655 E: samples.perth@elsenviro.com Launceston: 27 Wellington St, Launceston TAS 7250
Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT: OFFICE:	PRECISE ENVIRONMENTAL 7/14 FREMANTLE ST, BURLEIGH I	1EADS 4220	TURNAI (Standard e.g., Ultra	ROUND REQUIREMENTS : TAT may be longer for some tests Trace Organics)	Standard TAT (List	t due date): rgent TAT (List du	ue date):		FOR LAB	IORATORY/USE ON	LEY (Circle) + for the second se
PROJECT:	PE3394.22		ALS QU	OTE NO.: B	IN031/16 v4		COC SEQUEN	CE NUMBER (Circle	) Free ice / t	rozen de bricks present	vipon Yes No
ORDER NUMBER:	PE3394.22						COC: 1 2	3456	7 Random S	ample Temperature on	Receipt
PROJECT MANAGER	; CHRIS BUTLER		CONTACT: 0431 565 2	210			OF: 1 2	3 4 5 6	7 Other.com	ment	
SAMPLER:	CHRIS BUTLER / SEAN GARDINER	1	SAMPLER MOBILE: 04	409 827 396	RELINQUISHED BY:		RECEIVED BY:		RELINQUISHE	D BY:	RECEIVED BY:
COC emailed to ALS7	(YES / NO)	· · · · · · · · · · · · · · · · · · ·	EDD FORMAT (or defa	ault):	CHRIS BUTLER						
Email Reports to: mai	ll@preciseenvironmental.com.au				D_ Butte	DATE/TIME:		DATE/TIME:		DATE/TIME:	
Mail Invoice to: PO Be	ox 4424, Robina Town Centre 4230				13.07.22 9AM	_	<u> </u>				
COMMENTS/SPECIAL	HANDLING/STORAGE OR DISPOSA	L:									
ALS USE ONLY	SAMPLE DETAILS	Water(W)	MATRIX: Solid(S)	CONTAINER IN	FORMATION	ANALYSIS F	EQUIRED including	SUITES (NB. Suite Co (unfiltered bottle required) of	des must be listed to r Dissolved (field filtere	o attract suite price) ad bottle required).	Additional Information
					LLES	HFOX)	1 suite)			-	Comments on likely contaminant levels, d'utions, or samples requiring specific Q( analysis etc.

LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLE	EA037 (pHF and pHF(	EA033 (Chromium su				
48	вне	0.0	12.07.22	s	BAG/<4°C	1	x	x				 
49	вне	0.25	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x				 	 
56	BH6	0.50	12.07.22	s	BAG/<4°C	1	x	x				 
51	BH6	0.75	12.07.22	5	BAG/<4 <sup>0</sup> C	1	х					
52	BH6	1.00	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x	x				 
53	BH6	1.25	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x					 
54	BH6	1.50	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x	x				 
55	BH6	1.75	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x					 
56	BH6	2.00	12.07.22	s	BAG/<4°C	1	x					
57	BH6	2.25	12.07.22	5	BAG/<4 <sup>0</sup> C	1	x					
54	BH6	2.50	12,07.22	s	BAG/<4 <sup>0</sup> C	1	x	x				
59	BH6	2.75	12.07.22	8	BAG/<4°C	1	x	i				 
				a nga Sulah	<b>JATOT</b> .	12						

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AS = Amber Glass Unpreserved; AP - Altreight Unpreserved Plastic; Preserved Plastic; V = VOA Vial Sodium Hydroxide/Cd Preserved Vial SC = Sudiuric Preserved Plastic; AS = Amber Glass Unpreserved; VB = VOA Vial Sodium Hydroxide/Cd Preserved; VB = VOA Vial HCl Preserved; VB = VOA Vial Sodium Hydroxide Preserved Vial SC = Sudiuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Plastic; SF = Sudiuric Preserved Plastic; S = Sodium Hydroxide Preserved Vial SC = Sudiuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Plastic; SF = Sudiuric Preserved Plastic; S = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Storile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.



#### CHAIN OF CUSTODY CHAIN OF CUSTODY

ALS Laboratory: please tick ->

ALS Laboratory: please tick 🚽

Sydney: 277 Woodpark Rd. Smithfield NSW 2176 Pb. 02 8784 8555 E samples.sydney@alsenviro.com Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ph:02 4968 9433 Esamples newcastle@alsenviro.com

Brisbane: 32 Shand St, Stafford QLO 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.erveonmental@alsenviro.com

Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com Adolaide: 2-1 Burma Rd. Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com

D Perth: 10 Hod Way, Malaga WA 6090 Ph. 08 9209 7655 E: samples.perth@alsenviro.com C Launceston: 27 Wellington St. Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	PRECISE ENVIRONMENTAL	TURNAROUND REQUIREMENTS :	Standard TAT (List due date):		FOR LABORATORY/USE ONLY	(Circle)
OFFICE:	7/14 FREMANTLE ST, BURLEIGH HEADS 4220	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	Non Standard or urgent TAT (List du	e date):	Clistody Seal Intacl/2005	L.C. Yes - No
PROJECT:	PE3394.22	ALS QUOTE NO.: B	N031/16 v4	COC SEQUENCE NUMBER (Circle)	Free ice Afrozen ice bricks presentupon receipt?	Yes No
ORDER NUMBER:	PE3394.22			COC: 1 2 3 4 5 6	7 Random Sample Temperature on Rece	pt and the second s
PROJECT MANAGER:	CHRIS BUTLER CONTACT:	0431 565 210		OF: 1 2 3 4 5 6	7 Other comment	
SAMPLER:	CHRIS BUTLER / SEAN GARDINER SAMPLER	MOBILE: 0409 827 396	RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
COC emailed to ALS?	(YES / NO) EDD FORM	AT (or default):	CHRIS BUTLER			
Email Reports to: mail	@preciseenvironmental.com.au		DATE/TIME: Deutle	DATE/TIME:	DATE/TIME:	DATE/TIME:
Mail Invoice to: PO Bo	x 4424, Robina Town Centre 4230		13.07.22 9AM			

#### COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

AUSIUSEIONLY	NIN SAMPLE DETAILS Water(W)		MATRIX: Solid(S)		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 fittered bottle required).						Additional Information	
LAB ID	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EA037 (pHF and pHFOX)	EA033 (Chromium suite)						Comments on likely contaminant leve ditutions, or samples requiring specifi analysis atc.
60	BH7	0.0	12.07.22	5	BAG/<4°C	1	x							
61	BH7	0.25	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x							
62	BH7	0.50	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x							
63	BH7	0.75	12.07.22	5	BAG/<4°C	1	x							
64	BH7	1.00	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x							
65	BH7	1.25	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x							
66	BH7	1.50	12.07.22	s	BAG/<4°C	1	x							
67	BH7	1.75	12.07.22	s	BAG/<4 <sup>0</sup> C	1	x							
					· · · · ·									
					ATOT	8								

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide/Cd Preserved Plastic; AG = Amber Glass: Unpreserved; AP - Aitfreight Unpreserved Plastic; F = Formaldehyde Preserved Vial SG = Suffuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Plastic; SP = Suffuric Preserved Plastic; F = Formaldehyde Preserved Glass; F = Formaldehyde Preserved Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Suffuric Preserved Plastic; F = Formaldehyde Preserved Glass; H = HCl preserved Plastic; HS = HCl preserved; HS = HCl preserve

Z = Zinc Acetate Preserved Bottle: E = EDTA Preserved Bottles: ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soits; B = Unpreserved Bag.



## **CERTIFICATE OF ANALYSIS**

Work Order	EB2220427	Page	: 1 of 15
Client	: PRECISE ENVIRONMENTAL PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MR CHRIS BUTLER	Contact	: Nidhi Bhimani
Address	: PO BOX 4424	Address	: 2 Byth Street Stafford QLD Australia 4053
	ROBINA TOWN CENTRE QLD, AUSTRALIA 4230		
Telephone	:	Telephone	: +61-7-3243 7222
Project	: PE3394.22	Date Samples Received	: 14-Jul-2022 11:35
Order number	: PE3394.22	Date Analysis Commenced	: 18-Jul-2022
C-O-C number	:	Issue Date	: 20-Jul-2022 11:24
Sampler	: CHRIS BUTLER, SEAN GARDINER		HALA NALA
Site	:		
Quote number	: EN/222		Accreditation No. 925
No. of samples received	: 64		Accredited for compliance with
No. of samples analysed	: 64		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



#### **General Comments**

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

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

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

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

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

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

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society. LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- SPLIT WORK ORDER: It should be noted that ALS has split this work order over the following work orders EB2220520 and EB2220427 due to the size of the sample numbers. For any further
  information regarding this processing of samples please contact ALS client services division on ALSEnviro.Brisbane@alsglobal.com
- 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: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 Slight; 2 Moderate; 3 Strong; 4 Extreme
- 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'.
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.

