Preliminary Site Investigation

Lot 1 DP 667217
Lot 1 DP 821976
Lot 9 Section 1A DP 758631
Lot 8 Section 1A DP 758631
48 & 50 River Street
Maclean NSW, 2463
Document Number: 23125
Prepared for: Jesse Mowbray of Nimbus Architecture and Heritage Pty Ltd, on behalf of Clarence Valley Council

Site Assessors
Jeffery Presbury

Report Author
Jeffery Presbury

Internal Review
Lise Bolton

13 Ewing Street, LISMORE
NSW 2480 Australia
Phone: (02) 6621 5123
Fax: (02) 6621 8123
Email: info@ecoteam.com.au
Web: www.ecoteam.com.au

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EXECUTIVE SUMMARY

Project outline –

Ecoteam has been engaged by Jesse Mowbray of Nimbus Architecture and Heritage Pty Ltd, on behalf of Clarence Valley Council to undertake a Preliminary Site Investigation (PSI). The PSI is required for a proposed development project at: Lot 1 DP 667217, Lot 1 DP 821976, Lot 9 Section 1A DP 758631, Lot 8 Section 1A DP 758631, 48 & 50 River Street, Maclean NSW, 2463. The Primary Area of Environmental Concern (AEC) is approximately 0.25 ha and comprises the Maclean Civic Hall, adjoining building, prior garage and grassed areas on 48 River Street, Maclean. The AEC is proposed to be redeveloped to include the new Clarence Valley Cultural and Community Precinct with a tiered auditorium and associated infrastructure. This document provides information to support a development application for the new Clarence Valley Cultural and Community Precinct. The entirety of the AEC is identified for future expansion of the proposed facility, and as such will be assessed for commercial/industrial development.

Scope of works –

The objectives of this investigation are (i) to determine and document whether soil contamination is likely to have occurred from past land usage; (ii) assess the risk to human health; and (iii) determine the need for further investigations. A desktop assessment was undertaken to review and identify the previous zoning of land; the current and previous land use; the surrounding land use; and aerial photographs. Site assessment and soil sampling was conducted by Jeffery Presbury on Wednesday the 5th of April 2023. The site investigation was undertaken to describe the current conditions of the site and to identify contamination indicators. A systematic grid sampling plan was not possible due to site structures, as such a judgmental sampling plan was drafted for the 0.25 ha AEC. 8 subjective samples were collected and analysed individually. A further 2 soil duplicates were also collected, 1 for inter and 1 for intra laboratory analysis, with one rinsate matrix sample collected for quality assurance (QA). All soil samples were analysed for Heavy metals (Arsenic, Cadmium, Chromium (VI), Copper, Lead, Mercury (inorganic), Nickel, and Zinc), Total Recoverable Hydrocarbons (TRH) (C6 to C40), Benzene, toluene, ethylbenzene, xylenes, and Naphthalene (BTEXN) and Polycyclic Aromatic Hydrocarbons (PAH).

Summary of Sampling Results –

The results of the individual soil analyses from this investigation were compared with the Health Investigation Levels (HILs), Ecological Investigation Levels (EILs) Health Screening Levels (HSLs) and Ecological Screening Levels (ESLs) in the Schedule B (1) Guideline on the Investigation Levels for Soil (NEPC, 2013) and for semi-volatile hydrocarbons (F3) and non-volatile hydrocarbons (F4) in Friebel and Nadebaum (2011b) using column D ‘commercial’ and Column C ‘Recreational’.

Laboratory results indicated that BTEXN, was below the limit of reporting (LOR) within all soil samples analysed at the site. Total PAH was detected at Sample Sites 5, 6, and 7 but was below HIL levels. PAH – Benzo(a)pyrene (BaP TEQ) was detected at Sample Sites 5, 6, and 7, below the HILs, but above the ESL guideline. A CSM and further risk assessment has been conducted for potential receptors at the site. The elevated concentration is located in a grassed area used for rare foot traffic along the boundary of the site. This location does not present a risk to ecological receptors at the site. Following proposed development works the AEC will remain stabilised either as concreted areas, gravelled paths, or well grassed and landscaped areas, this reduces risk of migration downstream receptors.

Volatile Hydrocarbons (TRH F1 and F2 (C6-C16)) hydrocarbons and non-volatile hydrocarbons (TRH F4 (C34-C40)) were below to LOR in all samples. Semi-volatile hydrocarbons TRH F3 (C16 to C34) were detected at Sample Sites 3, 6, 7, and 8 (150, 110, 110, and 200 mg/kg, respectively). No hydrocarbons exceeded HSL's, or ESLs for commercial or recreational land use.

Copper concentrations within the 8 soil samples collected during the PSI ranged from 4 mg/kg to 180 mg/kg with an average concentration of 32.2 mg/kg. No samples exceed the HIL D development guideline value of 250,000 mg/kg. Sample 6 contained 180 mg/kg; this exceeds the adopted EIL guideline value of 170 mg/kg. Sample 6 did not exceed 250% (425 mg/kg) of the EIL guideline value. Statistical analysis (Pro UCL) performed on samples taken at the site determined that copper samples analysed had mean lead levels of 32.23 mg/kg, Standard Deviation of 60.05 mg/kg, and a coefficient of variance of 1.864. Copper results followed nonparametric distribution and had a 97.5% Chebyshev (Mean, Sd) UCL of 164.8 mg/kg, which is above the adopted EIL values. Highly sensitive ecological species are not expected to be present at the site. Therefore, potential ecological receptors which may be present within the AEC are unlikely to be affected by copper levels at the site. Following proposed development works the AEC will remain stabilised either as concreted areas, gravelled paths and roadways, or well grassed and landscaped areas, this reduces risk of copper migrating to downstream receptors.

Zinc concentrations within the 8 soil samples collected during the PSI ranged from 31 mg/kg to 700 mg/kg with an average concentration of 175 mg/kg. No samples exceed the HIL D development guideline value of 400,000 mg/kg. Sample 6 contained 700 mg/kg, this exceeds the adopted EIL guideline value of 320 mg/kg, this sample does not exceed 250% (800 mg/kg) of the EIL guideline value. Statistical analysis (Pro UCL) performed on samples taken at the site determined that zinc samples analysed had mean lead levels of 174.5 mg/kg, Standard Deviation of 227.5 mg/kg, and a coefficient of variance of 1.304. Zinc results followed Gamma distribution and had a 95% Adjusted Gamma UCL of 523.9 mg/kg which is above adopted EIL values. Any potential ecological receptors which may be present within the AEC are unlikely to be affected by zinc levels. The AEC will remain stabilised either as concreted areas, gravelled paths and roadways, or well grassed and landscaped areas, this reduces risk of zinc migrating to downstream receptors.

Sampling identified guideline exceedances of adopted HIL limits for lead within one sample. Lead concentrations within the 8 soil samples collected during the PSI ranged from 20 mg/kg to 1,800 mg/kg with an average concentration of 363 mg/kg. Sample 6 contained 1,800 mg/kg this exceeds the adopted Commercial HIL guideline value of 1,500 mg/kg. Sample 6 did not exceed 250% (3,750 mg/kg) of the HIL guideline value. Statistical analysis (Pro UCL) performed on samples taken at the site determined that lead samples analysed had mean lead levels of 363 mg/kg, Standard Deviation of 644.2 mg/kg, and a coefficient of variance of 1.775. Lead results followed nonparametric distribution with a 97.5% Chebyshev (Mean, Sd) UCL of 1,785 mg/kg which is above adopted HIL values. The statistical analysis determined that contamination at the site is above the HIL-D guidelines and the acceptance criteria has not been met.

Conclusions and Recommendations –

PAH - BaP TEQ was present at the site; levels were above the adopted ESL guideline values for commercial land use; however, the site does not represent a high ecological value.

Non-volatile and semi-volatile hydrocarbons are present at the site however, these levels were well below the adopted guideline values. Results identified guideline exceedances of the adopted EILs for copper, and zinc at one sampling location. All other metals were below EIL values. These metals are unlikely to cause concern to the surrounding environment and will not cause harm to future visitors or staff at the site.

Laboratory results indicated guideline exceedance of adopted HIL limits for lead at one sample location, all other analytes were below HIL values. Lead concentrations within soils analysed at the site had a 97.5% Chebyshev (Mean, Sd) UCL of 1,785 mg/kg. Statistical analysis of results concludes that the AEC may present an unacceptable risk and therefore, further sampling is required to determine if contamination is present at the site. If contamination is present, then the site will require remediation or further management.

Given the nature of the proposed development, results of laboratory analysis, and continued commercial land uses across the site, the risk of soil contamination to human health and environmental receptors is deemed low across the site at this time. During the demolition further contamination from analytes may be uncovered under building and sealed surfaces. Once the existing structures have been removed soils are to be assessed under all buildings and sealed surfaces. Any soils removed from the site are to be stockpiled and assessed prior to disposal.

Contents

1. Introduction

1.1. Project Outline

Ecoteam has been engaged by Jesse Mowbray of Nimbus Architecture and Heritage Pty Ltd, on behalf of Clarence Valley Council to undertake a Preliminary Site Investigation (PSI). The PSI is required for a proposed development project at: Lot 1 DP 667217, Lot 1 DP 821976, Lot 9 Section 1A DP 758631, Lot 8 Section 1A DP 758631, 48 & 50 River Street, Maclean NSW, 2463. The Primary Area of Environmental Concern (AEC) is approximately 0.25 ha and comprises the Maclean Civic Hall, adjoining building, prior garage, and grassed areas on 48 River Street, Maclean. The AEC is proposed to be redeveloped to include the new Clarence Valley Cultural and Community Precinct with a tiered auditorium and associated infrastructure. This document provides information to support a development application for the new Clarence Valley Cultural and Community Precinct. The entirety of the AEC is identified for future expansion of the proposed facility, and as such will be assessed for commercial/industrial development.

1.2. Site Identification

The works of the proposal will take place within the AEC in Lots 1 DP 667217, Lot 1 DP 821976, Lot 9 Section 1A DP 758631, Lot 8 Section 1A DP 758631.

Table 1 presents site details. Refer to **Appendix A** for site overview and detailed site plan of the AEC's. Site location of proposal marked in **Figure 1**.

Table 1. Property details.

Feature	Description
Address	48 - 50 River Street, Maclean, NSW, 2463
Plan Number	Lot 1 DP 667217 Lot 1 DP 821976 Lot 9 Section 1A DP 758631 Lot 8 Section 1A DP 758631
Local Government Area	Clarence Valley Council
Property Area	Approx. 2,500 m^2
Current Zoning (CVC LEP 2011)	E1 Local Centre
Investigation Area	AEC approx. 0.25 ha
Proposed Development	Clarence Valley Cultural and Community Precinct (**Appendix B**)

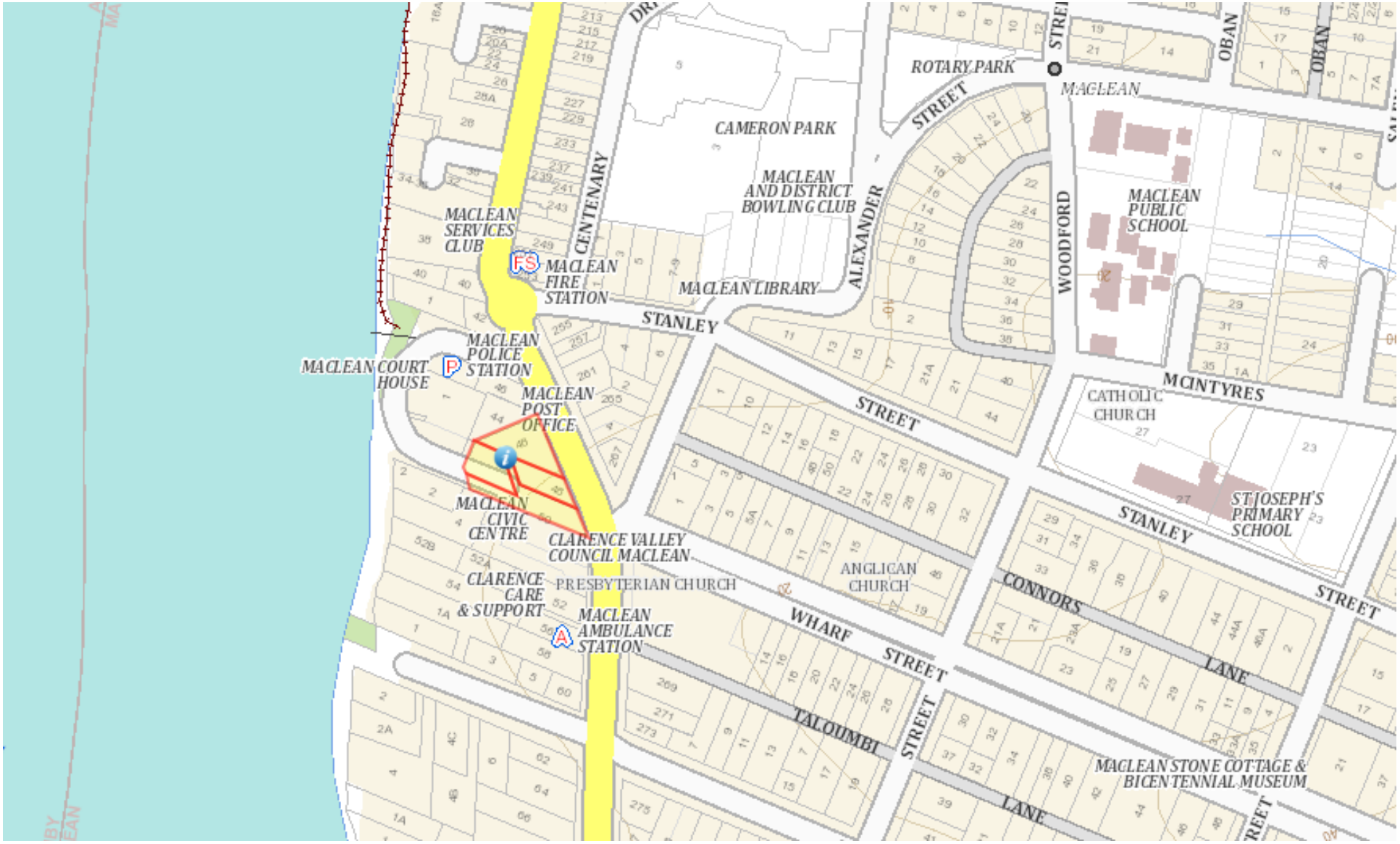

Figure 1. Site location. Property highlighted. Source: Six Maps Online (NSW Spatial Services, NSW Department of finance and Service).

