RAMBOLL

ENVIRONMENT
& HEALTH

17 August 2021

Waste Operations NSW EPA

NSW EPA

PO Box A290

SYDNEY SOUTH NSW 1232

via email: envsolclr.requests@epa.nsw.gov.au

Dear EPA

RE: Specific Immobilisation Approval Application - Lead Impacted Material

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Ref 318000780

Waste ~~Generator/~~Owner: Transport for NSW

Applicant: Ramboll Australia Pty Ltd

Site Location: Tarago Rail Yard, Tarago NSW

Contaminants of Concern: Lead

INTRODUCTION

John Holland Rail Pty Ltd engaged Ramboll to undertake lead stabilisation trials on lead impacted material located at the Tarago Rail Yard, Tarago NSW. Ramboll has provided assessment and management advice for contamination relating to the former Woodlawn Ore Concentrate Loadout Complex that operated at the Tarago Rail Yard. Ramboll provided advice before, during and after extension of an operational rail loop over a portion of the non-operational Woodlawn rail siding. Assessment advice is consolidated in the Targao Rail Corridor and Tarago Area Detailed Site Investigation (Ramboll 2020) and an addendum to the DSI (Ramboll 2021). This application should be read in conjunction the cited reports where further information is required.

A broad range of contaminants of potential concern were assessed including TRH, BTEXN, PAH, metals, OCP, OPP, PCB and asbestos. Lead was identified as the primary contaminant of concern and was observed to be limited in distribution to fouled ballast within the rail formation and in adjacent soils.

[1] The generator will be the custodian of the Country Regional Network; scheduled to transition from John Holland Rail to UGL.

Extension of the rail loop included excavation and stockpiling of approximately 750m^3 of contaminated ballast from the Woodlawn Siding.

Figures presented as **Appendix 1** describe the site locality, site boundaries, lead concentrations at sampling locations onsite, area excavated during loop extension, areas proposed to be excavated during remediation and the footprint of the historic ore concentrate loadout complex.

This letter provides supporting information required for an Application for Specific Immobilisation Approval (SIA). **Sections 1** - **11** are numbered according to sections set out in Section B (Waste and Proposed Treatment/Immobilisation Mechanism) of an Application for a SIA. Contingency and validation plans to ensure immobilisation occurs are presented as **Sections 12** and **13**.

Abbreviations

Abbreviation	Description
CoC	Chain of Custody
CoPC	Contaminant of Potential Concern
CT	Contaminant Threshold
GSW	General Solid Waste
ha	hectare
km	kilometre
L	litre
LOR	limit of reporting
m	metre
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
MAP	Monoammonium phosphate (reagent)
MEP	Multiple Extraction Procedure (in accordance with US EPA Method 1320, 1986)
MgO	Magnesium oxide (reagent)
NATA	National Association of Testing Authorities
NEPM	National Environment Protection (Assessment of Contamination) Measure (amended 2013)
Pb	Chemical symbol for lead
pH	measure of acidity, hydrogen ion activity
QA/QC	Quality Assurance and Quality Control
RPD	Relative Percentage Difference
RSW	Restricted Solid Waste
SCC	Specific Contaminant Concentration
t	tonne
TCLP	Toxicity Characteristic Leaching Procedure (in accordance with US EPA Method 1311, 1992)
UCL	Upper Confidence Limit
XRF	X-ray fluorescence spectrometer

1. AVOIDANCE, REUSE, RECYCLING OR REPROCESSING

Avoidance: The impacted material cannot be avoided as contamination of the affected area has already occurred and the Site is required to be suitable for the proposed continued use.

Reuse: The material is impacted with total lead levels that exceed the site-specific criterion for lead (2200 mg/kg) and criteria relevant to potential offsite reuse as defined under general Resource Recovery Exemptions prepared by the NSW EPA. Therefore, no reuse applications of the impacted material have been identified.

Recycling: The material contains limited calorific value, which precludes its recycling. No recycling options for material containing elevated lead concentrations can be identified.

Reprocessing: The material is co-contaminated with soil, and no technology or market exists for its incorporation into an alternative process or as a product.

2. QUANTITY OF WASTE REQUIRING TREATMENT AND/OR DISPOSAL & ESTIMATED TIME TO COMPLETE TREATMENT AND/OR DISPOSAL

Based on assessment of the horizontal and vertical distribution of contamination at the site the volume of material requiring remediation has been estimated at 4950 m^3. This includes an estimated 100 m^3 of railway sleepers, 2100 m^3 of soil adjacent the rail formation, 2000 m^3 of fouled ballast in the Woodlawn Siding (historically used to load ore concentrates for rail transport) and approximately 750m^3 of foulled ballast already excavated to stockpile. Assessment of ballast pieces identified concentrations of lead below site criteria and so mechanical screening to remove the ballast for onsite reuse is proposed as a precursor to chemical immobilisation. The total volume of material for chemical immobilisation is estimated at 3400 m^3 (refer to **Table 1**). Applying a volume to weight ratio of 1:1.8 this equates to an estimated 6120 t.

The time estimated for treatment works of the excavated and stockpiled waste is approximately 6 weeks, which includes allowance for receipt of conformance results and off-site disposal of the treated waste.

3. FORM OF THE WASTE

The waste material, comprising a combination of railway sleepers, soil and fouled ballast, currently sits onsite, partly in stockpile and partly in situ. This material will be excavated, stockpiled and screened (<20 mm) prior to treatment.

4. BACKGROUND INFORMATION ABOUT THE WASTE

The waste material comprises a combination of railway sleepers, soil adjacent the rail formation and fouled ballast in the Woodlawn Siding, which was historically used to load ore concentrates for rail transport. Contamination of these materials has occurred from this ore loading activity. Assessment of ballast pieces identified concentrations of lead below the site-specific criterion, therefore mechanical screening to remove the ballast for onsite reuse is proposed as a precursor to chemical immobilisation.

Estimated volumes of materials requiring remediation are shown in Error! Reference source not found.**Table 1.** Waste classifications for the > 20mm and < 20mm fractions are presented in **Section 5**.

Table 1: Volume projections for remediation materials

Material Type	Volume (m^3)	Mass (t)[1]
>20 mm fraction – onsite reuse	1,450	2,610
<20 mm fraction – ballast fines requiring immobilisation	1,300	2,340
Soil adjacent the rail formation – requiring immobilisation	2,100	3,780
Railway sleepers – GSW[2]	100	180
Total	4,950	8,910

[1]Masses have been calculated based on an assumed volume to mass ratio of $1m^3$: 1.8t
[2]Lead concentrations in rail sleepers do not consistently exceed site assessment criteria, however offsite disposal was adopted during previous works and aesthetics may drive offsite disposal again.

A waste classification for the rail sleepers is presented as **Appendix 3**.

5. CHEMICAL COMPOSITION AND PHYSICAL/CHEMICAL NATURE OF THE UNTREATED WASTE

5.1 Assessment Before and After Excavation

Comparison of lead concentrations in fouled ballast from the Woodlawn Siding in-situ (before excavation) and ex-situ (after excavation and stockpiling) is summarised in **Table 2**.

Table 2: Summary of lead concentrations in Woodlawn Siding Ballast before and After Excavation

	No. of Samples	Minimum (mg/kg)	Maximum (mg/kg)	Average (mg/kg)	Standard Deviation (mg/kg)
In-situ[1]	10	350	29,000	9,136	9,005
Ex-situ	10	1300	19000	6450	4816

[1] In-situ samples results summarised above are from samples SS23 – SS25, SS31, SS38, SS41 and samples of fouled ballast from TP01 – TP03/TP03A.
[2] Ex-situ sample results summarised above are from samples RRE_SP01 – RRE_SP10.

Comparison of statistics for lead concentrations in contaminated Woodlawn Siding ballast before and after excavation indicates that excavation results in a less variable distribution of lead within the waste stream. This is to be expected as excavation occurred such that lead in remaining soils was less than 2,200 mg/kg. The same criteria has been adopted for the proposed remediation and so a similar effect should be expected for the projected waste stream. Additionally, mechanical screening to remove ballast is proposed before immobilisation and this could be expected to reduce variability of lead distribution within the waste stream.

5.2 Assessment of Contaminant Distribution by Particle Size

Assessment of contaminant distribution by particle size within Woodlawn Siding ballast was completed to refine consideration of remedial requirements. This included:

- Collection of five bulk samples (approx. 20 kg)
- Particle Size Distribution (PSD) analyses
- Crushing and analyses of the >19 mm fraction for lead
- Analyses of total lead in ballast (excluding fines) as described below.

Total lead was analysed in 18 sub-samples collected from eight bulk samples. Bulk samples were collected to provide targeted assessment of ballast (excluding fines) within the Woodlawn Siding around the historic loader and systematic assessment of ballast (excluding fines) within the remainder of the Woodlawn Siding. Sampling locations (TP3a, TP5a, TP6a and BAL_01 – BAL_05) are presented on **Figures 2a** – **2e**, **Appendix 1**. A summary assessment is presented as **Table 3**.

Table 3: Lead in Woodlawn Siding Ballast (excluding fines)

No. of Samples	Minimum	Maximum	No. > criteria[1]	Average	St Dev	95% UCL
18	13	2,800	0	546	756	1,041

[1]The site specific criterion for lead protective of human health (2200 mg/kg) was adopted.

Guidance endorsed by the NSW EPA makes provision for contaminant risks to be assessed through calculation of the 95% upper confidence limit (95% UCL) of the mean concentration. The 95% UCL is a value that, when calculated repeatedly for randomly drawn subsets of site data, equals or exceeds the true mean 95 percent of the time. The 95% UCL is only relevant where:

- The standard deviation of the results should be less than 50% of the relevant investigation or screening level, and
- No single value should exceed 250% of the relevant investigation or screening level.

The maximum lead concentration in Woodlawn Siding ballast (excluding fines) was 2,800 mg/kg (< 250% of the guideline) and the standard deviation was 756 mg/kg (< 50% of the guideline). The 95% UCL was therefore considered relevant and was calculated at 1,041 mg/kg and below the adopted guideline.

Assessment of lead in Woodlawn Siding ballast (excluding fines) indicates this material would be suitable for reuse onsite following separation of fines.

The arithmetic mean percentage of >20 mm and <20 mm fractions were calculated at 54% and 46% respectively and support volume estimates for material types projected for remediation (see waste volume projections presented in **Table 1**).[2]

5.3 Assessment of Untreated Waste < 20 mm Particle Size

The < 20 mm fraction includes silty-sandy-gravelly ballast fines from the rail formation and clayey surficial soils from the adjacent area. The chemical composition of impacted material has been assessed through sampling of a stockpile comprising foulled ballast that was excavated from the Woodlawn Siding during extension of the Tarago Loop (2019 – 2020) and assessed through sampling of remnant materials in situ Ramboll (2020). Relevant data for the waste material are summarised in **Table 4**, which shows that the concentrations reported for lead would classify the waste as hazardous. All other contaminants of potential concern (CoPCs) are below the General Solid Waste (GSW) criteria (**Table 4**). Copies of the NATA accredited Certificates of Analysis are included in **Appendix 2**.

Total lead concentrations were measured in the field using a field-portable X-ray fluorescence spectrometer (XRF). Collected samples were analysed for total and leachable (TCLP) lead concentrations. A review of the analytical data shows that the maximum total and leachable lead concentrations were 184,000 mg/kg and 32 mg/L, respectively.

Ramboll collected four bulk samples (4 x 20 kg), TP3A, TP4A, TP5A and TP6A, of the impacted material on 16 September 2019. The laboratory results for total lead in the bulk samples are summarised below. Copies of the NATA accredited Certificates of Analysis are included in **Appendix 2**.

- TP3A: 18,500 mg/kg lead (Pb)
- TP4A: 184,000 mg/kg lead (Pb)
- TP5A: 29,000 mg/kg lead (Pb)
- TP6A: 5000 mg/kg lead (Pb)

Lead reported at TP4A was not considered representative of the waste stream for two reasons:

- Excavation and mechanical screening are expected to increase the homogeneity of lead in the waste stream
- Lead concentrations reported in samples of fouled ballast within the Woodlawn Siding approximately 10 m north (SS56 – 48,000 mg/kg) and < 10 m south (SS57 – 83,000 mg/kg) and directly below TP4A (TP4_0.1-0.3 – 38,000 mg/kg) reported lead concentrations substantially lower than at TP4A (184,000 mg/kg)

[2] Projections of ballast and fines proportions are based on limited data and presented to provide an indication of potential volumes only.

Two samples (TP3A and TP5A) were selected for use as bulk samples for the treatment trials. Based on the laboratory results summarised in **Table 4** for samples (n = 48) collected from the site in 2019, with an average total lead concentration of 11,692.5 mg/kg and a standard deviation of 10,221.5 mg/kg, TP3A was considered to best represent the upper range of expected total lead concentrations in the waste (once excavated and stockpiled), and TP5A represents a more 'worst-case' scenario, included as a contingency. Bulk sample TP6A was considered to provide insufficient contingency if higher total lead concentrations are reported in the excavated material, and the total lead concentration in sample TP4A was considered to be well beyond the expected concentration range in the excavated material.

Table 4: Summary of analytical results for representative onsite soil samples

Analyte	CT1 - General Solid Waste1	CT2 - Restricted Solid Waste*	TCLP1	Count	Mean	S.D	Min	Max	95 UCL
Antimony	--	---	---	22	19.5	13.1	5	55	---
Arsenic	100	400	NA	33	68.3	57.4	4.9	190	91.87
Beryllium	---	---	---	22	1.0	0.0	1	1	---
Boron	---	---	---	22	5.0	0.0	5	5	---
Cadmium	100*	80	1	58	39.9	93.3	0.7	440	**93.33**
Chromium	100	400*	NA	33	39.7	36.4	2.5	130	53.22
Cobalt	---	---	---	22	9.1	6.6	2.5	30	---
Copper	---	400	---	33	988.6	938.1	20	4,100	---
Lead[1]	100	400	NA	48	11,692.5	10,221.5[3]	52	184,000	---
Manganese	---	---	---	22	509.5	269.9	70	1100	---
Mercury	4	16	NA	33	0.5	0.6	0.05	2.9	---
Molybdenum	100	400	NA	22	6.9	4.3	2.5	20	---
Nickel	40	160	NA	33	22.1	23.3	2.5	85	30.86
Selenium	20	80	NA	22	11.8	8.0	1	27	14.77
Tin	---	---	---	22	65.0	88.3	5	400	---
Vanadium	---	---	---	22	62.0	16.6	30	93	---
Zinc	---	---	---	33	1589.7	2,360.8	130	12,000	---

[1]Total cadmuim concentrations in three TP4A sub-samples (TP4A_01 – TP4A_03) were reported at 130 – 190 mg/kg and these results were included in calcualtion of the 95% UCL for assessment against CT1 criteria.

[2]Lead concentrations at TP4A and SS57 have been included in characterisation of lead in the waste stream however they are considerd indicative of the degree of contamination likley within the fines of only 15m^3 of fouled ballast (ie: approximately 7.4 m^3 of fines). This is based on limitations on the extent of these concentrations inferred by a large concrete footing remaining across the Woodlawn Siding adjacent (south of) SS57 and by sample results below and around TP4A. The volume of fines represented by TP4A and SS57 as a percentage of the total volume of projected fines (3,400 m^3) is calculated at 0.2 %. Within this context the lead concentrations at TP4A and SS57 are considered outliers to the dataset for representative onsite soil samples though are included for transparency.

[3]The standard deviation for total lead concentrations has been calculated excluding TP4A and SS57 as these results are considered results are considered outliers. Further, while the standard deviation presented in **Table 4** is considered representative of variability in the distribution of lead in soils in-situ, the distribution of lead in the waste stream following excavation and mechanical screening is likley to be lower.

The numbers of analyses summarised in **Table 4** represent core analyses of 22 samples across 17 metals and additional targeted analyses of select metals including cadmium and lead where concentrations were observed at or above waste classification criteria. The sampling completed is considered adequate to characterise the waste material to be immobilised.

Bulk samples were selected for the treatability trial with lead concentrations approaching or above the sum of the average and standard deviation of lead concentrations from representative onsite soil samples as presented in **Table 4**. (ie: approaching or above 21,914 mg/kg). The selected bulk samples, TP3A and TP5A, were homogenised and screened (<20 mm) and analysed for total (SCC) and leachable (TCLP) lead, which are summarised in **Table 4**. Copies of the NATA accredited laboratory Certificates of Analysis are included in **Appendix 2**.

Table 5: Total and leachable (TCLP) lead results in the untreated bulk samples used for the treatment trials

Sample ID	Total (SCC) Pb mg/kg	TCLP pH 5.0 Pb mg/L	TCLP Leachate Initial pH	TCLP Leachate Final pH
General solid criteria	**1500**	**5**	--	--
Restricted solid criteria	**6000**	**20**	--	--
TP3A_A_SCR	16,000	14	2.9	5
TP3A_B_SCR	15,000	28	3.1	5
TP3A_C_SCR	19,000	10	3.1	5
TP3A_D_SCR	10,000	35	3.3	5
Mean	**15,000**	**22**	**3.1**	**5**
TP5A_A_SCR	39,000	190	7.1	5
TP5A_B_SCR	35,000	180	4.3	5
TP5A_C_SCR	37,000	190	4.3	5
TP5A_D_SCR	19,000	140	5.3	5.1
Mean	**32,500**	**175**	**5.0**	**5**

Analytical results for bulk samples TP3A and TP5A used in the treatability trials show the mean total lead concentrations were 15,000 and 32,500 mg/kg, respectively, and the mean leachable (TCLP) lead concentrations were 22 and 175 mg/L, respectively. These lead concentrations would result in both materials being classified as Hazardous Waste in accordance with the NSW Waste Classification Guidelines (2014).

6. CHEMICAL CONTAMINANTS OF CONCERN

The contaminant for which specific immobilisation approval is sought is lead.

7. PROPOSED TREATMENT METHOD OR PROCESS

To address the lead contamination in the waste material, it is proposed to use the chemical immobilisation reagent magnesium oxide (MgO), based on the treatability trial results presented in **Section 9**. Whilst the treatability trial results indicated other reagents, such as a phosphate-based reagent (for example, monoammonium phosphate, MAP), provided no additional improvement to either the short-term (TCLP) or long-term (MEP) leachability results (**Section 9**) EPA requested a minimum application of MAP be included to ensure the best environmental outcome whilst also ensuring a level of consistent regulation of SIA within NSW.

The proposed treatment method will involve initial homogenisation of the waste with sufficient water to produce a moist, spadeable mixture that would have sufficient moisture to facilitate formation of insoluble lead phosphate compounds upon addition of MAP and MgO to ensure adequate pH adjustment (discussed further in **Section 8**). The waste will be thoroughly mixed with the appropriate amounts of reagents using a high shear mixer for waste treatment projects in accordance with NSW EPA

Immobilisation Technical Note 1 - *Process Equipment for Treatment of Contaminated Soil and Sludge Waste*. The resulting treated waste will be stockpiled in a holding bay to cure, awaiting laboratory validation before off-site disposal.

Based on stoichiometric calculations presented in **Section 9**, **2.0% MAP** and **5% MgO** have been adopted as reagent additive loadings for the proposed treatment.

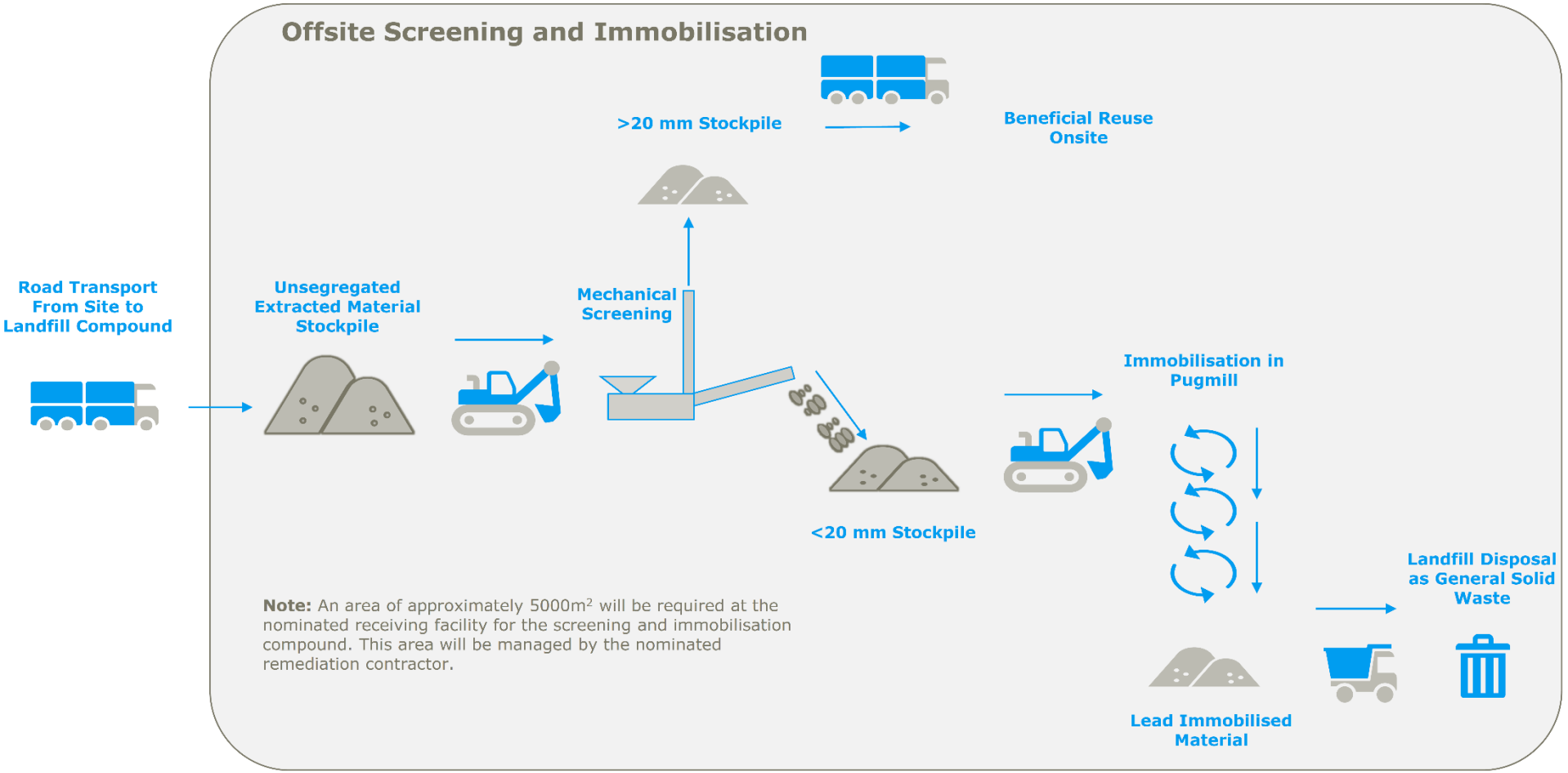
The total volume of waste following application of reagents is estimated at 3,638 m^3 (3400 * 1.07). The total mass of waste following application of reagents is estimated at 6,580 t (3,655 * 1.8).