# Page : 3 of 15 Work Order : EB2220427 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH1 0.0	BH1 0.25	BH1 0.50	BH1 0.75	BH1 1.00
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220427-001	EB2220427-002	EB2220427-003	EB2220427-004	EB2220427-005
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit	5.1		5.8		5.7
Titratable Actual Acidity (23F)		2	mole H+ / t	31		4		4
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.05		<0.02		<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S	0.019		0.014		0.014
acidity - Chromium Reducible Sulfur		10	mole H+ / t	12		<10		<10
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5		1.5		1.5
Net Acidity (sulfur units)		0.02	% S	0.07		0.02		0.02
Net Acidity (acidity units)		10	mole H+ / t	43		13		13
Liming Rate		1	kg CaCO3/t	3		<1		<1
Net Acidity excluding ANC (sulfur units)		0.02	% S	0.07		0.02		0.02
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	43		13		13
Liming Rate excluding ANC		1	kg CaCO3/t	3		<1		<1
EA037: Ass Field Screening Analysis								
ØpH (F)		0.1	pH Unit	5.9	6.1	6.0	6.3	6.1
ø pH (Fox)		0.1	pH Unit	2.9	3.1	4.9	5.4	4.8
Ø Reaction Rate		1	-	2	2	1	1	1

# Page : 4 of 15 Work Order : EB2220427 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH1 1.25	BH1 1.50	BH1 1.75	BH1 2.00	BH1 2.25
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220427-006	EB2220427-007	EB2220427-008	EB2220427-009	EB2220427-010
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit		5.4			
Titratable Actual Acidity (23F)		2	mole H+ / t		6			
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S		<0.02			
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S		0.197			
acidity - Chromium Reducible Sulfur		10	mole H+ / t		123			
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-		1.5			
Net Acidity (sulfur units)		0.02	% S		0.21			
Net Acidity (acidity units)		10	mole H+ / t		129			
Liming Rate		1	kg CaCO3/t		10			
Net Acidity excluding ANC (sulfur units)		0.02	% S		0.21			
Net Acidity excluding ANC (acidity units)		10	mole H+ / t		129			
Liming Rate excluding ANC		1	kg CaCO3/t		10			
EA037: Ass Field Screening Analysis								
Ø pH (F)		0.1	pH Unit	5.9	6.1	6.0	6.3	6.3
ø pH (Fox)		0.1	pH Unit	4.5	1.8	1.8	1.8	2.3
Ø Reaction Rate		1	-	1	4	4	4	4

# Page : 5 of 15 Work Order : EB2220427 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH1 2.50	BH1 2.75	BH2 0.0	BH2 0.25	BH2 0.50
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220427-011	EB2220427-012	EB2220427-013	EB2220427-014	EB2220427-015
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit	5.6				
Titratable Actual Acidity (23F)		2	mole H+ / t	4				
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02				
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S	0.194				
acidity - Chromium Reducible Sulfur		10	mole H+ / t	121				
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5				
Net Acidity (sulfur units)		0.02	% S	0.20				
Net Acidity (acidity units)		10	mole H+ / t	125				
Liming Rate		1	kg CaCO3/t	9				
Net Acidity excluding ANC (sulfur units)		0.02	% S	0.20				
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	125				
Liming Rate excluding ANC		1	kg CaCO3/t	9				
EA037: Ass Field Screening Analysis								
Ø pH (F)		0.1	pH Unit	7.4	7.7	6.6	6.6	6.6
ø pH (Fox)		0.1	pH Unit	2.0	3.7	3.3	3.8	5.1
Ø Reaction Rate		1	-	4	2	3	2	1

# Page : 6 of 15 Work Order : EB2220427 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL	Sample ID			BH2	BH2	BH2	BH2	BH2
(Matrix: SOIL)				0.75	1.00	1.25	1.50	1.75
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220427-016	EB2220427-017	EB2220427-018	EB2220427-019	EB2220427-020
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)		0.1	pH Unit	6.3	6.4	6.3	6.1	6.3
Ø pH (Fox)		0.1	pH Unit	4.9	4.3	2.1	1.8	2.1
Ø Reaction Rate		1	-	1	2	4	4	4
# Page : 7 of 15 Work Order : EB2220427 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: <b>SOIL</b> (Matrix: <b>SOIL</b> )			Sample ID	ВН3 0.0	BH3 0.25	BH3 0.50	BH3 0.75	BH3 1.00
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220427-021	EB2220427-022	EB2220427-023	EB2220427-024	EB2220427-025
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)		0.1	pH Unit	6.1	6.2	6.4	6.4	6.3
øpH (Fox)		0.1	pH Unit	2.8	3.6	4.6	5.0	4.2
Ø Reaction Rate		1	-	3	2	2	1	2

# Page : 8 of 15 Work Order : EB2220427 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH3 1.25	BH3 1.50	BH3 1.75	BH4 0.0	BH4 0.25
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220427-026	EB2220427-027	EB2220427-028	EB2220427-029	EB2220427-030
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit				5.4	
Titratable Actual Acidity (23F)		2	mole H+ / t				17	
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S				0.03	
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S				0.039	
acidity - Chromium Reducible Sulfur		10	mole H+ / t				24	
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-				1.5	
Net Acidity (sulfur units)		0.02	% S				0.07	
Net Acidity (acidity units)		10	mole H+ / t				41	
Liming Rate		1	kg CaCO3/t				3	
Net Acidity excluding ANC (sulfur units)		0.02	% S				0.07	
Net Acidity excluding ANC (acidity units)		10	mole H+ / t				41	
Liming Rate excluding ANC		1	kg CaCO3/t				3	
EA037: Ass Field Screening Analysis								
Ø pH (F)		0.1	pH Unit	6.3	6.4	7.1	6.6	6.8
ø pH (Fox)		0.1	pH Unit	1.8	1.8	1.8	2.7	3.2
Ø Reaction Rate		1	-	4	4	4	3	3

# Page : 9 of 15 Work Order : EB2220427 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH4 0.50	BH4 1.00	BH4 1.25	BH4 1.50	BH4 1.75
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220427-031	EB2220427-033	EB2220427-034	EB2220427-035	EB2220427-036
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit	5.8	5.9		5.7	
Titratable Actual Acidity (23F)		2	mole H+ / t	9	2		3	
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02		<0.02	
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S	0.027	0.223		0.187	
acidity - Chromium Reducible Sulfur		10	mole H+ / t	17	139		116	
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5	1.5		1.5	
Net Acidity (sulfur units)		0.02	% S	0.04	0.23		0.19	
Net Acidity (acidity units)		10	mole H+ / t	26	142		120	
Liming Rate		1	kg CaCO3/t	2	11		9	
Net Acidity excluding ANC (sulfur units)		0.02	% S	0.04	0.23		0.19	
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	26	142		120	
Liming Rate excluding ANC		1	kg CaCO3/t	2	11		9	
EA037: Ass Field Screening Analysis								
Ø pH (F)		0.1	pH Unit	7.2	7.2	7.2	7.0	6.9
ø pH (Fox)		0.1	pH Unit	4.1	1.4	1.6	2.0	1.6
Ø Reaction Rate		1	-	2	4	4	4	4