1.3. Scope of Works

The scope of works for this assessment were guided by the CLM Act (1997), SEPP 2021, NSW EPA (2022), NEPC (2013), AS 4482.1 (2005) and AS 4482.2 (1999). This scope of works included:

1. Undertaking a desktop assessment of landscape features and a review of current and historical land use with the aim of identifying potentially contaminating activities that may have occurred in the past;
2. Preparation of a sampling programme to adequately assess whether soil contamination has occurred within the site;
3. A site assessment of the AEC to extract soil samples, assess site condition and flow pathways, and to identify contamination indicators;
4. A site assessment of the broader property area to assess site condition and flow pathways, and to identify contamination indicators;
5. Soil sampling to include one Inter and one Intra lab duplicate.
6. Submission of soil samples to a NATA-accredited laboratory to measure soil contaminant concentration;
7. Ensuring quality control objectives are achieved;
8. Interpretation of laboratory results in accordance with National Environmental Protection Council Guidelines (2013a); and
9. Preparation of a Preliminary Site Investigation (PSI) report.

1.4. Objectives

The objectives of this assessment are to:

1. Identify potential contamination sources and concentrations of contaminants within soil; and
2. Assess the risk posed to human health by identified level of soil contamination.
3. Assess the adequacy of information available and determine the need for further investigations or site remediation.

1.5. Legislative Framework

The following legislative acts and guidelines have been referred to during the investigation and interpretation processes:

- Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC/NHMRC, 1992).
- Australian Standard (AS 4482.1- 2005) Guide to the investigation and sampling of sites with potentially contaminated soil (Part 1).
- Australian Standard (AS 4482.2- 1999) Guide to the sampling and investigation of potentially contaminated soil, Part 2: Volatile substances.
- Consultants Reporting on Contaminated Land – Contaminated Land Guidelines. (NSW EPA, 2020).
- Contaminated Sites: Guidelines for NSW Site Auditor Scheme (DECC NSW, 2006).
- Guidelines for the Assessment of On-site Containment of Contaminated Soil (ANZECC, 1999).
- Guidelines on the Duty to Report Contamination under the *Contaminated Land Management Act 1997* (DECC NSW, 2015).
- National Environmental Protection (Assessment of Site Contamination) Measures 1999 – Amended 2013 (NEPC, 2013).
- State Environmental Planning Policy (Resilience and Hazards) – Chapter 4 Remediation of Land (NSW Legislation 2021).
- *Protection of the Environment Operations Act 1997* (POEO Act), (NSW Government, 1997b).
- Regional Policy for the Management of Contaminated Land (NRRC, 2007).
- Sampling Design Part 1 – Application – Contaminated Land Guidelines. (NSW EPA, 2022).
- Sampling Design Part 2 – Interpretation – Contaminated Land Guidelines. (NSW EPA, 2022).
- Section 105 of the *Contaminated Land Management Act and Regulation 2022* (CLM Act) (NSW Government, 2022a).
- Waste Classification Guidelines – Part 1: Classifying Waste (EPA, NSW, 2014).

2. Site Condition and Surrounding Environment

2.1. Topography, Geology, Soil Landscape & Hydrogeology

Table 2 contains a description of the regional topography, geology, soil landscape and hydrogeology.

Table 2. Topography, geology, soil landscape & hydrogeology.

Feature	Description
Topography (DPIE 2022)	Rolling low hills and hills. Slopes range from 10 - 20%, though steeper areas of 30 - 35% exist. Slope shape is generally waning but can be complex. Local relief is 70 - 150 m and elevation ranges from 50 - 180 m. Characteristic landform elements are hillslopes and hillcrests. Isolated high points are common, as is the occurrence of rocks and boulders. Extensive exposed surficial bedrock usually occurs where the dip direction coincides with slope direction. Slope lengths range from 200 - 500 m; width of crests and ridges is 50 - 200 m. Drainage is erosional, integrated, and tributary.
Geology (DPIE 2022)	Kangaroo Creek Sandstone-quartz sandstone. Soil generally overlies a combination of colluvium, friable, porous sandstone saprolite and fresh rock, often shattered and fragmented at the weathering front
Soil Landscape (DPIE 2022)	Rolling low hills and hills on Kangaroo Creek Sandstone (quartz sandstone). Relief 80 - 150 m; elevation 50 - 180 m; slopes 10 - 20%, with some areas 30 - 35%. Rock outcrop is common. Uncleared, tall to very tall open forest, although previously logged.
Hydrology (DPIE 2022)	The subject property forms part of the Clarence River Basin in the *Clarence-Moreton Bay GWMA*.
Acid Sulphate Soil (ASS) (DPIE 2022)	Site mapped as Class 5 due to nearby Class 2 and 3 ASS.

Table 3 contains landscape features identified during the site investigation and site walkover.

Table 3. Landscape features identified at AEC during site investigation.

Feature	Description
Fill	Potential fill used during initial construction. No obvious signs of imported fill to site.
Visible signs of contamination	No visible signs of contamination.
Vegetation	Grass in exposed areas of the site, with maintained garden beds lined with geo-fab.
Waste materials present	No waste materials present.
Odours	No odours detected.
Buildings and roads	The AEC is currently the location of the Maclean Civic Hall and is located immediately next to sealed roadways.
Surface water quality	No natural surface waters on site.
Springs & wells	There are no groundwater (GW) wells located on the subject property, and 3 GW well located within 500 m of the AEC's, GW304298 located approximately 20 m southwest of the south section of the AEC. GW065622 is located approximately 250 m southeast of the AEC.

Feature	Description
	GW303634 is located approximately 340 m southeast of the AEC. (Sources: water.nsw.gov.au, accessed 28/04/2023). See **Appendix C**.
Flood potential	AEC is above the 1 in 100-year flood, AEC elevation ranges between 4–13 m AHD.
Sensitive environment	The Clarence River is located approximately 50 m west of the AEC's. Residential zoned areas located approximately 20 m southwest of the AEC.

3. Site & Regional History

3.1. Current Land Use

Current land use at the site is commercial and is used as a community facility. The site is the location of the Maclean Civic Hall, and a number of office spaces. The footprint of the AEC covers the entirety of the structure.

3.2. Site Walkover

The site was investigated on Wednesday 5th April 2023 by Jeffery Presbury. The proposed development location was identified on-site. The AEC has a mixture of structures, grassed yards, and garden beds. The AEC is maintained and vegetated by lawn grasses and garden species. Site walk over and soil sampling did not reveal any potential asbestos containing material or other contaminants across the site.

3.3. Dip Sites

No registered dip sites are located on the subject property, two (2) registered dip sites are located within 2 km of the AEC's. *Maclean* dip site located approximately 750 m northeast of the AEC; and *Windmill d*ip site located approximately 1,800 m southeast of the AEC. The topography/relief of the AEC in relation to the dip sites is not conducive to pathways of contamination via drainage and the likelihood of land contamination via dip sites is Low. Refer to **Table 4** for details of the dip sites within 2 km of the site.

Table 4. Dip site locations and details (NSW DPI, www.dpi.nsw.gov.au/agriculture 03/05/2023).

Feature	Description	
Dip Name	*Maclean*	*Windmill*
Distance & orientation to AEC	750 m NE	1,800 m SE
Road	Central Ave & Iona Cl	Brooms Head Road
Status	Remediated	Closed
Lease expiry date	-	-
Dip bath status/content	Covered	Capped
Current Chemicals	None	None
Chemicals used	Arsenic, Arsenic, DDT	Arsenic, Ethion

3.4. Surrounding Land Use

The land use surrounding the AEC to the south and west is a combination of R2 Low Density Residential and E1 Local Centre. To the north is E1 Local Centre, and to the east is R2 Low Density Residential. Further west is W2 Recreational Waterways. **Table 5** presents surrounding land use zoning.

Table 5. Surrounding land use.

Orientation	Land Use
North	E1 Local Centre
South	E1 Local Centre, R2 Low Density Residential
East	R2 Low Density Residential
West	E1 Local Centre, W2 Recreational Waterways

3.5. Previous Titles

A prior Title search was conducted via the NSW Land & Property information website for the subject property, and lots impacted by the proposal. (**Table 6**). The works of the proposal take place withing the entirety of lots 1/667217, 8/1A/758631, and 9/1A/758631. The works also take place on a small section of Lot 1/821976. Detailed history of the site is presented in **Appendix D.**

Table 6. Title search details.

Current title (2023)	1/667217	1/821976	8/1A/758631	9/1A/758631
Previous titles	459-159	CROWN LAND	GZ 23041976 FOL 1801	

3.6. Review of Aerial Photographs

Aerial photographs from 1957 to 2022 were reviewed and summarised to investigate previous land use within the AEC and the surrounding vicinity. **Table 7** contains a summary review of historic aerial photographs for the subject property and surrounding land (See **Appendix E** for historical images).

Table 7. Summary of historic aerial photographs.

Date	Source	Description
19/10/1957	NSW Historical Imagery	**The photograph is black and white and of poor quality.** The civic hall structure is present within the AEC. The majority of surrounding area contains commercial and residential buildings.
14/06/1971	NSW Historical Imagery	**The photograph is black and white and of moderate quality.** The site is largely unchanged.
13/08/1980	NSW Historical Imagery	**The photograph is black and white and of poor quality.** The site is largely unchanged.
14/04/1989	NSW Historical Imagery	**The photograph is black and white and of moderate quality.** The site is largely unchanged.
15/09/1998	NSW Historical Imagery	**The photograph is colour and of high quality** Roadway connection of Wharf St and River St (closed 1992) now separated by the new building (currently Clarence Valley Council, and Service NSW)
02/2011	Google Earth	**The photograph is colour and of High quality.** No Visible Changes.
11/2015	Google Earth	**The photograph is colour and of High quality.** No Visible Changes.
06/2022	Google Earth	**The photograph is colour and of High quality.** No Visible Changes.

3.7. Historical Land Use

Information provided by Clarence Valley Council, and historical searches of the subject has been assessed. Three of the main lots comprising of the AEC for the proposed development site remained visibly unchanged from 1957. A council building was built on lot 1/821976 between 1992, and 1998. Since then, structures at the site have remained relatively unchanged. The AEC appears to have been unchanged.

Historically the subject property has been used as a garage, shop front, council building, and prior roadway (**Appendix D**). Waste contaminants such as BTEXN, PAH, TRH and metals may be present.

Asbestos containing materials was likely used during various stages of development on the site prior to the 1960s, however no asbestos containing material was visually identified during the site assessment across the AEC's. Asbestos assessment and management plan is to be undertaken prior to building demolition.

Chemicals that present the greatest contamination risk were those commonly used in the 1940s to 1980s as structural protection and include pesticides, fungicides, and herbicides. These contain toxic contaminants such as arsenic pentoxide, lead arsenate, cadmium, mercury, organo-chlorines, DDT, dieldrin and organo-phosphates (Schedule 1, NRRC, 2007).

Contaminants of potential concern include metals, and petrochemicals from prior garage as well as pesticides under structures. Due to the previous land use at the property, the likelihood of land contamination within the AEC via past land use is high.

4. Assessment Criteria

The key assessment criteria adopted in the assessment of contamination is the National Environmental Protection (Assessment of Site Contamination) Measure 2013 (NEPC, 2013a). Schedule B1 provides contaminant exposure levels which can be used to assess risk of contamination to human and ecological receptors. Health investigation levels (HILs), Health Screening levels (HSLs), Ecological Screening Levels (ESLs) and Ecological Investigation Levels (EILs) may be adopted from the measure to determine the likely human and ecological health impacts of contamination and any further investigation required.

HILs provide assessment criteria for indicators of risk for direct contact and therefore are important for determining immediate risk. HSLs are applicable to assessing human health risk through inhalation, ingestion or direct contact pathways and are site dependent. EILs and ESLs assess the direct risk to terrestrial ecosystems and are only applicable to the top 2 m of soil. This assessment criteria will be used as a reference to indicate the potential for soil contamination. Management limits identify the need for further investigation but do not imply contamination risk.

4.1. Contaminants of Potential Concern (CoPC)

A site assessment was undertaken to determine the likelihood of CoPC within the AEC. Current land-use indicates there may be potential for contamination within the subject site. Contamination is possible from practices and infrastructure associated with the nearby commercial land uses. Leakages of fuel and oil from vehicles and machinery used on the site or metals and chemicals from other site uses and materials may also be present. Importation of contaminated fill may also have occurred at the site. Soil will be tested for contaminants of potential concern (CoPC) which include:

COPC are:

- Heavy metals including Arsenic, Beryllium, Boron, Cadmium, Chromium (VI), Cobalt, Copper, Lead, Manganese, Mercury (inorganic), Nickel, Selenium and Zinc.
- Total recoverable hydrocarbons (TRH) (C6 to C40).
- Benzene, toluene, ethylbenzene xylenes and Naphthalene (BTEXN).
- Polycyclic aromatic hydrocarbons (PAH).

Under slab COPCs

Organochloride and organophosphate pesticides (OCPs and OCPs) under buildings and sealed surfaces

4.2. Adopted Assessment Criteria

The adopted assessment concentrations in soil for the CoPC identified in **Table 8**. The tables were used to assess the risk to human health and the environment due to soil contamination at the site.

Table 8. Exposure limit assessment criteria using commercial criteria.

Contaminant	HIL Recreational (mg/kg)	HIL Commercial/ Industrial (mg/kg)	(EILs) Urban residential and open public spaces (mg/kg)	(EILs) Commercial/ Industrial (mg/kg)	HSL-Sand Recreational and open space (mg/kg)	HSL-Sand Commercial/ Industrial (mg/kg)	ESL Recreational and open space (mg/kg)	ESL Commercial/ Industrial (mg/kg)
Depth	**N/A**	**N/A**				**0-1 m**		**0-1m**
Arsenic	300	3,000	100	160				
Cadmium	90	900						
Chromium	300	3,600	390	650				
Copper	17,000	240,000	120	170				
Lead	600	1,500	1100	1800				
Mercury (inorganic)	80	730						
Nickel	1200	180	55	90				
Zinc	30,000	400,000	210	320				
TRH F1 (C_6 to C_{10})						260	180	215
TRH F2 (C_{10} to C_{16})							120	170
TRH F3 (C_{16} to C_{34})					5,300	27,000	1,300	2,500
TRH F4 (C_{34} to C_{40})					7,400	28,000	5,600	6,600
Benzene						3	65	95
Toluene							105	135
Ethylbenzene							125	185
Xylene							45	95
Naphthalene							170	370
PAH – BaP TEQ	3	40					0.7	0.7
Total PAH	300	4000						

Notes

- *Space denotes information not available.*
- *HILs, HSLs and ESLs are presented in National Environmental Protection (Assessment of Site Contamination) Measure 2013 (NEPC, 2013). Tables 1A (1), 1(A)3, 1(B)3, 1(B)4, 1(B)6*
- *HSL for TRH F3 and F4 are presented in Friebel and Nadebaum (2011b) Table B4 and are based on direct contact.*

5. Conceptual Site Model

A preliminary Conceptual Site Model (CSM) was prepared to identify pathways and receptors of CoPC within the AEC's. The Primary AEC is defined as a 0.25 ha area which encompasses the proposed building area. **Table 9** shows information on AEC and CoPCs which were tested at the site. **Table 10** presents contamination sources, AEC, activity of concern and CoPC characterisation.