The proposed remedial methodology comprises the following key steps:

- Acquire necessary approvals for the selected remedial option including:
    - A SIA for lead in waste streams not suitable for disposal as GSW
    - Amendment to development consent conditions and Environmental Protection Licence (EPL) for the nominated receiving facility
- Remove remnant rails for recycling and sleeper for disposal as GSW. A waste classification for sleepers is presented in the Tarago Rail Corridor Remedial Action Plan (Ramboll 2021)
- Establish a work zone at the nominated receiving facility for temporary storage, mechanical screening and immobilisation of material excavated from the Woodlawn Siding and adjacent soils
- Excavate and transport materials from the Woodlawn Siding and adjacent soils to the receiving facility at the work zone. Materials will be excavated until lead concentrations at the remnant site surface (as measured by field-portable-XRF) are lower than the site assessment criteria (2200 mg/kg) and confirmed by laboratory analysis
- Mechanically screen materials excavated from the Woodlawn Siding and adjacent soils into <20 mm and >20 mm fractions[3]
- Validate suitability of >20 mm fraction for beneficial reuse onsite through post-screening sampling
- Immobilise the <20 mm fraction in accordance with the SIA (following EPA approval of the SIA).
- Validate successful immobilisation
- Dispose of lead immobilised materials as GSW at the nominated facility.

A process diagram for screening and immobilisation is presented in **Figure 1.**

Figure 1: Screening and Immobilisation Process Diagram



8. SCIENTIFIC EVIDENCE/JUSTIFICATION

The proposed remediation methodology involves chemical immobilisation of leachable lead to form insoluble lead phosphate minerals. The process will also use MgO to buffer the soil pH. Soil pH and pH buffering capacity are important to the long term success of the stabilisation process for soils in order to prevent lead remobilising with time. Chemical immobilisation of lead is generally a preferable treatment to cement stabilisation as the latter relies on maintaining physical solidification, and the pH is unlikely to be in the optimal target range.

The aim of immobilisation treatment is to chemically convert the soluble heavy metal compounds in the waste material into thermodynamically more stable compounds with considerably less solubility. The immobilisation of heavy metals in waste materials depends on factors such as solid-solution equilibrium, or the solubility product (Ksp) of the solid phase. The leaching of metals is pH dependent, and the solubility of several heavy metal hydroxides, such as lead, is minimal within pH range 9-11, and preferably pH 9.4 to 10.2 (Smith, 1996). Figure 2 shows metal hydroxide solubility curves (theoretical), indicating the solubility of the common heavy metal ions and their respective solubility versus pH. Several metals, including lead, cadmium, copper and zinc are amphoteric, being soluble at both alkaline and acid conditions. The use of dolomitic limes containing MgO have been shown to act as a buffering agent within the pH 9-11 range, minimising heavy metal solubility and avoiding the re-dissolution that can occur by using lime reagents only, due to highly alkaline conditions (Smith, 1996; García et al., 2004, Nolan and Lunsmann, 2013).

Several metals are also known to form highly insoluble compounds with phosphate (e.g. cadmium, lead, zinc). Phosphate containing materials such as phosphorus fertilisers have been used effectively to precipitate lead as either pyromorphite, plumbogummite or other lead bearing minerals (Aide et al., 2008). Of the lead phosphate minerals, the most insoluble are the pyromorphites ($Pb_5(PO_4)_3X$ where X is either F^-, OH^-, Br^- or Cl^-). Chloropyromorphite is the most insoluble of the lead phosphate minerals and has the capability of controlling lead solubility throughout the pH range of most soils (Lindsay, 1979; Cao et al., 2003). The theoretical solubility products of the various pyromorphites are $10^{-71.6}$, $10^{-76.8}$, $10^{-78.1}$ and $10^{-84.4}$ for fluoro, hydroxyl, bromo and chloro pyromorphites, respectively (Miretzky and Fernandes-Cirelli, 2008). However, these solubilities are rarely achieved in the field due to various factors such as the degree of crystallinity, phase purity, particle size and the presence of more soluble lead minerals (Xie and Giammar, 2007). Nevertheless, phosphate treatment is widely accepted as the most appropriate means of lead immobilisation in soils (Miretzky and Fernandes-Cirelli, 2008; ITRC, 2003) and has been included by US EPA in their Best Management Practice for firing ranges as a viable lead immobilisation technology, where lead occurs in its metallic form as well as various carbonates and oxides (US EPA, 2001). Pyromorphite formation is kinetically controlled by pH, the solubility of the phosphate source and the solubility of the lead species (Chrysochoou et al., 2007). Under appropriate conditions the formation of pyromorphite is a rapid reaction (Chrysochoou et al., 2007; Miretzky and Fernandes-Cirelli, 2008).

MAP is a commercially available fertiliser with an effective solubility in water of 36 g/100 mL (at 20°C). MAP [$NH_4H_2PO_4$] will dissolve in moist soil to give $H_2PO_4^-$, which would react with soluble lead species to form insoluble compounds (Aide et al., 2008; ITRC, 2003), as shown in Reaction 1:

$(H_2PO_4^-)_3 + 5Pb^{2+} + H_2O = Pb_5(PO_4)_3OH + 7H+$.....(Reaction 1)

where:

$H_2PO_4^-$ is dihydrogen phosphate, the primary P-bearing compound in MAP

$Pb_5(PO_4)_3OH$ is hydroxypyromorphite

Potential excess acidity (H^+) produced by Reaction 1 will be neutralised by application of MgO. Notably, in the presence of calcite (calcium carbonate, $CaCO_3$), MAP can act as a weak acid and may form hydroxyapatite ($Ca_5(PO_4)_3OH$) in preference to the formation of pyromorphite. This process may significantly increase the amount of MAP required to stabilise lead impacted soils in areas with high calcite (Aide et al., 2008; Porter et al., 2004). In order to minimise the amount of MAP required for chemical stabilisation it is preferable that any proposed pH buffering source does not include calcium. Contaminants are not expected to be present in the MAP at any significant concentrations as this fertiliser is routinely used in agriculture for food crops and hence would need to be free from contaminants.

As noted, there are numerous lead phosphate species produced by the reaction of lead salts with phosphate and the exact solid phase speciation produced in the trial is difficult to determine. Results for the treatability trials conducted by Ramboll showed that the lead leachability was significantly reduced (>99.8% for pH 5 leachate) for samples treated with MAP (2-4%) and MgO (5-15%).

Results from previous studies (Ryan and Zhang, 2000) of chemical and X-ray diffraction (XRD) analysis, scanning electron microscopy (SEM) and scanning transmission electron microscopy (STEM) strongly support the mechanism of hydroxypyromorphite precipitation. However, XRD analysis of immobilised lead impacted soils are generally inconclusive based on the difficulty in identifying species at relatively low concentrations of lead (<2-3%).

Addition of water during the mixing of waste with the proposed treatment reagents, MAP and MgO, is recommended to facilitate the chemical immobilisation and minimise the generation of dust.

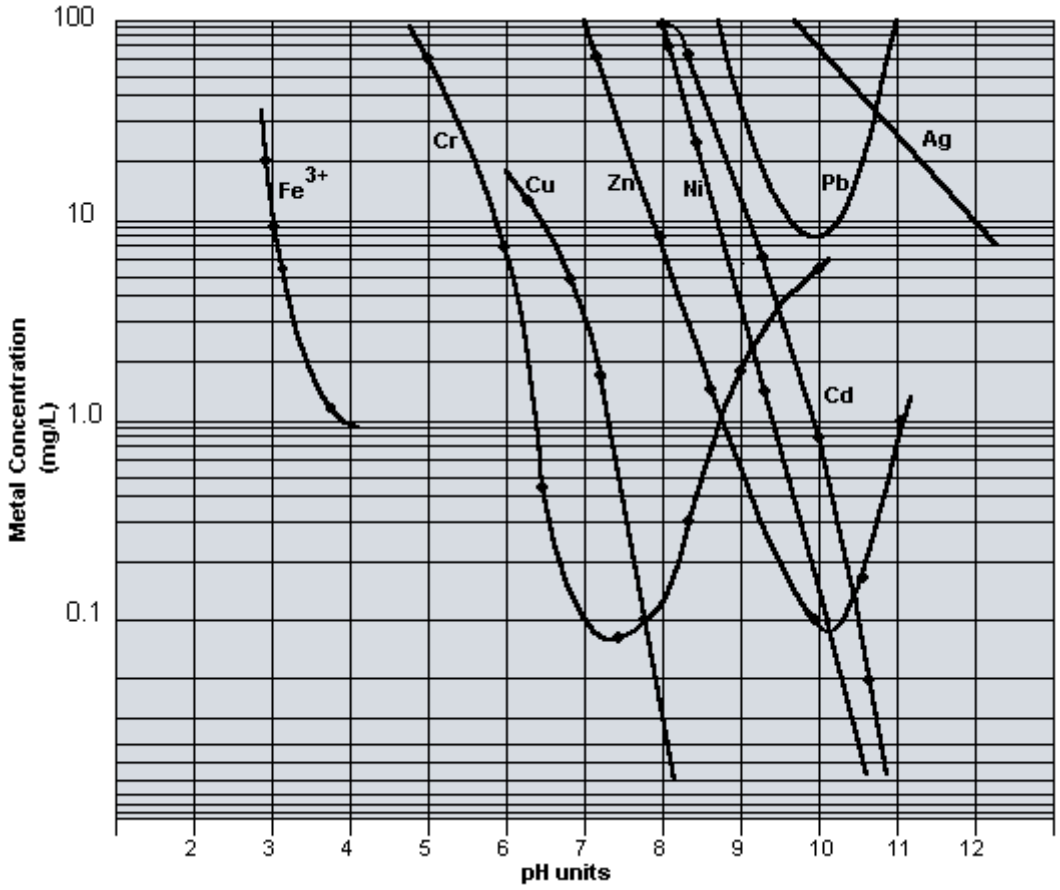


Figure 2: Metal hydroxide solubility curves (theoretical) (US EPA 1994).

9. TREATABILITY

Ramboll conducted the bench-scale treatability trial on 17 February 2021 using representative contaminated bulk samples, TP3A and TP5A, which were each pre-screened to <20 mm maximum particle size and homogenised. The soil samples were silty-sandy-gravelly soils, and were reddish brown in colour (TP3A, **Figure 3**) or light brown in colour (TP5A, **Figure 4**). The bulk samples were analysed for untreated total and leachable (TCLP) lead concentrations (**Table 4**).

For each treatment, sub-samples (600 g) of the homogenised bulk material were weighed into a mixing vessel followed by the appropriate amount(s) of reagents (**Table 5**), with sufficient water to moisten the soil, and thoroughly mixed using a hand-trowel. Hand mixing was considered the most effective method for mixing the amounts of material used for the treatments in this trial and has been previously demonstrated on a range of soil treatment projects to replicate full-scale treatment.

Figure 3. Homogenised bulk sample TP3A used in the lead immobilisation trials.

Figure 4. Homogenised bulk sample TP5A used in the lead immobilisation trials.

Treatments were conducted using MgO and/or MAP over a range of additive ratios (**Table 3**) based on Ramboll's previous experience with treatability trials for lead impacted soils. For all treated samples, the waste and reagent mixes were hydrated sufficiently (close to maximum water holding capacity) to facilitate formation of the stable lead compounds.

All treated samples were cured for at least 24 hours prior to post-treatment analysis of total (SCC) and leachable (TCLP) lead. All chemical analyses were conducted by Eurofins laboratory in Sydney, a NATA accredited laboratory and conducted the testing in accordance with quality

assurance protocols. Results for the treatment trial are summarised below in **Table 5**. Copies of the laboratory Certificates of Analysis are included in **Appendix 2**.

Table 5: Total (SCC) and leachable (TCLP) lead (Pb) concentrations in the treated waste (MAP = monoammonium phosphate; MgO = magnesium oxide).

Sample ID	Reagents		Total (SCC) Pb mg/kg	TCLP pH 5.0 Pb mg/L[1]	%Reduction	TCLP Leachate Initial pH	TCLP Leachate Final pH
	%MAP	%MgO					
General solid criteria	**--**	**--**	**1500**	**5**	--	--	--
Restricted solid criteria	**--**	**--**	**6000**	**20**	--	--	--
Untreated Samples							
TP3A_A_SCR	--	--	16,000	14	--	2.9	5
TP3A_B_SCR	--	--	15,000	28	--	3.1	5
TP3A_C_SCR	--	--	19,000	10	--	3.1	5
TP3A_D_SCR	--	--	10,000	35	--	3.3	5
Mean	--	--	**15,000**	**22**	--	**3.1**	**5**
TP5A_A_SCR	--	--	39,000	190	--	7.1	5
TP5A_B_SCR	--	--	35,000	180	--	4.3	5
TP5A_C_SCR	--	--	37,000	190	--	4.3	5
TP5A_D_SCR	--	--	19,000	140	--	5.3	5.1
Mean	--	--	**32,500**	**175**	--	**5.0**	**5**
Treated Samples							
TP3A_TR01-1	--	5%	8,200	<0.01	>99.9	9.2	9.0
TP3A_TR01-2	--	5%	--	<0.01	>99.9	9.3	9.0
Mean				**<0.01**	**>99.9**	**9.2**	**9.0**
TP3A_TR02-1	--	10%	9,600	<0.01	>99.9	9.5	9.2
TP3A_TR02-2	--	10%	--	<0.01	>99.9	9.5	9.3
Mean				**<0.01**	**>99.9**	**9.5**	**9.3**
TP3A_TR03-1	2%	5%	18,000	0.01	99.9	9.7	8.8
TP3A_TR03-2	2%	5%	--	0.03	99.9	9.7	9.2
Mean				**0.02**	**99.9**	**9.7**	**9.0**
TP3A_TR04-1	3%	5%	9,500	<0.01	>99.9	8.8	8.5
TP3A_TR04-2	3%	5%	--	0.04	99.8	8.9	8.3
Mean				**0.03**	**99.9**	**8.9**	**8.4**
TP3A_TR05-1	2%	10%	9,900	<0.01	>99.9	9.6	9.3
TP3A_TR05-2	2%	10%	--	0.04	99.8	9.6	9.3

Sample ID	Reagents		Total (SCC) Pb mg/kg	TCLP pH 5.0 Pb mg/L[1]	%Reduction	TCLP Leachate Initial pH	TCLP Leachate Final pH
	%MAP	%MgO					
Mean				**0.03**	**99.9**	**9.6**	**9.3**
TP3A_TR06-1	3%	10%	9,100	0.03	99.9	9.6	8.9
TP3A_TR06-2	3%	10%	--	0.01	99.9	9.5	9.0
Mean				**0.02**	**99.9**	**9.6**	**9.0**
TP5A_TR01-1	--	5%	17,000	0.19	99.9	9.7	9.2
TP5A_TR01-2	--	5%	--	<0.01	>99.9	9.8	9.0
Mean				**0.10**	**99.9**	**9.8**	**9.1**
TP5A_TR02-1	--	10%	15,000	0.05	>99.9	9.7	9.2
TP5A_TR02-2	--	10%	--	0.02	>99.9	9.7	9.2
Mean				**0.04**	**>99.9**	**9.7**	**9.2**
TP5A_TR03-1	2%	5%	18,000	0.03	>99.9	9.7	8.7
TP5A_TR03-2	2%	5%	--	0.03	>99.9	10	8.7
Mean				**0.03**	**>99.9**	**9.9**	**8.7**
TP5A_TR04-1	3%	5%	20,000	0.05	>99.9	9.9	9.2
TP5A_TR04-2	3%	5%	--	<0.01	>99.9	9.4	9.0
Mean				**0.03**	**>99.9**	**9.7**	**9.1**
TP5A_TR05-1	2%	10%	10,000	<0.01	>99.9	9.8	9.1
TP5A_TR05-2	2%	10%	--	0.01	>99.9	9.8	9.4
Mean				**0.01**	**>99.9**	**9.8**	**9.3**
TP5A_TR06-1	3%	10%	13,000	0.05	>99.9	9.9	9.4
TP5A_TR06-2	3%	10%	--	0.02	>99.9	9.8	9.3
Mean				**0.04**	**>99.9**	**9.9**	**9.4**
TP5A_TR07-1	4%	15%	12,000	0.08	>99.9	9.6	9.4
TP5A_TR07-2	4%	15%	--	0.05	>99.9	9.6	9.3
Mean				**0.07**	**>99.9**	**9.6**	**9.4**

[1]For calculation of mean results, the LOR was used if one of the duplicate results reported as <LOR

Results for the treated samples in **Table 5** demonstrate that each of the treatments successfully reduced the leachable lead to concentrations well below the GSW criterion of 5 mg/L lead (Pb) for both bulk samples, TP3A and TP5A, with >99.8% reduction in leachable (TCLP, pH 5) lead achieved for all treatments. Whilst bulk samples TP3A and TP5A used in the trial were pre-screened to <20 mm maximum particle size and homogenised, some variability is observed in the untreated total and leachable lead results, as well as the treated total lead results. However, this variabilty in lead concentrations is in line with previous lead immobilisation trials for soils undertaken by Ramboll and demonstrates the inherent

heterogeneity of lead contamination in the soil. However, despite this level of heterogeneity, each of the treatments consistently achieved >99.8% reduction in leachable lead concentrations, with duplicate samples included for each treatment.

The heterogeneity of total lead in soil at full-scale treatment will be addressed by ensuring the concentration of phosphate added to the soil is in excess of the **mean concentration** reported for total lead in untreated bulk sample TP5A (**Table 4**, 32,500 mg/kg), considered to represent a worst case scenario for total lead in soil (once excavated and screened) and provides an appropriately conservative approach.

The following stoichiometric calculation provides the upper limit of total lead able to be treated with the proposed 2.0% MAP:

- Molar mass of lead = 207.2 g
- Molar mass of MAP ($NH_4H_2PO_4$) = 115.3 g
- Molar mass of PO_4 = 94.7 g
- %PO_4 in MAP = 94.7/115.3 = 82.4%
- Mole ratio of PO4:Pb (assuming formation of hydroxypyromorphite, $Pb_5(PO_4)_3OH$) = 3:5 (0.6)

Mean concentration of total lead in soil (TP5A) = 32,500 mg/kg = 32.5 g/kg

Moles of mean total lead per kg of soil (TP5A) = 32.5/207.2 = 0.1569 moles

Mass of phosphate added per kg soil at 2.0% (20 g/kg) MAP additive ratio = 82.4% x 20 (g/kg MAP) = 16.48 g/kg

Moles of phosphate added per kg soil at 2.0% MAP additive ratio = 16.48/115.3 = 0.1429

Moles of PO_4 required (to be in excess of mean total lead) = 0.1568 x 0.6 = 0.0941

Upper limit of total lead able to be treated with 2.0% MAP = 0.1429 x (5/3) = 0.2381 moles = 0.2381 x 207.2 = 49.33 g/kg = 49,330 mg/kg

The stoichiometric calculation above shows that addition of 2.0% MAP to soil provides an amount of phophate in excess of the mean amount of lead in untreated sample TP5A (32,500 mg/kg), on a mole ratio basis assuming formation of hydroxypyromorphite, where sample TP5A is considered a worst case scenario from representative site sampling. Assuming 100% of total lead in soil became leachable over time (a very conservative estimate), for addition of 2.0% MAP, the upper limit of lead contamination able to be treated would be 49,330 mg/kg.

In order to provide evidence of the long term stability of the treated waste, four of the treated samples, TP3A-TR01-1 (5% MgO), TP3A-TR03-1 (2% MAP, 5% MgO), TP5A-TR01-1 (5% MgO) and TP5A-TR03-1 (2% MAP, 5% MgO), were selected for MEP analysis (lead), based on the minimum amount of reagent required to successfully treat both bulk samples, which are presented in **Table 6**. These results show:

- All four MEP results remained relatively stable over the 10 sequential extractions and were well below the GSW criterion of 5 mg/L Pb.
- The final pH of the leachate also remained relatively stable, with the leachate pH at Day 10 ranging from 9.1 to 9.8, close to the minimum point of solubility for lead.
- There appeared to be little difference in the MEP results for TR01 (5% MgO) vs TR03 (2% MAP, 5% MgO) for both bulk samples, indicating MAP is not required to achieve long term stability of the treated waste.
- Whilst there was some variability across the 10 MEP extractions for each sample, these results are similar to previous MEP results reported for lead immobilised wastes and is

likely related to the low concentrations detected and/or heterogeneity of lead in the sample, where the amount of lead exposed to leachate during each test may vary.
- There was one anomalously higher leachate result of 1 mg/L for TP5A_TR01-1 on Day 9 (however results on Day 8 and Day 10 were below the LOR of 0.01 mg/L), hence it is likely this result was an anomaly, however it is still five times below the GSW criterion for lead.

Based on the treatment trial results presented in **Table 5** and **Table 6**, the stoichiometric calculation presented above and EPA endorsement of the use of both MAP and MgO, it is proposed to use **2.0% MAP** and **5% MgO** to chemically immobilise the leachable lead in the waste material from the Site. Whilst addition of MAP did not appear to provide substantial improvement to either the short term (TCLP) or long term (MEP) treatment results, EPA endorse the immobilisation of metals such as lead through both chemical immobilisation and pH buffering to ensure the best environmental outcome whilst also ensuring a level of consistent regulation of SIA within NSW.

10. ABILITY TO REPRODUCE THE PROCESSES, AND QUALITY ASSURANCE

The remediation contractor undertaking the waste treatment shall have an Environmental Management System with third party accreditation to ISO14001 and work under the framework of an integrated Management Plan for the remediation works. As part of this plan, Work Procedures, Inspection and Test Plans and Inspection and Test Reports will be developed for specific tasks such as the proposed on-site treatment works.

The Work Procedure and Inspection and Test Plan will cover aspects such as:

- Materials tracking and batch formation
- Sampling procedures (composite sampling) and results reporting including accept/reject criteria
- Analytical testing to be undertaken by NATA accredited testing bodies.

Sampling of the treated stockpiled waste will take place at a rate of 1 sample per 25 m^3 of waste for analytical testing. Samples will be dispatched to a NATA accredited laboratory for TCLP and total lead analyses. Conformance of the waste material will be based on an accept/reject procedure determined by calculation of 95% UCL for chemical contaminants. Further details are presented in **Section 13**. Additionally a formal contingency plan has been prepared and is presented in **Section 12** to define actions if lead leachate in treated waste is reported above SCC1.

This remediation project is subject to audit, and a full Validation Sampling, Analysis and Quality Plan (VSAQP) will be developed and signed off by the auditor. The project implementation will also be overseen by the auditor.