# Page : 10 of 15 Work Order : EB2220427 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL			Sample ID	BH4	BH4	BH5	BH5	BH5
				2.00	2.25	0.0	0.50	0.75
		Sampli	ing date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220427-037	EB2220427-038	EB2220427-039	EB2220427-040	EB2220427-041
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit		6.0			
Titratable Actual Acidity (23F)		2	mole H+ / t		<2			
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S		<0.02			
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S		0.151			
acidity - Chromium Reducible Sulfur		10	mole H+ / t		94			
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-		1.5			
Net Acidity (sulfur units)		0.02	% S		0.15			
Net Acidity (acidity units)		10	mole H+ / t		94			
Liming Rate		1	kg CaCO3/t		7			
Net Acidity excluding ANC (sulfur units)		0.02	% S		0.15			
Net Acidity excluding ANC (acidity units)		10	mole H+ / t		94			
Liming Rate excluding ANC		1	kg CaCO3/t		7			
EA037: Ass Field Screening Analysis								
Ø pH (F)		0.1	pH Unit	6.8	7.4	6.5	6.7	6.4
ø pH (Fox)		0.1	pH Unit	1.9	1.9	4.6	5.3	5.3
Ø Reaction Rate		1	-	4	4	3	1	1

# Page : 11 of 15 Work Order : EB2220427 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH5	BH5	BH5	BH5	BH6
		Sampli	na date / time	12- Jul-2022 00:00				
Common and	CAC Number			EB2220427 042	EB2220427 043	EB2220427 044	EB2220427 045	EB2220427 048
Compound	CAS Number	LON	Unit	ED2220427-042	EB2220427-045	ED2220427-044	EB2220427-045	EB2220427-040
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit					5.3
Titratable Actual Acidity (23F)		2	mole H+ / t					12
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S					<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S					0.022
acidity - Chromium Reducible Sulfur		10	mole H+ / t					14
(a-22B)								
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					26
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					26
Liming Rate excluding ANC		1	kg CaCO3/t					2
EA037: Ass Field Screening Analysis								
Ø pH (F)		0.1	pH Unit	5.6	5.1	5.0	5.4	5.6
ø pH (Fox)		0.1	pH Unit	3.3	1.8	2.0	1.8	2.9
Ø Reaction Rate		1	-	2	4	4	4	3

# Page : 12 of 15 Work Order : EB2220427 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH6 0.25	BH6 0.50	BH6 0.75	BH6 1.00	BH6 1.25
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220427-049	EB2220427-050	EB2220427-051	EB2220427-052	EB2220427-053
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit		4.7		5.2	
Titratable Actual Acidity (23F)		2	mole H+ / t		45		15	
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S		0.07		0.02	
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S		0.027		0.020	
acidity - Chromium Reducible Sulfur		10	mole H+ / t		16		12	
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-		1.5		1.5	
Net Acidity (sulfur units)		0.02	% S		0.10		0.04	
Net Acidity (acidity units)		10	mole H+ / t		61		27	
Liming Rate		1	kg CaCO3/t		5		2	
Net Acidity excluding ANC (sulfur units)		0.02	% S		0.10		0.04	
Net Acidity excluding ANC (acidity units)		10	mole H+ / t		61		27	
Liming Rate excluding ANC		1	kg CaCO3/t		5		2	
EA037: Ass Field Screening Analysis								
Ø pH (F)		0.1	pH Unit	5.7	5.6	5.8	6.1	5.7
ø pH (Fox)		0.1	pH Unit	2.6	2.5	3.1	4.1	3.0
Ø Reaction Rate		1	-	3	3	3	2	2

# Page : 13 of 15 Work Order : EB2220427 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH6 1.50	BH6 1.75	BH6 2.00	BH6 2.25	BH6 2.50
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220427-054	EB2220427-055	EB2220427-056	EB2220427-057	EB2220427-058
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit	5.3				5.4
Titratable Actual Acidity (23F)		2	mole H+ / t	10				8
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	0.141				0.161
acidity - Chromium Reducible Sulfur		10	mole H+ / t	88				100
(a-22B)								
EA033-E: Acid Base Accounting								
ANC Fineness Factor		0.5	-	1.5				1.5
Net Acidity (sulfur units)		0.02	% S	0.16				0.17
Net Acidity (acidity units)		10	mole H+ / t	97				108
Liming Rate		1	kg CaCO3/t	7				8
Net Acidity excluding ANC (sulfur units)		0.02	% S	0.16				0.17
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	97				108
Liming Rate excluding ANC		1	kg CaCO3/t	7				8
EA037: Ass Field Screening Analysis								
Ø pH (F)		0.1	pH Unit	6.0	6.2	6.3	6.3	6.2
ø pH (Fox)		0.1	pH Unit	1.9	1.8	2.0	2.0	2.1
Ø Reaction Rate		1	-	4	4	4	4	4

# Page : 14 of 15 Work Order : EB2220427 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH6	BH7	BH7	BH7	BH7
(				2.75	0.0	0.25	0.50	0.75
	Sampling date / time			12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2220427-059	EB2220427-060	EB2220427-061	EB2220427-062	EB2220427-063
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
ø pH (F)		0.1	pH Unit	5.6	5.4	5.8	5.4	6.0
øpH (Fox)		0.1	pH Unit	1.8	3.5	3.8	4.7	4.6
Ø Reaction Rate		1	-	4	3	2	2	2

# Page : 15 of 15 Work Order : EB2220427 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH7 1.00	BH7 1.25	BH7 1.50	BH7 1.75	
		Sampli	ng date / time	12-Jul-2022 00:00	12-Jul-2022 00:00	12-Jul-2022 00:00	12-Jul-2022 00:00	
Compound	CAS Number	LOR	Unit	EB2220427-064	EB2220427-065	EB2220427-066	EB2220427-067	
				Result	Result	Result	Result	
EA037: Ass Field Screening Analysis								
ø pH (F)		0.1	pH Unit	5.5	5.6	5.9	6.0	
øpH (Fox)		0.1	pH Unit	2.1	1.7	1.8	1.6	
Ø Reaction Rate		1	-	4	4	4	4	



# **QUALITY CONTROL REPORT**

Work Order	: EB2220427	Page	: 1 of 4
Client	PRECISE ENVIRONMENTAL PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MR CHRIS BUTLER	Contact	: Nidhi Bhimani
Address	: PO BOX 4424	Address	: 2 Byth Street Stafford QLD Australia 4053
	ROBINA TOWN CENTRE QLD, AUSTRALIA 4230		
Telephone	:	Telephone	: +61-7-3243 7222
Project	: PE3394.22	Date Samples Received	: 14-Jul-2022
Order number	: PE3394.22	Date Analysis Commenced	: 18-Jul-2022
C-O-C number	:	Issue Date	: 20-Jul-2022
Sampler	: CHRIS BUTLER, SEAN GARDINER		Hac-MRA NATA
Site	:		
Quote number	: EN/222		Accreditation No. 825
No. of samples received	: 64		Accredited for compliance with
No. of samples analysed	: 64		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



### **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.

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 I	Duplicate (DUP) Report		
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA033-A: Actual Ac	idity (QC Lot: 4465208)								
EB2220272-010	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	14	12	17.2	No Limit
		EA033: pH KCI (23A)		0.1	pH Unit	5.2	5.2	0.0	0% - 20%
EB2220427-033	BH4 1.00	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 KCI (23A)		0.1	pH Unit	5.9	5.9	0.0	0% - 20%
EA033-B: Potential	Acidity (QC Lot: 4465208)								
EB2220272-010	Anonymous	EA033: Chromium Reducible Sulfur (22B)		0.005	% S	0.136	0.134	1.4	0% - 20%
		EA033: acidity - Chromium Reducible Sulfur		10	mole H+ / t	85	84	1.4	No Limit
		(a-22B)							
EB2220427-033	BH4 1.00	EA033: Chromium Reducible Sulfur (22B)		0.005	% S	0.223	0.210	6.2	0% - 20%
		EA033: acidity - Chromium Reducible Sulfur		10	mole H+ / t	139	131	6.2	0% - 50%
		(a-22B)							
EA037: Ass Field S	creening Analysis (QC Lo	t: 4461683)							
EB2220427-001	BH1 0.0	EA037: pH (F)		0.1	pH Unit	5.9	6.0	0.0	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	2.9	2.9	0.0	0% - 20%
EB2220427-011	BH1 2.50	EA037: pH (F)		0.1	pH Unit	7.4	7.5	1.3	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	2.0	2.0	0.0	0% - 20%
EA037: Ass Field S	creening Analysis (QC Lo	t: 4461684)							
EB2220427-021	BH3 0.0	EA037: pH (F)		0.1	pH Unit	6.1	6.0	0.0	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	2.8	2.7	0.0	0% - 20%
EB2220427-031	BH4 0.50	EA037: pH (F)		0.1	pH Unit	7.2	7.1	0.0	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	4.1	4.2	0.0	0% - 20%