Table 9. AEC, activities of concern and CoPCs

I.D	AEC	Activity of concern	CoPC	Comments
Maclean Civic Hall and adjoining buildings.	Entirety of site including under buildings and sealed surfaces.	Chemicals treatment and metals for pesticide treatment.	TRH, BTEXN, metals, PAH.	Contaminant of metals may be present in the top surface of the soil and directly under sealed surfaces. Metals and pesticides from chemical use may be present under buildings and sealed surfaces.
Prior use as a garage.	Oil and fuel collection and disposal. Areas in proximity to prior garage.	Oil, diesel and leaded fuel storage and dispensing	TRH, BTEXN, metals, PAH.	Contaminant of oil, diesel and leaded fuel and oils. Due to age volatile substances are not likely to be found on the surface.

Table 10. Potential contamination sources and transport mechanisms.

AEC	Primary Sources	Secondary Sources	Transport mechanisms
Maclean Civic Hall and adjoining buildings.	- Historical commercial structures and machinery. -Fill material -Surface spills -Chemical application during laying of the bitumen. Oil, fuel, and chemical spills. -Contaminants from stormwater and runoff (0-0.3m). *Metals and pesticides (organo-chlorines & organo-phosphates) associated with construction chemicals.	-Impacted surface soil (0-0.3m) -Impacted sub-surface soil (0.3m+) -Volatilisation and atmospheric dispersion of dusts and vapours. -Impacted sub-surface soil (0.1m+)	-Soil and contaminant particle movement. -Imported organic material. -Mobile free phase hydrocarbon or chemical migration. -Soil dispersion during alteration and removal of surfaces. -Volatilisation and atmospheric dispersion of dusts and vapours. -Flood/storm migration
Prior use as a garage.	-Leaking vehicles, machinery and storage of disused machinery and containers (>2m) -Commercial structures and machinery. -Fill material -Surface spills -Oil, fuel, and chemical spills. -Contaminants from stormwater and runoff (0-0.3m), Water contamination *Metals and pesticides (organo-chlorines & organo-phosphates) associated with construction chemicals,	-Impacted surface soil (0-0.3m) -Impacted sub-surface soil (0.3m+) -Volatilisation and atmospheric dispersion of dusts and vapours. -Impacted sub-surface soil (0.1m+) -Impacted surface water	-Soil and contaminant particle movement. -Imported organic material. -Mobile free phase hydrocarbon or chemical migration. -Soil dispersion during alteration and removal of surfaces. -Volatilisation and atmospheric dispersion of dusts and vapours -Flood/storm migration

5.1. Sensitive Receptors and Pathways

The area of investigation is within a location used for commercial activities in close proximity to facility buildings, access roads, and carparks used for commercial purposes. The site will be developed as the Clarence Valley Cultural and Community Precinct (**Appendix B**), which will be a commercial use and some level of outdoor recreational use. Based on the level of soil contact within the AEC, the proposed facility will be assessed as land use scenario D "Commercial". This land use provides contaminant levels which assume mostly sealed surfaces. The remainder of the site which is planned for open space recreational activities will be assessed a land use scenario C 'Recreational'.

5.2. Sensitive receptors

Future sensitive receptors have been identified at the site:

- Future construction personnel during excavation work;
- Future workers at the site;
- Visitors to the site;
- Existing and future commercial facilities located on subject property and in proximity to proposal; and
- Ecological receptors in proximity to the site.

5.3. Potential exposure pathways

Contamination has been identified as being potentially present in soil within the AEC due to past activities. The main CoPC have been identified as TRH, BTEXN, PAH, and metals. OCP and OPP may be present under slabs, however testing will be required following demolition. Exposure pathways of these contaminants in soil include direct contact, inhalation of vapours and ingestion of soil particles through dust or eating of soil. **Table 11** provides a risk assessment of potential exposure pathways for receptors at the site.

Table 11. Receptor and pathway risk assessment**.**

Source	Pathway		Risk
Contamination from historical and current land use	**Human health**	Ingestion of soil and inhalation of dust particles.	Moderate risk. Soil particles may be directly ingested. Risk is high for construction workers due to extensive earthworks and settling times associated with construction. Inhalation exposure associated with particulates are considered of less significance than direct ingestion of soil.
		Ingestion of contaminated water	Minor risk. Maclean has a reticulated water mains supply. Based on this it is considered unlikely that drinking water will present a risk.
		Inhalation/Vapour intrusion	Minor risk. Volatile contaminates may be present from past land use. Given time period since installation of existing infrastructure, the majority of semi-volatile chemicals would not be present.
		Dermal absorption	Minor risk. Dermal absorption of chemicals is low.
	Ecological	Direct uptake from ecological receptors	Minor risk. Ecological areas exist towards the west of the AEC. Contamination is unlikely to spread to these ecological receptors.

6. Sampling, Analysis and Quality Plan

A Sampling, Analysis and Quality Plan (SAQP) has been developed for the site using the Data Quality Objectives (DQO). DQO are defined using a 7-step planning approach which provides type, quality and quantity of data required to assess the environmental condition of the site. This process defines the project requirements (NEPM 2013, Schedule B2, AS 4482.1 2005, AS 4482.2- 1999, NSW EPA 2022a and b).

The 7 steps include:

1. **State the problem**
2. **Identify the decision**
3. **Identify inputs to the decision**
4. **Define boundaries of the study**
5. **Develop a decision rule**
6. **Specify acceptable limits on decision errors**
7. **Optimise the design for obtaining data**

6.1. State the problem

The AEC identified within the site needs to be confirmed as not presenting a risk to human health or the environment. Concentrations of contaminants may be present above naturally occurring levels from past land use practices. These contaminants pose a threat to the health of construction staff, future staff, and visitors. Contaminant levels above the HIL and HSL-D (Commercial) within the building development area or HIL and HSL-C (Recreational) within the open space recreational areas require management or remediation. Evidence is required to confirm each site does not pose an unacceptable risk to human health or the environment and that the site is suitable for its intended use.

6.2. Identify the decision

Soil sampling and analysis will be undertaken to confirm the presence or absence of contaminants within the AECs. Soil sampling analysis results are required to be below the acceptable limits for HIL, HSL, EIL, and ESLs to confirm whether the site is suitable for its intended use. If contamination is identified, then the extent will be assessed to provide management and remediation actions.

6.3. Identify inputs into the decision

Inputs into the decision include:

- The historical/background site information listed in **Section 3;**
- Guideline documents listed in **Section 1**;
- Data collected during field assessments and observations of site conditions;
- Outcomes of QA/QC assessment made in **Section 8**; and
- Results from the soil sampling measure against assessment criteria in **Table 8**.

6.4. Define boundaries of the study

The investigation boundaries will be defined as Lots 1/667217, 1/821976, 9/1A/758631, 8/1A/758631. The AEC in which soil sampling will be conducted has been identified as a 0.25 ha area containing the northern portion of Lot 1/821976, and the entirety of lots 1/667217,

9/1A/758631, 8/1A/758631. Refer to **Appendix A** for locations. Surface sampling will be used to detect contamination hotspots and determine the horizontal extent of any contamination.

6.5. Develop a decision rule

Data obtained from laboratory analysis and field assessment will be assessed against the adopted exposure risk assessment criteria (**Table 8**). Laboratory data will be accepted if it has passed the QA/QC assessment (**Section 8**).

Decision Rules

- If soil contaminant concentrations are below the adopted assessment criteria, then soil contamination exposure risk is considered acceptable.
- Sites with soil contaminant concentrations exceeding exposure limit assessment criteria (**Table 8**) will be considered to be contaminated.
- Soil management and/or remediation will be required to reduce exposure risk where soil contamination is unacceptable.

6.6. Specify acceptable limits on decision errors

Decision errors may occur when sampling programs do not adequately detect the variability of a contaminant across the site. Measurement errors occur due to deficient collection and analysis of data.

Two types of decision errors are:

- Deciding that soil contamination on the site poses an acceptable risk for the intended land use when it does not; and
- Deciding that contamination on the site poses an unacceptable risk for the intended land use when it does not.

This assessment aimed to conclude with a 95% probability that analysis of field and soil sampling results in AEC do not present an unacceptable risk and that risk is not assumed unless a 90% probability is applied to that decision.

Soil was assessed against the following points which will quantify tolerable limits on decision errors:

- No individual soil sample result shall have a concentration that exceeds 250% of the criterion;
- Comparison of the 95% upper confidence limit of the arithmetic mean concentration (95% UCL values) of each contaminant to the nominated site criterion;
- A normal distribution will only be applied if the coefficient of variance is not greater than 1.2; and
- The standard deviation of a sample population should not exceed 50% of the nominated criteria.

Assessment and analytical methods used in the assessment were based on qualified and experienced staff using QA and QC procedures. Sampling QA and QC can be found in

Section 8 of this document. Data Quality Indicators (DQI) are listed in **Tables 14, 15, 16 and 17**.

6.7. Optimise the design for obtaining data

The data optimisation was achieved by the following guidelines:

- NEPM (2013)
- NSW EPA (2022a and b)
- AS 4482.1 (2005)
- AS 2282.2 (1999)

Sample methodology and rationale has been documented in **Section 7**. Systematic sampling was not possible due to structures on the site and as such judgemental sampling will be undertaken within the AEC's. Data will be optimised by using QA and QC procedures. Sampling QA and QC can be found in **Section 8** of this document. Data quality indicators (DQI) are listed in **Tables 14, 15, 16 and 17**. This includes using NATA accredited laboratories.

7. Sampling Methodology

7.1. Sampling & Analysis Rationale

Soil sampling occurred across the AEC which have a history of past contamination activities to assess if the site is suitable for the proposed development. The sampling regime was based on the requirements of NSW EPA (2022) and AS4482.1-2005 and AS 4482.2- 1999. Using a systematic grid sampling pattern was not possible due to site structures and as such a judgemental sampling plan was developed, in direct reference to ***Procedure A – Number of sampling points required for hot spot detection*** (NSW EPA, 1995). Refer to **Tables 12, and 13** for details on the sampling regime for the AEC.

Table 12. Details on the sampling regime primary AEC.

Feature	Description
Primary AEC Land area (m^2)	2,500.0 m^2
Minimum number of sampling points required (NSW EPA, 2022)	2,500 m^2 = 8
Sampling points employed	8
Sample point interval (grid size) (m)	N/A
Hotspot diameter (m)	14.4 m
Confidence level	95%

7.2. Sampling Design

Within the primary AEC, soil surface sampling of 0 – 0.15 m was undertaken at 8 locations (samples 1 – 8). Samples 3, and 4 were taken within the proposed recreational land use all other samples were taken within proposed commercial/industrial areas. Samples were taken with maximum spacing. Soil sampling was undertaken by Jeffery Presbury on Wednesday the 05th of April 2023. Weather conditions at the time were sunny and minor rain prior to assessment. **Appendix F** contains the sampling methodology. Site photographs are presented in **Appendix G**. **Appendix H** contains a summary of results and **Appendix I** contains signed chain-of-custody forms acknowledging receipt date and time, and identity of samples. **Appendix J** contains consultant insurances.

A systematic grid sampling plan was not possible at the site due to structures, as such a judgemental sampling plan was drafted for the 0.25 ha AEC. 8 grid sub-samples were collected and analysed individually. A further 2 soil duplicates were also collected, 1 for inter and 1 for intra laboratory analysis, with one rinsate matrix sample collected for Quality Assurance (QA). See **Table 13** for sample details.

Table 13. Sample details.

Sample zone	Sample description	No. of samples	Analysis	Sample ID
2,500 m^2 AEC	Judgemental Plan	8	Metals, TRH, BTEXN, PAH	1 - 8
AEC's	Duplicates	2	Metals, TRH, BTEXN, PAH	1X, 2X

8. Investigation QA/QC Evaluation

Tables 14, 15, 16 and 17 present summaries of the field and laboratory investigation QA/QC evaluation and include Data Quality Indicators (DQI) required to be achieved to ensure quality of data.

Table 14. Investigation DQIs.

Precision	Precision is measured by the reproducibility of the data under different conditions. The laboratory results and sampling techniques will be assessing the Relative Percent Difference (RPD) of duplicate samples (**Table 17**).
Accuracy	Accuracy assesses any bias in the analysis techniques. The laboratory data compared to the QA/QC presented in **Tables 16 and 17.**
Representativeness	Representativeness ensures that sample data represents the characteristics of the environmental condition. Samples will be collected on a representative bases by collecting and adequate number of samples in each location to characterize the site correctly (**Table 15**).
Comparability	Comparability expresses the confidence of each data set. Consistent technique will be used to collect samples and analyse samples (**Tables 15, 16 and 17**).
Completeness	Completeness defines the percentage of measurements taken which are considered valid. The validation sampling design and collection methods will ensure sufficient data is collected (**Table 15**).
Sensitivity	Sensitivity expressed the appropriateness of the laboratory assessment. The LOR will be compared to the adopted criteria (**Table 8**).

Table 15. Investigation Field QA/ QC program.

Criteria	Objectives/DQI	References	Evaluation/ Comments
Historical evaluation/ desktop study	Determine past and present land use activities that present contamination risk.	Aerial photographs, and communication with owner.	Objective achieved.
Soil Sampling Design	Soil sampling protocol for site investigation will detect contamination within the AEC. Systematic sampling in AEC.	NSW EPA (2020) NEPC (2013b) Schedule B2 OEH (2011)	Objectives achieved. Systematic sampling not possible due to structures thus judgemental plan used.
Site Assessment	Investigate signs of contamination. Assess potential contaminant pathways. Use qualified and experienced staff. Ensure all QA protocol is followed.	NEPC (2013b) Schedule B2 OEH (2011)	Contamination indicators assessed. Objectives achieved.

Table 16. Investigation Field Sampling QA/ QC program.

Criteria	Objectives/DQI	References	Evaluation/ Comments
QA/QC Soil Sampling Procedure	No cross contamination between samples Decontamination procedure – New disposable gloves used to collect samples; spade decontaminated between each sampling location. Sampling equipment washed with phosphate free detergent and rinsed with distilled water for each sampling location. Rinsate samples taken and analysed. Samples individually stored in clean sampling containers provided by SGS and Envirolab. Ensure the proper recording of sample date, locations, and sampler. Minimise holding times, temporal and operator influences. Samples stored on ice on the day and sent immediately to the laboratory for delivery the following day. Ensure chain-of-custody procedure.	AS 4482.1 (2005). AS 4482.2 (1999).	Objective achieved during sampling.
QA/QC Soil Sampling Procedure	Field inter and intra laboratory duplicates – Divide a single field sample into two separate samples and send half to the main laboratory and half to another laboratory. 2 duplicate samples assessed per 20 samples. Assess precision of the data by calculating the Relative Percent Difference (RPD) using the following formula: $RPD\ (\%) = \frac{Co - Cd}{Co + Cd} \times 200$ Where: Co = Analyte concentration of the original sample Cd = Analyte concentration of the duplicate sample Nominal acceptance criteria of 30% to 50% RPD will be used for field intra laboratory duplicates. This may not always be achieved due to heterogenous soil or fill and/or low analyte concentrations. These factors will be taken into consideration when assessing intra-laboratory duplicates.		Objective achieved for sampling. Duplicates taken and analysed. RPD for multiple samples were above acceptance criteria in some inter and intra lab duplicates due to very low analyte concentrations. Both laboratories' results were often only just above the LOR, showing some differences in analysis methodology. This is still within acceptable levels. RPD values ranged between 0.00 and 163.64.