TP3A_TR01-1	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
Leachate Fluid	4	4	4	4	4	4	4	4	4	4
pH (initial)	9.4	8.7	8.8	9.3	8.8	9	9.1	9.7	9.7	9.2
pH (Leachate fluid)	6.8	5.1	6.8	6.8	6.8	6.8	6.2	6.2	6.2	6.2
pH (off)	9.6	9.2	9.5	9.5	9.3	9.3	9.8	9.3	9.3	9.1
Lead (mg/L)	<0.001	0.001	0.003	0.002	<0.001	0.002	<0.001	<0.001	0.004	0.017
TP3A_TR03-1	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**	**Day 8**	**Day 9**	**Day 10**
Leachate Fluid	4	4	4	4	4	4	4	4	4	4
pH (initial)	9.1	8.7	8.9	9.3	9	9.4	9	9.7	9.7	9.3
pH (Leachate fluid)	6.8	5.1	6.8	6.8	6.8	6.8	6.2	6.2	6.2	6.2
pH (off)	9.5	9.3	9.5	9.4	9.6	9.5	9.5	9.4	9.4	9.4
Lead (mg/L)	0.12	0.001	0.004	0.13	0.001	0.002	<0.001	0.013	0.015	0.003
TP5A_TR01-1	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**	**Day 8**	**Day 9**	**Day 10**
Leachate Fluid	4	4	4	4	4	4	4	4	4	4
pH (initial)	9.6	9.1	9.5	9.8	9.6	9.9	9.6	9.9	9.8	9.8
pH (Leachate fluid)	6.8	5.1	6.8	6.8	6.8	6.8	6.2	6.2	6.2	6.2
pH (off)	10	9.6	9.5	9.8	9.8	9.7	9.9	9.7	9.7	9.8
Lead (mg/L)	0.002	<0.001	0.017	0.075	0.004	0.003	0.058	<0.001	1	<0.001
TP5A_TR03-1	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**	**Day 8**	**Day 9**	**Day 10**
Leachate Fluid	4	4	4	4	4	4	4	4	4	4
pH (initial)	9.4	8.9	9.3	9.7	9.4	9.9	9.5	10	9.9	9.7
pH (Leachate fluid)	6.8	5.1	6.8	6.8	6.8	6.8	6.2	6.2	6.2	6.2
pH (off)	10	9.7	9.7	9.8	9.8	9.8	10	9.8	9.8	9.8
Lead (mg/L)	<0.001	0.036	0.031	0.053	0.047	0.042	<0.001	0.016	0.017	0.001

11. PROPOSED DISPOSAL LOCATION

It is proposed the treated and validated material will be disposed to a local landfill (to be confirmed) once the amendment to development consent conditions and EPL for the nominated receiving facility are approved.

12. CONTINGENCY PLAN

The contingencies presented in **Table 12-1** are to be implemented where unexpected site conditions or circumstances occur.

Table 12-1: Contingency Plan

Contingency Event	Contingency Action	Personnel Responsible
Validation sampling indicates screened ballast is unsuitable for onsite reuse	Further removal of contaminated fines or immobilisation and disposal	Remediation Contractor following consideration from Principal and Principal's Environmental Representative
Validation sampling of immobilised material indicates not suitable for disposal as immobilised GSW	Further immobilisation will occur	Remediation Contractor following consideration from Principal and Principal's Environmental Representative
Discovery of unexpected materials	Contact the Principal's representative, sort materials into a segregated stockpile and discuss possible disposal options with the Principal or the Principal's Representative	Principal, following notification from the Remediation Contractor

13. VALIDATION PLAN

The following is the validation Sampling and Analysis Quality plan (SAQP) to be implemented to validate the screening and immobilisation of lead contamianted waste from the Tarago Rail Yard.

13.1 Validation Data Quality Objectives

Specific Data Quality Objectives (DQOs) have been developed for the validation of field and analytical data obtained during the remediation. The DQO process is a systemic, seven step process that defines the criteria that the validation sampling should satisfy in accordance with the requirements of NSW EPA (2017) *Guidelines for the NSW Site Auditor Scheme* (3rd Edition). DQOs specific to the screening and immobilisation of waste from the Tarago Rail Yard are presented below.

13.1.1 Step 1: State the Problem

Lead impacted soil exists at the site. Remediation is required to mitigate potential exposure risks into the future. The proposed remedial strategy includes excavation of lead impacted material, transport to a landfill for mechanical screening to remove ballast and chemical immobilisation of lead in fines, return of ballast for reuse at the site and dispsoal of fines as immobilised GSW.

13.1.2 Step 2: Identify the Decisions

The validation SAQP is to ensure that contaminated material excavated from the Woodlawn Siding and surrounding soils (described in further detail on **Figures 2a** – **2e**) is appropratiely screened to allow onsite reuse of ballast and immobilised to allow offsite disposal under a SIA.

13.1.3 Step 3: Identify Inputs to the Decision

The following inputs into the decision-making process are required:

- fpXRF measurement of lead concentrations to refine excavation areas onsite before excavation commences
- Documented materials tracking of all material movements including source excavation, transport. Screening and immobilisation, return of ballast to site and disposal of immobilised GSW
- fpXRF measurement of lead during remediation to define vertical and horizontal excavation limits onsite
- Validation sampling of screened ballast and analyses for total lead to confirm suitability for reuse onsite
- Validation sampling of immobilised ballast fines for TCLP lead to confirm suitability for disposal as immobilised GSW
- fpXRF measurement of lead in the screening and immobilisation compound before establishment of the compound and at completion of remediation
- Survey of validation excavations to define contaminated areas remaining onsite

13.1.4 Step 4: Define the Study Boundary

The study boundary includes proposed excavation areas onsite (the Woodlawn Siding and surrounding soils as defined on **Figures 2a** – **2e**) and the screening and immobilisation compound.

13.1.5 Step 5: Development of Decision Rules

Data will be considered reliable if it satisfies the limits of decision error defined in **Section 13.1.6**.

Excavation will be considered sufficient when lead concentrations in remnant soils onsite are below the nominated remediation criteria of 2,200 mg/kg or excavation must be limited to preserve the structural integrity of operational lines.

Screened ballast will be considered suitable for reuse if the 95% UCL of lead concentrations in screened ballast after remediation is less than the nominated remediation criteria of 2,200 mg/kg.

Ballast fines will be considered suitable for disposal as immobilised GSW if the 95% UCL of lead leachate (TCLP) is less than the limit for lead leachate in GSW defined in the NSW EPA Waste Classification Guidelines (TCLP1 – 5 mg/L).

Clean-up of the screening and immobilisation compound after remediation will be considered complete when the 95% UCL of lead concentrations in remnant surface soils is below either the Tier 1 health investigation level for lead industrial land or the 95% UCL of lead concentrations in remnant surface soils before establishing the compound.

13.1.6 Step 6: Specify Performance Criteria

Validation performance criteria are defined to assess potential for a false positive or false negative in validation data. Performance criteria for fpXRF measurements of lead in soil, and sampling for laboratory analyses of surface water and airborne dust are presented in **Table 13-1** below.

Table 13-1 Performance Criteria for Validation Sampling

	fpXRF Measurements	**Sampling of Screened Ballast and Immobilised Ballast Fines**
Accuracy: Accuracy in the collection of field data will be controlled by:	Appropriate sampling methodologies utilised and complied with. Works to be completed in accordance with US EPA 2007, *Method 6200, Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment*.	Soil sampling for laboratory analyses will occur in general accordance with *AS 4482.1-2005 Guide to the investigation and sampling of sites with potentially contaminated soil - Non-volatile and semi-volatile compounds* and *AS 1141.3.1 – 2012 Methods for Sampling and Testing Aggregates, Method 3.1: Sampling – Aggregates*
Precision: The degree to which data generated from replicate or repetitive measurements differ from one another due to random errors. Precision of field data will be maintained by:	• XRF readings will be collected by an experienced scientist holding a NSW EPA license required for field based XRF testing • XRF readings will be collected from soil in-situ and measurements will be taken by placing the XRF directly on the ground surface. • the soil surface to be measured will be cleared of debris and grass prior to taking the measurement to ensure that there is no obstruction, that the analyser window is protected and that contact with the sample surface is maintained during measurements. • As moisture is known to affect measured concentrations, visually dry surfaces will be chosen for measurement. • Soil sampling for confirmatory laboratory analyses will occur in general accordance with *AS 4482.1-2005 Guide to the investigation and sampling of sites with potentially contaminated soil - Non-*	In the field, precision will be maintained by: • Using standard operating procedures for the collection of soil samples. • Collection of soil samples by suitably experienced environmental scientists. • Use of disposable nitrile rubber gloves between sampling locations. • Placement of samples directly into designated single use sampling containers. • Collection of intra-laboratory and inter-laboratory duplicate samples at a rate of 1 in 20 primary samples. • Collection of one rinsate sample on reusable sampling equipment at the end of each day. • Recording of sample identification and analytical requirements on chain of custody documents. • Samples transported to the laboratory under chain of custody conditions to a laboratory with NATA

	fpXRF Measurements	**Sampling of Screened Ballast and Immobilised Ballast Fines**
	volatile and semi-volatile compounds. This will include: ○ Collection of samples by a suitably experienced environmental scientist ○ Use of disposable nitrile rubber gloves between locations ○ Soil samples will be placed immediately into laboratory supplied and appropriately preserved sampling vessels. ○ Sample numbers, preservation and analytical requirements are to be recorded on chain of custody documents. • Samples are to be transported to the laboratory under chain of custody conditions to a laboratory with NATA accreditation for COPCs.	accreditation for the analytical methods prescribed. • XRF readings collected by an experienced scientist holding a NSW EPA license required for field based XRF testing. • In the laboratory, precision will be assessed using blind duplicate samples and split duplicates.
Completeness: The completeness of the data set shall be judged by:	• All locations sampled as outlined in **Section 13.1.7**. • Sampling completed by experienced personnel • Field documentation completed correctly	• All locations sampled as outlined in **Section 13.1.7**. • Sampling completed by experienced personnel • Field documentation completed correctly
Representativeness: The representativeness of the field data will be judged by:	• Non-disposable sampling equipment, such as the hand auger, will be thoroughly decontaminated between locations using Decon 90 solution and deionised rinsate water. • At each location, a pair of disposable nitrile gloves will be	• Non-disposable sampling equipment, such as the hand auger, will be thoroughly decontaminated between locations using Decon®90 solution and deionised rinsate water. • At each location, a pair of disposable nitrile gloves will be worn while sampling and

	fpXRF Measurements	**Sampling of Screened Ballast and Immobilised Ballast Fines**
	worn while sampling and handling the sample; gloves will be replaced between each successive sample. • Soil analytical samples will be collected directly into the sampling vessels.	handling the sample; gloves will be replaced between each successive sample. • Soil analytical samples will be collected directly into the sampling containers following size reduction and splitting.
Comparability: Comparability to existing field data will be maintained by:	• Use of the same appropriate sampling methodologies • Same sampling depths will be used (i.e.: 0-0.05 mbgl) • Analytical samples will be collected for submission to the laboratory • Photographs will be taken of sampling location conditions at the time of sampling.	• Use of the same appropriate sampling methodologies • Same sampling depths will be used (where practical) • Analytical samples will be collected for submission to the laboratory • Photographs will be taken of sampling location conditions at the time of sampling.

Performance criteria for analyses of soil duplicates are defined as follows:

- Data will be analysed adopting RPD control limits of +/- 30%.
  Where concentration levels are less than two times the PQL, the Absolute Difference (AD) shall be calculated. Data will be considered acceptable if the: AD <2.5 times the PQL.

  Any data which does not conform to these acceptance criteria will be examined for determination of suitability.
- The laboratory will additionally undertake a method blank with each analytical batch of samples. Laboratory method blank analyses are to be below the PQLs. Results shall be examined, and any positive results shall be examined. Positive blank results may not be subtracted from sample results.

  Positive results may be acceptable if sample analyte concentrations are significantly greater than the amount reported in the blank (ten times for laboratory reagents such as methylene chloride, chloroform, and acetone etc., and five times for all other analytes). Alternatively, the laboratory PQL may be raised to accommodate blank anomalies provided that regulatory guidelines are not compromised by any adjustment made to the PQL.

Decision Error Protocol

If the data received is not in accordance with the defined acceptable limits outlined in Steps 5 and 6, it may be considered to be an estimate or be rejected. Determination of whether this data may be used or if re-sampling is required will be based on the following considerations:

- Closeness of the result to the guideline concentrations
- Specific contaminant of concern (e.g., response to carcinogens may be more conservative)
- The area of site and the potential lateral and vertical extent of questionable information
- Whether the uncertainty can be effectively incorporated into site management controls

Rectifying Non-conformances

If any of the validation procedures or criteria identified are not followed or met, this will constitute a non-conformance. The significance of the non-conformance will determine if rectification is required after discussion with the site auditor. In order to address any non-conformances, the Principal's Environmental Representative must assess the significance of each non-conformance and put their conclusion and recommendation to the auditor for approval.

13.1.7 Step 7: Optimise the Design for Obtaining Data

All validation samples are to be collected in accordance with the DQOs outlined in this Section.

Validation samples, frequency of collection, the analysis required, and justification is presented in **Table 13-2**.

Table 13-2: Validation Plan

Validation Method	Validation Requirements	Measurement / Analyses
Validation of remnant soils	fpXRF measurements onsite demonstrating lead in excavation surface soils is < 2200 mg/kg. fpXRF measurements at the immobilsiation compound deomnstrating the 95% UCL of lead concentrations in remnant surface soils is below either the Tier 1 health investigation level for lead industrial land or the 95% UCL of lead concentrations in remnant surface soils before establishing the compound. Measurements will occur to achieve a density of 1/100 m^2 across the base of excavation areas on 10 meter icnrements along excavation walls. Measurements will occur to achieve a density of 1/100 m^2 across the immobilisation compound. Validation sampling has occurred in areas where excavation of lead impacted soils occurred during loop extension. Analytical results will be provided in the validation report though were observed to fall below site assessment criteria. Excavation for rail loop construction was followed by importation and placemnet of rail construction materials. Further validation is not considered warranted though would also not be feasible without disturbing active rail formation. Review of material tracking demonstrating appropriate and controlled movement of lead impacted materials. Lead impacted soils will remain in onsite following remediation and will be managed under a long term EMP.	fpXRF measurements of lead supplemented by laboratory QC samples and existing primary laboratory analyses.
Validation of screened ballast and immobilised fines	Screened ballast will be considered suitable for reuse if the 95% UCL of lead concentrations in screened ballast after remediation is less than the Industrial Health Investigation Level for lead of 1,500 mg/kg (NEPC 2013). Ballast fines will be considered suitable for disposal as immobilised GSW if the 95% UCL of lead leachate (TCLP) is less than the limit for lead leachate in GSW defined in the NSW EPA Waste Classification Guidelines (TCLP1 – 5 mg/L). Validation sampling of screened ballast and immobilised fines stockpiles will be completed by the Principals environmental representative. Sampling will occur to achieve a density of 1/25 m^3 with a minimum of three samples.	Laboratory analyses of screened ballast for total lead and immobilised fines for lead leachate (TCLP).

13.2 Validation Reporting

A validation Report will be prepared in general accordance with the relevant sections of NSW OEH (2020) *Guidelines for Consultants Reporting on Contaminated Land* and the NSW EPA *Guidelines for the NSW Site Auditor Scheme 3rd Edition* (NSW EPA 2017). The Validation Report will include:

- Executive summary
- Scope of work
- Site Description
- Summary of site history and previous investigations
- Remediation activities undertaken, including the extent of the excavation works (survey information) and observations made during excavation works
- Supporting factual evidence of the remediation work including photographic and field records and materials tracking data
- Validation sampling and analysis results
- Quality assurance/ quality control (QA/QC) protocols for field work and laboratory analysis and
- A statement indicating the adequacy of the remediation completed, degree to which lead impacts have been removed and if / where impacts remain.

Please contact the undersigned if you have any questions.

Yours sincerely,

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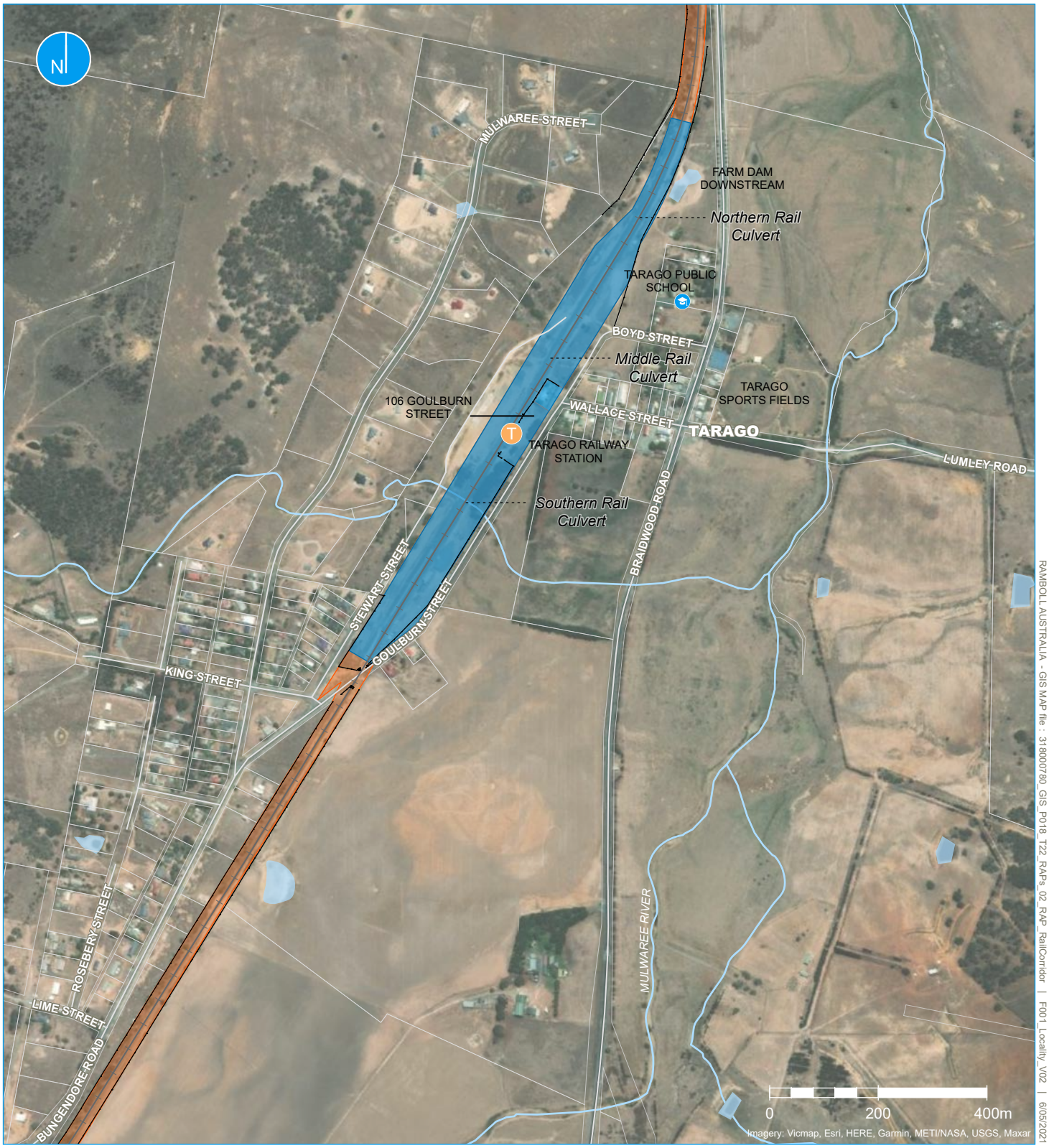
APPENDIX 1
FIGURES



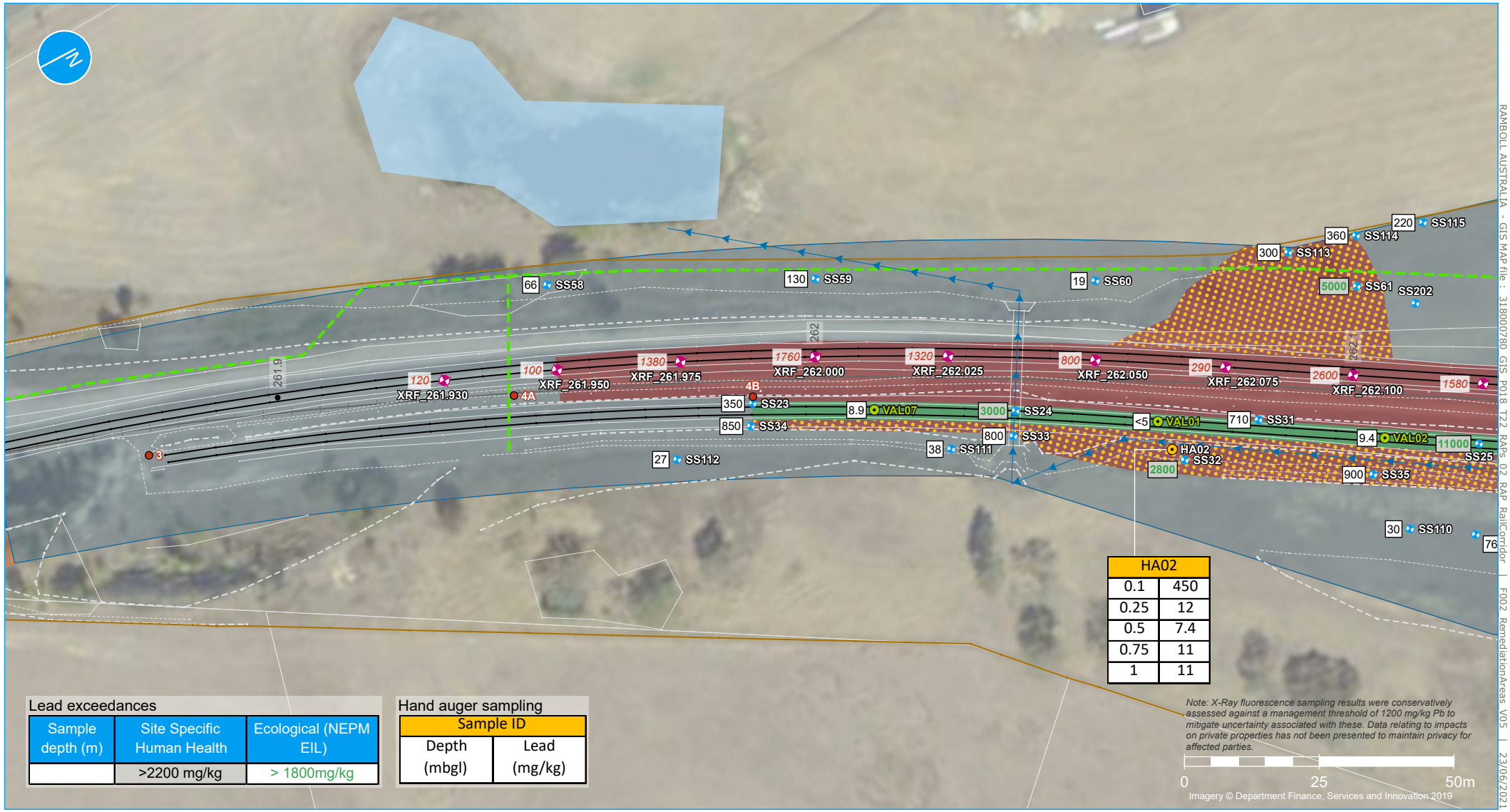
RAMBOLL AUSTRALIA - GIS MAP file : 318000780_GIS_P018_T22_RAPs_02_RAP_RailCorridor | F001_Locality_V02 | 6/05/2021

A4
1:10,000

Legend

- Site boundary
- Rail corridor
- Rail corridor fence

Figure 1 | Locality Plan



HA02	
0.1	450
0.25	12
0.5	7.4
0.75	11
1	11

Lead exceedances

Sample depth (m)	Site Specific Human Health	Ecological (NEPM EIL)
	>2200 mg/kg	> 1800mg/kg

Hand auger sampling

Sample ID	
Depth (mbgl)	Lead (mg/kg)

Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Previous sampling location (McMahon)
- Shallow soil (Ramboll 2019)
- Hand auger (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Validation sample (Ramboll 2019)