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Work Order	: EB2220427
Client	: PRECISE ENVIRONMENTAL PTY LTD
Project	: PE3394.22



Sub-Matrix: SOIL						Laboratory D	uplicate (DUP) Report		
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA037: Ass Field Sc	reening Analysis (QC Lot: 4	461685)							
EB2220427-042	BH5 1.00	EA037: pH (F)		0.1	pH Unit	5.6	5.5	2.0	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	3.3	3.4	5.1	0% - 20%
EB2220427-054	BH6 1.50	EA037: pH (F)		0.1	pH Unit	6.0	6.1	2.2	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	1.9	1.9	0.0	0% - 50%
EA037: Ass Field Sc	reening Analysis (QC Lot: 4	461686)							
EB2220427-064	BH7 1.00	EA037: pH (F)		0.1	pH Unit	5.5	5.6	0.0	0% - 20%
		EA037: pH (Fox)		0.1	pH Unit	2.1	2.1	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)	Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Acceptable	e Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EA033-A: Actual Acidity (QCLot: 4465208)									
EA033: pH KCI (23A)			pH Unit		4.4 pH Unit	102	91.0	107	
EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	19 mole H+ / t	88.7	70.0	124	
EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02					
EA033-B: Potential Acidity (QCLot: 4465208)									
EA033: Chromium Reducible Sulfur (22B)		0.005	% S	<0.005	0.246 % S	92.2	77.0	121	
EA033: acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	<10					

## 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.



# QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EB2220427	Page	: 1 of 6
Client		Laboratory	: Environmental Division Brisbane
Contact	: MR CHRIS BUTLER	Telephone	: +61-7-3243 7222
Project	: PE3394.22	Date Samples Received	: 14-Jul-2022
Site	:	Issue Date	: 20-Jul-2022
Sampler	: CHRIS BUTLER, SEAN GARDINER	No. of samples received	: 64
Order number	: PE3394.22	No. of samples analysed	: 64

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.

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

### **Outliers : Analysis Holding Time Compliance**

• NO Analysis Holding Time Outliers exist.

### **Outliers : Frequency of Quality Control Samples**

• <u>NO</u> 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 <u>VOC in soils</u> 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 ; 🗸 = With	n holding time
Method		Sample Date	E	xtraction / Preparation		Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-A: Actual Acidity								
Snap Lock Bag - frozen (EA033)								
BH1 - 0.0,	BH1 - 0.50,	12-Jul-2022	19-Jul-2022	12-Jul-2023	1	19-Jul-2022	17-Oct-2022	✓
BH1 - 1.00,	BH1 - 1.50,							
BH1 - 2.50,	BH4 - 0.0,							
BH4 - 0.50,	BH4 - 1.00,							
BH4 - 1.50,	BH4 - 2.25,							
BH6 - 0.0,	BH6 - 0.50,							
BH6 - 1.00,	BH6 - 1.50,							
BH6 - 2.50								
EA033-B: Potential Acidity								
Snap Lock Bag - frozen (EA033)								
BH1 - 0.0,	BH1 - 0.50,	12-Jul-2022	19-Jul-2022	12-Jul-2023	1	19-Jul-2022	17-Oct-2022	✓
BH1 - 1.00,	BH1 - 1.50,							
BH1 - 2.50,	BH4 - 0.0,							
BH4 - 0.50,	BH4 - 1.00,							
BH4 - 1.50,	BH4 - 2.25,							
BH6 - 0.0,	BH6 - 0.50,							
BH6 - 1.00,	BH6 - 1.50,							
BH6 - 2.50								
EA033-C: Acid Neutralising Capacity								
Snap Lock Bag - frozen (EA033)								
BH1 - 0.0,	BH1 - 0.50,	12-Jul-2022	19-Jul-2022	12-Jul-2023	1	19-Jul-2022	17-Oct-2022	<ul> <li>✓</li> </ul>
BH1 - 1.00,	BH1 - 1.50,							
BH1 - 2.50,	BH4 - 0.0,							
BH4 - 0.50,	BH4 - 1.00,							
BH4 - 1.50,	BH4 - 2.25,							
BH6 - 0.0,	BH6 - 0.50,							
BH6 - 1.00,	BH6 - 1.50,							
BH6 - 2 50								

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Work Order	: EB2220427
Client	: PRECISE ENVIRONMENTAL PTY LTD
Project	; PE3394.22



Matrix: SOIL					Evaluation	: × = Holding time	breach ; 🗸 = Withi	in holding time
Method		Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-D: Retained Acidity								
Snap Lock Bag - frozen (EA033)								
BH1 - 0.0,	BH1 - 0.50,	12-Jul-2022	19-Jul-2022	12-Jul-2023	1	19-Jul-2022	17-Oct-2022	✓
BH1 - 1.00,	BH1 - 1.50,							
BH1 - 2.50,	BH4 - 0.0,							
BH4 - 0.50,	BH4 - 1.00,							
BH4 - 1.50,	BH4 - 2.25,							
BH6 - 0.0,	BH6 - 0.50,							
BH6 - 1.00,	BH6 - 1.50,							
BH6 - 2.50								
EA033-E: Acid Base Accounting								
Snap Lock Bag - frozen (EA033)								
BH1 - 0.0,	BH1 - 0.50,	12-Jul-2022	19-Jul-2022	12-Jul-2023	1	19-Jul-2022	17-Oct-2022	✓
BH1 - 1.00,	BH1 - 1.50,							
BH1 - 2.50,	BH4 - 0.0,							
BH4 - 0.50,	BH4 - 1.00,							
BH4 - 1.50,	BH4 - 2.25,							
BH6 - 0.0,	BH6 - 0.50,							
BH6 - 1.00,	BH6 - 1.50,							
BH6 - 2.50								

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Work Order	: EB2220427
Client	: PRECISE ENVIRONMENTAL PTY LTD
Project	: PE3394.22



Matrix: SOIL					Evaluation	: × = Holding time	breach ; ✓ = Withi	in holding time	2
Method		Sample Date	Ex	traction / Preparation			Analysis		ľ
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA037: Ass Field Screening Analysis									
Snap Lock Bag - frozen (EA037)									
BH1 - 0.0,	BH1 - 0.25,	12-Jul-2022	18-Jul-2022	08-Jan-2023	1	18-Jul-2022	08-Jan-2023	✓	
BH1 - 0.50,	BH1 - 0.75,								
BH1 - 1.00,	BH1 - 1.25,								
BH1 - 1.50,	BH1 - 1.75,								
BH1 - 2.00,	BH1 - 2.25,								
BH1 - 2.50,	BH1 - 2.75,								
BH2 - 0.0,	BH2 - 0.25,								
BH2 - 0.50,	BH2 - 0.75,								
BH2 - 1.00,	BH2 - 1.25,								
BH2 - 1.50,	BH2 - 1.75,								
BH3 - 0.0,	BH3 - 0.25,								
BH3 - 0.50,	BH3 - 0.75,								
BH3 - 1.00,	BH3 - 1.25,								
BH3 - 1.50,	BH3 - 1.75,								
BH4 - 0.0,	BH4 - 0.25,								
BH4 - 0.50,	BH4 - 1.00,								
BH4 - 1.25,	BH4 - 1.50,								
BH4 - 1.75,	BH4 - 2.00,								
BH4 - 2.25,	BH5 - 0.0,								
BH5 - 0.50,	BH5 - 0.75,								
BH5 - 1.00,	BH5 - 1.25,								
BH5 - 1.50,	BH5 - 1.75,								
BH6 - 0.0,	BH6 - 0.25,								
BH6 - 0.50,	BH6 - 0.75,								
BH6 - 1.00,	BH6 - 1.25,								
BH6 - 1.50,	BH6 - 1.75,								
BH6 - 2.00,	BH6 - 2.25,								
BH6 - 2.50,	BH6 - 2.75,								
BH7 - 0.0,	BH7 - 0.25,								
BH7 - 0.50,	BH7 - 0.75,								
BH7 - 1.00,	BH7 - 1.25,								
BH7 - 1 50	BH7 - 1 75								