Table 17. Investigation laboratory QA program.

Criteria	Objectives/DQI	References	Evaluation/ Comments
Testing Accreditation	Maximise data quality by using NATA accredited laboratories.	SGS Sydney (NATA accreditation No. NATA # 2562 Site # 4354. Envirolab Sydney (NATA accreditation No. NATA # 2801 Site # 2894.	Laboratory employs full QA procedures
Laboratory QA/QC	Laboratory duplicates - 1 duplicate sample in every 10 samples are analysed to provide information to ensure analytical precision. Laboratory control sample - A reference sample of known concentration is analysed in the batch to ensure analysis precision. Spiked samples - A field sample is spiked with a known concentration of the analyte of concern to evaluate analytical techniques. Method blanks - An aqueous solution which is free from contamination is added to the reagents and carried through the analysis procedure to ensure no contamination has occurred during the analysis process. Surrogate standard/spikes - Surrogate compounds are spiked into blanks, standards, and samples to evaluate the analysis process.		Laboratory QA results were checked and retained.

8.1. QA/QC Summary

Appropriate QA and QC procedures were carried out during field sampling and laboratory analysis to meet data quality objectives.

9. Results & Interpretation

The results of the soil analyses from this investigation were compared with the HILs, EILs, HSLs and ESLs in the Schedule B(1) Guideline on the Investigation Levels for Soil (NEPC, 2013) and for F3 and F4 hydrocarbons in Friebel and Nadebaum (2011b) using column D 'commercial' and Column C 'Recreational'. The adopted assessment criteria are based on human health and the protection of aquatic ecosystems in Schedule B (1) Guideline on the Investigation Levels for Soil and Groundwater (NEPC 2013a). Analytical results and exceedances are contained in **Appendix H**. Laboratory results and Laboratory Quality Assurance are presented in **Appendix L**.

9.1.1 BTEXN, PAH and TRH

Laboratory results indicated that BTEXN, was below the limit of reporting (LOR) within all soil samples analysed at the site. Total PAH was detected at Sample Sites 5, 6, and 7 but was below HIL levels. PAH – Benzo(a)pyrene (BaP TEQ) was detected at Sample Sites 5, 6, and 7, below the HILs, but above the ESL guideline.

A CSM and further risk assessment has been conducted for potential receptors at the site. The location of elevated BaP TEQ at the site has been mapped in **Appendix A**. The elevated concentration is located in a grassed area used for rare foot traffic along the boundary of the site. This location does not present a risk to ecological receptors at the site. This location is isolated and has very low ecological value due to land use. BaP TEQ exists across the AEC at concentrations averaging around 0.6 mg/kg (**Appendix H**). According to CRC Care (2017), NEPM ESLs are based on older Canadian soil guidelines. According to CRC Care (2017), in the case of urban land, ESLs are likely lower than the HSLs. Furthermore, they recommend 1.4 mg/kg for commercial land use. Earthworms and invertebrates have individual EIL of BaP TEQ ranging from 25.6 mg/kg to 247 mg/kg. Even soil bacteria can tolerate concentrations of up to 293 mg/kg. Following proposed development works the AEC will remain stabilised either as concreted areas, gravelled paths, or well grassed and landscaped areas, this reduces risk of migration downstream receptors.

Volatile Hydrocarbons (TRH F1 and F2 (C6-C16)) hydrocarbons and non-volatile hydrocarbons (TRH F4 (C34-C40)) were below to LOR in all samples. Semi-volatile hydrocarbons TRH F3 (C16 to C34) were detected at Sample Sites 3, 6, 7, and 8 (150, 110, 110, and 200 mg/kg, respectively). No hydrocarbons exceeded HSL's, or ESLs for commercial or recreational land use.

9.1.2 Copper

Copper concentrations within the 8 soil samples collected during the PSI ranged from 4 mg/kg to 180 mg/kg with an average concentration of 32.2 mg/kg. No samples exceed the HIL D development guideline value of 250,000 mg/kg. Sample 6 contained 180 mg/kg; this exceeds the adopted EIL guideline value of 170 mg/kg. Sample 6 did not exceed 250% (425 mg/kg) of the EIL guideline value. Statistical analysis using Pro UCL (**Appendix K**) performed on samples taken at the site determined that copper samples analysed had mean lead levels of 32.23 mg/kg, Standard Deviation of 60.05 mg/kg, and a coefficient of variance of 1.864. Copper results followed nonparametric distribution and had a 97.5% Chebyshev (Mean, Sd) UCL of 164.8 mg/kg, which is above the adopted EIL values.

A CSM and further risk assessment has been conducted for potential receptors at the site. The location of elevated copper at the site has been mapped in **Appendix A**. The elevated concentration is located in a grassed area used for rare foot traffic. This location does not present a risk to ecological receptors at the site. This location is isolated and has very low ecological value due to land use.

Copper exists across the AEC at concentrations averaging around 32.2 mg/kg (**Appendix H**). Further assessment has been made using the USEPA Ecological Soil Screening Levels for Copper (2007) and based on several species which are assumed will be present at the site. Earthworms and invertebrates have individual EIL of copper ranging from 6 mg/kg to 1,732 mg/kg with the majority of species being able to tolerate concentrations well above 200 mg/kg copper. Herbivores and carnivores are well adapted to copper soil levels up to 1,100 mg/kg, 560 mg/kg respectively. Highly sensitive ecological species are not expected to be present at the site. Therefore, potential ecological receptors which may be present within the AEC are unlikely to be affected by copper levels at the site. Following proposed development works the AEC will remain stabilised either as concreted areas, gravelled paths and roadways, or well grassed and landscaped areas, this reduces risk of copper migrating to downstream receptors.

9.1.3 Zinc

Zinc concentrations within the 8 soil samples collected during the PSI ranged from 31 mg/kg to 700 mg/kg with an average concentration of 175 mg/kg. No samples exceed the HIL D development guideline value of 400,000 mg/kg. Sample 6 contained 700 mg/kg, this exceeds the adopted EIL guideline value of 320 mg/kg, this sample does not exceed 250% (800 mg/kg) of the EIL guideline value. Statistical analysis using Pro UCL (**Appendix K**) performed on samples taken at the site determined that zinc samples analysed had mean lead levels of 174.5 mg/kg, Standard Deviation of 227.5 mg/kg, and a coefficient of variance of 1.304. Zinc results followed Gamma distribution and had a 95% Adjusted Gamma UCL of 523.9 mg/kg which is above adopted EIL values.

A CSM and further risk assessment has been conducted for potential receptors at the site. The location of elevated zinc at the site has been mapped in **Appendix A**. The elevated concentration is located in a grassed area used for rare foot traffic. This location does not present a risk to ecological receptors at the site. This location is isolated and has very low future ecological value.

Zinc exists across the AEC at concentrations averaging around 175 mg/kg (**Appendix H**). Further assessment has been made using the USEPA Ecological Soil Screening Levels for Zinc (2007) and based on a number of species which are assumed will be present at the site. Earthworms and invertebrates have individual EIL of zinc ranging from 85 mg/kg to 1,059 mg/kg with the majority of species being able to tolerate concentrations well above 300 mg/kg zinc. Herbivores and carnivores are well adapted to zinc soil levels up to 6,800 mg/kg, 10,000 mg/kg respectively. Any potential ecological receptors which may be present within the AEC are unlikely to be affected by zinc levels. The AEC will remain stabilised either as concreted areas, gravelled paths and roadways, or well grassed and landscaped areas, this reduces risk of zinc migrating to downstream receptors.

9.1.4 Lead

Lead concentrations within the 8 soil samples collected during the PSI ranged from 20 mg/kg to 1,800 mg/kg with an average concentration of 363 mg/kg. Sample 6 contained 1,800 mg/kg;

this exceeds the adopted Commercial HIL guideline value of 1,500 mg/kg. Sample 6 did not exceed 250% (3,750 mg/kg) of the HIL guideline value. Statistical analysis using Pro UCL (**Appendix K**) performed on samples taken at the site determined that lead samples analysed had mean lead levels of 363 mg/kg, Standard Deviation of 644.2 mg/kg, and a coefficient of variance of 1.775. Lead results followed nonparametric distribution with a 97.5% Chebyshev (Mean, Sd) UCL of 1,785 mg/kg which is above adopted HIL D values. The statistical analysis determined that contamination at the site is above the HIL-D guidelines and the acceptance criteria has not been met.

10. Conclusion & Recommendations

Laboratory results indicated that lead was above the HIL for 'Commercial D', all other analytes were below the HILs for 'Commercial D' and 'Recreational C' Development. Semi-volatile hydrocarbons are present at the site however, these levels were well below the adopted guideline values for commercial and recreational land use and low ecological value areas. Results identified guideline exceedances of adopted EIL limits for copper at one sample location and zinc at one sampling location. All other metals were below EIL values. These metals are unlikely to cause concern to the surrounding environment and will not cause harm to future visitors or staff at the site. Results did identify guideline exceedances of adopted ESL limits for PAH - BaP TEQ at one sampling location. All other analytes were below ESL values. These are unlikely to cause concern to the surrounding environment and will not cause harm to future visitors or staff at the site. Given the nature of the proposed development, results of laboratory analysis, and continued commercial and potential recreational land uses across the site, the risk of soil contamination to human health is deemed unacceptable. It is considered that the Investigation Area requires further testing and remediation works in order to be considered suitable for the proposed use. It is recommended that further soil investigation or remediation activities are required for lead contamination within the Investigation Area

Further analysis will be required during demolition to ensure contamination is not present under buildings and sealed surfaces which could not be sampled during this investigation. The garage pit will need to be validated following demolition. This shall involve soil sampling after building and infrastructure removal prior to any earthworks. Stockpile sampling will also be required prior to soil removal from the site.

11. References & Guidelines

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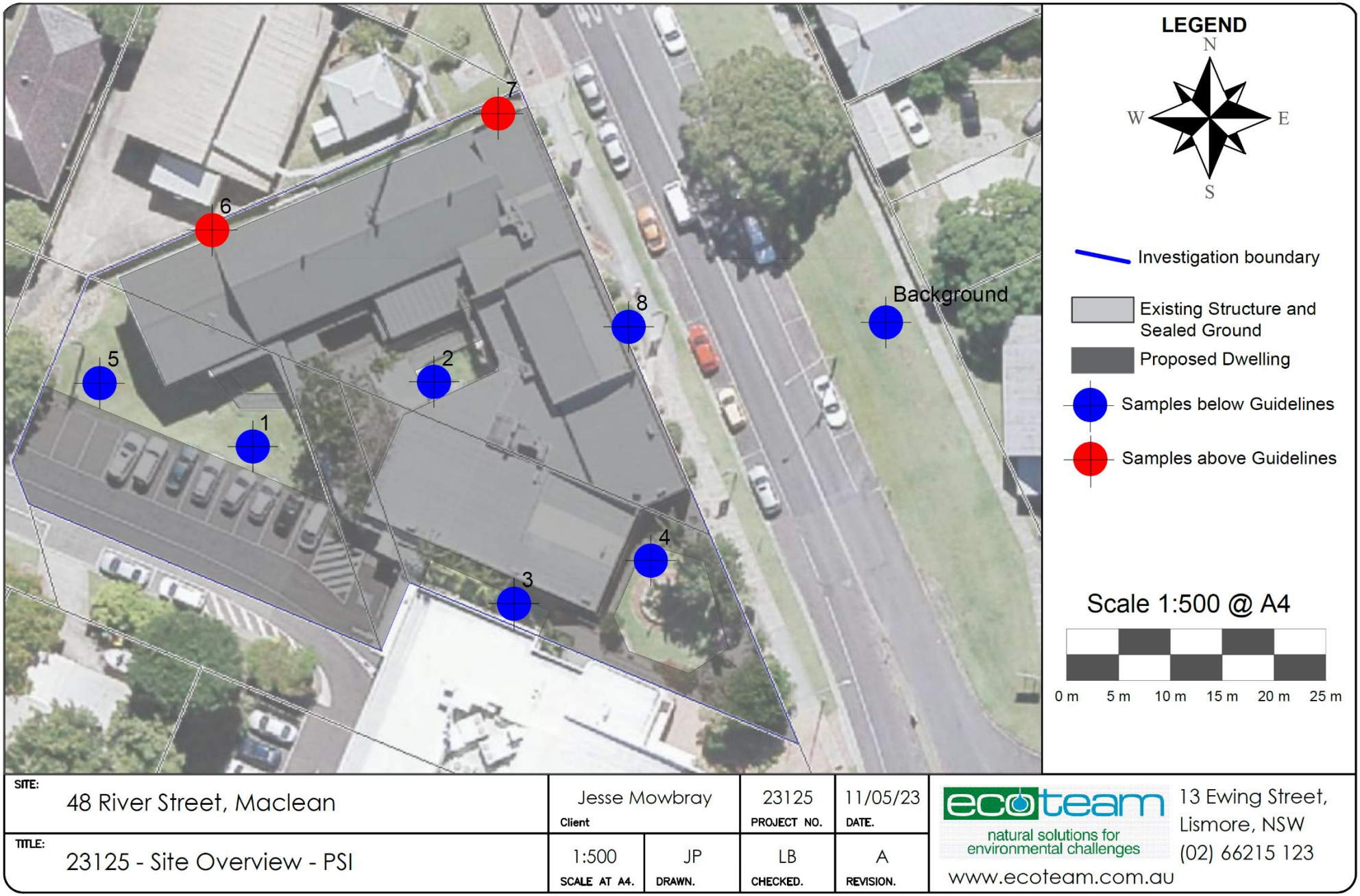
U.S. Environmental Protection Agency Office of Solid Waste and Emergency - Response, (2005). *Ecological Soil Screening Levels for Copper*. Washington DC: United States Environmental Protection Agency.

Appendix A. Site Mapping



SITE: 48 River Street, Maclean	Jesse Mowbray (Client)		23125 (PROJECT NO.)	11/05/23 (DATE.)
TITLE: 23125 - Site Overview - PSI	1:500 (SCALE AT A4.)	JP (DRAWN.)	LB (CHECKED.)	A (REVISION.)