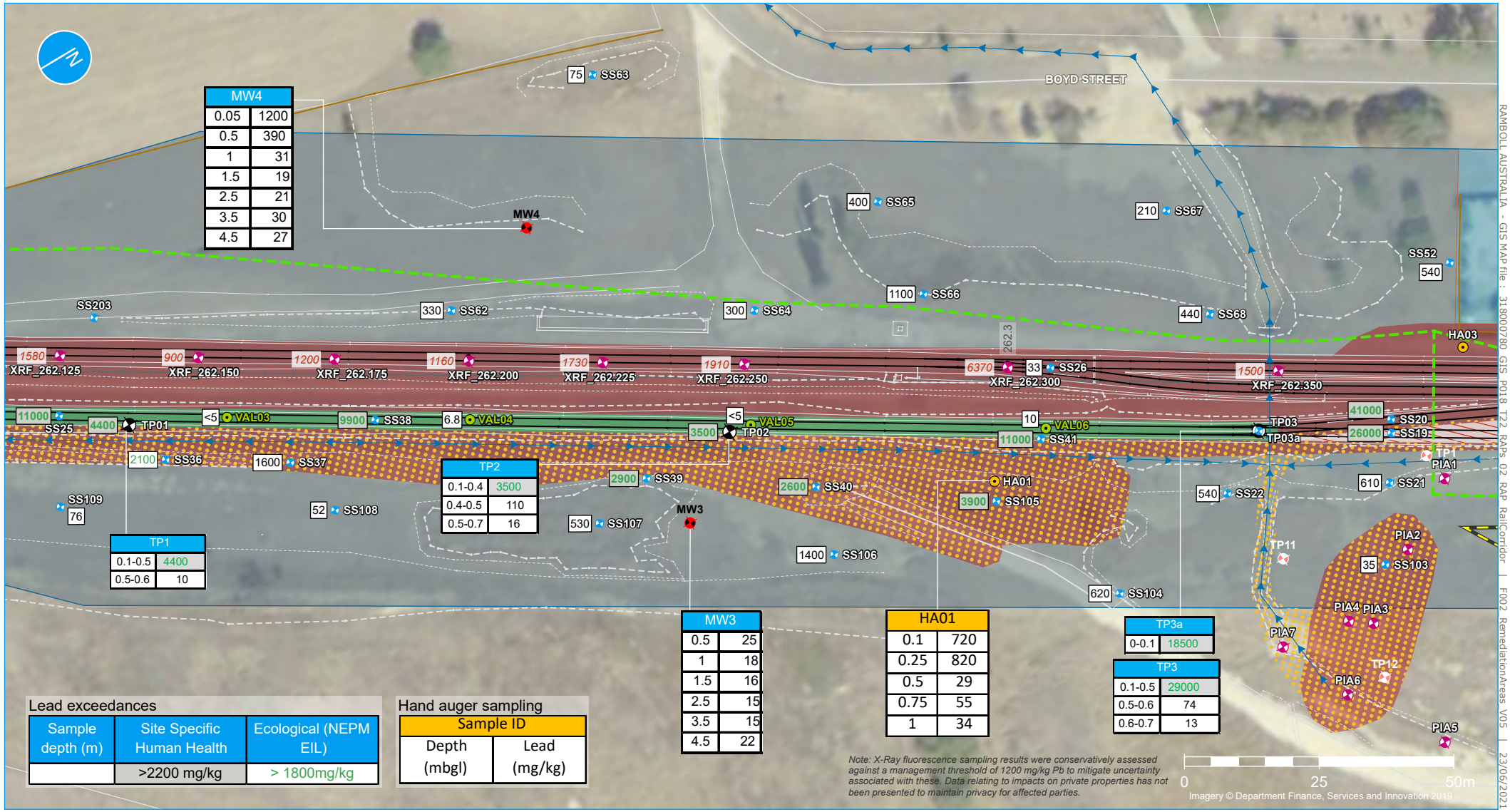
- Lead impacted area to remain
- Lead impacted area surrounding the siding (excluding all rail formation) - proposed excavation depth 0.3 mbgl
- Area of excavation during loop extension (no further excavation proposed)

A4
1:1,000

Location

Page 1 of 5

Figure 2a | Site Plan



Lead exceedances

Sample depth (m)	Site Specific Human Health	Ecological (NEPM EIL)
	>2200 mg/kg	> 1800mg/kg

Hand auger sampling

Sample ID	
Depth (mbgl)	Lead (mg/kg)

Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these. Data relating to impacts on private properties has not been presented to maintain privacy for affected parties.

Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)
- Former loadout road (approximate)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

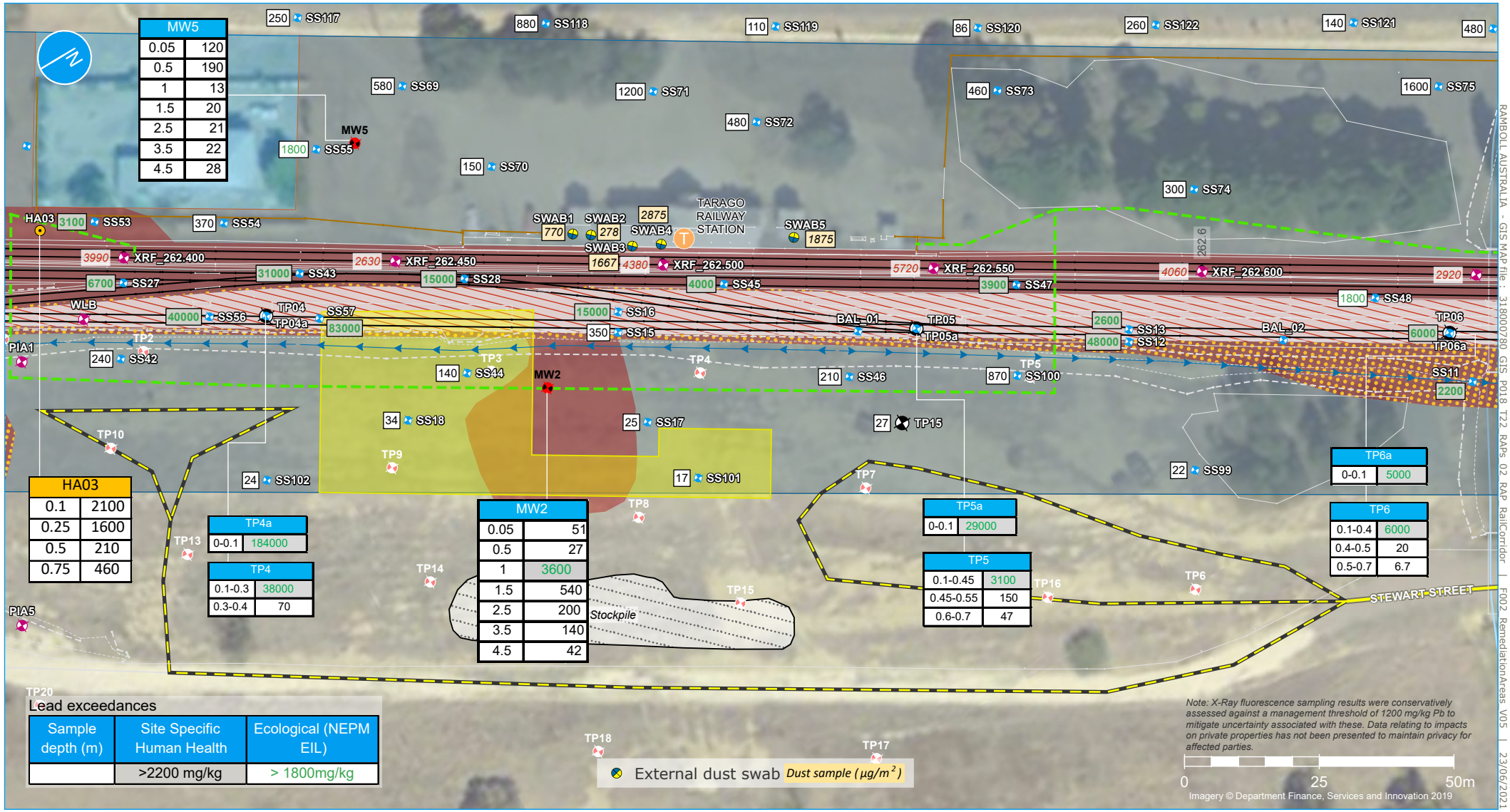
- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- Hand auger (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Validation sample (Ramboll 2019)
- Groundwater monitoring location
- Test pit (loadout complex)

- Lead impacted area to remain
- Redundant Woodlawn siding - propopsed excavation depth 0.5 mbgl
- Lead impacted area surrounding the siding (excluding all rail formation) - proposed excavation depth 0.3 mbgl
- Area of excavation during loop extension (no further excavation proposed)

A4
1:1,000

Location

Figure 2b | Site Plan



Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)
- Former loadout road (approximate)
- Former loadout complex building footprint

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

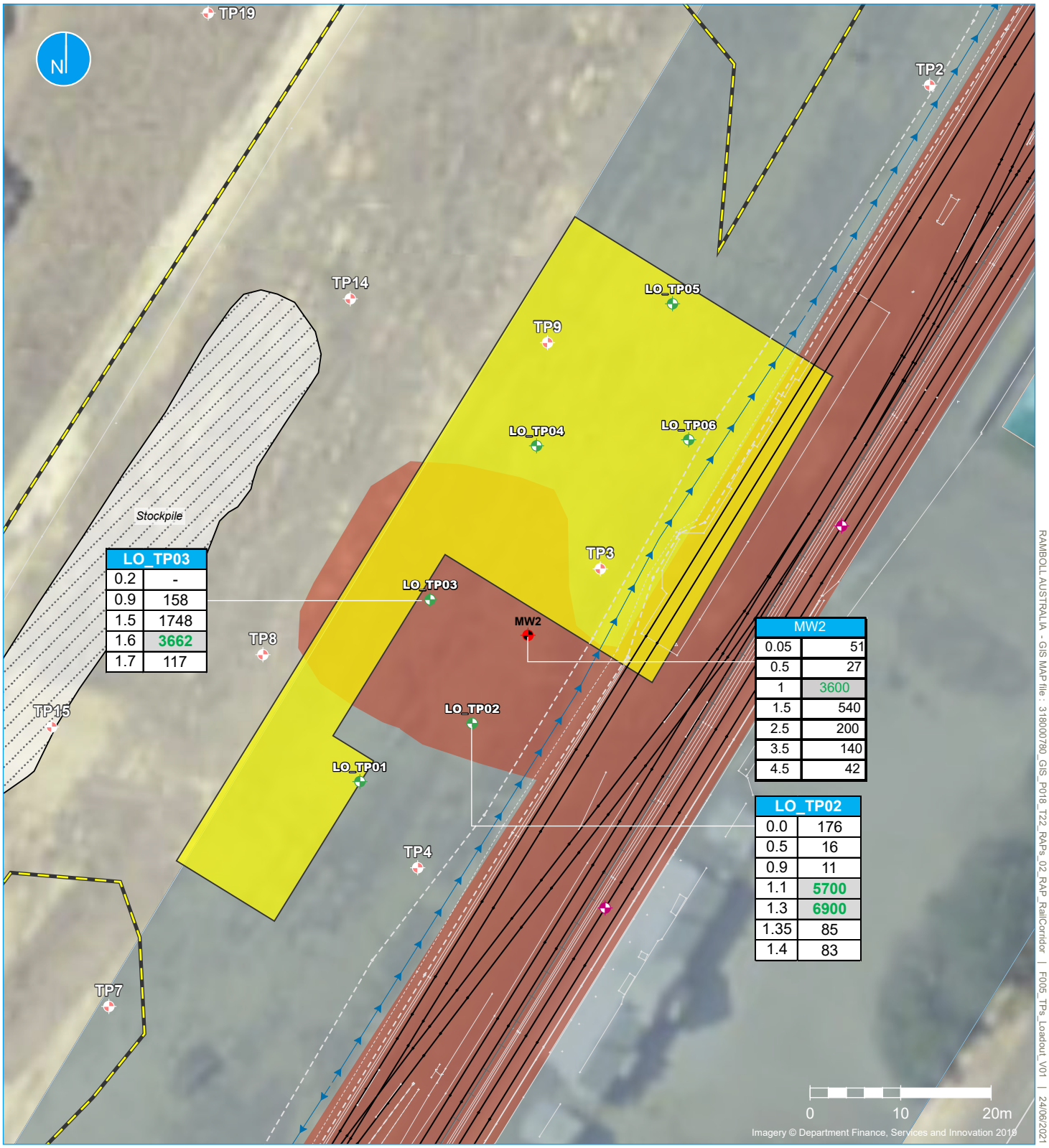
- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- Hand auger (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Groundwater monitoring location
- Test pit (loadout complex)

- Lead impacted area to remain
- Redundant Woodlawn siding - propopsed excavation depth 0.5 mbgl
- Lead impacted area surrounding the siding (excluding all rail formation) - proposed excavation depth 0.3 mbgl
- Haul route

A4 1:1,000

Location

Figure 2c | Site Plan



A4
1:600

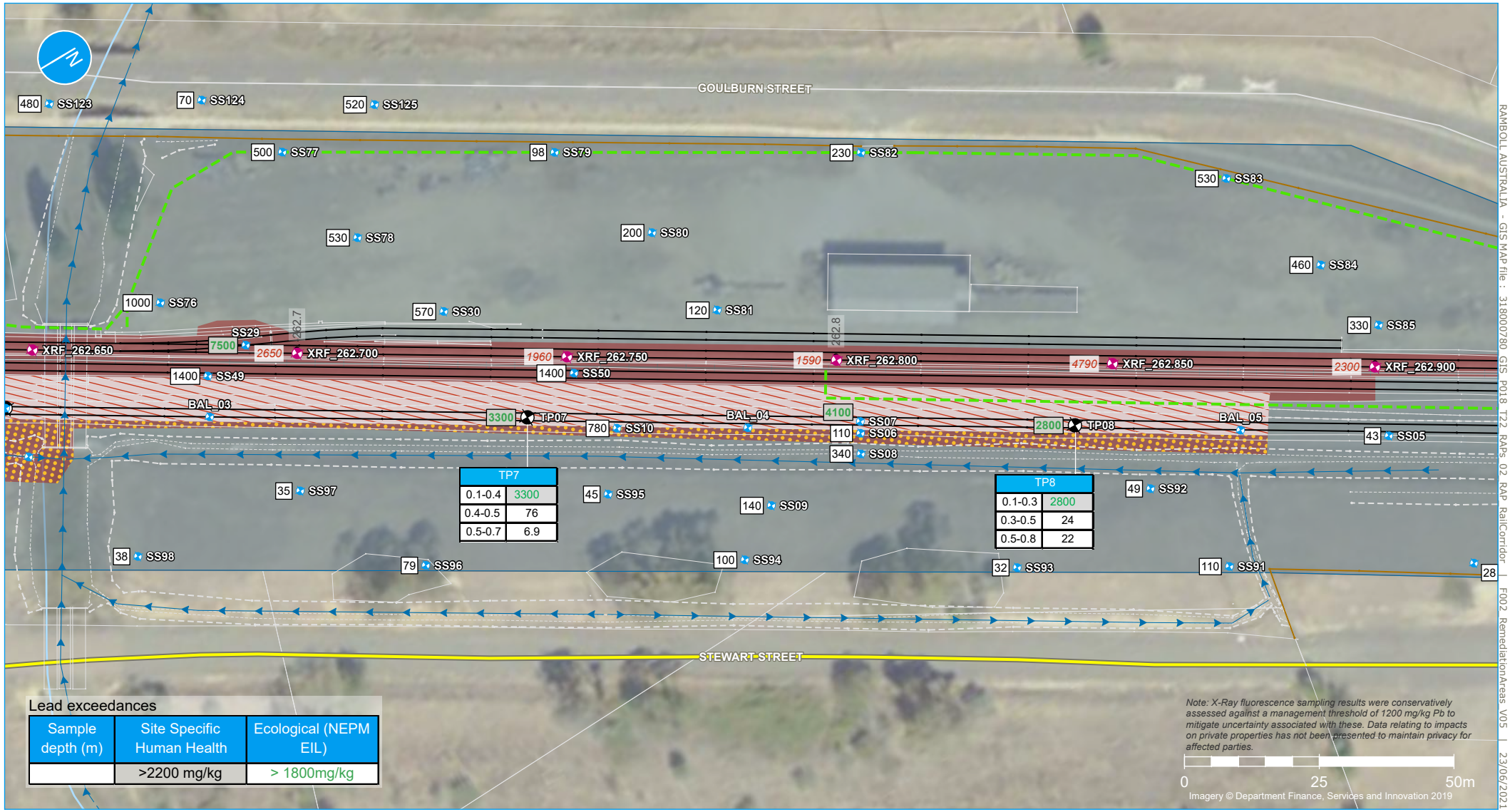
Legend

- Former loadout complex building footprint
- Former loadout road (approximate)
- Site boundary
- Surface water flow (indicative)
- Lead impacted area
- Loadout complex testpit (March 2020)
- Loadout complex testpit (August 2020)
- Groundwater monitoring location

Lead exceedance criteria

Sample depth (m)	Site Specific Human Health	EIL Commercial/Ind. (NEPM 2013)
	>2200 mg/kg	>1800 mg/kg

Figure 2ci | Loadout complex sampling locations



Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

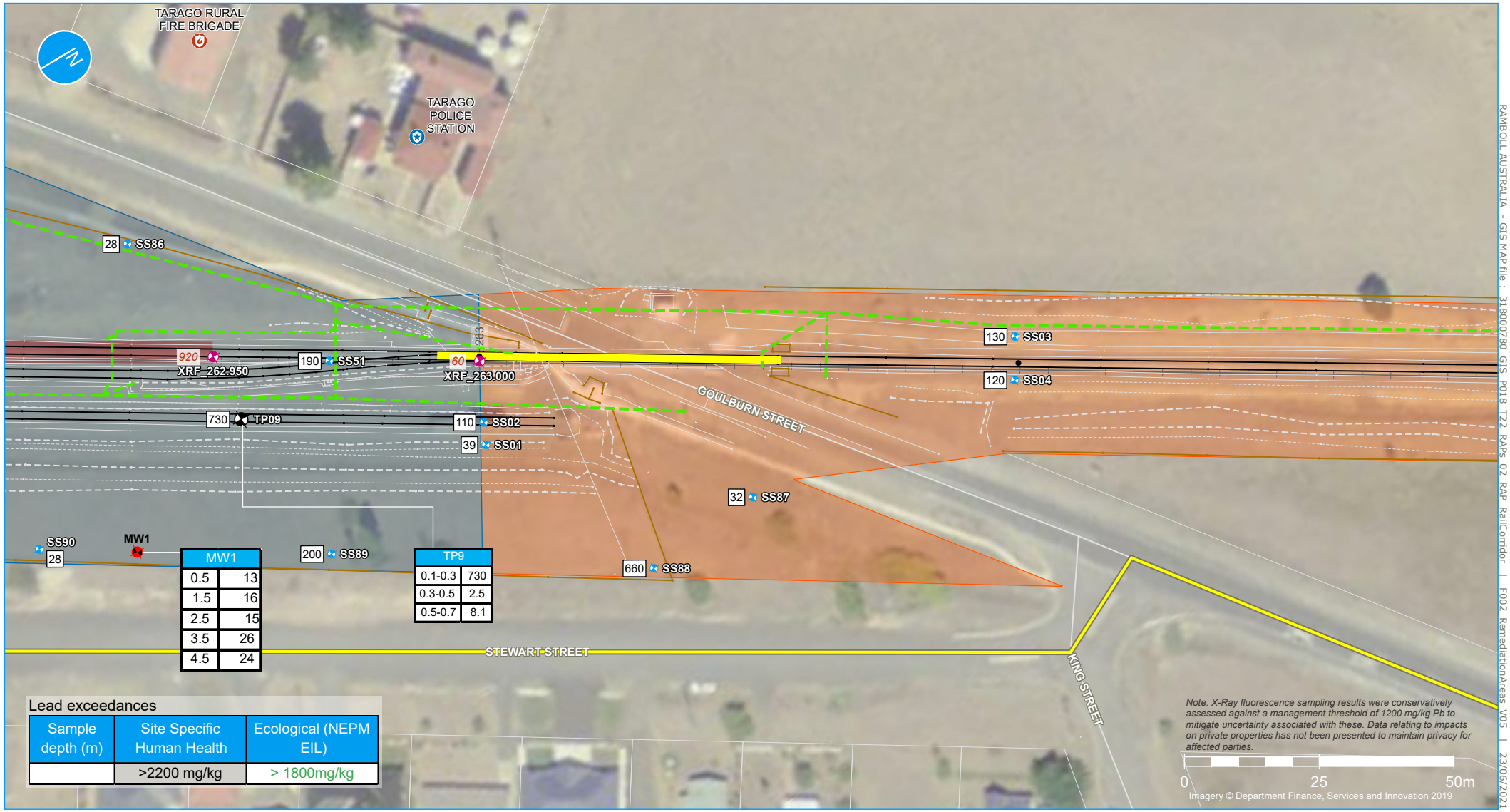
- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)

- Lead impacted area to remain
- Redundant Woodlawn siding - propopsed excavation depth 0.5 mbgl
- Lead impacted area surrounding the siding (excluding all rail formation) - proposed excavation depth 0.3 mbgl
- Haul route

A4 1:1,000

Location

Figure 2d | Site Plan



Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Goulburn Street level crossing
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

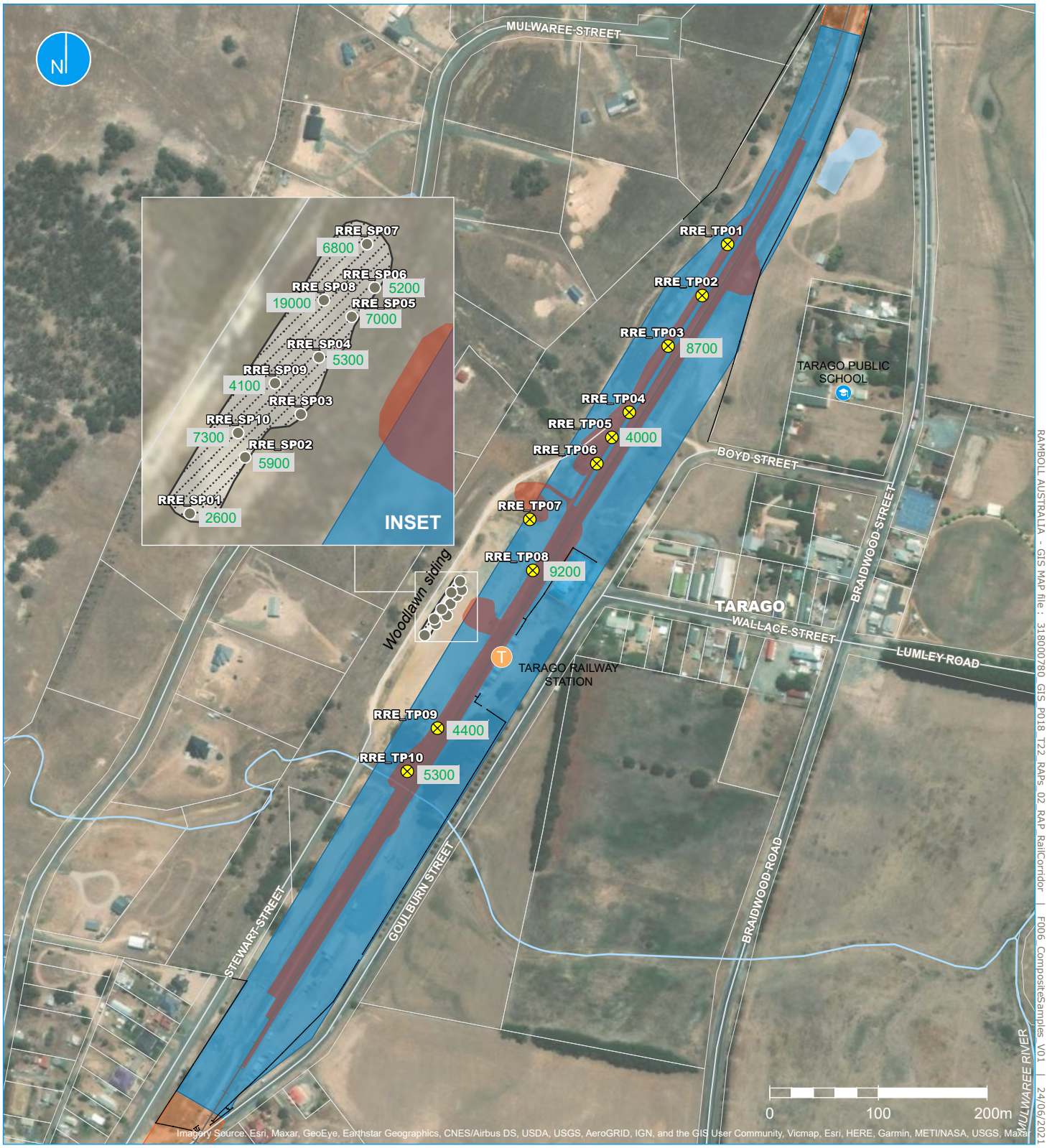
- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Groundwater monitoring location