# **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	n: 🗴 = Quality Co	ntrol frequency n	ot within specification ; $\checkmark$ = Quality Control frequency within specification.	
Quality Control Sample Type		C	Count	Rate (%)			Quality Control Specification	
Analytical Methods	Method	00	Reaular	Actual	Expected	Evaluation		
Laboratory Duplicates (DUP)								
ASS Field Screening Analysis	EA037	7	64	10.94	10.00	✓	NEPM 2013 B3 & ALS QC Standard	
Chromium Suite for Acid Sulphate Soils	EA033	2	20	10.00	10.00	$\checkmark$	NEPM 2013 B3 & ALS QC Standard	
Laboratory Control Samples (LCS)								
Chromium Suite for Acid Sulphate Soils	EA033	1	20	5.00	5.00	$\checkmark$	NEPM 2013 B3 & ALS QC Standard	
Method Blanks (MB)								
Chromium Suite for Acid Sulphate Soils	EA033	1	20	5.00	5.00	$\checkmark$	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
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.
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
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house



# **SAMPLE RECEIPT NOTIFICATION (SRN)**

Work Order	: EB2222068		
Client Contact Address	<ul> <li>PRECISE ENVIRONMENTAL PTY LTD</li> <li>RESULTS &amp; INVOICE</li> <li>PO BOX 4424</li> <li>ROBINA TOWN CENTRE QLD,</li> <li>AUSTRALIA 4230</li> </ul>	Laboratory : Enviro Contact : Nidhi E Address : 2 Byth 4053	nmental Division Brisbane 3himani Street Stafford QLD Australia
E-mail         : mail@preciseenvironmental.com.au           Telephone         : +61 07 5593 7848           Facsimile         : +61 07 5593 7020		E-mail : nidhi.b Telephone : +61-7- Facsimile : +61-7-	himani@alsglobal.com 3243 7222 3243 7218
Project Order number C-O-C number Site Sampler	: PE3394.22 : PE3394.22 : : : CHRIS BUTLER, SEAN GARDINER	Page: 1 of 2Quote number: EB201QC Level: NEPM	9PREENV0003 (BN/031/16 V5) 2013 B3 & ALS QC Standard
Dates Date Samples Receive Client Requested Due Date	d : 25-Jul-2022 15:29 : 04-Aug-2022	Issue Date Scheduled Reporting Date	28-Jul-2022 <b>04-Aug-2022</b>
Delivery Details Mode of Delivery No. of coolers/boxes Receipt Detail	S : Samples On Hand : : REBATCH	Security Seal Temperature No. of samples received / analys	: Not Available : sed : 18 / 18

## **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
- This work order was created to rebatch samples from EB2220427 and EB2220520.
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.
- 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.
- 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 laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.



### Sample Container(s)/Preservation Non-Compliances

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

Soils

#### • 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 A033 M Suite for Acid Sulphate 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 - E Chromiu
EB2222068-001	12-Jul-2022 00:00	BH2 0.0	1
EB2222068-002	12-Jul-2022 00:00	BH3 0.0	1
EB2222068-003	12-Jul-2022 00:00	BH7 0.0	✓
EB2222068-004	12-Jul-2022 00:00	BH8 0.0	✓
EB2222068-005	12-Jul-2022 00:00	BH8 0.25	✓
EB2222068-006	12-Jul-2022 00:00	BH8 0.50	✓
EB2222068-007	12-Jul-2022 00:00	BH9 0.0	✓
EB2222068-008	12-Jul-2022 00:00	BH9 0.50	✓
EB2222068-009	12-Jul-2022 00:00	BH9 1.00	✓
EB2222068-010	12-Jul-2022 00:00	BH9 1.50	✓
EB2222068-011	12-Jul-2022 00:00	BH10 0.0	✓
EB2222068-012	12-Jul-2022 00:00	BH11 0.75	✓
EB2222068-013	12-Jul-2022 00:00	BH12 0.0	✓
EB2222068-014	12-Jul-2022 00:00	BH13 0.0	✓
EB2222068-015	12-Jul-2022 00:00	BH14 0.0	✓
EB2222068-016	12-Jul-2022 00:00	BH14 0.50	✓
EB2222068-017	12-Jul-2022 00:00	BH14 1.00	✓
EB2222068-018	12-Jul-2022 00:00	BH14 1.50	✓

## Proactive Holding Time Report

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

### **Requested Deliverables**

### **RESULTS & INVOICE**

<ul> <li>*AU Certificate of Analysis - NATA (COA)</li> </ul>	Email	mail@preciseenvironmental.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	mail@preciseenvironmental.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	mail@preciseenvironmental.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	mail@preciseenvironmental.com.au
- A4 - AU Tax Invoice (INV)	Email	mail@preciseenvironmental.com.au
- Chain of Custody (CoC) (COC)	Email	mail@preciseenvironmental.com.au
- EDI Format - XTab (XTAB)	Email	mail@preciseenvironmental.com.au

		CHAIN OF CUSTODY ALS Laboratory: please tick →	CHAIN OF CUSTODY ALS Laboratory: please tick →	☐ Sydney, 277 Wood Ph: 02 8754 8555 Exs ☐ Newcastler 5 Rose Ph: 02 4968 9433 Erss	òpark Rd, Smithfik amples,sydney@ ggum Rd, Warabr imples.newcastle	eld NSW 2176 Distance: 32 Shand St. alsenviro.com Ph:07 3243 7222 Esamples ock NSW 2304 Distance: 14-15 Desn Qelsenviro.com Ph:07 4796 6600 E: worswill	Stafford QLD 4053 brisbane@alsenvi a CL Bohle QLD 4 .erwironmentel@alse	ro.com Ph: 1818 I Inviro.com Ph	Melbourne 03 8549 960 Adelaide: 3 08 6359 06	: 2-4 Westall Ro 10 E: samples.n 2-1 Burma Rd, 1 90 E:adelaide@	d, Springvale VIC 3171 elbourne@alsenviro.com Jooraka SA 5095 galsenviro.com	□ Peri Ph: 08 □ Lau Ph: 03	Environm Brisbane <sup>Work Or</sup> EB2	tental Division der Reference 2222068
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FFICE:		7/14 FREMANTLE ST, BURLEIGH	HEADS 4220		e.g., Ultra Tr	ace Organics)	Standard or un	gent TAT (List	due date)	:				
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ROJECT	ANAGER:	CHRIS BUTLER		CONTACT	: 0431 565 21	0			OF:	1 2	3 4 5 6	7 5	Telephone : +1	61-7-3243 7222
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AUSIU	ONLY	SAMPLE DETAILS	⊾. Water(W)	MATE	RIX: Solid(S)	CONTAINER INFORMATIC	N	ANALYSIS	6 REQUIR letals are req	ED including	g SUITES (NB. Suite C	odes must be lister or Dissolved (field filt	d to attract suite price) ered bottle required).	Additional Information
LA	םו	SAMPLE ID	SAMPLE DESCRIPTION	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EA037 (pHF and pHFOX)	EA033 (Chromium suite)					Outments of here y containing the end ditutions, or samples requiring specific analysis etc.
	Ĭ.	BH2	0.0	12.07.22	s	BAG/<4°C	1		x			_		
	2	внз	0.0	12.07.22	5	BAG/<4°C	1		x					
	3	BH7	0.0	12.07.22	s	BAG/<4°C	1		x					
	Ý	BH8	0.0	12.07.22	s	BAG/<4°C	1		x					
	5	BH8	0,25	12.07.22	s	BAG/<4 <sup>0</sup> C	1		x					
	1	BH8	0,50	12.07.22	s	BAG/<4 <sup>0</sup> C	1		x					
	- -	вня	0.0	12,07,22	s	BAG/<4 <sup>0</sup> C	1		x			-		
	×	BH9	0.50	12.07.22	s	BAG/<4°C	1		x					
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Z = Zinc Ace e Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