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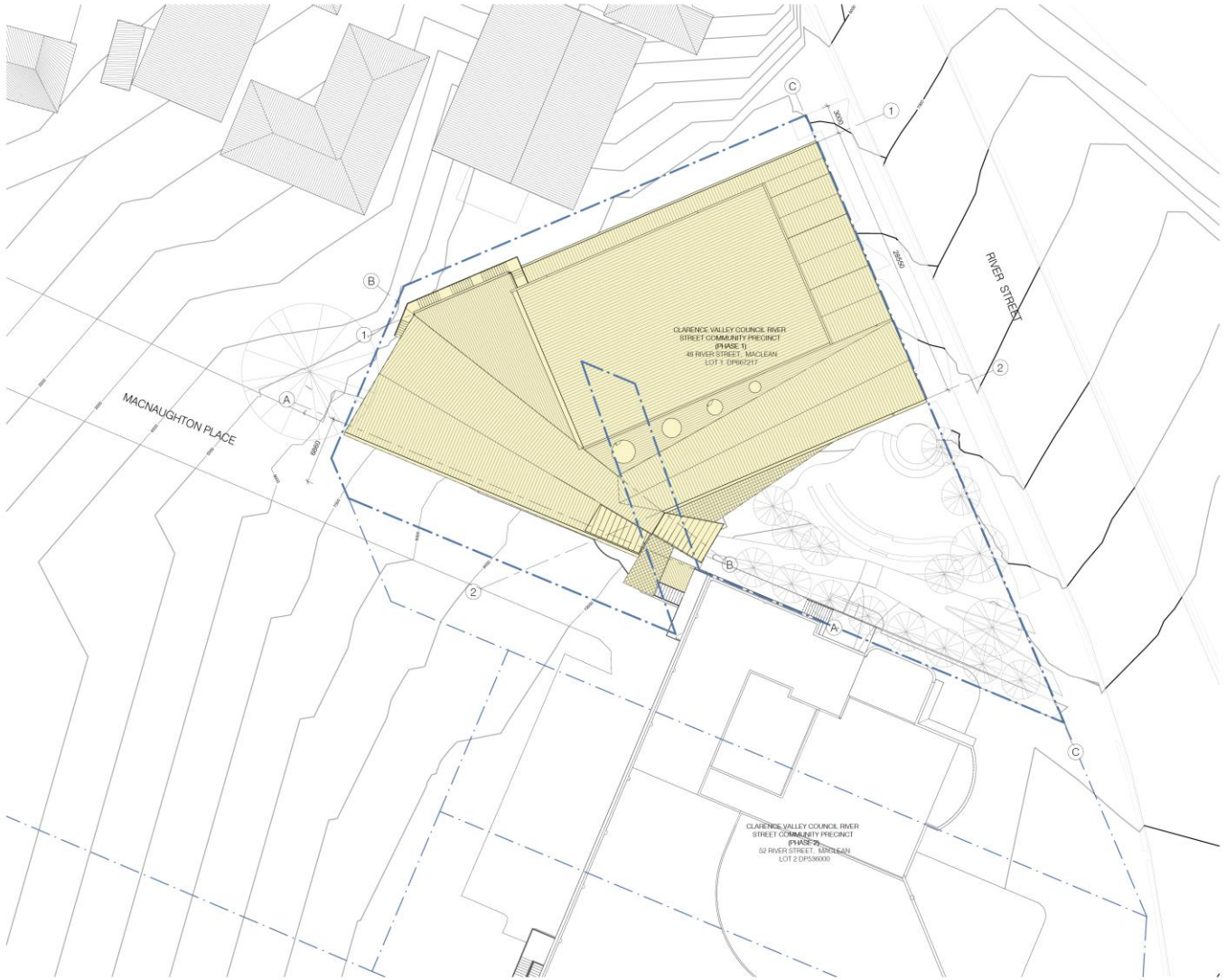
(02) 66215 123

Appendix B. Development Plans



Design Development

River Street Community Precinct
48 River Street, Maclean 2463
For : Clarence Valley Council
Project Status: Design Development

COMPLETE

clarence VALLEY COUNCIL

Rev	Revision Description	Date	Drawn	Reviewed
A	For Information	17.11.22	SS	JM
B	For Information	24.11.22	SS	JM
C	For Information	30.11.22	SS	JM
D	For Information	23.01.23	IN	JM
E	For Information	02.02.23	SS	JM

nimbus architecture + heritage

Nimbus Architecture and Heritage Pty Ltd
Nominated Architect: Jesse Mawdsley (NSWARB 8818, ARBV 20252)
ABN 71 609 345 965
Email admin@nimbusarch.com
Phone +61 2 9801 3564

Scale: 1:100 @A1

Date : 2/02/2023 1:56:56 PM

Site Plan (A1)

Project Number : 2214
Drawing Number : SK-110
Revision : E

Appendix C. Groundwater Well Locations

Appendix D. Historical Records

ABN: 36 092 724 251
Ph: 02 9099 7400
(Ph: 0413 400 020)

Level 14, 135 King Street, Sydney
Sydney 2000
GPO Box 4103 Sydney NSW 2001
DX 967 Sydney

Summary of Owners Report

Address: - 48 River Street Maclean- NSW

Description: - Lot 1 in D.P. 667217, Lots 8 & 9 Section 1 in D.P. 758631 & Part Lot 1 in D.P. 821976

Lot 1 in D.P. 667217

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
25.03.1875 (1875 to 1961)	Alexander Cameron Samuel Bailey Eadow John Wye Weekes Samuel McNaughton	Volume 459 Folio 159
12.01.1961 (1961 to 1961)	Ernest Walton Collins (Garage Proprietor) Henry Gordon McPherson (Storeman) Kelvin Coleman Mackay (Garage Proprietor) (Section 14 Application, not investigated)	Volume 459 Folio 159
12.01.1961 (1961 to Date)	# The Council of the Shire of Maclean Now # Clarence Valley Council	Volume 459 Folio 159 Now 1/667217

# Denotes current registered proprietor

Leases: –

- 06.02.2021 (AQ691900) to Tursa Employment & Training Limited of Sections A, B, C, D, E, F, G, H & I, 48 River Street, Maclean. Expires 30.06.2021.
  - 12.04.2022 (AS36898) Variation – Expiry date now 30.06.2022

Easements: – Nil

Lot 8 Section 1 in D.P. 758631

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
	This part was formerly part of a road that was in existence in or before 1875 known as Wharf Street.	
13.07.1962	Reserve from Sale Reserve No. 83912 for Public Recreation	Government Gazette
23.04.1976 (1976 to Date)	# The Council of the Shire of Maclean Now # Clarence Valley Council	Government Gazette Now 8/1A/758631

# Denotes current registered proprietor

Leases & Easements: – Nil

Email: harrison.byrne@infotrack.com.au 1

ABN: 36 092 724 251
Ph: 02 9099 7400
(Ph: 0413 400 020)

Level 14, 135 King Street, Sydney
Sydney 2000
GPO Box 4103 Sydney NSW 2001
DX 967 Sydney

Lot 9 Section 1 in D.P. 758631

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
	This part was formerly part of a road that was in existence in or before 1875 known as Wharf Street.	
13.07.1962	Reserve from Sale for Public Recreation Reserve No. 83912	Government Gazette
23.04.1976 (1976 to Date)	# The Council of the Shire of Maclean Now # Clarence Valley Council	Government Gazette Now 9/1A/758631

# Denotes current registered proprietor

Leases: –

- 06.02.2021 (AQ691900) to Tursa Employment & Training Limited of Sections A, B, C, D, E, F, G, H & I, 48 River Street, Maclean. Expires 30.06.2021.
    - 12.04.2022 (AS36898) Variation – Expiry date now 30.06.2022

Easements: – Nil

Part Lot 1 in D.P. 821976

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
	This part was formerly part of a road that was in existence in or before 1875 known as Wharf Street.	
1962	This part was formerly part of a lane 22.7 metres wide that was in existence in or before 1962.	
20.03.1992 (1992 to 1992)	The State of New South Wales	Government Gazette Now 1/821976
04.06.1992 (1992 to Date)	# The Council of the Shire of Maclean Now # Clarence Valley Council	1/821976

# Denotes current registered proprietor

Leases & Easements: – Nil

Yours Sincerely
Harrison Byrne
27th April 2023

Email: harrison.byrne@infotrack.com.au 2

A 715 81-03

PAPER No. GF90H395

D.P. 821976

Registered 5H 63.1992

Purpose CROWN TITLE ISSUE

Ref. Map YIB2-2-11*

~~MUN~~/SHIRE ~~CITY~~: MACLEAN

LOCALITY MACLEAN

LAND DISTRICT: GRAFTON

PARISH: TALOUMBI COUNTY: CLARENCE

PLAN OF ROAD PURCHASE APPLICATION BY: THE COUNCIL OF THE SHIRE OF MACLEAN

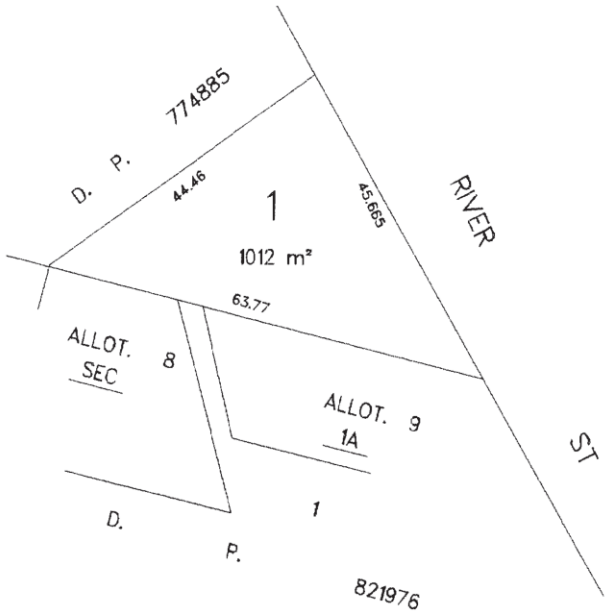
COMPILED FROM INFORMATION SHOWN ON PLAN 22-1840

COMPILED IN THE CROWN LANDS OFFICE REDUCTION RATIO 1:1000 LENGTHS ARE IN METRES

81-71

10 20 30 40 50 60 70 Table of mm 110 120 130 140

This negative is a photograph made as a permanent record of a document in the custody of the Registrar General this day. 10th March 1992



DP 667217

Registered: GP 17.7.1998

Title System: TORRENS

Purpose: DEPARTMENTAL

Ref. Map: Y1832-11

Last Plan: 6.1840

THIS PLAN HAS BEEN CREATED TO PROVIDE A UNIQUE IDENTIFIER TO ENABLE THE ISSUE OF AN AUTOMATED TORRENS TITLE FOR THE LAND COMPRISED IN FOLIO OF THE REGISTER VOLUME 459 FOLIO 159 FORMERLY KNOWN AS 1 ROOD AREA GRANT

Lengths are in metres.
Reduction Ratio : NOT TO SCALE

L.G.A.: MACLEAN

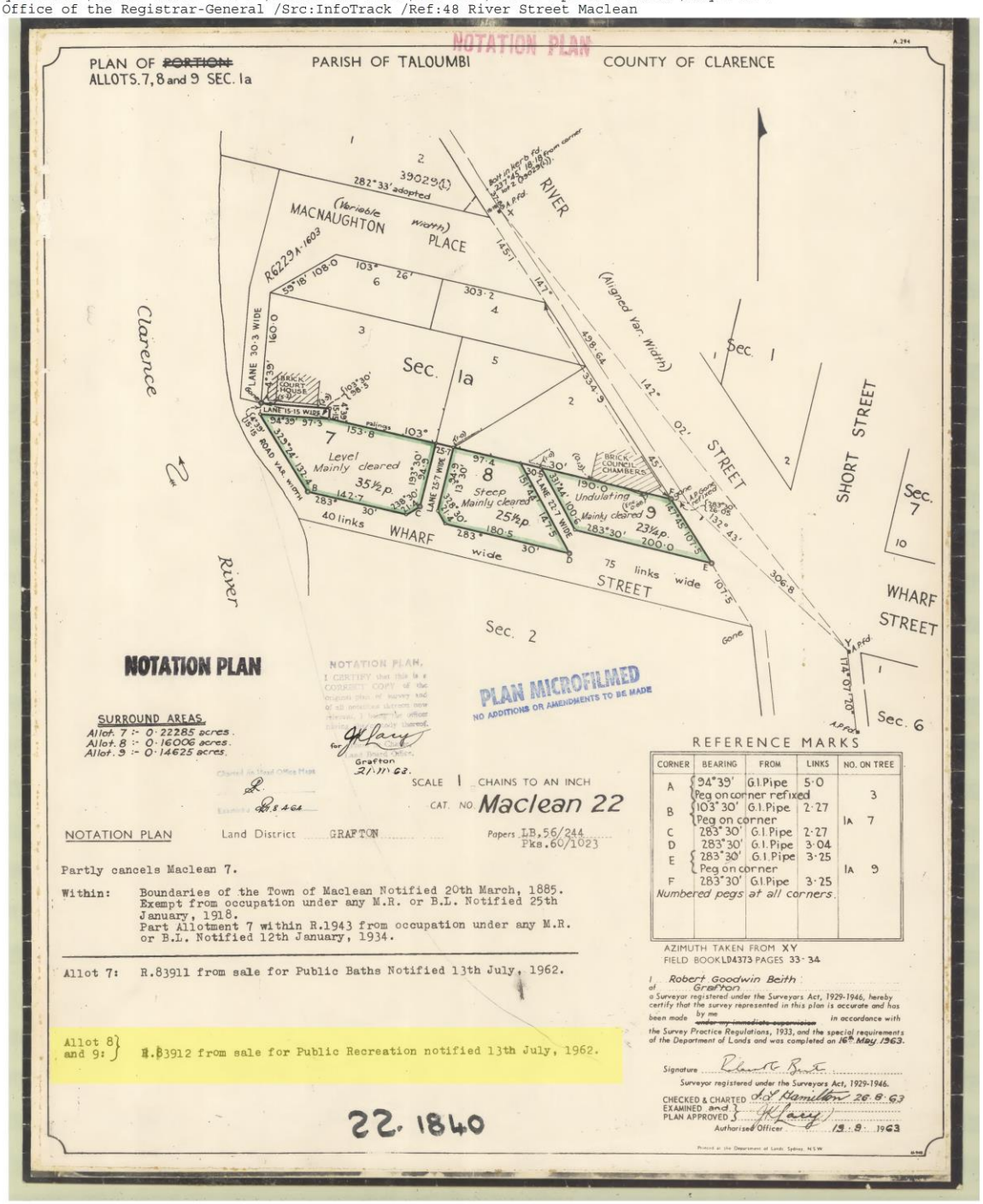
LOCALITY: MACLEAN (3)

PARISH: TALOUMBI

COUNTY: CLARENCE

NO 1 D1 B

G.D.B. ----



LAND DISTRICT—GOULBURN; SHIRE—GUNNING

Road separating portions 29 and 199 from portions 159 and 162, extending easterly, thence southerly from the north-easterly prolongation of the north-western boundary of portion 159 to the north-easterly prolongation of a line parallel to and rectangularly distant 150 links from the easternmost south-eastern boundary of portion 162, suburban lands of the town of Collector, parish Collector, county Argyle. R. 60-1,420.

LAND DISTRICT—HAY; SHIRE—WARADGERY

Road east of portions 13 and 55, parish Benduck South; road 6 chains wide south-east of portions 92 and 93, parish Tongul, county Waradgery. R. 61-1,578.

Public road west of portions 17 and 42, exclusive of the northernmost 1 chain of that road. Parish Illiliwa, county Waradgery. R. 61-472.

LAND DISTRICT—WAGGA WAGGA; SHIRE—LOCKHART

The road, variable width (including public road 1 chain wide) southerly and easterly of portion 25 rendered unnecessary by the new road R. 26,702-1,603, parish Mundawaddery, county Mitchell. R. 59-1,223.

(4242) Sydney, 4th July, 1962.