- Lead impacted area to remain
- Haul route

A4
1:1,000

Figure 2e | Site Plan



A4
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Legend

- Site boundary
- Rail corridor
- Rail corridor fence
- Lead impacted area
- Stockpile (JHR)

Composite sampling (Ramboll 2020)

- Stockpile sample
- Test pit
- 400 Lead (mg/kg)

Figure 3 | Soil Sampling for the Resource Recovery Exemption

APPENDIX 2
LABORATORY CERTIFICATES OF ANALYSIS

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Stephen Maxwell**

Report **668047-S**
Project name
Project ID 318000780
Received Date Jul 26, 2019

Client Sample ID			**TP1 0.1-0.5**	**TP1 0.5-0.6**	**TP2 0.1-0.4**	**TP2 0.4-0.5**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Jl39891**	**S19-Jl39892**	**S19-Jl39893**	**S19-Jl39894**
Date Sampled			**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	4400	10	3500	110
% Moisture	1	%	3.9	4.8	2.7	4.4

Client Sample ID			**TP2 0.5-0.7**	**TP3 0.1-0.5**	**TP3 0.5-0.6**	**TP3 0.6-0.7**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Jl39895**	**S19-Jl39896**	**S19-Jl39897**	**S19-Jl39898**
Date Sampled			**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	16	29000	74	13
% Moisture	1	%	9.2	9.8	6.4	9.1

Client Sample ID			**TP4 0.1-0.3**	**TP4 0.3-0.4**	**TP5 0.1-0.45**	**TP5 0.45-0.55**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Jl39899**	**S19-Jl39900**	**S19-Jl39901**	**S19-Jl39902**
Date Sampled			**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	38000	70	3100	150
% Moisture	1	%	4.2	8.4	5.6	5.4

Client Sample ID			TP5 0.6-0.7	TP6 0.1-0.4	TP6 0.4-0.5	TP6 0.5-0.7
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39903	S19-JI39904	S19-JI39905	S19-JI39906
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	47	6000	20	6.7
% Moisture	1	%	12	5.8	6.5	11

Client Sample ID			TP7 0.1-0.4	TP7 0.4-0.5	TP7 0.5-0.7	TP8 0.1-0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39907	S19-JI39908	S19-JI39909	S19-JI39910
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	3300	76	6.9	2800
% Moisture	1	%	3.7	5.7	11	2.2

Client Sample ID			TP8 0.3-0.5	TP8 0.5-0.8	TP9 0.1-0.3	TP9 0.3-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39911	S19-JI39912	S19-JI39913	S19-JI39914
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	24	22	600	< 5
% Moisture	1	%	6.0	9.5	2.4	6.1

Client Sample ID			TP9 0.5-0.7	TP15 0.1	TP15 0.8	SS1 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39915	S19-JI39918	S19-JI39919	S19-JI39920
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	8.1	27	26	39
% Moisture	1	%	10	6.1	12	4.6

Client Sample ID			SS2 0.0-0.1	SS3 0.0-0.1	SS4 0.0-0.1	SS5 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39921	S19-JI39922	S19-JI39923	S19-JI39924
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	110	130	120	43
% Moisture	1	%	3.2	7.5	5.6	2.8

Client Sample ID			SS6 0.0-0.1	SS7 0.0-0.1	SS8 0.0-0.1	SS9 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39925	S19-JI39926	S19-JI39927	S19-JI39928
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	110	4100	340	140
% Moisture	1	%	2.8	4.4	19	6.2

Client Sample ID			SS10 0.0-0.1	SS11 0.0-0.1	SS12 0.0-0.1	SS13 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39929	S19-JI39930	S19-JI39931	S19-JI39932
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	780	2200	32000	2600
% Moisture	1	%	2.2	5.8	3.3	1.2

Client Sample ID			SS14 0.0-0.1	SS15 0.0-0.1	SS16 0.0-0.1	D02_260719
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39933	S19-JI39934	S19-JI39935	S19-JI39936
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	31	350	15000	280
% Moisture	1	%	6.8	4.7	1.9	5.0

Client Sample ID			D03_260719	SS17_0.0-0.1	SS18_0.0-0.1	SS19_0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39937	S19-JI39997	S19-JI39998	S19-JI39999
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	120	25	34	26000
% Moisture	1	%	5.5	3.2	4.8	2.4

Client Sample ID			SS20_0.0-0.1	SS21	SS22
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			S19-JI40000	S19-JI40001	S19-JI40002
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit			
Heavy Metals					
Lead	5	mg/kg	35000	610	540
% Moisture	1	%	3.6	2.2	3.4

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Jul 29, 2019	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Jul 29, 2019	14 Days
- Method: LTM-GEN-7080 Moisture			

eurofins | Environment Testing

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web : www.eurofins.com.au

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Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
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16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name:
Project ID: 318000780

Order No.:
Report #: 668047
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jul 26, 2019 5:54 PM
Due: Jul 29, 2019
Priority: 1 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TP1 0.1-0.5	Jul 26, 2019		Soil	S19-Jl39891		X	X
2	TP1 0.5-0.6	Jul 26, 2019		Soil	S19-Jl39892		X	X
3	TP2 0.1-0.4	Jul 26, 2019		Soil	S19-Jl39893		X	X
4	TP2 0.4-0.5	Jul 26, 2019		Soil	S19-Jl39894		X	X
5	TP2 0.5-0.7	Jul 26, 2019		Soil	S19-Jl39895		X	X
6	TP3 0.1-0.5	Jul 26, 2019		Soil	S19-Jl39896		X	X
7	TP3 0.5-0.6	Jul 26, 2019		Soil	S19-Jl39897		X	X
8	TP3 0.6-0.7	Jul 26, 2019		Soil	S19-Jl39898		X	X
9	TP4 0.1-0.3	Jul 26, 2019		Soil	S19-Jl39899		X	X

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Sample Detail						HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
10	TP4 0.3-0.4	Jul 26, 2019		Soil	S19-Jl39900		X	X
11	TP5 0.1-0.45	Jul 26, 2019		Soil	S19-Jl39901		X	X
12	TP5 0.45-0.55	Jul 26, 2019		Soil	S19-Jl39902		X	X
13	TP5 0.6-0.7	Jul 26, 2019		Soil	S19-Jl39903		X	X
14	TP6 0.1-0.4	Jul 26, 2019		Soil	S19-Jl39904		X	X
15	TP6 0.4-0.5	Jul 26, 2019		Soil	S19-Jl39905		X	X
16	TP6 0.5-0.7	Jul 26, 2019		Soil	S19-Jl39906		X	X
17	TP7 0.1-0.4	Jul 26, 2019		Soil	S19-Jl39907		X	X
18	TP7 0.4-0.5	Jul 26, 2019		Soil	S19-Jl39908		X	X
19	TP7 0.5-0.7	Jul 26, 2019		Soil	S19-Jl39909		X	X
20	TP8 0.1-0.3	Jul 26, 2019		Soil	S19-Jl39910		X	X
21	TP8 0.3-0.5	Jul 26, 2019		Soil	S19-Jl39911		X	X

eurofins | Environment Testing

ABN – 50 005 085 521
e.mail : EnviroSales@eurofins.com
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Report #: 668047
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jul 26, 2019 5:54 PM
Due: Jul 29, 2019
Priority: 1 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
22	TP8 0.5-0.8	Jul 26, 2019		Soil	S19-Jl39912		X	X
23	TP9 0.1-0.3	Jul 26, 2019		Soil	S19-Jl39913		X	X
24	TP9 0.3-0.5	Jul 26, 2019		Soil	S19-Jl39914		X	X
25	TP9 0.5-0.7	Jul 26, 2019		Soil	S19-Jl39915		X	X
26	TP15 0.1	Jul 26, 2019		Soil	S19-Jl39918		X	X
27	TP15 0.8	Jul 26, 2019		Soil	S19-Jl39919		X	X
28	SS1 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39920		X	X
29	SS2 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39921		X	X
30	SS3 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39922		X	X
31	SS4 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39923		X	X
32	SS5 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39924		X	X
33	SS6 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39925		X	X

eurofins | Environment Testing

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e.mail : EnviroSales@eurofins.com
web : www.eurofins.com.au

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name:
Project ID: 318000780

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Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
34	SS7 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39926		X	X
35	SS8 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39927		X	X
36	SS9 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39928		X	X
37	SS10 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39929		X	X
38	SS11 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39930		X	X
39	SS12 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39931		X	X
40	SS13 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39932		X	X
41	SS14 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39933		X	X
42	SS15 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39934		X	X
43	SS16 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39935		X	X
44	D02_260719	Jul 26, 2019		Soil	S19-Jl39936		X	X
45	D03_260719	Jul 26, 2019		Soil	S19-Jl39937		X	X

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Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
46	TP10_0.8-1.0	Jul 26, 2019		Soil	S19-Jl39990	X		
47	TP11_0.5-0.6	Jul 26, 2019		Soil	S19-Jl39991	X		
48	TP11_0.8-1.0	Jul 26, 2019		Soil	S19-Jl39992	X		
49	TP12_0.5	Jul 26, 2019		Soil	S19-Jl39993	X		
50	TP13_0.5-0.6	Jul 26, 2019		Soil	S19-Jl39994	X		
51	TP13_0.8-0.9	Jul 26, 2019		Soil	S19-Jl39995	X		
52	TP14_0.6-0.8	Jul 26, 2019		Soil	S19-Jl39996	X		
53	SS17_0.0-0.1	Jul 26, 2019		Soil	S19-Jl39997		X	X
54	SS18_0.0-0.1	Jul 26, 2019		Soil	S19-Jl39998		X	X
55	SS19_0.0-0.1	Jul 26, 2019		Soil	S19-Jl39999		X	X
56	SS20_0.0-0.1	Jul 26, 2019		Soil	S19-Jl40000		X	X
57	SS21	Jul 26, 2019		Soil	S19-Jl40001		X	X

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Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
58	SS22	Jul 26, 2019		Soil	S19-Jl40002		X	X
59	D01_260719	Jul 26, 2019		Soil	S19-Jl40003	X		
Test Counts						8	51	51

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Lead	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Heavy Metals							
Lead	%	127			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S19-Jl39895	CP	%	119			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-Jl39894	CP	mg/kg	110	92	19	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-Jl39896	CP	%	9.8	9.4	5.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-Jl39904	CP	mg/kg	6000	6600	10	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-Jl39906	CP	%	11	11	4.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-Jl39914	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-Jl39918	CP	%	6.1	5.5	10	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-Jl39928	CP	%	6.2	5.2	17	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-Jl39997	CP	%	3.2	3.8	17	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised By

Andrew Black	Analytical Services Manager
Gabriele Cordero	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Environ
PO Box560
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **668047-S-V2**
Project name
Project ID 318000780
Received Date Jul 26, 2019

Client Sample ID			**TP1 0.1-0.5**	**TP1 0.5-0.6**	**TP2 0.1-0.4**	**TP2 0.4-0.5**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Jl39891**	**S19-Jl39892**	**S19-Jl39893**	**S19-Jl39894**
Date Sampled			**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	10	0.7	7	2.1
Lead	5	mg/kg	4400	10	3500	110
% Moisture	1	%	3.9	4.8	2.7	4.4

Client Sample ID			**TP2 0.5-0.7**	**TP3 0.1-0.5**	**TP3 0.5-0.6**	**TP3 0.6-0.7**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Jl39895**	**S19-Jl39896**	**S19-Jl39897**	**S19-Jl39898**
Date Sampled			**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	< 0.4	3.4	< 0.4	0.8
Lead	5	mg/kg	16	29000	74	13
% Moisture	1	%	9.2	9.8	6.4	9.1

Client Sample ID			**TP4 0.1-0.3**	**TP4 0.3-0.4**	**TP5 0.1-0.45**	**TP5 0.45-0.55**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Jl39899**	**S19-Jl39900**	**S19-Jl39901**	**S19-Jl39902**
Date Sampled			**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	0.8	2.9	-	1.4
Lead	5	mg/kg	38000	70	3100	150
% Moisture	1	%	4.2	8.4	5.6	5.4

Client Sample ID			TP5 0.6-0.7	TP6 0.1-0.4	TP6 0.4-0.5	TP6 0.5-0.7
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39903	S19-JI39904	S19-JI39905	S19-JI39906
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	1.8	3.5	0.7	0.7
Lead	5	mg/kg	47	6000	20	6.7
% Moisture	1	%	12	5.8	6.5	11

Client Sample ID			TP7 0.1-0.4	TP7 0.4-0.5	TP7 0.5-0.7	TP8 0.1-0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39907	S19-JI39908	S19-JI39909	S19-JI39910
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	3.8	< 0.4	< 0.4	3.5
Lead	5	mg/kg	3300	76	6.9	2800
% Moisture	1	%	3.7	5.7	11	2.2

Client Sample ID			TP8 0.3-0.5	TP8 0.5-0.8	TP9 0.1-0.3	TP9 0.3-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39911	S19-JI39912	S19-JI39913	S19-JI39914
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	< 0.4	< 0.4	2.3	< 0.4
Lead	5	mg/kg	24	22	600	< 5
% Moisture	1	%	6.0	9.5	2.4	6.1

Client Sample ID			TP9 0.5-0.7	TP15 0.1	TP15 0.8	SS1 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39915	S19-JI39918	S19-JI39919	S19-JI39920
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	0.5
Lead	5	mg/kg	8.1	27	26	39
% Moisture	1	%	10	6.1	12	4.6

Client Sample ID			SS2 0.0-0.1	SS3 0.0-0.1	SS4 0.0-0.1	SS5 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39921	S19-JI39922	S19-JI39923	S19-JI39924
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	0.6	3.1	3.5	0.7
Lead	5	mg/kg	110	130	120	43
% Moisture	1	%	3.2	7.5	5.6	2.8

Client Sample ID			SS6 0.0-0.1	SS7 0.0-0.1	SS8 0.0-0.1	SS9 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39925	S19-JI39926	S19-JI39927	S19-JI39928
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	0.4	18	2.7	1.5
Lead	5	mg/kg	110	4100	340	140
% Moisture	1	%	2.8	4.4	19	6.2

Client Sample ID			SS10 0.0-0.1	SS11 0.0-0.1	SS12 0.0-0.1	SS13 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39929	S19-JI39930	S19-JI39931	S19-JI39932
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	0.8	3.4	-	14
Lead	5	mg/kg	780	2200	32000	2600
% Moisture	1	%	2.2	5.8	3.3	1.2

Client Sample ID			SS14 0.0-0.1	SS15 0.0-0.1	SS16 0.0-0.1	D02_260719
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39933	S19-JI39934	S19-JI39935	S19-JI39936
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	< 0.4	4.6	-	1.5
Lead	5	mg/kg	31	350	15000	280
% Moisture	1	%	6.8	4.7	1.9	5.0

Client Sample ID			D03_260719	SS17_0.0-0.1	SS18_0.0-0.1	SS19_0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39937	S19-JI39997	S19-JI39998	S19-JI39999
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	1.1	-	-	-
Lead	5	mg/kg	120	25	34	26000
% Moisture	1	%	5.5	3.2	4.8	2.4

Client Sample ID			SS20_0.0-0.1	SS21	SS22
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			S19-JI40000	S19-JI40001	S19-JI40002
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit			
Heavy Metals					
Lead	5	mg/kg	35000	610	540
% Moisture	1	%	3.6	2.2	3.4

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	May 26, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Jul 29, 2019	14 Days
- Method: LTM-GEN-7080 Moisture			

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name:
Project ID: 318000780

Order No.:
Report #: 668047
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jul 26, 2019 5:54 PM
Due: Jul 29, 2019
Priority: 1 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TP1 0.1-0.5	Jul 26, 2019		Soil	S19-Jl39891		X	X
2	TP1 0.5-0.6	Jul 26, 2019		Soil	S19-Jl39892		X	X
3	TP2 0.1-0.4	Jul 26, 2019		Soil	S19-Jl39893		X	X
4	TP2 0.4-0.5	Jul 26, 2019		Soil	S19-Jl39894		X	X
5	TP2 0.5-0.7	Jul 26, 2019		Soil	S19-Jl39895		X	X
6	TP3 0.1-0.5	Jul 26, 2019		Soil	S19-Jl39896		X	X
7	TP3 0.5-0.6	Jul 26, 2019		Soil	S19-Jl39897		X	X
8	TP3 0.6-0.7	Jul 26, 2019		Soil	S19-Jl39898		X	X
9	TP4 0.1-0.3	Jul 26, 2019		Soil	S19-Jl39899		X	X

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NATA # 1261
Site # 1254 & 14271

Sydney
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Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
10	TP4 0.3-0.4	Jul 26, 2019		Soil	S19-Jl39900		X	X
11	TP5 0.1-0.45	Jul 26, 2019		Soil	S19-Jl39901		X	X
12	TP5 0.45-0.55	Jul 26, 2019		Soil	S19-Jl39902		X	X
13	TP5 0.6-0.7	Jul 26, 2019		Soil	S19-Jl39903		X	X
14	TP6 0.1-0.4	Jul 26, 2019		Soil	S19-Jl39904		X	X
15	TP6 0.4-0.5	Jul 26, 2019		Soil	S19-Jl39905		X	X
16	TP6 0.5-0.7	Jul 26, 2019		Soil	S19-Jl39906		X	X
17	TP7 0.1-0.4	Jul 26, 2019		Soil	S19-Jl39907		X	X
18	TP7 0.4-0.5	Jul 26, 2019		Soil	S19-Jl39908		X	X
19	TP7 0.5-0.7	Jul 26, 2019		Soil	S19-Jl39909		X	X
20	TP8 0.1-0.3	Jul 26, 2019		Soil	S19-Jl39910		X	X
21	TP8 0.3-0.5	Jul 26, 2019		Soil	S19-Jl39911		X	X

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Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
22	TP8 0.5-0.8	Jul 26, 2019		Soil	S19-Jl39912		X	X
23	TP9 0.1-0.3	Jul 26, 2019		Soil	S19-Jl39913		X	X
24	TP9 0.3-0.5	Jul 26, 2019		Soil	S19-Jl39914		X	X
25	TP9 0.5-0.7	Jul 26, 2019		Soil	S19-Jl39915		X	X
26	TP15 0.1	Jul 26, 2019		Soil	S19-Jl39918		X	X
27	TP15 0.8	Jul 26, 2019		Soil	S19-Jl39919		X	X
28	SS1 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39920		X	X
29	SS2 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39921		X	X
30	SS3 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39922		X	X
31	SS4 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39923		X	X
32	SS5 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39924		X	X
33	SS6 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39925		X	X

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Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
34	SS7 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39926		X	X
35	SS8 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39927		X	X
36	SS9 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39928		X	X
37	SS10 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39929		X	X
38	SS11 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39930		X	X
39	SS12 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39931		X	X
40	SS13 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39932		X	X
41	SS14 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39933		X	X
42	SS15 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39934		X	X
43	SS16 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39935		X	X
44	D02_260719	Jul 26, 2019		Soil	S19-Jl39936		X	X
45	D03_260719	Jul 26, 2019		Soil	S19-Jl39937		X	X

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Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
46	TP10_0.8-1.0	Jul 26, 2019		Soil	S19-Jl39990	X		
47	TP11_0.5-0.6	Jul 26, 2019		Soil	S19-Jl39991	X		
48	TP11_0.8-1.0	Jul 26, 2019		Soil	S19-Jl39992	X		
49	TP12_0.5	Jul 26, 2019		Soil	S19-Jl39993	X		
50	TP13_0.5-0.6	Jul 26, 2019		Soil	S19-Jl39994	X		
51	TP13_0.8-0.9	Jul 26, 2019		Soil	S19-Jl39995	X		
52	TP14_0.6-0.8	Jul 26, 2019		Soil	S19-Jl39996	X		
53	SS17_0.0-0.1	Jul 26, 2019		Soil	S19-Jl39997		X	X
54	SS18_0.0-0.1	Jul 26, 2019		Soil	S19-Jl39998		X	X
55	SS19_0.0-0.1	Jul 26, 2019		Soil	S19-Jl39999		X	X
56	SS20_0.0-0.1	Jul 26, 2019		Soil	S19-Jl40000		X	X
57	SS21	Jul 26, 2019		Soil	S19-Jl40001		X	X

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Sample Detail						HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
58	SS22	Jul 26, 2019		Soil	S19-Jl40002		X	X
59	D01_260719	Jul 26, 2019		Soil	S19-Jl40003	X		
Test Counts						8	51	51

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Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Cadmium			mg/kg	< 0.4			0.4	Pass	
Lead			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Heavy Metals									
Cadmium			%	119			80-120	Pass	
Lead			%	127			80-120	Fail	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S19-JI39895	CP	%	124			75-125	Pass	
Lead	S19-JI39895	CP	%	119			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S19-JI39905	CP	%	131			75-125	Fail	
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S19-JI39927	CP	%	123			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-JI39894	CP	mg/kg	110	92	19	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-JI39896	CP	%	9.8	9.4	5.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-JI39904	CP	mg/kg	6000	6600	10	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-JI39906	CP	%	11	11	4.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-JI39914	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-JI39918	CP	%	6.1	5.5	10	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-JI39928	CP	%	6.2	5.2	17	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-JI39997	CP	%	3.2	3.8	17	30%	Pass	

Comments

V2- new version to import Cd results as per client request.

1. The results in this report supersede any previously corresponded results.
2. All Soil Results are reported on a dry basis.
3. Samples are analysed on an as received basis.