				·										
	CHAIN OF CUSTOD ALS Leboretory: please tick →	Y CHAIN OF CUSTODY ALS Laboratory: please tick →	☐ Sydney: 277 Woodp Ph: 02 8784 8555 E:sar ☐ Newcastle: 5 Roseg Ph:02 4968 9433 E san	ark Rd, Smithfi npies.sydney@ um Rd. Warabi pies newcastłe	eld NSW 2176 D Brisbane: 3; alsenviro.com Ph.07 3243 7222 ook NSW 2304 D Townsville: @alsenviro.com Ph.07 4795 0500	2 Shand St, Stafford QLD 40 E:samples.brisbane@alser 14-15 Desma Ct, Bohle QLE E: tovnsville.environmental@a	153   Iviro.com   D 4818   Isenviro.com	D Meibou Ph:03 6549 D Adelaid Ph: 08 635	irne: 2-4 Westall 9600 E: sample: de: 2-1 Burma Ro 9 0690 E:adelaid	Rd, Springvale Vi .melbourne@als I, Pooraka SA 509 e@alsenviro.com	IC 3171 enviro.com 95	Perth. 10 Hod W     Ph: 08 9209 7655 E.     Launceston: 27 1     Ph: 03 6331 2159 E     Immune 45 660	ay, Malaga WA 609 samples.perth@als Wellington St, Laun : launceston@alser	0 senvi/o.com ceston TAS 7250 tviro.com
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ECT MANAGER:	CHRIS BUTLER		CONTACT:	0431 565 21	0			0	F: 1 2	34	5 6	7	Gi Kasar	
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# **CERTIFICATE OF ANALYSIS**

Work Order	EB2222068	Page	: 1 of 6	
Client	: PRECISE ENVIRONMENTAL PTY LTD	Laboratory	: Environmental Division Bri	sbane
Contact	: RESULTS & INVOICE	Contact	: Nidhi Bhimani	
Address	: PO BOX 4424	Address	: 2 Byth Street Stafford QLD	) Australia 4053
	ROBINA TOWN CENTRE QLD, AUSTRALIA 4230			
Telephone	: +61 07 5593 7848	Telephone	: +61-7-3243 7222	
Project	: PE3394.22	Date Samples Received	: 25-Jul-2022 15:29	
Order number	: PE3394.22	Date Analysis Commenced	: 03-Aug-2022	
C-O-C number	:	Issue Date	: 03-Aug-2022 15:26	NATA
Sampler	: CHRIS BUTLER, SEAN GARDINER		-	Hac-MRA NAIA
Site	:			
Quote number	: BN/031/16 V5			Appreditation No. 935
No. of samples received	: 18			Accredited for compliance with
No. of samples analysed	: 18			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



#### **General Comments**

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

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- ø = ALS is not NATA accredited for these tests.
- $\sim$  = Indicates an estimated value.
- 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: 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'.

# Page : 3 of 6 Work Order : EB2222068 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH2 0.0	BH3 0.0	BH7 0.0	BH8 0.0	BH8 0.25
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2222068-001	EB2222068-002	EB2222068-003	EB2222068-004	EB2222068-005
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit	4.9	4.5	4.6	4.8	4.7
Titratable Actual Acidity (23F)		2	mole H+ / t	66	128	106	40	44
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.10	0.20	0.17	0.06	0.07
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S	0.013	0.016	0.018	0.014	0.018
acidity - Chromium Reducible Sulfur		10	mole H+ / t	<10	10	11	<10	11
(a-22B)								
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	0.12	0.22	0.19	0.08	0.09
Net Acidity (acidity units)		10	mole H+ / t	74	138	117	49	55
Liming Rate		1	kg CaCO3/t	6	10	9	4	4
Net Acidity excluding ANC (sulfur units)		0.02	% S	0.12	0.22	0.19	0.08	0.09
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	74	138	117	49	55
Liming Rate excluding ANC		1	kg CaCO3/t	6	10	9	4	4

# Page : 4 of 6 Work Order : EB2222068 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH8 0.50	BH9 0.0	BH9 0.50	BH9 1.00	BH9 1.50
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2222068-006	EB2222068-007	EB2222068-008	EB2222068-009	EB2222068-010
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit	5.8	4.6	5.8	5.6	5.2
Titratable Actual Acidity (23F)		2	mole H+ / t	<2	79	<2	3	7
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	0.13	<0.02	<0.02	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S	0.019	0.030	0.015	0.037	0.124
acidity - Chromium Reducible Sulfur		10	mole H+ / t	12	18	<10	23	77
(a-22B)								
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	0.16	<0.02	0.04	0.14
Net Acidity (acidity units)		10	mole H+ / t	12	98	<10	26	84
Liming Rate		1	kg CaCO3/t	<1	7	<1	2	6
Net Acidity excluding ANC (sulfur units)		0.02	% S	<0.02	0.16	<0.02	0.04	0.14
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	12	98	<10	26	84
Liming Rate excluding ANC		1	kg CaCO3/t	<1	7	<1	2	6

# Page : 5 of 6 Work Order : EB2222068 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL			Sample ID	BH10	BH11	BH12	BH13	BH14
(Matrix: SOIL)				0.0	0.75	0.0	0.0	0.0
		Sampli	ng date / time	12-Jul-2022 00:00				
Compound	CAS Number	LOR	Unit	EB2222068-011	EB2222068-012	EB2222068-013	EB2222068-014	EB2222068-015
				Result	Result	Result	Result	Result
EA033-A: Actual Acidity								
pH KCI (23A)		0.1	pH Unit	4.8	4.8	4.6	4.6	4.5
Titratable Actual Acidity (23F)		2	mole H+ / t	42	49	66	87	124
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.07	0.08	0.11	0.14	0.20
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)		0.005	% S	0.023	0.012	0.012	0.015	0.024
acidity - Chromium Reducible Sulfur		10	mole H+ / t	14	<10	<10	<10	15
(a-22B)								
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	0.09	0.09	0.12	0.15	0.22
Net Acidity (acidity units)		10	mole H+ / t	56	57	74	96	138
Liming Rate		1	kg CaCO3/t	4	4	6	7	10
Net Acidity excluding ANC (sulfur units)		0.02	% S	0.09	0.09	0.12	0.15	0.22
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	56	57	74	96	138
Liming Rate excluding ANC		1	kg CaCO3/t	4	4	6	7	10

# Page : 6 of 6 Work Order : EB2222068 Client : PRECISE ENVIRONMENTAL PTY LTD Project : PE3394.22



Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH14 0.50	BH14 1.00	BH14 1.50	 
		Sampli	ng date / time	12-Jul-2022 00:00	12-Jul-2022 00:00	12-Jul-2022 00:00	 
Compound	CAS Number	LOR	Unit	EB2222068-016	68-016 EB2222068-017 EB2222068-018		 
				Result	Result	Result	 
EA033-A: Actual Acidity							
pH KCI (23A)		0.1	pH Unit	5.6	5.3	5.0	 
Titratable Actual Acidity (23F)		2	mole H+ / t	4	7	11	 
sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02	<0.02	<0.02	 
EA033-B: Potential Acidity							
Chromium Reducible Sulfur (22B)		0.005	% S	0.015	0.108	0.094	 
acidity - Chromium Reducible Sulfur		10	mole H+ / t	<10	67	58	 
(a-22B)							
EA033-E: Acid Base Accounting							
ANC Fineness Factor		0.5	-	1.5	1.5	1.5	 
Net Acidity (sulfur units)		0.02	% S	0.02	0.12	0.11	 
Net Acidity (acidity units)		10	mole H+ / t	13	74	69	 
Liming Rate		1	kg CaCO3/t	<1	6	5	 
Net Acidity excluding ANC (sulfur units)		0.02	% S	0.02	0.12	0.11	 
Net Acidity excluding ANC (acidity units)		10	mole H+ / t	13	74	69	 
Liming Rate excluding ANC		1	kg CaCO3/t	<1	6	5	 