ALTERATIONS AND LIMITATION NOTICE UNDER THE PROVISIONS OF SECTION 35 (2), PUBLIC ROADS ACT, 1902

I, Lieutenant-General Sir ERIC WINSLOW WOODWARD, Governor of the State of New South Wales, with the advice of the Executive Council, do hereby notify that, in accordance with the provisions of section 35 (2), Public Roads Act, 1902, the notification in the Government Gazette of 7th January, 1938, page 43, relating to the opening of the road of access to the bridge over the Hastings River at Kindee—Developmental Road No. 1,094, parishes Cowangara and Kindee, county Macquarie, as shown on plan catalogued R. 20,092-1,603, is altered and limited by deleting the words "Resumption and dedication are" from the footnote and substituting in lieu thereof the words "Dedication is". R. 35-974.

E. W. WOODWARD, Governor.

K. C. COMPTON, Minister for Lands.

(4853) Sydney, 13th July, 1962.

WITHDRAWAL OF LAND FROM TRAVELLING STOCK RESERVE UNDER THE CONTROL OF PASTURES PROTECTION BOARD

IT is hereby notified that, in pursuance of the provisions of section 42 (2) of the Pastures Protection Act, 1934-1957, the parts of the Travelling Stock Reserve particularised hereunder shall be and the same are hereby withdrawn from such reserve for the purpose stated.

K. C. COMPTON, Minister for Lands.

LAND BOARD DISTRICT—TAMWORTH; PASTURES PROTECTION DISTRICT—TAMWORTH

Parish Johnston, county Pottinger; Reserve No. 31,107, for Travelling Stock. Notified 30th June, 1900. Part withdrawn—about 2 acres 1 rood shown by dark-brown colour on plan R. 25,410-1,603 R. in the Department of Lands, Sydney. Rds. 53-533.

Withdrawn for purpose of public road.

(Placed under control, Gazette, 7th December, 1934.)

(4851) Sydney, 13th July, 1962.

RESERVES FROM SALE

IT is hereby notified that, in pursuance of the provisions of section 28 of the Crown Lands Consolidation Act, 1913, the Crown lands hereunder described shall be reserved from sale for the public purposes hereinafter specified, and they are hereby reserved accordingly.

K. C. COMPTON, Minister for Lands.

FOR PUBLIC SCHOOL PURPOSES

LAND DISTRICT—HILLSTON; SHIRE—CARRATHOOL

No. 83,907 from sale. Parish Bellingerambil South, county Nicholson, 2 acres, being part portion 29 revoked from T.S. and C.R. 60,619 this day. N. 1,943-1,992. P. 62-1,948.

FOR PUBLIC RECREATION

LAND DISTRICT—GLOUCESTER; SHIRE—STROUD

No. 83,908 from sale. Parish Forster, county Gloucester, 1 rood 11¼ perches, being allotment 42, section 3, at Seal Rocks. G. 6,307-1,497. P. 62-1,363.

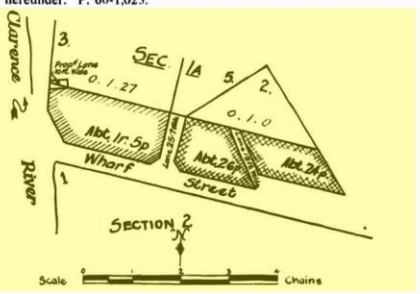
LAND DISTRICT—GRAFTON; SHIRE—MACLEAN

No. 83,912 from sale. Parish Taloumbi, county Clarence, town of Maclean, about 1 rood 10 perches (in two parts) shown by cross hatched edge on diagram hereunder. P. 60-1,023.

FOR PUBLIC BATHS

LAND DISTRICT—GRAFTON; SHIRE—MACLEAN

No. 83,911 from sale. Parish Taloumbi, county Clarence, about 1 rood 5 perches shown by hatched edge on diagram hereunder. P. 60-1,023.



FOR PUBLIC HALL

LAND DISTRICT—GLOUCESTER; SHIRE—STROUD

No. 83,909 from sale. Parish Forster, county Gloucester, 26¼ perches, being allotment 11, section 1, at Seal Rocks. G. 6,303-1,497. P. 62-1,363.

FOR FUTURE PUBLIC REQUIREMENTS

LAND DISTRICT—GLOUCESTER; SHIRE—STROUD

No. 83,910 from sale. Parish Forster, county Gloucester, 1 rood 26 perches, being allotment 43, section 3, at Seal Rocks. G. 6,306-1,497. P. 62-1,363.

LAND DISTRICT—METROPOLITAN; SHIRE—WARRINGAH

No. 83,916 from sale. Parish Narrabeen, county Cumberland, 15 acres 0 roods 29 perches, being portions 209, 210 and 232, C. 8,211-2,030. Ten. 62-2,867.

FOR NIGHT SOIL DEPOT

LAND DISTRICT—BEGA; SHIRE—MUMBULLA

No. 83,913 from sale. Parish Bermaguee, county Dampier, about 4¼ acres, being a strip of land about 3¼ chains wide north of portion 287 and west of the formed road within R. 70,710 for Public Recreation and Resting Place, notified 16th October, 1942. Pks. 62-2,236.

FOR RUBBISH DEPOT

LAND DISTRICT—BEGA; SHIRE—MUMBULLA

No. 83,914 from sale. Parish Bermaguee, county Dampier, 7 acres 1 rood 9 perches, being portion 287. Plan D. 3,667-1,618. P. 62-2,236.

(4852) Sydney, 13th July, 1962.

PROPOSED REVOCATION OF DEDICATION

WHEREAS under section 25 of the Crown Lands Consolidation Act, 1913, it is proposed to revoke land dedicated by the Crown; and whereas I am of opinion that it is expedient in the public interest to revoke the said dedication of the area described hereunder: Now, therefore, notice is hereby given, in accordance with the provisions of the 25th section of the

ADDITION TO RESERVED CROWN LAND

Pursuant to Section 88 of the Crown Lands Act 1989, the Crown land specified in Column 1 of the Schedule hereunder is added to the reserved land specified opposite thereto in Column 2 of the Schedule.

GARRY WEST, M.P.,
Minister for Conservation and Land Management

SCHEDULE

COLUMN 1	COLUMN 2
Land District: Queanbeyan City: Queanbeyan Parish: Queanbeyan County: Murray Lot 1 to 5 inclusive D.P. 727593 Area: 6412 square metres File No.: GB89 H 500 NP	Crown land reserved for the public purpose of Public Recreation by notification in the Gazette of 1st June, 1962, as reserve No. 83835 at Queanbeyan

FORFEITURE OF HOLDING

Pursuant to Part 6, Crown Lands Act 1989, the undermentioned holding is declared to be forfeited, with effect from the date of publication of this notification.

GARRY WEST, M.P.,
Minister for Conservation and Land Management

Land District—Moss Vale; Shire—Wingecarribee

Parish Berrima, County Camden, Special Lease 76752 (1958/9) being lot 455, D.P. 257032 of 54.22 hectares; holders Noel Gordon CROWE and Yvonne Joy CROWE.

GB91 H 395 NP.

GRAFTON OFFICE of
Department of Conservation and Land Management
49 Victoria Street (P.O. Box 11), Grafton, N.S.W. 2460
Phone: (066) 420 547; Fax: (066) 420 556

ERRATUM

ALTERATION NOTICE UNDER SECTION 35 (2) PUBLIC ROADS ACT 1902

Land District-Bellingen; City-Coffs Harbour

The notification appearing in the Government Gazette of 6th March, 1992, Folio 1547, for closing of roads in parish of Moonee, County of Fitzroy, in the name of Kynboy Pty Limited, is hereby altered by the deletion of "lots 1, 2, 4, 5, 6 and 7 D.P. 821966" and insertion of "lots 1, 2, and 4, D.P. 821966 and lots 1, 2 and 3, D.P. 821978" in lieu thereof.

F91 H 461.

GARRY WEST, M.P.,
Minister for Conservation and Land Management.

NOTIFICATION OF CLOSING OF ROADS

In pursuance of the provisions of the Public Roads Act 1902, the roads hereunder specified are closed and the lands comprised therein are freed and discharged from any rights of the public or any person to the same as highways.

GARRY WEST, M.P.,
Minister for Conservation and Land Management

Land District—Bellingen; City—Coffs Harbour

Peter John Estich and Kathleen Faith Estich. Lot 1, D.P. 821960, Parish Bonville, County Raleigh, at Boambee.

GF89 H 38.

Land District—Grafton; Shire—Maclean

The Council of the Shire of Maclean. Lot 1, D.P. 821976, Parish Taloumbi, County Clarence, at Maclean.

GF90 H 395.

Land District—Lismore; Shire—Byron

Selwyn William James and Neil Alexander James. Lot 1, D.P. 821938, Parish Teven, County Rous, at Nashua.

GF91 H 559.

Land District—Murwillumbah; Shire—Byron

Susan Margaret Burlinson. Lot 466, D.P. 821977, Parish Billinudgel, County Rous, at Mullumbimby.

GF91 H 512.

NOTIFICATION OF PROPOSED CLOSING OF ROADS

In pursuance of the provisions of the Public Roads Act 1902, I propose to consider the closing of the roads hereunder described.

All persons interested are hereby called upon to set forth in writing and forward to the officer specified in the notice for the purpose, within one month from the date of publication of this notice, any objections which may appear to them to exist to these proposals.

GARRY WEST, M.P.,
Minister for Conservation and Land Management.

Description

Land District—Grafton; Shire—Maclean

Vicki Denise Gulaptis, Allison Jayne Smith, Esmae Jean Daniel and Bronwen Ruth Munday. The part of Rawdon Street separating allotments 7, 8 and 9, Section 63 from

Appendix E. Historic Imagery

Historical imagery of the site. Site location marked in red circle.

Plate A (19/10/1957) Aerial View: Spatial viewer.

Plate B (14/06/1971) Aerial View: Spatial viewer.

Plate C (03/08/1980) Aerial View: Spatial viewer.

	**Plate D** (14/04/1989) Aerial View: Spatial viewer.
	**Plate E** (15/09/1998) Aerial View: Spatial viewer.
	**Plate F** (02/2011) Aerial View: Google Earth.

	**Plate G** (11/2015) Aerial View: Google Earth.
	**Plate H** (06/2022) Aerial View: Google Earth.

Appendix F. Sampling Methodology

Soil sampling methodology & procedures for soil sampling are as follows:

- Sampling equipment is to be decontaminated immediately prior to sampling, then decontaminated again after extraction of every individual sample;
- Industry standard field tapes, GPS, compasses, and maps are to be used to identify and record each of the sample stations;
- Latex or rubber protective gloves are to be used during all soil sampling procedures.
- A hand operated auger or trowel is to be used to collect soil samples at required depths in accordance with AS 4482.1 (2005) sections 7.3.3 and 7.3.5 (a);
- A split spoon sampler can be used during deep profile sampling or the drilling of well boreholes;
- A backhoe may be used for collecting samples from excavated areas;
- Samples are to be immediately placed in a labelled (using permanent waterproof marker) sample jar;
- Samples are to be stored in a cooler with ice in accordance with AS4482.1 (2005) section 7.4.2, and transported to a NATA certified laboratory as soon as practicable,
- A dated and signed chain of custody form, listing all samples from the site including the names of investigators and samplers, is to accompany the samples to the laboratory; and
- All individual samples shall be logged during sampling and observations and weather recorded along with sampler's name, date, and time of each sample extraction in accordance with AS 4482.1 (2005) section 7.6.

NOTE: Samples should be delivered as soon as practicable to a NATA certified laboratory and stored in a refrigerator if they are not delivered to the analytical laboratory the same day that they are collected. Chain of Custody forms must be completed upon submission of the samples to the laboratory, and copies of forms must be retained by the site supervisor.

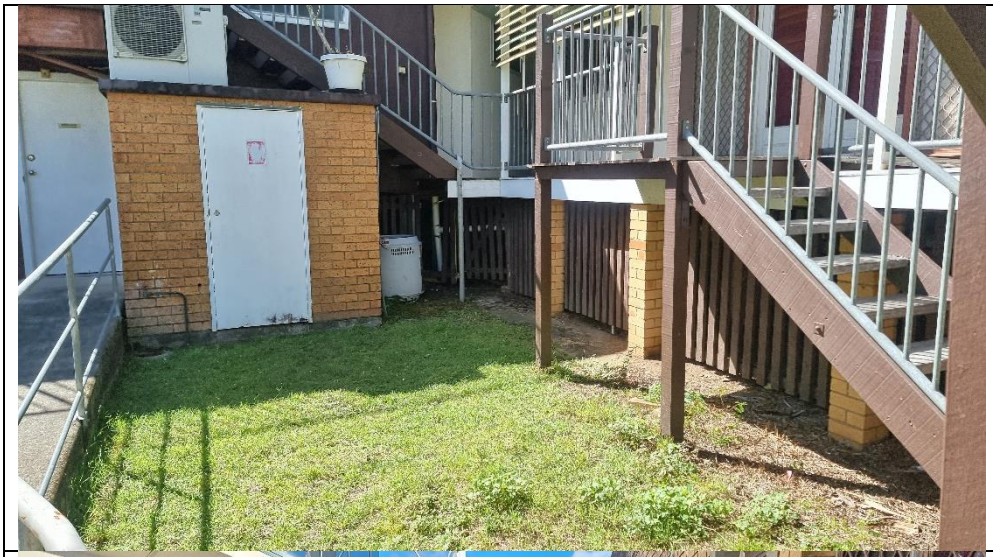
Decontamination of equipment followed the procedures outlined in AS 4482.1 (2005) section 7.5.6, and involved the following:

- Removal of excess soil with a dry scrubbing brush;
- Washing of equipment in fresh water + detergent using a clean scrubbing cloth;
- Rinsing of equipment in fresh water containing detergent using a scrubbing brush;
- Washing of equipment in fresh water;
- Rinsing of equipment in fresh water; and
- Drying of equipment with a disposable cloth towel, then air-dried prior to use.

Analysis of samples to be conducted by NATA accredited Laboratory. All necessary Personal Protection Equipment shall be used by soil sampling personnel.

Appendix G. Site Photographs

	**Plate I** (05/04/23) View southwest from northeast corner of the site.
	**Plate J** (05/04/23) View west along norther boundary from sample point 7.
	**Plate K** (05/04/23) View east from western corner of site near sample point 5.

	**Plate L** (05/04/23) View of courtyard. Location of sample point 2.
	**Plate M** (05/04/23) View west from sample point 3.
	**Plate N** (05/04/23) View of garden area at southeast corner of site. Location of sample point 4.