ABBREVIATIONS

mg/kg : milligrams per kilograms, mg/L : milligrams per litre, ppm : parts per million,
LOR : Limit of Reporting
RPD : Relative Percent Difference
CRM : Certified Reference Material
LCS : Laboratory Control Sample

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Andrew Black Analytical Services Manager

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **670968-S**
Project name
Project ID 318000780
Received Date Aug 13, 2019

Client Sample ID			**SS23**	**SS24**	**SS25**	**SS26**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Au17274**	**S19-Au17275**	**S19-Au17276**	**S19-Au17277**
Date Sampled			**Aug 12, 2019**	**Aug 12, 2019**	**Aug 12, 2019**	**Aug 12, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	350	3000	11000	33
% Moisture	1	%	1.7	3.3	4.9	2.7

Client Sample ID			**SS27**	**SS28**	**SS29**	**SS30**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Au17278**	**S19-Au17279**	**S19-Au17280**	**S19-Au17281**
Date Sampled			**Aug 12, 2019**	**Aug 12, 2019**	**Aug 12, 2019**	**Aug 12, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	6700	12000	3700	470
% Moisture	1	%	6.7	5.7	3.9	3.5

Client Sample ID			**D01_120819**	**D02_120819**
Sample Matrix			**Soil**	**Soil**
Eurofins Sample No.			**S19-Au17282**	**S19-Au17283**
Date Sampled			**Aug 12, 2019**	**Aug 12, 2019**
Test/Reference	LOR	Unit		
Heavy Metals				
Lead	5	mg/kg	13000	570
% Moisture	1	%	6.1	4.4

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Aug 13, 2019	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Aug 13, 2019	14 Days
- Method: LTM-GEN-7080 Moisture			

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Received: Aug 14, 2019 9:43 AM
Due: Aug 15, 2019
Priority: 1 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Alena Bounkeua

Sample Detail	Aluminium (filtered)	Barium (filtered)	Beryllium (filtered)	Cobalt (filtered)	Conductivity (at 25°C)	Iron (filtered)	Lead	Manganese (filtered)	pH (at 25°C)	Total Dissolved Solids Dried at 180°C ± 2°C	Total Suspended Solids Dried at 103–105°C	Turbidity	Moisture Set	Eurofins | mgt Suite B6 (filtered metals)	BTEXN and Volatile TRH	Eurofins | mgt Suite B19D: Total N, TKN, NOx, NO2, NO3, Total P
Melbourne Laboratory - NATA Site # 1254 & 14271																X
Sydney Laboratory - NATA Site # 18217	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																
Perth Laboratory - NATA Site # 23736																
External Laboratory																

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID													
1	S03 UP	Aug 13, 2019		Water	S19-Au17273	X	X	X	X	X	X		X	X	X	X	X		X		X
2	SS23	Aug 12, 2019		Soil	S19-Au17274							X						X			
3	SS24	Aug 12, 2019		Soil	S19-Au17275							X						X			
4	SS25	Aug 12, 2019		Soil	S19-Au17276							X						X			
5	SS26	Aug 12, 2019		Soil	S19-Au17277							X						X			
6	SS27	Aug 12, 2019		Soil	S19-Au17278							X						X			
7	SS28	Aug 12, 2019		Soil	S19-Au17279							X						X			
8	SS29	Aug 12, 2019		Soil	S19-Au17280							X						X			
9	SS30	Aug 12, 2019		Soil	S19-Au17281							X						X			

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Melbourne Laboratory - NATA Site # 1254 & 14271																					X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																					
Perth Laboratory - NATA Site # 23736																					
10	D01_120819	Aug 12, 2019		Soil	S19-Au17282							X						X			
11	D02_120819	Aug 12, 2019		Soil	S19-Au17283							X						X			
12	D01_130819	Aug 12, 2019		Water	S19-Au17284	X	X	X	X	X	X		X	X	X	X	X		X		X
13	SPIKE	Aug 12, 2019		Water	S19-Au17285															X	
14	BLANK	Aug 12, 2019		Water	S19-Au17286															X	
Test Counts						2	2	2	2	2	2	10	2	2	2	2	2	10	2	2	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	104			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S19-Au11644	NCP	%	102			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-Au17274	CP	mg/kg	350	380	6.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-Au17274	CP	%	1.7	1.2	35	30%	Fail	Q15

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
Q15	The RPD reported passes Eurofins | mgt's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Alena Bounkeua	Analytical Services Manager
Gabriele Cordero	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Stephen Maxwell**

Report **673583-S**
Project name 318000780
Received Date Aug 27, 2019

Client Sample ID			**SS30**	**SS31**	**SS32**	**SS33**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Au39075**	**S19-Au39076**	**S19-Au39077**	**S19-Au39078**
Date Sampled			**Aug 27, 2019**	**Aug 27, 2019**	**Aug 27, 2019**	**Aug 27, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	2100	710	2400	800
% Moisture	1	%	2.4	1.5	2.2	3.8

Client Sample ID			**SS34**	**SS35**	**SS37**	**SS38**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Au39079**	**S19-Au39080**	**S19-Au39082**	**S19-Au39083**
Date Sampled			**Aug 27, 2019**	**Aug 27, 2019**	**Aug 27, 2019**	**Aug 27, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	850	900	1600	9900
% Moisture	1	%	1.7	2.4	1.8	1.8

Client Sample ID			**SS39**	**SS40**	**SS41**	**SS42**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Au39084**	**S19-Au39085**	**S19-Au39086**	**S19-Au39087**
Date Sampled			**Aug 27, 2019**	**Aug 27, 2019**	**Aug 27, 2019**	**Aug 27, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	2900	2600	11000	240
% Moisture	1	%	1.2	2.3	3.0	4.8

Client Sample ID			SS43	SS44	SS45	SS46
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-Au39088	S19-Au39089	S19-Au39090	S19-Au39091
Date Sampled			Aug 27, 2019	Aug 27, 2019	Aug 27, 2019	Aug 27, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	31000	140	4000	210
% Moisture	1	%	7.5	8.7	6.1	9.6

Client Sample ID			SS47	SS48	SS49	SS50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-Au39092	S19-Au39093	S19-Au39094	S19-Au39095
Date Sampled			Aug 27, 2019	Aug 27, 2019	Aug 27, 2019	Aug 27, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	3900	1800	1400	1400
% Moisture	1	%	7.4	6.9	5.9	7.3

Client Sample ID			SS51	D01_270819	D02_270819
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			S19-Au39096	S19-Au39097	S19-Au39098
Date Sampled			Aug 27, 2019	Aug 27, 2019	Aug 27, 2019
Test/Reference	LOR	Unit			
Heavy Metals					
Lead	5	mg/kg	190	2800	230
% Moisture	1	%	3.0	2.6	4.8

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Aug 27, 2019	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Aug 27, 2019	14 Days
- Method: LTM-GEN-7080 Moisture			

eurofins | Environment Testing

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web : www.eurofins.com.au

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Site # 1254 & 14271

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NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**		**Received:**	Aug 27, 2019 5:45 PM
Address:	Level 3/100 Pacific Highway North Sydney NSW 2060	**Report #:**	673583	**Due:**	Aug 28, 2019
		Phone:	02 9954 8118	**Priority:**	1 Day
		Fax:	02 9954 8150	**Contact Name:**	Stephen Maxwell
Project Name:	318000780				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						CANCELLED	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	SS30	Aug 27, 2019		Soil	S19-Au39075		X	X
2	SS31	Aug 27, 2019		Soil	S19-Au39076		X	X
3	SS32	Aug 27, 2019		Soil	S19-Au39077		X	X
4	SS33	Aug 27, 2019		Soil	S19-Au39078		X	X
5	SS34	Aug 27, 2019		Soil	S19-Au39079		X	X
6	SS35	Aug 27, 2019		Soil	S19-Au39080		X	X
7	SS36	Aug 27, 2019		Soil	S19-Au39081	X		
8	SS37	Aug 27, 2019		Soil	S19-Au39082		X	X
9	SS38	Aug 27, 2019		Soil	S19-Au39083		X	X
10	SS39	Aug 27, 2019		Soil	S19-Au39084		X	X

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Perth Laboratory - NATA Site # 23736								
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12	SS41	Aug 27, 2019		Soil	S19-Au39086		X	X
13	SS42	Aug 27, 2019		Soil	S19-Au39087		X	X
14	SS43	Aug 27, 2019		Soil	S19-Au39088		X	X
15	SS44	Aug 27, 2019		Soil	S19-Au39089		X	X
16	SS45	Aug 27, 2019		Soil	S19-Au39090		X	X
17	SS46	Aug 27, 2019		Soil	S19-Au39091		X	X
18	SS47	Aug 27, 2019		Soil	S19-Au39092		X	X
19	SS48	Aug 27, 2019		Soil	S19-Au39093		X	X
20	SS49	Aug 27, 2019		Soil	S19-Au39094		X	X
21	SS50	Aug 27, 2019		Soil	S19-Au39095		X	X
22	SS51	Aug 27, 2019		Soil	S19-Au39096		X	X
23	D01_270819	Aug 27, 2019		Soil	S19-Au39097		X	X

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Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
24	D02_270819	Aug 27, 2019		Soil	S19-Au39098		X	X
Test Counts						1	23	23

Internal Quality Control Review and Glossary

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WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

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6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
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Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	128			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S19-Au30488	NCP	%	120			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-Au39083	CP	mg/kg	9900	9500	4.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-Au39084	CP	%	1.2	1.6	27	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-Au39094	CP	mg/kg	1400	1300	4.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-Au39094	CP	%	5.9	6.7	13	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised By

Andrew Black	Analytical Services Manager
Gabriele Cordero	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Environ
PO Box560
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection and proficiency testing scheme providers reports.

Attention: **Stephen Maxwell**

Report **694957-S-V3**
Project name 318000780
Received Date Dec 20, 2019

Client Sample ID			**HA01_0.1**	**HA01_0.25**	**HA01_0.5**	**HA01_0.75**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-De30523**	**S19-De30524**	**S19-De30525**	**S19-De30526**
Date Sampled			**Dec 18, 2019**	**Dec 18, 2019**	**Dec 18, 2019**	**Dec 18, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	4.2	1.9	0.6	2
Lead	5	mg/kg	720	820	29	55
% Moisture	1	%	2.2	7.0	18	17

Client Sample ID			**HA01_1.0**	**HA02_0.1**	**HA02_0.25**	**HA02_0.5**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-De30527**	**S19-De30528**	**S19-De30529**	**S19-De30530**
Date Sampled			**Dec 18, 2019**	**Dec 18, 2019**	**Dec 18, 2019**	**Dec 18, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	< 0.4	12	1	< 0.4
Lead	5	mg/kg	34	450	12	7.4
% Moisture	1	%	15	2.3	13	10

Client Sample ID			**HA02_0.75**	**HA02_1.0**	**HA03_0.1**	**HA03_0.25**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-De30531**	**S19-De30532**	**S19-De30533**	**S19-De30534**
Date Sampled			**Dec 18, 2019**	**Dec 18, 2019**	**Dec 18, 2019**	**Dec 18, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	< 0.4	< 0.4	2.5	0.5
Lead	5	mg/kg	11	11	2100	1600
% Moisture	1	%	14	13	4.2	8.0

Client Sample ID			HA03_0.5	HA03_0.75	SS113	SS114
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-De30535	S19-De30536	S19-De30537	S19-De30538
Date Sampled			Dec 18, 2019	Dec 18, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	0.4	0.8	3.8	1.8
Lead	5	mg/kg	210	460	300	360
% Moisture	1	%	11	12	3.5	2.2

Client Sample ID			SS115	SS116	SS117	SS118
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-De30539	S19-De30540	S19-De30541	S19-De30542
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	0.9	2.4	2.7	8.7
Copper	5	mg/kg	-	-	50	310
Lead	5	mg/kg	220	250	250	880
Zinc	5	mg/kg	-	-	540	1300
% Moisture	1	%	3.4	< 1	3.1	2.3

Client Sample ID			SS119	SS120	SS121	SS122
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-De30543	S19-De30544	S19-De30545	S19-De30546
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	0.8	0.7	1.2	2.7
Copper	5	mg/kg	21	20	40	59
Lead	5	mg/kg	110	86	140	260
Zinc	5	mg/kg	160	150	260	530
% Moisture	1	%	3.4	3.0	1.1	2.3

Client Sample ID			SS123	SS124	SS125	SS126
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-De30547	S19-De30548	S19-De30549	S19-De30550
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	3.3	0.7	5	1
Copper	5	mg/kg	81	32	110	-
Lead	5	mg/kg	480	70	520	110
Zinc	5	mg/kg	700	180	850	-
% Moisture	1	%	1.2	3.9	2.6	2.4

Client Sample ID			SS127	SS128	SS129	SS130
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-De30551	S19-De30552	S19-De30553	S19-De30554
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	1	< 0.4	< 0.4	0.6
Lead	5	mg/kg	89	39	61	190
% Moisture	1	%	3.6	2.5	3.2	1.1

Client Sample ID			SS131	SS132	SS133	SS134
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-De30555	S19-De30556	S19-De30557	S19-De30558
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	0.6	< 0.4	< 0.4	< 0.4
Lead	5	mg/kg	240	17	46	42
% Moisture	1	%	1.3	< 1	< 1	1.0

Client Sample ID			SS135	SS136	SS137	SS138
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-De30559	S19-De30560	S19-De30561	S19-De30562
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	< 0.4	3.8	2.7	1.8
Lead	5	mg/kg	59	1200	1100	210
% Moisture	1	%	3.2	2.1	< 1	1.1

Client Sample ID			SS139	SS140	SS141	PAINT1
Sample Matrix			Soil	Soil	Soil	Paint
Eurofins Sample No.			S19-De30563	S19-De30564	S19-De30565	S19-De30587
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	9.5	7.4	3.9	-
Lead	5	mg/kg	800	660	390	-
% Moisture	1	%	1.1	1.6	1.5	-
Lead (% w/w)	0.01	%	-	-	-	0.09

Client Sample ID			PAINT2	PAINT3	PAINT4	PAINT5
Sample Matrix			Paint	Paint	Paint	Paint
Eurofins Sample No.			S19-De30588	S19-De30589	S19-De30590	S19-De30591
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Lead (% w/w)	0.01	%	0.25	1.8	0.29	0.03

Client Sample ID			PAINT6	PAINT7	PAINT8	D01_191219
Sample Matrix			Paint	Paint	Paint	Soil
Eurofins Sample No.			S19-De30592	S19-De30593	S19-De30594	S19-De30595
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	-	-	-	2.2
Lead	5	mg/kg	-	-	-	320
% Moisture	1	%	-	-	-	3.5
Lead (% w/w)	0.01	%	0.07	16	15	-

Client Sample ID			D02_191219	D03_191219
Sample Matrix			Soil	Soil
Eurofins Sample No.			S19-De30596	S19-De30597
Date Sampled			Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit		
Heavy Metals				
Cadmium	0.4	mg/kg	0.7	3.2
Lead	5	mg/kg	98	1100
% Moisture	1	%	2.6	2.6

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	May 26, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
- Method: LTM-MET-3030 Metals in Soils by ICP-OES			
Lead (% w/w)	Sydney	Dec 23, 2019	6 Months
- Method: LTM-MET-3040 Metals in Waters Soils & Sediments by ICP-MS			
% Moisture	Melbourne	Dec 20, 2019	14 Days
- Method: LTM-GEN-7080 Moisture			

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Project Name: 318000780

Order No.:
Report #: 694957
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Dec 20, 2019 11:00 AM
Due: Dec 31, 2019
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	Lead	Lead (% w/w)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271						X			X
Sydney Laboratory - NATA Site # 18217							X	X	
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	HA01_0.1	Dec 18, 2019		Soil	S19-De30523	X			X
2	HA01_0.25	Dec 18, 2019		Soil	S19-De30524	X			X
3	HA01_0.5	Dec 18, 2019		Soil	S19-De30525	X			X
4	HA01_0.75	Dec 18, 2019		Soil	S19-De30526	X			X
5	HA01_1.0	Dec 18, 2019		Soil	S19-De30527	X			X
6	HA02_0.1	Dec 18, 2019		Soil	S19-De30528	X			X
7	HA02_0.25	Dec 18, 2019		Soil	S19-De30529	X			X
8	HA02_0.5	Dec 18, 2019		Soil	S19-De30530	X			X
9	HA02_0.75	Dec 18, 2019		Soil	S19-De30531	X			X
10	HA02_1.0	Dec 18, 2019		Soil	S19-De30532	X			X
11	HA03_0.1	Dec 18, 2019		Soil	S19-De30533	X			X

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Melbourne Laboratory - NATA Site # 1254 & 14271						X			X
Sydney Laboratory - NATA Site # 18217							X	X	
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
12	HA03_0.25	Dec 18, 2019		Soil	S19-De30534	X			X
13	HA03_0.5	Dec 18, 2019		Soil	S19-De30535	X			X
14	HA03_0.75	Dec 18, 2019		Soil	S19-De30536	X			X
15	SS113	Dec 19, 2019		Soil	S19-De30537	X			X
16	SS114	Dec 19, 2019		Soil	S19-De30538	X			X
17	SS115	Dec 19, 2019		Soil	S19-De30539	X			X
18	SS116	Dec 19, 2019		Soil	S19-De30540	X			X
19	SS117	Dec 19, 2019		Soil	S19-De30541	X			X
20	SS118	Dec 19, 2019		Soil	S19-De30542	X			X
21	SS119	Dec 19, 2019		Soil	S19-De30543	X			X
22	SS120	Dec 19, 2019		Soil	S19-De30544	X			X
23	SS121	Dec 19, 2019		Soil	S19-De30545	X			X
24	SS122	Dec 19, 2019		Soil	S19-De30546	X			X

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Melbourne Laboratory - NATA Site # 1254 & 14271						X			X
Sydney Laboratory - NATA Site # 18217							X	X	
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
25	SS123	Dec 19, 2019		Soil	S19-De30547	X			X
26	SS124	Dec 19, 2019		Soil	S19-De30548	X			X
27	SS125	Dec 19, 2019		Soil	S19-De30549	X			X
28	SS126	Dec 19, 2019		Soil	S19-De30550	X			X
29	SS127	Dec 19, 2019		Soil	S19-De30551	X			X
30	SS128	Dec 19, 2019		Soil	S19-De30552	X			X
31	SS129	Dec 19, 2019		Soil	S19-De30553	X			X
32	SS130	Dec 19, 2019		Soil	S19-De30554	X			X
33	SS131	Dec 19, 2019		Soil	S19-De30555	X			X
34	SS132	Dec 19, 2019		Soil	S19-De30556	X			X
35	SS133	Dec 19, 2019		Soil	S19-De30557	X			X
36	SS134	Dec 19, 2019		Soil	S19-De30558	X			X
37	SS135	Dec 19, 2019		Soil	S19-De30559	X			X

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Sample Detail						Lead	Lead	Lead (% w/w)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271						X			X
Sydney Laboratory - NATA Site # 18217							X	X	
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
38	SS136	Dec 19, 2019		Soil	S19-De30560	X			X
39	SS137	Dec 19, 2019		Soil	S19-De30561	X			X
40	SS138	Dec 19, 2019		Soil	S19-De30562	X			X
41	SS139	Dec 19, 2019		Soil	S19-De30563	X			X
42	SS140	Dec 19, 2019		Soil	S19-De30564	X			X
43	SS141	Dec 19, 2019		Soil	S19-De30565	X			X
44	SWAB1	Dec 19, 2019		Wipes	S19-De30566		X		
45	SWAB2	Dec 19, 2019		Wipes	S19-De30567		X		
46	SWAB3	Dec 19, 2019		Wipes	S19-De30568		X		
47	SWAB4	Dec 19, 2019		Wipes	S19-De30569		X		
48	SWAB5	Dec 19, 2019		Wipes	S19-De30570		X		
49	SWAB6	Dec 19, 2019		Wipes	S19-De30571		X		
50	SWAB7	Dec 19, 2019		Wipes	S19-De30572		X		

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Melbourne Laboratory - NATA Site # 1254 & 14271						X			X
Sydney Laboratory - NATA Site # 18217							X	X	
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
51	SWAB8	Dec 19, 2019		Wipes	S19-De30573		X		
52	SWAB9	Dec 19, 2019		Wipes	S19-De30574		X		
53	SWAB10	Dec 19, 2019		Wipes	S19-De30575		X		
54	SWAB11	Dec 19, 2019		Wipes	S19-De30576		X		
55	SWAB12	Dec 19, 2019		Wipes	S19-De30577		X		
56	SWAB13	Dec 19, 2019		Wipes	S19-De30578		X		
57	SWAB14	Dec 19, 2019		Wipes	S19-De30579		X		
58	SWAB15	Dec 19, 2019		Wipes	S19-De30580		X		
59	SWAB16	Dec 19, 2019		Wipes	S19-De30581		X		
60	SWAB17	Dec 19, 2019		Wipes	S19-De30582		X		
61	SWAB18	Dec 19, 2019		Wipes	S19-De30583		X		
62	SWAB19	Dec 19, 2019		Wipes	S19-De30584		X		
63	SWAB20	Dec 19, 2019		Wipes	S19-De30585		X		

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Sample Detail						Lead	Lead	Lead (% w/w)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271						X			X
Sydney Laboratory - NATA Site # 18217							X	X	
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
64	SWAB21	Dec 19, 2019		Wipes	S19-De30586		X		
65	PAINT1	Dec 19, 2019		Paint	S19-De30587			X	
66	PAINT2	Dec 19, 2019		Paint	S19-De30588			X	
67	PAINT3	Dec 19, 2019		Paint	S19-De30589			X	
68	PAINT4	Dec 19, 2019		Paint	S19-De30590			X	
69	PAINT5	Dec 19, 2019		Paint	S19-De30591			X	
70	PAINT6	Dec 19, 2019		Paint	S19-De30592			X	
71	PAINT7	Dec 19, 2019		Paint	S19-De30593			X	
72	PAINT8	Dec 19, 2019		Paint	S19-De30594			X	
73	D01_191219	Dec 19, 2019		Soil	S19-De30595	X			X
74	D02_191219	Dec 19, 2019		Soil	S19-De30596	X			X
75	D03_191219	Dec 19, 2019		Soil	S19-De30597	X			X
76	QA1	Dec 19, 2019		Wipes	S19-De30598		X		

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Phone : 0800 856 450
IANZ # 1290

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: 318000780

Order No.:
Report #: 694957
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Dec 20, 2019 11:00 AM
Due: Dec 31, 2019
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	Lead	Lead (% w/w)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271						X			X
Sydney Laboratory - NATA Site # 18217							X	X	
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
77	QA2	Dec 19, 2019		Wipes	S19-De30599		X		
Test Counts						69	69	8	46

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Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Cadmium	mg/kg	< 0.4			0.4	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Heavy Metals							
Cadmium	%	109			80-120	Pass	
Copper	%	114			80-120	Pass	
Lead	%	117			80-120	Pass	
Zinc	%	112			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S19-De30524	CP	%	105			75-125	Pass	
Copper	S19-De30524	CP	%	66			75-125	Fail	
Zinc	S19-De30524	CP	%	42			75-125	Fail	
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S19-De30534	CP	%	104			75-125	Pass	
Copper	S19-De30534	CP	%	129			75-125	Fail	
Zinc	S19-De30534	CP	%	127			75-125	Fail	
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S19-De30544	CP	%	106			75-125	Pass	
Copper	S19-De30544	CP	%	199			75-125	Fail	
Lead	S19-De30544	CP	%	91			75-125	Pass	
Zinc	S19-De30544	CP	%	105			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S19-De30554	CP	%	119			75-125	Pass	
Copper	S19-De30554	CP	%	116			75-125	Pass	
Zinc	S19-De30554	CP	%	262			75-125	Fail	Q08
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S19-De30564	CP	%	86			75-125	Pass	
Copper	S19-De30564	CP	%	70			75-125	Fail	Q08

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S19-De30523	CP	mg/kg	260	180	37	30%	Fail	
Lead	S19-De30523	CP	mg/kg	720	650	11	30%	Pass	
Zinc	S19-De30523	CP	mg/kg	420	390	7.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S19-De30524	CP	mg/kg	150	150	<1	30%	Pass	
Lead	S19-De30524	CP	mg/kg	820	830	1.0	30%	Pass	
Zinc	S19-De30524	CP	mg/kg	300	300	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-De30530	CP	%	10	10	2.0	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S19-De30533	CP	mg/kg	420	380	9.0	30%	Pass	
Lead	S19-De30533	CP	mg/kg	2100	1900	5.0	30%	Pass	
Zinc	S19-De30533	CP	mg/kg	360	400	11	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S19-De30534	CP	mg/kg	230	230	1.0	30%	Pass	
Lead	S19-De30534	CP	mg/kg	1600	1600	1.0	30%	Pass	
Zinc	S19-De30534	CP	mg/kg	180	180	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-De30540	CP	%	< 1	< 1	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-De30543	CP	mg/kg	110	97	10	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-De30544	CP	mg/kg	86	86	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-De30550	CP	%	2.4	2.5	3.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S19-De30553	CP	mg/kg	17	17	1.0	30%	Pass	
Lead	S19-De30553	CP	mg/kg	61	64	6.0	30%	Pass	
Zinc	S19-De30553	CP	mg/kg	190	200	6.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S19-De30554	CP	mg/kg	32	32	1.0	30%	Pass	
Lead	S19-De30554	CP	mg/kg	190	190	1.0	30%	Pass	
Zinc	S19-De30554	CP	mg/kg	280	280	1.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-De30560	CP	%	2.1	1.9	11	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S19-De30563	CP	mg/kg	200	200	<1	30%	Pass	
Lead	S19-De30563	CP	mg/kg	800	790	2.0	30%	Pass	
Zinc	S19-De30563	CP	mg/kg	1100	1100	4.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S19-De30564	CP	mg/kg	130	140	3.0	30%	Pass	
Lead	S19-De30564	CP	mg/kg	660	670	2.0	30%	Pass	
Zinc	S19-De30564	CP	mg/kg	1500	1500	2.0	30%	Pass	

Comments

V3- new version to import Cd as per client request on soil samples.