# **QUALITY CONTROL REPORT**

Work Order	EB2222068	Page	: 1 of 4
Client	: PRECISE ENVIRONMENTAL PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: RESULTS & INVOICE	Contact	: Nidhi Bhimani
Address	: PO BOX 4424	Address	: 2 Byth Street Stafford QLD Australia 4053
	ROBINA TOWN CENTRE QLD, AUSTRALIA 4230		
Telephone	: +61 07 5593 7848	Telephone	: +61-7-3243 7222
Project	: PE3394.22	Date Samples Received	: 25-Jul-2022
Order number	: PE3394.22	Date Analysis Commenced	: 03-Aug-2022
C-O-C number	:	Issue Date	: 03-Aug-2022
Sampler	: CHRIS BUTLER, SEAN GARDINER		Hac-MRA NATA
Site	:		
Quote number	: BN/031/16 V5		Accreditation No. 825
No. of samples received	: 18		Accredited for compliance with
No. of samples analysed	: 18		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



#### **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.

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 (%)	
EA033-A: Actual Ac	idity (QC Lot: 4494355)									
EB2221902-001	Anonymous	EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.08	0.08	0.0	No Limit	
		EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	48	47	0.0	0% - 20%	
		EA033: pH KCI (23A)		0.1	pH Unit	4.5	4.5	0.0	0% - 20%	
EB2222060-005	Anonymous	EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	0.03	0.03	0.0	No Limit	
		EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	19	18	0.0	No Limit	
		EA033: pH KCI (23A)		0.1	pH Unit	4.9	4.9	0.0	0% - 20%	
EA033-A: Actual Ac	idity (QC Lot: 4494356)									
EB2222068-010	BH9 1.50	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	7	7	0.0	No Limit	
		EA033: pH KCI (23A)		0.1	pH Unit	5.2	5.2	0.0	0% - 20%	
EB2222247-002	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 KCI (23A)		0.1	pH Unit	7.0	7.0	0.0	0% - 20%	
EA033-B: Potential	Acidity (QC Lot: 4494355)									
EB2221902-001	Anonymous	EA033: Chromium Reducible Sulfur (22B)		0.005	% S	0.033	0.030	7.8	No Limit	
		EA033: acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	20	19	7.8	No Limit	
EB2222060-005	Anonymous	EA033: Chromium Reducible Sulfur (22B)		0.005	% S	0.025	0.024	0.0	No Limit	
		EA033: acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	15	15	0.0	No Limit	
EA033-B: Potential	Acidity (QC Lot: 4494356)									
EB2222068-010	BH9 1.50	EA033: Chromium Reducible Sulfur (22B)		0.005	% S	0.124	0.126	1.3	0% - 20%	
		EA033: acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	77	78	0.0	No Limit	

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Work Order	EB2222068
Client	: PRECISE ENVIRONMENTAL PTY LTD
Project	: PE3394.22



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report							
Laboratory sample ID	Sample ID Method: Compound CAS Nu		CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)		
EA033-B: Potential Acidity (QC Lot: 4494356) - continued											
EB2222247-002	Anonymous	EA033: Chromium Reducible Sulfur (22B)		0.005	% S	0.025	0.024	0.0	No Limit		
EA033:		EA033: acidity - Chromium Reducible Sulfur		10	mole H+ / t	16	15	0.0	No Limit		
		(a-22B)									



## 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)	Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Acceptable	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EA033-A: Actual Acidity (QCLot: 4494355)									
EA033: pH KCI (23A)			pH Unit		4.4 pH Unit	99.2	91.0	107	
EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	16 mole H+ / t	102	70.0	124	
EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02					
EA033-A: Actual Acidity (QCLot: 4494356)									
EA033: pH KCI (23A)			pH Unit		4.4 pH Unit	99.2	91.0	107	
EA033: Titratable Actual Acidity (23F)		2	mole H+ / t	<2	16 mole H+ / t	98.4	70.0	124	
EA033: sulfidic - Titratable Actual Acidity (s-23F)		0.02	% pyrite S	<0.02					
EA033-B: Potential Acidity (QCLot: 4494355)									
EA033: Chromium Reducible Sulfur (22B)		0.005	% S	<0.005	0.246 % S	92.4	77.0	121	
EA033: acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	<10					
EA033-B: Potential Acidity (QCLot: 4494356)									
EA033: Chromium Reducible Sulfur (22B)		0.005	% S	<0.005	0.246 % S	88.7	77.0	121	
EA033: acidity - Chromium Reducible Sulfur (a-22B)		10	mole H+ / t	<10					

## 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.



# QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EB2222068	Page	: 1 of 5
Client		Laboratory	: Environmental Division Brisbane
Contact	: RESULTS & INVOICE	Telephone	: +61-7-3243 7222
Project	: PE3394.22	Date Samples Received	: 25-Jul-2022
Site	:	Issue Date	: 03-Aug-2022
Sampler	: CHRIS BUTLER, SEAN GARDINER	No. of samples received	: 18
Order number	: PE3394.22	No. of samples analysed	: 18

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.

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

### **Outliers : Analysis Holding Time Compliance**

• <u>NO</u> Analysis Holding Time Outliers exist.

### **Outliers : Frequency of Quality Control Samples**

• <u>NO</u> 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 <u>VOC in soils</u> 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 <u>or</u> 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	
EA033-A: Actual Acidity									
80* dried soil (EA033)									
BH2 - 0.0,	BH3 - 0.0,	12-Jul-2022	03-Aug-2022	12-Jul-2023	1	03-Aug-2022	01-Nov-2022	<ul> <li>✓</li> </ul>	
BH7 - 0.0,	BH8 - 0.0,								
BH8 - 0.25,	BH8 - 0.50,								
BH9 - 0.0,	BH9 - 0.50,								
BH9 - 1.00,	BH9 - 1.50,								
BH10 - 0.0,	BH11 - 0.75,								
BH12 - 0.0,	BH13 - 0.0,								
BH14 - 0.0,	BH14 - 0.50,								
BH14 - 1.00,	BH14 - 1.50								
EA033-B: Potential Acidity									
80* dried soil (EA033)									
BH2 - 0.0,	BH3 - 0.0,	12-Jul-2022	03-Aug-2022	12-Jul-2023	1	03-Aug-2022	01-Nov-2022	✓	
BH7 - 0.0,	BH8 - 0.0,								
BH8 - 0.25,	BH8 - 0.50,								
BH9 - 0.0,	BH9 - 0.50,								
BH9 - 1.00,	BH9 - 1.50,								
BH10 - 0.0,	BH11 - 0.75,								
BH12 - 0.0,	BH13 - 0.0,								
BH14 - 0.0,	BH14 - 0.50,								
BH14 - 1.00,	BH14 - 1.50								

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Work Order	EB2222068
Client	: PRECISE ENVIRONMENTAL PTY LTD
Project	; PE3394.22



Matrix: SOIL				Evaluation: × = Holding time breach ; ✓ = Within holding tim						
Method Container / Client Sample ID(s)		Sample Date	Ex	traction / Preparation		Analysis				
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation		
EA033-C: Acid Neutralising Capacity										
80* dried soil (EA033)										
BH2 - 0.0,	BH3 - 0.0,	12-Jul-2022	03-Aug-2022	12-Jul-2023	1	03-Aug-2022	01-Nov-2022	✓		
BH7 - 0.0,	BH8 - 0.0,									
BH8 - 0.25,	BH8 - 0.50,									
BH9 - 0.0,	BH9 - 0.50,									
BH9 - 1.00,	BH9 - 1.50,									
BH10 - 0.0,	BH11 - 0.75,									
BH12 - 0.0,	BH13 - 0.0,									
BH14 - 0.0,	BH14 - 0.50,									
BH14 - 1.00,	BH14 - 1.50									
EA033-D: Retained Acidity										
80* dried soil (EA033)										
BH2 - 0.0,	BH3 - 0.0,	12-Jul-2022	03-Aug-2022	12-Jul-2023	1	03-Aug-2022	01-Nov-2022	✓		
BH7 - 0.0,	BH8 - 0.0,									
BH8 - 0.25,	BH8 - 0.50,									
BH9 - 0.0,	BH9 - 0.50,									
BH9 - 1.00,	BH9 - 1.50,									
BH10 - 0.0,	BH11 - 0.75,									
BH12 - 0.0,	BH13 - 0.0,									
BH14 - 0.0,	BH14 - 0.50,									
BH14 - 1.00,	BH14 - 1.50									
EA033-E: Acid Base Accounting										
80* dried soil (EA033)										
BH2 - 0.0,	BH3 - 0.0,	12-Jul-2022	03-Aug-2022	12-Jul-2023	1	03-Aug-2022	01-Nov-2022	✓		
BH7 - 0.0,	BH8 - 0.0,									
BH8 - 0.25,	BH8 - 0.50,									
BH9 - 0.0,	BH9 - 0.50,									
BH9 - 1.00,	BH9 - 1.50,									
BH10 - 0.0,	BH11 - 0.75,									
BH12 - 0.0,	BH13 - 0.0,									
BH14 - 0.0,	BH14 - 0.50,									
BH14 - 1.00,	BH14 - 1.50									