Appendix H. Summary of Results

Contaminants of Concern (mg/kg)			Arsenic	Cadmium	Chromium (VI)	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH F1 (C6 to C10)	TRH F2 (C10 to C16)	TRH F3 (C16 to C34)	TRH F4 (C34 to C40)	Benzene	Toluene	Ethylbenzene	Xylene	Naphthalene	PAH – BaP TEQ	Total PAH
Assessment Criteria	HIL Recreational	Depth	300	90	300	17000	600	80	1200	30000										3	300
	HIL Commercial/ Industrial	Depth	3000	800	3000	3E+05	1500	4000	4000	4E+05										40	4000
	EIL Urban residential and open public spaces	0-2m	100		390	120	1100		55	210											
	EIL Commercial/ Industrial	0-2m	160		650	170	1800		90	320											
	HSL Recreational and open space	0-1m											5300	7400							
	HSL Commercial/ Industrial	0-1m									260		27000	38000	3			230			
	ESL Recreational and open space	0-1m									180	120	1300	5600	65	105	125	45	170	0.7	
	ESL Commercial/ Industrial	0-1m									215	170	2500	6600	95	135	185	95	370	0.7	
Sample ID	Sample Description	Sample Type	Depth (mm)																		
1	Coarse moist sandy clay loam, grassed.	Soil	0-150	2	<0.3	4	4	20	0.05	1	32	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.2	<0.1	<0.2	<0.8
2	Coarse moist sandy clay loam, grassed.	Soil	0-150	2	<0.3	7	9	52	0.08	0.8	130	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.2	<0.1	<0.2	<0.8
3	Coarse moist sandy clay loam, under garden.	Soil	0-150	3	<0.3	11	26	62	0.13	3.2	110	<25	<25	150	<120	<0.1	<0.1	<0.1	<0.2	<0.1	<0.2	<0.8
4	Coarse moist sandy clay loam, grassed.	Soil	0-150	2	<0.3	8.9	9.5	32	0.11	2.3	31	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.2	<0.1	<0.2	<0.8
5	Coarse moist sandy clay loam, grassed.	Soil	0-150	2	<0.3	5.5	9.1	36	0.07	1.1	68	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.2	<0.1	0.3	2.2
6	Coarse moist sandy clay loam, grassed.	Soil	0-150	2	1	13	180	1800	2	4.6	700	<25	<25	110	<120	<0.1	<0.1	<0.1	<0.2	<0.1	1.7	13
7	Coarse moist sandy clay loam, grassed.	Soil	0-150	1	<0.3	11	9.2	840	0.18	1.5	280	<25	<25	110	<120	<0.1	<0.1	<0.1	<0.2	<0.1	2	14
8	Coarse moist sandy clay loam, under garden.	Soil	0-150	3	<0.3	8.6	11	62	<0.05	2.1	45	<25	<25	200	<120	<0.1	<0.1	<0.1	<0.2	<0.1	<0.2	<0.8

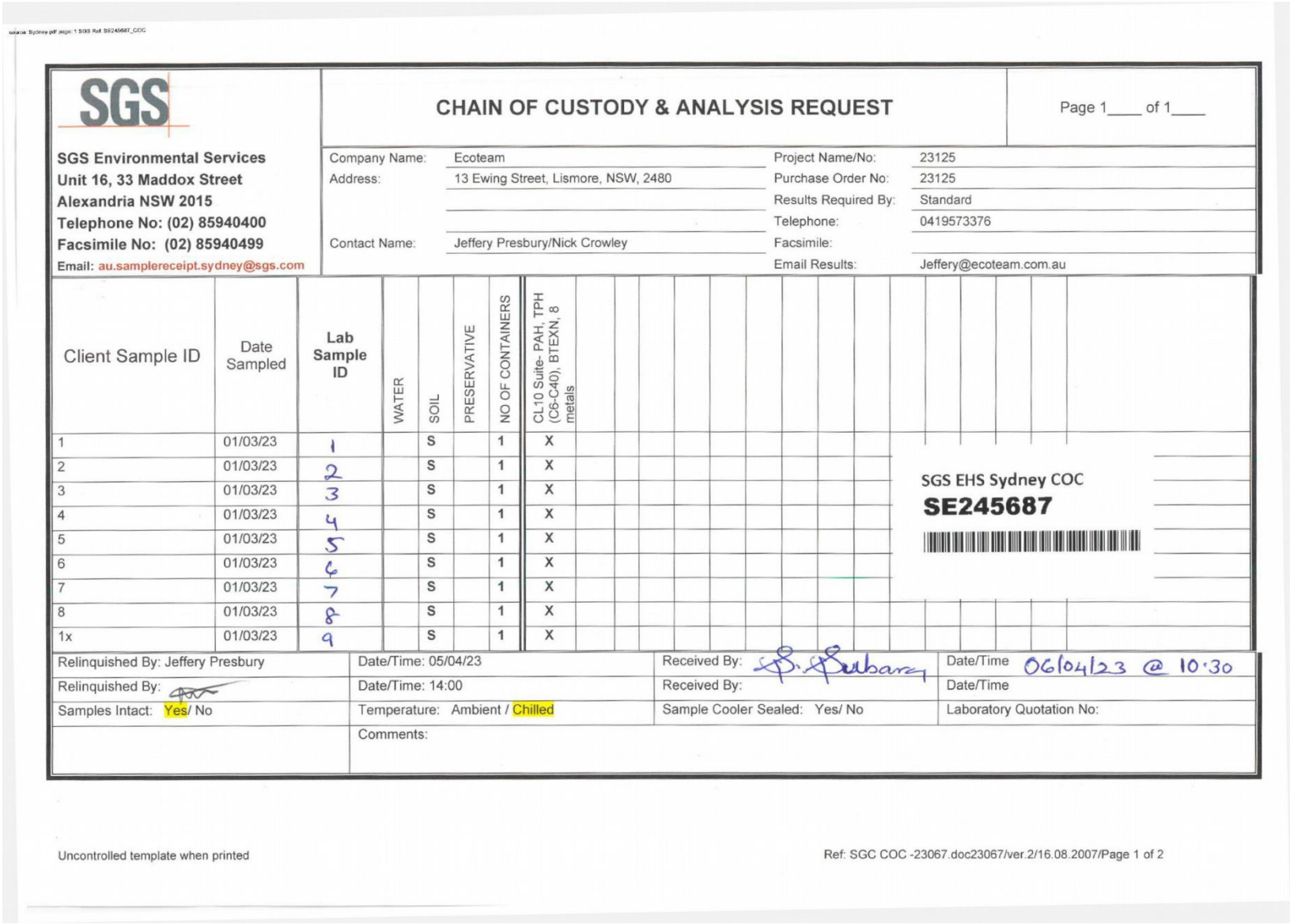
Further Analysis

	Arsenic	Cadmium	Chromium (VI)	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH F1 (C6 to C10)	TRH F2 (C10 to C16)	TRH F3 (C16 to C34)	TRH F4 (C34 to C40)	Benzene	Toluene	Ethylbenzene	Xylene	Naphthalene	PAH – BaP TEQ	Total PAH
No. Samples	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Samples above HIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum Concentration	3	1	13	180	1800	2	4.6	700	12.5	12.5	200	60	0.05	0.05	0.05	0.1	0.05	2	14
Average	2	0.3	9	32.2	363.0	0.3	2	175	12.5	13	94	60	0.1	0.1	0.1	0.1	0.1	0.6	3.9
Standard Deviation	1	0	3	60	644	1	1	228	0	0	59	0	0	0	0	0	0	1	6
Minimum Required Sample	0	0	0	1	2	0	0	15	0	0	0	0	0	0	0	0	0	211	0
95% UCL	2.6	0.5	10.8	164.8	1785.0	0.8	3.0	523.9	12.5	12.5	135.6	60.0	0.1	0.1	0.1	0.1	0.1	1.1	8.1
Coefficient of Variance (CV)	0.3	1.2	0.4	1.9	1.8	2.0	0.6	1.3	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.5

Duplicate Analysis

1	Sample	2	<0.3	4	4	20	0	1	32	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.2	<0.1	<0.2	<0.8
1X	Inter Lab Duplicate	<4	<4	8	4	12	<0.1	1	130	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Relative % Difference	0	-172	-67	0	50	0	0	-121											
2	Sample	2	<0.3	7	9	52	0	1	130	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.2	<0.1	<0.2	<0.8
2x	Intra Lab Duplicate	2	0	13	2	6	0	2	13	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.2	<0.1	<0.2	<0.8
	Relative % Difference	0	0	-60	127	159	105	-72	164	0	0	0	0	0	0	0	0	0	0	0

Appendix I. Chain Of Custody



SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

Page 1____ of 1____

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name:	Ecoteam	Project Name/No:	23125
Address:	13 Ewing Street, Lismore, NSW, 2480	Purchase Order No:	23125
		Results Required By:	Standard
		Telephone:	0419573376
Contact Name:	Jeffery Presbury/Nick Crowley	Facsimile:	
		Email Results:	Jeffery@ecoteam.com.au

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	CL10 Suite- PAH, TPH (C6-C40), BTEXN, 8 metals
1	01/03/23	1		S		1	X
2	01/03/23	2		S		1	X
3	01/03/23	3		S		1	X
4	01/03/23	4		S		1	X
5	01/03/23	5		S		1	X
6	01/03/23	6		S		1	X
7	01/03/23	7		S		1	X
8	01/03/23	8		S		1	X
1x	01/03/23	9		S		1	X

SGS EHS Sydney COC
SE245687

Relinquished By: Jeffery Presbury	Date/Time: 05/04/23	Received By:	Date/Time 06/04/23 @ 10:30
Relinquished By:	Date/Time: 14:00	Received By:	Date/Time
Samples Intact: Yes/ No	Temperature: Ambient / Chilled	Sample Cooler Sealed: Yes/ No	Laboratory Quotation No:
	Comments:		

Uncontrolled template when printed

Ref: SGC COC -23067.doc23067/ver.2/16.08.2007/Page 1 of 2

ENVIROLAB GROUP | ENVIROLAB SERVICES | mpl

CHAIN OF CUSTODY FORM - Client

[Copyright and Confidential]

ENVIROLAB GROUP
National phone number 1300 424 344

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph 02 9910 6200 | sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt, Myaree, WA 6154
Ph 08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
Ph 03 9763 2500 | melbourne@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph 08 7087 6800 | adelaide@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
Ph 07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820
Ph 08 8967 1201 | darwin@envirolab.com.au

Client: Ecotechnology Trading as Ecoteam	Client Project Name/Number/Site etc (ie report title): 23125 - Maclean
Contact Person: Robyn Mirigliani	
Project Mgr: Jeffery Presbury	PO No.:
Sampler: Jeffery Presbury	Envirolab Quote No.:
Address: 13 Ewing Street Lismore NSW 2480	Date results required: Standard
	Or choose: standard / same day / 1 day / 2 day / 3 day *Note: Inform lab in advance if urgent turnaround is required - surcharges apply*
Phone: 02 66215123 Mob: 0428215124	Additional report format: esdat / equis /
Email: nick@ecoteam.com.au	Lab Comments:

Sample information					PO No.:														Comments
Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	Metals (8)	NEPM 2013 - Soil Characteristics													Provide as much information about the sample as you can
1	2X			Soil	X	X													Jar Soil
2	Background			Soil	X														Jar Soil
3	R1			water	X														1 x water

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by (Company):	Received by (Company): ES SYD	*Lab Use Only*	
Print Name: Jeffery Presbury	Print Name: Sherry	Job number: 320501	Cooling: Ice / Ice pack / None
Date & Time: 5/04/2023	Date & Time: 11/4 1130	Temperature: 18	Security seal: Intact / Broken / None
Signature:	Signature: SD	TAT Req - SAME day / 1 / 2 / 3 / 4 / STD	

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Appendix J. Insurances

Insurance Class	Policy No.	Insurer	Period of Insurance	Limit of Liability
Worker's Compensation	124079601	iCare Workers Compensation	31 October 2022 - 31 October 2023	NA
Professional Indemnity	AU00010297-001	DUAL Australia Pty Ltd On behalf of certain underwriters at Lloyd's	28 February 2023 - 28 February 2024	$10,000,000
Public/Products Liability	B0621CECOT000523	Certain Underwriters at Lloyd's of London	28 February 2023 - 28 February 2024	$20,000,000

Appendix K. ProUCL Statistics

Nonparametric UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.119/05/2023 3:30:56 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Copper

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	4	Mean	32.23
Maximum	180	Median	9.35
SD	60.05	Std. Error of Mean	21.23
Coefficient of Variation	1.864	Skewness	2.767
Mean of logged Data	2.639	SD of logged Data	1.149

Note: Sample size is small (e.g., <10), if data are collected using ISM approach
you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options.

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	72.45	95% Adjusted-CLT UCL (Chen-1995)	89.34
		95% Modified-t UCL (Johnson-1978)	75.91

Nonparametric Distribution Free UCLs

95% CLT UCL	67.15	95% Jackknife UCL	72.45
95% Standard Bootstrap UCL	65.42	95% Bootstrap-t UCL	668.8
95% Hall's Bootstrap UCL	555.5	95% Percentile Bootstrap UCL	73.25
95% BCA Bootstrap UCL	93.89		
90% Chebyshev(Mean, Sd) UCL	95.92	95% Chebyshev(Mean, Sd) UCL	124.8
97.5% Chebyshev(Mean, Sd) UCL	164.8	99% Chebyshev(Mean, Sd) UCL	243.5

Suggested UCL to Use

95% Hall's Bootstrap UCL	555.5

Recommended UCL exceeds the maximum observation

In Case Bootstrap t and/or Hall's Bootstrap yields an unreasonably large UCL value, use 97.5% or 99% Chebyshev (Mean, Sd) UCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1	Gamma UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.119/05/2023 3:33:04 PM								
5	From File			WorkSheet.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Zinc											
12												
13	General Statistics											
14						Total Number of Observations	8				Number of Distinct Observations	8	
15											Number of Missing Observations	0	
16						Minimum	31				Mean	174.5	
17						Maximum	700				Median	89	
18						SD	227.5				SD of logged Data	1.094	
19						Coefficient of Variation	1.304				Skewness	2.21	
20													
21	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use												
22	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.												
23	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).												
24	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1												
25													
26	Gamma GOF Test												
27						A-D Test Statistic	0.496				Anderson-Darling Gamma GOF Test		
28						5% A-D Critical Value	0.735				Data appear Gamma Distributed at 5% Significance Level		
29						K-S Test Statistic	0.225				Kolmogorov-Smirnov Gamma GOF Test		
30						5% K-S Critical Value	0.301				Data appear Gamma Distributed at 5% Significance Level		
31	Data appear Gamma Distributed at 5% Significance Level												
32													
33	Gamma Statistics												
34						k hat (MLE)	1				k star (bias corrected MLE)	0.709	
35						Theta hat (MLE)	174.4				Theta star (bias corrected MLE)	246.3	
36						nu hat (MLE)	16.01				nu star (bias corrected)	11.34	
37						MLE Mean (bias corrected)	174.5				MLE Sd (bias corrected)	207.3	
38											Approximate Chi Square Value (0.05)	4.794	
39						Adjusted Level of Significance	0.0195				Adjusted Chi Square Value	3.776	
40													
41	Assuming Gamma Distribution												
42						95% Approximate Gamma UCL (use when n>=50)	412.7				95% Adjusted Gamma UCL (use when n<50)	523.9	
43													
44	Suggested UCL to Use												
45						95% Adjusted Gamma UCL	523.9						
46													
47	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.												
48	Recommendations are based upon data size, data distribution, and skewness.												
49	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).												
50	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.												
51													