1. The results in this report supersede any previously corresponded results.
2. All Soil Results are reported on a dry basis.
3. Samples are analysed on an as received basis.

ABBREVIATIONS

mg/kg : milligrams per kilograms, mg/L : milligrams per litre, ppm : parts per million,

LOR : Limit of Reporting

RPD : Relative Percent Difference

CRM : Certified Reference Material

LCS : Laboratory Control Sample

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference
Q15	The RPD reported passes mgt-LabMark's Acceptance Criteria as stipulated in AS-POL-002. Refer to Glossary Page of this report for further details

Authorised by:

Andrew Black Analytical Services Manager

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Stephen Maxwell**

Report **772644-S**
Project name LEAD TRIAL
Project ID 318000780
Received Date Feb 08, 2021

Client Sample ID			**TP3A_BALA**	**TP3A_BALB**	**TP3A_BALC**	**TP5A_BALA**
Sample Matrix			**Rock**	**Rock**	**Rock**	**Rock**
Eurofins Sample No.			**S21-Fe16479**	**S21-Fe16480**	**S21-Fe16481**	**S21-Fe16482**
Date Sampled			**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	550	2800	2100	560
% Moisture	1	%	< 1	< 1	< 1	1.1

Client Sample ID			**TP5A_BALB**	**TP5A_BALC**	**TP6A_BALA**	**TP6A_BALB**
Sample Matrix			**Rock**	**Rock**	**Rock**	**Rock**
Eurofins Sample No.			**S21-Fe16483**	**S21-Fe16484**	**S21-Fe16485**	**S21-Fe16486**
Date Sampled			**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	420	390	1100	360
% Moisture	1	%	1.2	1.2	1.2	< 1

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Feb 18, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Feb 09, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

eurofins | Environment Testing

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Company Name: Ramboll Australia Pty Ltd
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NSW 2060

Project Name: LEAD TRIAL
Project ID: 318000780

Order No.:
Report #: 772644
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 8, 2021 2:15 PM
Due: Feb 15, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TP3A_BALA	Feb 08, 2021		Rock	S21-Fe16479		X	X
2	TP3A_BALB	Feb 08, 2021		Rock	S21-Fe16480		X	X
3	TP3A_BALC	Feb 08, 2021		Rock	S21-Fe16481		X	X
4	TP5A_BALA	Feb 08, 2021		Rock	S21-Fe16482		X	X
5	TP5A_BALB	Feb 08, 2021		Rock	S21-Fe16483		X	X
6	TP5A_BALC	Feb 08, 2021		Rock	S21-Fe16484		X	X
7	TP6A_BALA	Feb 08, 2021		Rock	S21-Fe16485		X	X
8	TP6A_BALB	Feb 08, 2021		Rock	S21-Fe16486		X	X
9	TP6A_BALC	Feb 08, 2021		Rock	S21-Fe16487	X		

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

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NATA # 1261 Site # 18217

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IANZ # 1290

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: LEAD TRIAL
Project ID: 318000780

Order No.:
Report #: 772644
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 8, 2021 2:15 PM
Due: Feb 15, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail	HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271			
Sydney Laboratory - NATA Site # 18217	X	X	X
Brisbane Laboratory - NATA Site # 20794			
Perth Laboratory - NATA Site # 23736			
Mayfield Laboratory			
External Laboratory			
Test Counts	2	8	8

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	105			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Fe35255	NCP	%	97			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe31701	NCP	mg/kg	23	20	15	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Fe16479	CP	%	< 1	< 1	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **772646-L**
Project name TREATABLILITY TRIAL
Project ID 318000780
Received Date Feb 08, 2021

Client Sample ID			**TP3A_A_SCR**	**TP3A_B_SCR**	**TP3A_C_SCR**	**TP5A_A_SCR**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**S21-Fe16506**	**S21-Fe16507**	**S21-Fe16508**	**S21-Fe16509**
Date Sampled			**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	14	28	10	190
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	2.9	3.1	3.1	7.1
pH (off)	0.1	pH Units	5.0	5.0	5.0	5.0
pH (USA HCl addition)	0.1	pH Units	1.5	1.6	1.6	1.9

Client Sample ID			**TP5A_B_SCR**	**TP5A_C_SCR**
Sample Matrix			**US Leachate**	**US Leachate**
Eurofins Sample No.			**S21-Fe16510**	**S21-Fe16511**
Date Sampled			**Feb 08, 2021**	**Feb 08, 2021**
Test/Reference	LOR	Unit		
Heavy Metals				
Lead	0.01	mg/L	180	190
USA Leaching Procedure				
Leachate Fluid[C01]		comment	1.0	1.0
pH (initial)	0.1	pH Units	4.3	4.3
pH (off)	0.1	pH Units	5.0	5.0
pH (USA HCl addition)	0.1	pH Units	1.7	2.0

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Feb 15, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
USA Leaching Procedure	Sydney	Feb 10, 2021	14 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

eurofins | Environment Testing

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NATA # 1261 Site # 18217

Brisbane
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NATA # 1261 Site # 20794

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IANZ # 1290

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: TREATABLILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 772646
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 8, 2021 2:15 PM
Due: Feb 15, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TP3A_A_SCR	Feb 08, 2021		Soil	S21-Fe16500	X		X
2	TP3A_B_SCR	Feb 08, 2021		Soil	S21-Fe16501	X		X
3	TP3A_C_SCR	Feb 08, 2021		Soil	S21-Fe16502	X		X
4	TP5A_A_SCR	Feb 08, 2021		Soil	S21-Fe16503	X		X
5	TP5A_B_SCR	Feb 08, 2021		Soil	S21-Fe16504	X		X
6	TP5A_C_SCR	Feb 08, 2021		Soil	S21-Fe16505	X		X
7	TP3A_A_SCR	Feb 08, 2021		US Leachate	S21-Fe16506	X	X	
8	TP3A_B_SCR	Feb 08, 2021		US Leachate	S21-Fe16507	X	X	
9	TP3A_C_SCR	Feb 08, 2021		US Leachate	S21-Fe16508	X	X	

eurofins | Environment Testing

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Phone : 0800 856 450
IANZ # 1290

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: TREATABLILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 772646
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 8, 2021 2:15 PM
Due: Feb 15, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory								
External Laboratory								
10	TP5A_A_SCR	Feb 08, 2021		US Leachate	S21-Fe16509	X	X	
11	TP5A_B_SCR	Feb 08, 2021		US Leachate	S21-Fe16510	X	X	
12	TP5A_C_SCR	Feb 08, 2021		US Leachate	S21-Fe16511	X	X	
Test Counts						12	6	6

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/L	< 0.01			0.01	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	98			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Fe23191	NCP	%	96			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe24422	NCP	mg/L	0.23	0.24	5.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **772646-S**
Project name TREATABLILITY TRIAL
Project ID 318000780
Received Date Feb 08, 2021

Client Sample ID			**TP3A_A_SCR**	**TP3A_B_SCR**	**TP3A_C_SCR**	**TP5A_A_SCR**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Fe16500**	**S21-Fe16501**	**S21-Fe16502**	**S21-Fe16503**
Date Sampled			**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	16000	15000	19000	39000
% Moisture	1	%	8.0	8.4	8.5	2.6

Client Sample ID			**TP5A_B_SCR**	**TP5A_C_SCR**
Sample Matrix			**Soil**	**Soil**
Eurofins Sample No.			**S21-Fe16504**	**S21-Fe16505**
Date Sampled			**Feb 08, 2021**	**Feb 08, 2021**
Test/Reference	LOR	Unit		
Heavy Metals				
Lead	5	mg/kg	35000	37000
% Moisture	1	%	2.6	4.0

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Feb 10, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Feb 09, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

eurofins | Environment Testing

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: TREATABLILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 772646
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 8, 2021 2:15 PM
Due: Feb 15, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TP3A_A_SCR	Feb 08, 2021		Soil	S21-Fe16500	X		X
2	TP3A_B_SCR	Feb 08, 2021		Soil	S21-Fe16501	X		X
3	TP3A_C_SCR	Feb 08, 2021		Soil	S21-Fe16502	X		X
4	TP5A_A_SCR	Feb 08, 2021		Soil	S21-Fe16503	X		X
5	TP5A_B_SCR	Feb 08, 2021		Soil	S21-Fe16504	X		X
6	TP5A_C_SCR	Feb 08, 2021		Soil	S21-Fe16505	X		X
7	TP3A_A_SCR	Feb 08, 2021		US Leachate	S21-Fe16506	X	X	
8	TP3A_B_SCR	Feb 08, 2021		US Leachate	S21-Fe16507	X	X	
9	TP3A_C_SCR	Feb 08, 2021		US Leachate	S21-Fe16508	X	X	

eurofins | Environment Testing

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Project Name: TREATABLILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 772646
Phone: 02 9954 8118
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Received: Feb 8, 2021 2:15 PM
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Priority: 5 Day
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Mayfield Laboratory								
External Laboratory								
10	TP5A_A_SCR	Feb 08, 2021		US Leachate	S21-Fe16509	X	X	
11	TP5A_B_SCR	Feb 08, 2021		US Leachate	S21-Fe16510	X	X	
12	TP5A_C_SCR	Feb 08, 2021		US Leachate	S21-Fe16511	X	X	
Test Counts						12	6	6

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
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7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
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****NOTE:** pH duplicates are reported as a range NOT as RPD

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MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
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CRM	Certified Reference Material - reported as percent recovery.
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CP	Client Parent - QC was performed on samples pertaining to this report
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QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

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Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

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2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
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5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
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8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Lead	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Heavy Metals							
Lead	%	109			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Fe16501	CP	%	8.4	8.6	3.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe16504	CP	mg/kg	35000	37000	6.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **774893-L**
Project name TREATABILITY TRIAL
Project ID 318000780
Received Date Feb 17, 2021

Client Sample ID			**TP3A_D_SCR**	**TP3A_TR01-1**	**TP3A_TR01-2**	**TP3A_TR02-1**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**S21-Fe36599**	**S21-Fe36600**	**S21-Fe36601**	**S21-Fe36602**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	35	< 0.01	< 0.01	< 0.01
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	3.3	9.2	9.3	9.5
pH (off)	0.1	pH Units	5.0	9.0	9.0	9.2
pH (USA HCl addition)	0.1	pH Units	1.8	1.9	1.9	2.0

Client Sample ID			**TP3A_TR02-2**	**TP3A_TR03-1**	**TP3A_TR03-2**	**TP3A_TR04-1**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**S21-Fe36603**	**S21-Fe36604**	**S21-Fe36605**	**S21-Fe36606**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	< 0.01	0.01	0.03	< 0.01
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	9.5	9.7	9.7	8.8
pH (off)	0.1	pH Units	9.3	8.8	9.2	8.5
pH (USA HCl addition)	0.1	pH Units	1.9	2.0	2.0	1.9

Client Sample ID			**TP3A_TR04-2**	**TP3A_TR05-1**	**TP3A_TR05-2**	**TP3A_TR06-1**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**S21-Fe36607**	**S21-Fe36608**	**S21-Fe36609**	**S21-Fe36610**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	0.04	< 0.01	0.04	0.03
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	8.9	9.6	9.6	9.6
pH (off)	0.1	pH Units	8.3	9.3	9.3	8.9
pH (USA HCl addition)	0.1	pH Units	1.9	1.9	1.8	1.9

Client Sample ID			TP3A_TR06-2	TP5A_D_SCR	TP5A_TR01-1	TP5A_TR01-2
Sample Matrix			US Leachate	US Leachate	US Leachate	US Leachate
Eurofins Sample No.			S21-Fe36611	S21-Fe36612	S21-Fe36613	S21-Fe36614
Date Sampled			Feb 17, 2021	Feb 17, 2021	Feb 17, 2021	Feb 17, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	0.01	140	0.19	< 0.01
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	9.5	5.3	9.7	9.8
pH (off)	0.1	pH Units	9.0	5.1	9.2	9.0
pH (USA HCl addition)	0.1	pH Units	1.9	1.9	2.0	1.9

Client Sample ID			TP5A_TR02-1	TP5A_TR02-2	TP5A_TR03-1	TP5A_TR03-2
Sample Matrix			US Leachate	US Leachate	US Leachate	US Leachate
Eurofins Sample No.			S21-Fe36615	S21-Fe36616	S21-Fe36617	S21-Fe36618
Date Sampled			Feb 17, 2021	Feb 17, 2021	Feb 17, 2021	Feb 17, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	0.05	0.02	0.03	0.03
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	9.7	9.7	9.7	10.0
pH (off)	0.1	pH Units	9.2	9.2	8.7	8.7
pH (USA HCl addition)	0.1	pH Units	2.0	1.9	1.9	2.0

Client Sample ID			TP5A_TR04-1	TP5A_TR04-2	TP5A_TR05-1	TP5A_TR05-2
Sample Matrix			US Leachate	US Leachate	US Leachate	US Leachate
Eurofins Sample No.			S21-Fe36619	S21-Fe36620	S21-Fe36621	S21-Fe36622
Date Sampled			Feb 17, 2021	Feb 17, 2021	Feb 17, 2021	Feb 17, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	0.05	< 0.01	< 0.01	0.01
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	9.9	9.4	9.8	9.8
pH (off)	0.1	pH Units	9.2	9.0	9.1	9.4
pH (USA HCl addition)	0.1	pH Units	1.9	1.8	1.9	1.9

Client Sample ID			TP5A_TR06-1	TP5A_TR06-2	TP5A_TR07-1	TP5A_TR07-2
Sample Matrix			US Leachate	US Leachate	US Leachate	US Leachate
Eurofins Sample No.			S21-Fe36623	S21-Fe36624	S21-Fe36625	S21-Fe36626
Date Sampled			Feb 17, 2021	Feb 17, 2021	Feb 17, 2021	Feb 17, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	0.05	0.02	0.08	0.05
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	9.9	9.8	9.6	9.6
pH (off)	0.1	pH Units	9.4	9.3	9.4	9.3
pH (USA HCl addition)	0.1	pH Units	1.9	1.9	1.8	2.0

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Feb 23, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
USA Leaching Procedure	Sydney	Feb 20, 2021	14 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: TREATABILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 774893
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 17, 2021 3:00 PM
Due: Feb 24, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	pH (1:5 Aqueous extract at 25°C as rec.)	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	TP3A_D_SCR	Feb 17, 2021		Soil	S21-Fe36583	X	X		X
2	TP3A_TR01-1	Feb 17, 2021		Soil	S21-Fe36584	X			X
3	TP3A_TR02-1	Feb 17, 2021		Soil	S21-Fe36585	X			X
4	TP3A_TR03-1	Feb 17, 2021		Soil	S21-Fe36586	X			X
5	TP3A_TR04-1	Feb 17, 2021		Soil	S21-Fe36587	X			X
6	TP3A_TR05-1	Feb 17, 2021		Soil	S21-Fe36588	X			X
7	TP3A_TR06-1	Feb 17, 2021		Soil	S21-Fe36589	X			X
8	TP5A_D_SCR	Feb 17, 2021		Soil	S21-Fe36590	X	X		X
9	TP5A_TR01-1	Feb 17, 2021		Soil	S21-Fe36591	X			X

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Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
10	TP5A_TR02-1	Feb 17, 2021		Soil	S21-Fe36592	X			X
11	TP5A_TR03-1	Feb 17, 2021		Soil	S21-Fe36593	X			X
12	TP5A_TR04-1	Feb 17, 2021		Soil	S21-Fe36594	X			X
13	TP5A_TR05-1	Feb 17, 2021		Soil	S21-Fe36595	X			X
14	TP5A_TR06-1	Feb 17, 2021		Soil	S21-Fe36596	X			X
15	TP5A_TR07-1	Feb 17, 2021		Soil	S21-Fe36597	X			X
16	TP3A_D_SCR	Feb 17, 2021		US Leachate	S21-Fe36599	X		X	
17	TP3A_TR01-1	Feb 17, 2021		US Leachate	S21-Fe36600	X		X	
18	TP3A_TR01-2	Feb 17, 2021		US Leachate	S21-Fe36601	X		X	
19	TP3A_TR02-1	Feb 17, 2021		US Leachate	S21-Fe36602	X		X	
20	TP3A_TR02-2	Feb 17, 2021		US Leachate	S21-Fe36603	X		X	

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Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
21	TP3A_TR03-1	Feb 17, 2021		US Leachate	S21-Fe36604	X		X	
22	TP3A_TR03-2	Feb 17, 2021		US Leachate	S21-Fe36605	X		X	
23	TP3A_TR04-1	Feb 17, 2021		US Leachate	S21-Fe36606	X		X	
24	TP3A_TR04-2	Feb 17, 2021		US Leachate	S21-Fe36607	X		X	
25	TP3A_TR05-1	Feb 17, 2021		US Leachate	S21-Fe36608	X		X	
26	TP3A_TR05-2	Feb 17, 2021		US Leachate	S21-Fe36609	X		X	
27	TP3A_TR06-1	Feb 17, 2021		US Leachate	S21-Fe36610	X		X	
28	TP3A_TR06-2	Feb 17, 2021		US Leachate	S21-Fe36611	X		X	
29	TP5A_D_SCR	Feb 17, 2021		US Leachate	S21-Fe36612	X		X	
30	TP5A_TR01-1	Feb 17, 2021		US Leachate	S21-Fe36613	X		X	
31	TP5A_TR01-2	Feb 17, 2021		US Leachate	S21-Fe36614	X		X	

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Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
32	TP5A_TR02-1	Feb 17, 2021		US Leachate	S21-Fe36615	X		X	
33	TP5A_TR02-2	Feb 17, 2021		US Leachate	S21-Fe36616	X		X	
34	TP5A_TR03-1	Feb 17, 2021		US Leachate	S21-Fe36617	X		X	
35	TP5A_TR03-2	Feb 17, 2021		US Leachate	S21-Fe36618	X		X	
36	TP5A_TR04-1	Feb 17, 2021		US Leachate	S21-Fe36619	X		X	
37	TP5A_TR04-2	Feb 17, 2021		US Leachate	S21-Fe36620	X		X	
38	TP5A_TR05-1	Feb 17, 2021		US Leachate	S21-Fe36621	X		X	
39	TP5A_TR05-2	Feb 17, 2021		US Leachate	S21-Fe36622	X		X	
40	TP5A_TR06-1	Feb 17, 2021		US Leachate	S21-Fe36623	X		X	
41	TP5A_TR06-2	Feb 17, 2021		US Leachate	S21-Fe36624	X		X	
42	TP5A_TR07-1	Feb 17, 2021		US Leachate	S21-Fe36625	X		X	

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Sample Detail						Lead	pH (1:5 Aqueous extract at 25°C as rec.)	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
43	TP5A_TR07-2	Feb 17, 2021		US Leachate	S21-Fe36626	X		X	
Test Counts						43	2	28	15

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/L	< 0.01			0.01	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	93			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Fe36618	CP	%	82			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe36599	CP	mg/L	35	35	1.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe36609	CP	mg/L	0.04	0.04	3.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe36619	CP	mg/L	0.05	0.03	42	30%	Fail	Q15

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Stephen Maxwell**

Report **774893-S**
Project name TREATABILITY TRIAL
Project ID 318000780
Received Date Feb 17, 2021

Client Sample ID			**TP3A_D_SCR**	**TP3A_TR01-1**	**TP3A_TR02-1**	**TP3A_TR03-1**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Fe36583**	**S21-Fe36584**	**S21-Fe36585**	**S21-Fe36586**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	2.8	-	-	-
% Moisture	1	%	7.8	15	16	13
Heavy Metals						
Lead	5	mg/kg	10000	8200	9600	18000

Client Sample ID			**TP3A_TR04-1**	**TP3A_TR05-1**	**TP3A_TR06-1**	**TP5A_D_SCR**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Fe36587**	**S21-Fe36588**	**S21-Fe36589**	**S21-Fe36590**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	-	-	-	4.2
% Moisture	1	%	13	14	12	2.4
Heavy Metals						
Lead	5	mg/kg	9500	9900	9100	19000

Client Sample ID			**TP5A_TR01-1**	**TP5A_TR02-1**	**TP5A_TR03-1**	**TP5A_TR04-1**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Fe36591**	**S21-Fe36592**	**S21-Fe36593**	**S21-Fe36594**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
% Moisture	1	%	17	13	20	18
Heavy Metals						
Lead	5	mg/kg	17000	15000	18000	20000

Client Sample ID			TP5A_TR05-1	TP5A_TR06-1	TP5A_TR07-1
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Fe36595**	**S21-Fe36596**	**S21-Fe36597**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit			
% Moisture	1	%	13	16	15
Heavy Metals					
Lead	5	mg/kg	10000	13000	12000

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
pH (1:5 Aqueous extract at 25°C as rec.)	Sydney	Feb 20, 2021	7 Days
- Method: LTM-GEN-7090 pH in soil by ISE			
Heavy Metals	Sydney	Feb 22, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Feb 18, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: TREATABILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 774893
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 17, 2021 3:00 PM
Due: Feb 24, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	pH (1:5 Aqueous extract at 25°C as rec.)	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	TP3A_D_SCR	Feb 17, 2021		Soil	S21-Fe36583	X	X		X
2	TP3A_TR01-1	Feb 17, 2021		Soil	S21-Fe36584	X			X
3	TP3A_TR02-1	Feb 17, 2021		Soil	S21-Fe36585	X			X
4	TP3A_TR03-1	Feb 17, 2021		Soil	S21-Fe36586	X			X
5	TP3A_TR04-1	Feb 17, 2021		Soil	S21-Fe36587	X			X
6	TP3A_TR05-1	Feb 17, 2021		Soil	S21-Fe36588	X			X
7	TP3A_TR06-1	Feb 17, 2021		Soil	S21-Fe36589	X			X
8	TP5A_D_SCR	Feb 17, 2021		Soil	S21-Fe36590	X	X		X
9	TP5A_TR01-1	Feb 17, 2021		Soil	S21-Fe36591	X			X