## **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	n: 🗴 = Quality Co	ntrol frequency n	ot within specification ; $\checkmark$ = Quality Control frequency within specification.
Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Chromium Suite for Acid Sulphate Soils	EA033	4	32	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Chromium Suite for Acid Sulphate Soils	EA033	2	32	6.25	5.00	$\checkmark$	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chromium Suite for Acid Sulphate Soils	EA033	2	32	6.25	5.00	$\checkmark$	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
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.
Preparation Methods	Method	Matrix	Method Descriptions
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house

#### APPENDIX G – CROSS SECTION SCHEMATICS

E



Figure 1. Schematic cross-section of a treatment pad, including a compacted clay layer, guard layer, leachate collection system and containment with bunding (Source: Soil Management Guidelines, DNRM, 2002).



Figure 2. Cross-section of typical catch drain (Source: IE Aust, 1996).



Figure 3. Cross-section of typical sediment fence (Source: IE Aust, 1996).

APPENDIX H – NSW WASTE CLASSIFICATION GUIDELINES



# Waste classification guidelines Part 4: Acid sulfate soils



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#### Published by:

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Email: info@environment.nsw.gov.au Website: www.epa.nsw.gov.au

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November 2014

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Actual acid sulfate soils	2
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Classifying wastes into groups that pose similar risks to the environment and human health facilitates their management and appropriate disposal. It is the responsibility of those who generate waste to classify that waste. To assist waste generators classify the wastes they produce, the EPA has developed the *Waste Classification Guidelines* ('the Guidelines') which are a step-by-step process for classifying waste.

Generators and waste facilities must carefully follow the procedures in these Guidelines to ensure they comply with applicable laws in classifying their waste and safeguard protection of the environment and human health.

The Guidelines are comprised of the following sections, of which this document is Part 4:

Overview of the Guidelines

Part 1: Classifying waste

Part 2: Immobilisation of waste

Part 3: Waste containing radioactive material

Part 4: Acid sulfate soils

All sections of the Guidelines are available for download from the EPA website at <u>www.epa.nsw.gov.au/waste/classification.htm</u>.

# Introduction

Acid sulfate soils (ASS) are those naturally occurring sediments and soils which contain sulfides, mainly iron sulfide and iron disulfide or their precursors. Exposure of these sulfides in the soil to oxygen – often as a result of drainage or excavation – can produce sulfuric acid, which may have a significant impact on the environment. Leaching of sulfuric acid into waterways can cause serious water quality problems, resulting in fish kills and damage to infrastructure, such as floodgates and bridges.

ASS are most commonly found in NSW along the coast and they need to be managed appropriately to avoid major environmental damage.

The NSW *Acid Sulfate Soils Manual*<sup>1</sup> (the ASS Manual) provides 'best practice' guidance for planning, assessing and managing activities in areas prone to developing ASS. The manual is available from the NSW Department of Planning: phone 1300 305 695.

## Using this part of the Guidelines

This part of the EPA Waste Classification Guidelines (the Guidelines) applies to acid sulfate soils which are unable to be managed on-site. In these cases, off-site disposal to landfill is often the most appropriate management option.

Waste generators need to assess the status of ASS at their point of generation, using the techniques outlined in the ASS Manual. The ASS Manual also provides guidance for on-site management, while this part of the Waste Classification Guidelines details disposal requirements for ASS that need to be transported and managed off-site.

This document has advice on dealing with both 'potential' ASS and 'actual' ASS. The two types are often found together in the same soil profile, with actual ASS generally overlying potential ASS horizons.

# Potential acid sulfate soils

Potential ASS are soils that contain iron sulfides or sulfidic materials that have not been exposed to air and thus are not oxidised. The pH of these soils in their undisturbed state is 5.5 or more, making them neutral or slightly alkaline. If not managed appropriately, potential ASS pose a considerable environmental risk: disturbance and exposure to air may render them severely acidic.

## Handling potential acid sulfate soils prior to disposal

Potential ASS must be kept wet at all times during excavation and subsequent handling, transport and storage, until they can be disposed of safely. They must be received at the proposed disposal point within 16 hours of being dug up.

<sup>&</sup>lt;sup>1</sup> Stone Y, Ahem, CR and Blunden, B 1998. *Acid Sulphate Soils Manual 1998*. Acid Sulphate Soils Management Advisory Committee (ASSMAC), Wollongbar, NSW.

## Disposal of potential acid sulfate soils below the water table

Potential ASS may be disposed of in water below the permanent water table, provided:

- this occurs before they have had a chance to oxidise, i.e. within 24 hours of excavation and
- they meet the definition of 'virgin excavated natural material' (VENM) under the *Protection of the Environment Operations Act 1997*, even though they contain sulfidic ores or soils.

Landfills must be licensed by the EPA to dispose of potential ASS below the water table. EPA's Environment Line has details on facilities able to accept this waste: phone 131 555.

Potential ASS must be disposed of within 8 hours of their receipt at a landfill and kept wet at all times until their burial at least two metres below the lowest historical level of the water table at the disposal site.

Documentation must be provided to the occupier of the landfill for each truckload of potential ASS received, indicating that the soil's excavation, transport and handling have been in accordance with the ASS Manual, thus preventing the generation of acid.

The occupier of the disposal site must also test the pH of each load of soil received immediately prior to its placement under water using the test method(s) in the ASS Manual (Methods 21A and/or 21Af). These details, together with the pH of the soil recorded at the time of its extraction, must be retained by the occupier of the landfill site.

The disposal site's licence will outline what documentation needs to be kept and for how long.

Soil that has dried out, undergone any oxidation of its sulfidic minerals, or which has a pH of less than 5.5 must be treated by neutralisation and disposed of at a landfill that can lawfully accept it (see **Disposal of actual acid sulfate soils** below).

The pH of the water at the landfill into which the potential ASS is placed must not be less than 6.0 at any time. Landfill licence conditions require the occupiers of potential ASS disposal sites to regularly monitor the pH of ground and surface waters at their premises.

## Disposal of potential acid sulfate soils above the water table

Where potential ASS cannot be classified as VENM or a suitable underwater disposal site at a landfill is not available, the soil must be treated in accordance with the neutralising techniques in the ASS Manual. After treatment the soil should be chemically assessed in accordance with Step 5 in Part 1 of the Waste Classification Guidelines, available at <u>www.epa.nsw.gov.au/waste/classification.htm</u>. This will determine whether any other contaminants are present in the material. When the classification has been established, the soil should be disposed of to a landfill that can lawfully accept that class of waste.

# Actual acid sulfate soils

Actual ASS contain highly acidic soil horizons or layers resulting from the aeration of soil materials that are rich in sulfides, primarily iron sulfide. This oxidation produces more hydrogen ions than the sediment is able to neutralise, resulting in soils with a pH of 5.5 or less when measured in dry season conditions. These soils can usually be identified by the presence of pale yellow mottles and coatings of jarosite.

## Treatment of actual acid sulfate soils prior to disposal

Actual ASS must be treated by the generator of the waste before they can be considered for disposal. Treatment should be in accordance with the neutralising techniques outlined in the ASS Manual.

## Disposal of actual acid sulfate soils

Following neutralisation, the generator of the waste must chemically assess the soil in accordance with Step 5 of Part 1 of the Waste Classification Guidelines. This will determine whether there are any other contaminants that may affect how the waste is classified for disposal.

Once classified, the waste must be taken to a landfill licensed to accept that class of waste.

Prior arrangements should be made with the occupier of the landfill to ensure that it is licensed to accept the waste. The landfill should be informed that the actual ASS has been treated in accordance with the neutralising techniques outlined in the ASS Manual and that the waste has also been classified in accordance with Part 1 of the Waste Classification Guidelines.