1	Nonparametric UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation	ProUCL 5.119/05/2023 12:26:09 PM										
5	From File	WorkSheet.xls										
6	Full Precision	OFF										
7	Confidence Coefficient	95%										
8	Number of Bootstrap Operations	2000										
9												
10												
11	Lead											
12												
13	General Statistics											
14	Total Number of Observations	8					Number of Distinct Observations	7				
15							Number of Missing Observations	0				
16	Minimum	20					Mean	363				
17	Maximum	1800					Median	57				
18	SD	644.2					Std. Error of Mean	227.7				
19	Coefficient of Variation	1.775					Skewness	2.052				
20	Mean of logged Data	4.56					SD of logged Data	1.634				
21												
22	Note: Sample size is small (e.g., <10), if data are collected using ISM approach											
23	you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
24	Chebyshev UCL can be computed using the Nonparametric and All UCL Options.											
25												
26	Nonparametric Distribution Free UCL Statistics											
27	Data do not follow a Discernible Distribution (0.05)											
28												
29	Assuming Normal Distribution											
30	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
31	95% Student's-t UCL	794.5					95% Adjusted-CLT UCL (Chen-1995)	914.2				
32							95% Modified-t UCL (Johnson-1978)	822				
33												
34	Nonparametric Distribution Free UCLs											
35	95% CLT UCL	737.6					95% Jackknife UCL	794.5				
36	95% Standard Bootstrap UCL	708.1					95% Bootstrap-t UCL	13903				
37	95% Hall's Bootstrap UCL	7532					95% Percentile Bootstrap UCL	776.5				
38	95% BCA Bootstrap UCL	919.3										
39	90% Chebyshev(Mean, Sd) UCL	1046					95% Chebyshev(Mean, Sd) UCL	1356				
40	97.5% Chebyshev(Mean, Sd) UCL	1785					99% Chebyshev(Mean, Sd) UCL	2629				
41												
42	Suggested UCL to Use											
43	95% Hall's Bootstrap UCL	7532										
44												
45	Recommended UCL exceeds the maximum observation											
46												
47	In Case Bootstrap t and/or Hall's Bootstrap yields an unreasonably large UCL value, use 97.5% or 99% Chebyshev (Mean, Sd) UCL											
48												
49	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
50	Recommendations are based upon data size, data distribution, and skewness.											
51	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
52	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
53												

Appendix L. Soil Analysis Results

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Jeffery Presbury
Client	ECOTEAM
Address	13 EWING ST. LISMORE NSW 2480
Telephone	61 2 66215123
Facsimile	(Not specified)
Email	jeffery@ecoteam.com.au
Project	**23125**
Order Number	**23125**
Samples	9

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE245687 R0**
Date Received	6/4/2023
Date Reported	18/4/2023

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Dong LIANG
Metals/Inorganics Team Leader

Kamrul AHSAN
Senior Chemist

Ly Kim HA
Organic Section Head

Shane MCDERMOTT
Inorganic/Metals Chemist

VOC's in Soil [AN433] Tested: 13/4/2023

PARAMETER	UOM	LOR	1 SOIL - 1/3/2023 SE245687.001	2 SOIL - 1/3/2023 SE245687.002	3 SOIL - 1/3/2023 SE245687.003	4 SOIL - 1/3/2023 SE245687.004	5 SOIL - 1/3/2023 SE245687.005
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX*	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene (VOC)*	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	6 SOIL - 1/3/2023 SE245687.006	7 SOIL - 1/3/2023 SE245687.007	8 SOIL - 1/3/2023 SE245687.008	1x SOIL - 1/3/2023 SE245687.009
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX*	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene (VOC)*	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 13/4/2023

PARAMETER	UOM	LOR	1 SOIL - 1/3/2023 SE245687.001	2 SOIL - 1/3/2023 SE245687.002	3 SOIL - 1/3/2023 SE245687.003	4 SOIL - 1/3/2023 SE245687.004	5 SOIL - 1/3/2023 SE245687.005
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	6 SOIL - 1/3/2023 SE245687.006	7 SOIL - 1/3/2023 SE245687.007	8 SOIL - 1/3/2023 SE245687.008	1x SOIL - 1/3/2023 SE245687.009
TRH C6-C9	mg/kg	20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 13/4/2023

PARAMETER	UOM	LOR	1 SOIL - 1/3/2023 SE245687.001	2 SOIL - 1/3/2023 SE245687.002	3 SOIL - 1/3/2023 SE245687.003	4 SOIL - 1/3/2023 SE245687.004	5 SOIL - 1/3/2023 SE245687.005
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	**59**	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	**170**	<45	**66**
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	**150**	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	**230**	<110	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	6 SOIL - 1/3/2023 SE245687.006	7 SOIL - 1/3/2023 SE245687.007	8 SOIL - 1/3/2023 SE245687.008	1x SOIL - 1/3/2023 SE245687.009
TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	**66**	**68**	**91**	<45
TRH C29-C36	mg/kg	45	**64**	**70**	**160**	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	**110**	**110**	**200**	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	**130**	**140**	**250**	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 13/4/2023

PARAMETER	UOM	LOR	1 SOIL - 1/3/2023 SE245687.001	2 SOIL - 1/3/2023 SE245687.002	3 SOIL - 1/3/2023 SE245687.003	4 SOIL - 1/3/2023 SE245687.004	5 SOIL - 1/3/2023 SE245687.005
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.2
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	0.1	<0.1	0.2	0.1	0.4
Pyrene	mg/kg	0.1	0.1	<0.1	0.2	<0.1	0.4
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.2
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.2
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	0.1	<0.1	0.2
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.2
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.2
Carcinogenic PAHs, BaP TEQ <LOR=0*	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR*	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	0.4
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2*	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	0.3
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	2.2
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	2.2

PARAMETER	UOM	LOR	6 SOIL - 1/3/2023 SE245687.006	7 SOIL - 1/3/2023 SE245687.007	8 SOIL - 1/3/2023 SE245687.008	1x SOIL - 1/3/2023 SE245687.009
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	0.2	0.2	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	1.1	0.8	<0.1	<0.1
Anthracene	mg/kg	0.1	0.4	0.3	<0.1	<0.1
Fluoranthene	mg/kg	0.1	2.4	2.3	0.2	0.1
Pyrene	mg/kg	0.1	2.1	2.1	0.1	0.1
Benzo(a)anthracene	mg/kg	0.1	1.2	1.2	<0.1	<0.1
Chrysene	mg/kg	0.1	1.0	1.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	1.3	1.5	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	0.6	0.7	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	1.1	1.3	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.8	1.0	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	0.2	0.3	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	0.7	0.9	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0*	TEQ (mg/kg)	0.2	1.7	2.0	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR*	TEQ (mg/kg)	0.3	1.7	2.0	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2*	TEQ (mg/kg)	0.2	1.7	2.0	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	13	14	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	13	14	<0.8	<0.8

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 13/4/2023

PARAMETER	UOM	LOR	1 SOIL - 1/3/2023 SE245687.001	2 SOIL - 1/3/2023 SE245687.002	3 SOIL - 1/3/2023 SE245687.003	4 SOIL - 1/3/2023 SE245687.004	5 SOIL - 1/3/2023 SE245687.005
Arsenic, As	mg/kg	1	2	2	3	2	2
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	4.0	7.0	11	8.9	5.5
Copper, Cu	mg/kg	0.5	4.0	9.0	26	9.5	9.1
Lead, Pb	mg/kg	1	20	52	62	32	36
Nickel, Ni	mg/kg	0.5	1.0	0.8	3.2	2.3	1.1
Zinc, Zn	mg/kg	2	32	130	110	31	68

PARAMETER	UOM	LOR	6 SOIL - 1/3/2023 SE245687.006	7 SOIL - 1/3/2023 SE245687.007	8 SOIL - 1/3/2023 SE245687.008	1x SOIL - 1/3/2023 SE245687.009
Arsenic, As	mg/kg	1	2	1	3	<1
Cadmium, Cd	mg/kg	0.3	1.0	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	13	11	8.6	3.2
Copper, Cu	mg/kg	0.5	180	9.2	11	12
Lead, Pb	mg/kg	1	1800	840	62	19
Nickel, Ni	mg/kg	0.5	4.6	1.5	2.1	0.8
Zinc, Zn	mg/kg	2	700	280	45	25

Mercury in Soil [AN312] Tested: 13/4/2023

PARAMETER	UOM	LOR	1 SOIL - 1/3/2023 SE245687.001	2 SOIL - 1/3/2023 SE245687.002	3 SOIL - 1/3/2023 SE245687.003	4 SOIL - 1/3/2023 SE245687.004	5 SOIL - 1/3/2023 SE245687.005
Mercury	mg/kg	0.05	**0.05**	**0.08**	**0.13**	**0.11**	**0.07**

PARAMETER	UOM	LOR	6 SOIL - 1/3/2023 SE245687.006	7 SOIL - 1/3/2023 SE245687.007	8 SOIL - 1/3/2023 SE245687.008	1x SOIL - 1/3/2023 SE245687.009
Mercury	mg/kg	0.05	**2.0**	**0.18**	<0.05	**0.05**

Moisture Content [AN002] Tested: 13/4/2023

PARAMETER	UOM	LOR	1 SOIL - 1/3/2023 SE245687.001	2 SOIL - 1/3/2023 SE245687.002	3 SOIL - 1/3/2023 SE245687.003	4 SOIL - 1/3/2023 SE245687.004	5 SOIL - 1/3/2023 SE245687.005
% Moisture	%w/w	1	**9.6**	**12.1**	**27.3**	**11.6**	**10.0**

PARAMETER	UOM	LOR	6 SOIL - 1/3/2023 SE245687.006	7 SOIL - 1/3/2023 SE245687.007	8 SOIL - 1/3/2023 SE245687.008	1x SOIL - 1/3/2023 SE245687.009
% Moisture	%w/w	1	**12.9**	**5.4**	**27.7**	**9.9**

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid , mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser . Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoverable Hydrocarbons - Silica (TRH-Si) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D). Total PAH calculated from individual analyte detections at or above the limit of reporting .
AN420	Carcinogenic PAHs may be expressed as Benzo(a)pyrene equivalents by applying the BaP toxicity equivalence factor (NEPM 1999, June 2013, B7). These can be reported as the individual PAHs and as a sum of carcinogenic PAHs. The sum is reported three ways, the first assuming all <LOR results are zero, the second assuming all < LOR results are half the LOR and the third assuming all <LOR results are the LOR.
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
***	Indicates that both * and ** apply.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 320561

Client Details

Client	Ecoteam
Attention	Nick Crowley
Address	13 Ewing Street, Lismore, NSW, 2480

Sample Details

Your Reference	**23125 - Maclean**
Number of Samples	2 Soil, 1 Water
Date samples received	11/04/2023
Date completed instructions received	11/04/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	18/04/2023
Date of Issue	18/04/2023

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Diego Bigolin, Inorganics Supervisor
Greta Petzold, Operation Manager
Loren Bardwell, Development Chemist

Authorised By

Nancy Zhang, Laboratory Manager

CEC		
Our Reference		320561-1
Your Reference	UNITS	2X
Type of sample		Soil
Date prepared	-	18/04/2023
Date analysed	-	18/04/2023
Exchangeable Ca	meq/100g	5.3
Exchangeable K	meq/100g	0.2
Exchangeable Mg	meq/100g	0.6
Exchangeable Na	meq/100g	<0.1
Cation Exchange Capacity	meq/100g	6.1

Misc Inorg - Soil		
Our Reference	UNITS	320561-1
Your Reference		2X
Type of sample		Soil
Date prepared	-	17/04/2023
Date analysed	-	17/04/2023
pH 1:5 soil:$CaCl_2$	pH Units	5.4
Total Organic Carbon (Walkley Black)	mg/kg	22,000

Clay 50-120g		
Our Reference	UNITS	320561-1
Your Reference		2X
Type of sample		Soil
Date prepared	-	13/04/2023
Date analysed	-	14/04/2023
Clay in soils <2µm	% (w/w)	9

Acid Extractable metals in soil			
Our Reference	UNITS	320561-1	320561-2
Your Reference		2X	Background
Type of sample		Soil	Soil
Date prepared	-	14/04/2023	14/04/2023
Date analysed	-	14/04/2023	14/04/2023
Arsenic	mg/kg	<4	<4
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	8	7
Copper	mg/kg	9	3
Lead	mg/kg	64	51
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	1	2
Zinc	mg/kg	120	19

Moisture			
Our Reference		320561-1	320561-2
Your Reference	UNITS	2X	Background
Type of sample		Soil	Soil
Date prepared	-	12/04/2023	12/04/2023
Date analysed	-	13/04/2023	13/04/2023
Moisture	%	8.7	11

HM in water - total		
Our Reference	UNITS	320561-3
Your Reference		R1
Type of sample		Water
Date prepared	-	12/04/2023
Date analysed	-	12/04/2023
Arsenic-Total	µg/L	<1
Cadmium-Total	µg/L	<0.1
Chromium-Total	µg/L	<1
Copper-Total	µg/L	<1
Lead-Total	µg/L	<1
Mercury-Total	µg/L	<0.05
Nickel-Total	µg/L	<1
Zinc-Total	µg/L	<1

Method ID	Methodology Summary
AS1289.3.6.3	Particle Size Distribution using in house method INORG-107 by way of sieving and/or hydrometer sedimentation testing. Clay fraction at <2µm reported.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-036	Total Organic Carbon or Matter - A titrimetric method that measures the oxidisable organic content of soils.
Metals-020	Determination of various metals by ICP-AES.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-OES analytical finish.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			18/04/2023	[NT]	[NT]	[NT]	[NT]	18/04/2023	[NT]
Date analysed	-			18/04/2023	[NT]	[NT]	[NT]	[NT]	18/04/2023	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	119	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	123	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	120	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	125	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			17/04/2023	[NT]	[NT]	[NT]	[NT]	17/04/2023	[NT]
Date analysed	-			17/04/2023	[NT]	[NT]	[NT]	[NT]	17/04/2023	[NT]
pH 1:5 soil:$CaCl_2$	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	99	[NT]
Total Organic Carbon (Walkley Black)	mg/kg	1000	Inorg-036	<1000	[NT]	[NT]	[NT]	[NT]	105	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	[NT]
Date prepared	-			14/04/2023	[NT]	[NT]	[NT]	[NT]	14/04/2023	[NT]
Date analysed	-			14/04/2023	[NT]	[NT]	[NT]	[NT]	14/04/2023	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	108	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	101	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	119	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]

QUALITY CONTROL: HM in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			12/04/2023	[NT]	[NT]	[NT]	[NT]	12/04/2023	[NT]
Date analysed	-			12/04/2023	[NT]	[NT]	[NT]	[NT]	12/04/2023	[NT]
Arsenic-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Cadmium-Total	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Chromium-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Copper-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Lead-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Mercury-Total	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	100	[NT]
Nickel-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Zinc-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Total metals: no unfiltered, preserved sample was received, therefore analysis was conducted from the unpreserved sample bottle.
Note: there is a possibility some elements may be underestimated.