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Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
10	TP5A_TR02-1	Feb 17, 2021		Soil	S21-Fe36592	X			X
11	TP5A_TR03-1	Feb 17, 2021		Soil	S21-Fe36593	X			X
12	TP5A_TR04-1	Feb 17, 2021		Soil	S21-Fe36594	X			X
13	TP5A_TR05-1	Feb 17, 2021		Soil	S21-Fe36595	X			X
14	TP5A_TR06-1	Feb 17, 2021		Soil	S21-Fe36596	X			X
15	TP5A_TR07-1	Feb 17, 2021		Soil	S21-Fe36597	X			X
16	TP3A_D_SCR	Feb 17, 2021		US Leachate	S21-Fe36599	X		X	
17	TP3A_TR01-1	Feb 17, 2021		US Leachate	S21-Fe36600	X		X	
18	TP3A_TR01-2	Feb 17, 2021		US Leachate	S21-Fe36601	X		X	
19	TP3A_TR02-1	Feb 17, 2021		US Leachate	S21-Fe36602	X		X	
20	TP3A_TR02-2	Feb 17, 2021		US Leachate	S21-Fe36603	X		X	

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Sample Detail						Lead	pH (1:5 Aqueous extract at 25°C as rec.)	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
21	TP3A_TR03-1	Feb 17, 2021		US Leachate	S21-Fe36604	X		X	
22	TP3A_TR03-2	Feb 17, 2021		US Leachate	S21-Fe36605	X		X	
23	TP3A_TR04-1	Feb 17, 2021		US Leachate	S21-Fe36606	X		X	
24	TP3A_TR04-2	Feb 17, 2021		US Leachate	S21-Fe36607	X		X	
25	TP3A_TR05-1	Feb 17, 2021		US Leachate	S21-Fe36608	X		X	
26	TP3A_TR05-2	Feb 17, 2021		US Leachate	S21-Fe36609	X		X	
27	TP3A_TR06-1	Feb 17, 2021		US Leachate	S21-Fe36610	X		X	
28	TP3A_TR06-2	Feb 17, 2021		US Leachate	S21-Fe36611	X		X	
29	TP5A_D_SCR	Feb 17, 2021		US Leachate	S21-Fe36612	X		X	
30	TP5A_TR01-1	Feb 17, 2021		US Leachate	S21-Fe36613	X		X	
31	TP5A_TR01-2	Feb 17, 2021		US Leachate	S21-Fe36614	X		X	

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Sample Detail						Lead	pH (1:5 Aqueous extract at 25°C as rec.)	USA Leaching Procedure	Moisture Set
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Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
32	TP5A_TR02-1	Feb 17, 2021		US Leachate	S21-Fe36615	X		X	
33	TP5A_TR02-2	Feb 17, 2021		US Leachate	S21-Fe36616	X		X	
34	TP5A_TR03-1	Feb 17, 2021		US Leachate	S21-Fe36617	X		X	
35	TP5A_TR03-2	Feb 17, 2021		US Leachate	S21-Fe36618	X		X	
36	TP5A_TR04-1	Feb 17, 2021		US Leachate	S21-Fe36619	X		X	
37	TP5A_TR04-2	Feb 17, 2021		US Leachate	S21-Fe36620	X		X	
38	TP5A_TR05-1	Feb 17, 2021		US Leachate	S21-Fe36621	X		X	
39	TP5A_TR05-2	Feb 17, 2021		US Leachate	S21-Fe36622	X		X	
40	TP5A_TR06-1	Feb 17, 2021		US Leachate	S21-Fe36623	X		X	
41	TP5A_TR06-2	Feb 17, 2021		US Leachate	S21-Fe36624	X		X	
42	TP5A_TR07-1	Feb 17, 2021		US Leachate	S21-Fe36625	X		X	

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Received: Feb 17, 2021 3:00 PM
Due: Feb 24, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	pH (1:5 Aqueous extract at 25°C as rec.)	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
43	TP5A_TR07-2	Feb 17, 2021		US Leachate	S21-Fe36626	X		X	
Test Counts						43	2	28	15

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	92			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Fe34686	NCP	%	94			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
pH (1:5 Aqueous extract at 25°C as rec.)	S21-Fe36583	CP	pH Units	2.8	2.8	Pass	30%	Pass	
% Moisture	S21-Fe36583	CP	%	7.8	8.1	3.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe36583	CP	mg/kg	10000	9400	8.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Fe36593	CP	%	20	19	5.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe36593	CP	mg/kg	18000	16000	9.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Andrew Black	Analytical Services Manager
Charl Du Preez	Senior Analyst-Inorganic (NSW)
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **777838-L**
Project name ADDITIONAL TREATABILITY TRIAL
Project ID 318000780
Received Date Mar 03, 2021

Client Sample ID			**TP3A_TR01-1 (DAY 1)**	**TP3A_TR01-1 (DAY 2)**	**0448224653**	**TP3A_TR01-1 (DAY 4)**
Sample Matrix			**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**
Eurofins Sample No.			**S21-Ma06656**	**S21-Ma06657**	**S21-Ma06658**	**S21-Ma06659**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	< 0.001	0.001	0.003	0.002
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	9.4	8.7	8.8	9.3
pH (Leachate fluid)	0.1	pH Units	6.8	5.1	6.8	6.8
pH (off)	0.1	pH Units	9.6	9.2	9.5	9.5

Client Sample ID			**TP3A_TR01-1 (DAY 5)**	**TP3A_TR01-1 (DAY 6)**	**TP3A_TR01-1 (DAY 7)**	**TP3A_TR01-1 (DAY 8)**
Sample Matrix			**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**
Eurofins Sample No.			**S21-Ma06660**	**S21-Ma06661**	**S21-Ma06662**	**S21-Ma06663**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	< 0.001	0.002	< 0.001	< 0.001
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	8.8	9.0	9.1	9.7
pH (Leachate fluid)	0.1	pH Units	6.8	6.8	6.2	6.2
pH (off)	0.1	pH Units	9.3	9.3	9.8	9.3

Client Sample ID			TP3A_TR01-1 (DAY 9)	TP3A_TR01-1 (DAY 10)	TP3A_TR03-1 (DAY 1)	TP3A_TR03-1 (DAY 2)
Sample Matrix			Leachate - MEP	Leachate - MEP	Leachate - MEP	Leachate - MEP
Eurofins Sample No.			S21-Ma06664	S21-Ma06665	S21-Ma06666	S21-Ma06667
Date Sampled			Feb 17, 2021	Feb 17, 2021	Feb 17, 2021	Feb 17, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	0.004	0.017	0.12	0.001
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	9.7	9.2	9.1	8.7
pH (Leachate fluid)	0.1	pH Units	6.2	6.2	6.8	5.1
pH (off)	0.1	pH Units	9.3	9.1	9.5	9.3

Client Sample ID			TP3A_TR03-1 (DAY 3)	TP3A_TR03-1 (DAY 4)	TP3A_TR03-1 (DAY 5)	TP3A_TR03-1 (DAY 6)
Sample Matrix			Leachate - MEP	Leachate - MEP	Leachate - MEP	Leachate - MEP
Eurofins Sample No.			S21-Ma06668	S21-Ma06669	S21-Ma06670	S21-Ma06671
Date Sampled			Feb 17, 2021	Feb 17, 2021	Feb 17, 2021	Feb 17, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	0.004	0.13	0.001	0.002
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	8.9	9.3	9.0	9.4
pH (Leachate fluid)	0.1	pH Units	6.8	6.8	6.8	6.8
pH (off)	0.1	pH Units	9.5	9.4	9.6	9.5

Client Sample ID			TP3A_TR03-1 (DAY 7)	TP3A_TR03-1 (DAY 8)	TP3A_TR03-1 (DAY 9)	TP3A_TR03-1 (DAY 10)
Sample Matrix			Leachate - MEP	Leachate - MEP	Leachate - MEP	Leachate - MEP
Eurofins Sample No.			S21-Ma06672	S21-Ma06673	S21-Ma06674	S21-Ma06675
Date Sampled			Feb 17, 2021	Feb 17, 2021	Feb 17, 2021	Feb 17, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	< 0.001	0.013	0.015	0.003
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	9.0	9.7	9.7	9.3
pH (Leachate fluid)	0.1	pH Units	6.2	6.2	6.2	6.2
pH (off)	0.1	pH Units	9.5	9.4	9.4	9.4

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Mar 22, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
AUS Leaching Procedure	Sydney	Mar 19, 2021	7 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

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Site # 1254 & 14271

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Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
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NATA # 1261 Site # 20794

Perth
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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: ADDITIONAL TREATABILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 777838
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Mar 3, 2021 12:14 PM
Due: Mar 17, 2021
Priority: 10 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	AUS Leaching Procedure
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	TP3A_TR01-1 (DAY 1)	Feb 17, 2021		Leachate - MEP	S21-Ma06656	X	X
2	TP3A_TR01-1 (DAY 2)	Feb 17, 2021		Leachate - MEP	S21-Ma06657	X	X
3	TP3A_TR01-1 (DAY 3)	Feb 17, 2021		Leachate - MEP	S21-Ma06658	X	X
4	TP3A_TR01-1 (DAY 4)	Feb 17, 2021		Leachate - MEP	S21-Ma06659	X	X
5	TP3A_TR01-1 (DAY 5)	Feb 17, 2021		Leachate - MEP	S21-Ma06660	X	X
6	TP3A_TR01-1	Feb 17, 2021		Leachate -	S21-Ma06661	X	X

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Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
	(DAY 6)			MEP			
7	TP3A_TR01-1 (DAY 7)	Feb 17, 2021		Leachate - MEP	S21-Ma06662	X	X
8	TP3A_TR01-1 (DAY 8)	Feb 17, 2021		Leachate - MEP	S21-Ma06663	X	X
9	TP3A_TR01-1 (DAY 9)	Feb 17, 2021		Leachate - MEP	S21-Ma06664	X	X
10	TP3A_TR01-1 (DAY 10)	Feb 17, 2021		Leachate - MEP	S21-Ma06665	X	X
11	TP3A_TR03-1 (DAY 1)	Feb 17, 2021		Leachate - MEP	S21-Ma06666	X	X
12	TP3A_TR03-1 (DAY 2)	Feb 17, 2021		Leachate - MEP	S21-Ma06667	X	X

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Sample Detail						Lead	AUS Leaching Procedure
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
13	TP3A_TR03-1 (DAY 3)	Feb 17, 2021		Leachate - MEP	S21-Ma06668	X	X
14	TP3A_TR03-1 (DAY 4)	Feb 17, 2021		Leachate - MEP	S21-Ma06669	X	X
15	TP3A_TR03-1 (DAY 5)	Feb 17, 2021		Leachate - MEP	S21-Ma06670	X	X
16	TP3A_TR03-1 (DAY 6)	Feb 17, 2021		Leachate - MEP	S21-Ma06671	X	X
17	TP3A_TR03-1 (DAY 7)	Feb 17, 2021		Leachate - MEP	S21-Ma06672	X	X
18	TP3A_TR03-1 (DAY 8)	Feb 17, 2021		Leachate - MEP	S21-Ma06673	X	X
19	TP3A_TR03-1	Feb 17, 2021		Leachate -	S21-Ma06674	X	X

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Contact Name: Stephen Maxwell

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Sample Detail						Lead	AUS Leaching Procedure
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
	(DAY 9)			MEP			
20	TP3A_TR03-1 (DAY 10)	Feb 17, 2021		Leachate - MEP	S21-Ma06675	X	X
Test Counts						20	20

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Lead	mg/L	< 0.001			0.001	Pass	
LCS - % Recovery							
Heavy Metals							
Lead	%	103			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06668	CP	%	122			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06670	CP	%	109			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06672	CP	%	96			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Ma06659	CP	mg/L	0.002	0.002	4.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Ma06661	CP	mg/L	0.002	0.002	21	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Ma06663	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised by:

Ryan Gilbert	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Attention: **Stephen Maxwell**

Report **777842-L**
Project name ADDITIONAL TREATABILITY TRIAL
Project ID 318000780
Received Date Mar 03, 2021

Client Sample ID			**TP5A_TR01-1 (DAY 1)**	**TP5A_TR01-1 (DAY 2)**	**TP5A_TR01-1 (DAY 3)**	**TP5A_TR01-1 (DAY 4)**
Sample Matrix			**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**
Eurofins Sample No.			**S21-Ma06676**	**S21-Ma06677**	**S21-Ma06678**	**S21-Ma06679**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	0.002	< 0.001	0.017	0.075
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	9.6	9.1	9.5	9.8
pH (Leachate fluid)	0.1	pH Units	6.8	5.1	6.8	6.8
pH (off)	0.1	pH Units	10	9.6	9.5	9.8

Client Sample ID			**TP5A_TR01-1 (DAY 5)**	**TP5A_TR01-1 (DAY 6)**	**TP5A_TR01-1 (DAY 7)**	**TP5A_TR01-1 (DAY 8)**
Sample Matrix			**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**
Eurofins Sample No.			**S21-Ma06680**	**S21-Ma06681**	**S21-Ma06682**	**S21-Ma06683**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	0.004	0.003	0.058	< 0.001
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	9.6	9.9	9.6	9.9
pH (Leachate fluid)	0.1	pH Units	6.8	6.8	6.2	6.2
pH (off)	0.1	pH Units	9.8	9.7	9.9	9.7

Client Sample ID			TP5A_TR01-1 (DAY 9)	TP5A_TR01-1 (DAY 10)	TP5A_TR03-1 (DAY 1)	TP5A_TR03-1 (DAY 2)
Sample Matrix			**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**
Eurofins Sample No.			**S21-Ma06684**	**S21-Ma06685**	**S21-Ma06686**	**S21-Ma06687**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	1.0	< 0.001	< 0.001	0.036
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	9.8	9.8	9.4	8.9
pH (Leachate fluid)	0.1	pH Units	6.2	6.2	6.8	5.1
pH (off)	0.1	pH Units	9.7	9.8	10.0	9.7

Client Sample ID			TP5A_TR03-1 (DAY 3)	TP5A_TR03-1 (DAY 4)	TP5A_TR03-1 (DAY 5)	TP5A_TR03-1 (DAY 6)
Sample Matrix			**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**
Eurofins Sample No.			**S21-Ma06688**	**S21-Ma06689**	**S21-Ma06690**	**S21-Ma06691**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	0.031	0.053	0.047	0.042
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	9.3	9.7	9.4	9.9
pH (Leachate fluid)	0.1	pH Units	6.8	6.8	6.8	6.8
pH (off)	0.1	pH Units	9.7	9.8	9.8	9.8

Client Sample ID			TP5A_TR03-1 (DAY 7)	TP5A_TR03-1 (DAY 8)	TP5A_TR03-1 (DAY 9)	TP5A_TR03-1 (DAY 10)
Sample Matrix			**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**
Eurofins Sample No.			**S21-Ma06692**	**S21-Ma06693**	**S21-Ma06694**	**S21-Ma06695**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	< 0.001	0.016	0.017	0.001
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	9.5	10.0	9.9	9.7
pH (Leachate fluid)	0.1	pH Units	6.2	6.2	6.2	6.2
pH (off)	0.1	pH Units	10.0	9.8	9.8	9.8

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Mar 22, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
AUS Leaching Procedure	Sydney	Mar 19, 2021	7 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

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IANZ # 1290

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: ADDITIONAL TREATABILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 777842
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Mar 3, 2021 12:14 PM
Due: Mar 17, 2021
Priority: 10 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	AUS Leaching Procedure
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	TP5A_TR01-1 (DAY 1)	Feb 17, 2021		Leachate - MEP	S21-Ma06676	X	X
2	TP5A_TR01-1 (DAY 2)	Feb 17, 2021		Leachate - MEP	S21-Ma06677	X	X
3	TP5A_TR01-1 (DAY 3)	Feb 17, 2021		Leachate - MEP	S21-Ma06678	X	X
4	TP5A_TR01-1 (DAY 4)	Feb 17, 2021		Leachate - MEP	S21-Ma06679	X	X
5	TP5A_TR01-1 (DAY 5)	Feb 17, 2021		Leachate - MEP	S21-Ma06680	X	X
6	TP5A_TR01-1	Feb 17, 2021		Leachate -	S21-Ma06681	X	X

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Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
	(DAY 6)			MEP			
7	TP5A_TR01-1 (DAY 7)	Feb 17, 2021		Leachate - MEP	S21-Ma06682	X	X
8	TP5A_TR01-1 (DAY 8)	Feb 17, 2021		Leachate - MEP	S21-Ma06683	X	X
9	TP5A_TR01-1 (DAY 9)	Feb 17, 2021		Leachate - MEP	S21-Ma06684	X	X
10	TP5A_TR01-1 (DAY 10)	Feb 17, 2021		Leachate - MEP	S21-Ma06685	X	X
11	TP5A_TR03-1 (DAY 1)	Feb 17, 2021		Leachate - MEP	S21-Ma06686	X	X
12	TP5A_TR03-1 (DAY 2)	Feb 17, 2021		Leachate - MEP	S21-Ma06687	X	X

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Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
13	TP5A_TR03-1 (DAY 3)	Feb 17, 2021		Leachate - MEP	S21-Ma06688	X	X
14	TP5A_TR03-1 (DAY 4)	Feb 17, 2021		Leachate - MEP	S21-Ma06689	X	X
15	TP5A_TR03-1 (DAY 5)	Feb 17, 2021		Leachate - MEP	S21-Ma06690	X	X
16	TP5A_TR03-1 (DAY 6)	Feb 17, 2021		Leachate - MEP	S21-Ma06691	X	X
17	TP5A_TR03-1 (DAY 7)	Feb 17, 2021		Leachate - MEP	S21-Ma06692	X	X
18	TP5A_TR03-1 (DAY 8)	Feb 17, 2021		Leachate - MEP	S21-Ma06693	X	X
19	TP5A_TR03-1	Feb 17, 2021		Leachate -	S21-Ma06694	X	X

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Due: Mar 17, 2021
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Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	AUS Leaching Procedure
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
	(DAY 9)			MEP			
20	TP5A_TR03-1 (DAY 10)	Feb 17, 2021		Leachate - MEP	S21-Ma06695	X	X
Test Counts						20	20

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/L	< 0.001			0.001	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	116			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06679	CP	%	84			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06687	CP	%	99			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06691	CP	%	89			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06693	CP	%	112			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06694	CP	%	92			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06695	CP	%	104			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**	**Result 2**	**RPD**	**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Ma06680	CP	mg/L	0.004	0.002	62	30%	Fail	Q15

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Ryan Gilbert	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **799567-L**
Project name TARAGO CADMIUM ANALYSIS
Project ID 31800780
Received Date Jun 01, 2021

Client Sample ID			**TP3a_01**	**TP3a_02**	**TP3a_03**	**TP4a_01**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**N21-Jn00956**	**N21-Jn00957**	**N21-Jn00958**	**N21-Jn00959**
Date Sampled			**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.005	mg/L	0.63	0.58	0.44	1.2
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	3.4	3.4	3.3	4.0
pH (off)	0.1	pH Units	4.9	4.9	4.9	4.8
pH (USA HCl addition)	0.1	pH Units	1.8	1.8	1.8	1.8

Client Sample ID			**TP4a_02**	**TP4a_03**	**TP5a_01**	**TP5a_02**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**N21-Jn00960**	**N21-Jn00961**	**N21-Jn00962**	**N21-Jn00963**
Date Sampled			**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.005	mg/L	0.92	0.91	0.33	0.35
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	4.0	4.0	4.6	4.6
pH (off)	0.1	pH Units	4.9	4.9	5.0	5.0
pH (USA HCl addition)	0.1	pH Units	1.8	1.8	1.8	1.8

Client Sample ID			**TP5a_03**	**TP6a_01**	**TP6a_02**	**TP6a_03**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**N21-Jn00964**	**N21-Jn00965**	**N21-Jn00966**	**N21-Jn00967**
Date Sampled			**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.005	mg/L	0.36	0.22	0.19	0.19
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	4.7	5.0	5.1	5.0
pH (off)	0.1	pH Units	5.0	5.0	5.0	5.0
pH (USA HCl addition)	0.1	pH Units	1.8	1.8	1.8	1.8

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Jun 03, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
USA Leaching Procedure	Sydney	Jun 02, 2021	14 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

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Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: TARAGO CADMIUM ANALYSIS
Project ID: 31800780

Order No.: 318000780
Report #: 799567
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 1, 2021 12:40 PM
Due: Jun 3, 2021
Priority: 2 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Cadmium	USA Leaching Procedure	Moisture Set
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Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
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External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
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2	TP3a_02	Jun 01, 2021		Soil	N21-Jn00913	X		X
3	TP3a_03	Jun 01, 2021		Soil	N21-Jn00914	X		X
4	TP4a_01	Jun 01, 2021		Soil	N21-Jn00915	X		X
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8	TP5a_02	Jun 01, 2021		Soil	N21-Jn00919	X		X
9	TP5a_03	Jun 01, 2021		Soil	N21-Jn00920	X		X

Date Reported:Jun 03, 2021

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23	TP6a_02	Jun 01, 2021		US Leachate	N21-Jn00966	X	X	
24	TP6a_03	Jun 01, 2021		US Leachate	N21-Jn00967	X	X	
Test Counts						24	12	12

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram | **mg/L:** milligrams per litre | **ug/L:** micrograms per litre

ppm: Parts per million | **ppb:** Parts per billion | **%:** Percentage

org/100mL: Organisms per 100 millilitres | **NTU:** Nephelometric Turbidity Units | **MPN/100mL:** Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Cadmium	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Heavy Metals							
Cadmium	%	89			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Cadmium	N21-Jn00956	CP	mg/L	0.63	0.58	7.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Cadmium	N21-Jn00958	CP	mg/L	0.44	0.45	1.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Certificate of Analysis

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 25079

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection and proficiency testing scheme providers reports.

Attention: **Stephen Maxwell**

Report **799567-S**
Project name TARAGO CADMIUM ANALYSIS
Project ID 31800780
Received Date Jun 01, 2021

Client Sample ID			**TP3a_01**	**TP3a_02**	**TP3a_03**	**TP4a_01**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**N21-Jn00912**	**N21-Jn00913**	**N21-Jn00914**	**N21-Jn00915**
Date Sampled			**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	51	30	27	190
% Moisture	1	%	8.4	7.4	6.8	4.8

Client Sample ID			**TP4a_02**	**TP4a_03**	**TP5a_01**	**TP5a_02**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**N21-Jn00916**	**N21-Jn00917**	**N21-Jn00918**	**N21-Jn00919**
Date Sampled			**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	130	170	430	270
% Moisture	1	%	7.4	2.3	2.0	2.0

Client Sample ID			**TP5a_03**	**TP6a_01**	**TP6a_02**	**TP6a_03**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**N21-Jn00920**	**N21-Jn00921**	**N21-Jn00922**	**N21-Jn00923**
Date Sampled			**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	440	12	9.6	7.1
% Moisture	1	%	2.1	6.0	5.0	4.7

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Jun 02, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Jun 01, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

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3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Cadmium			mg/kg	< 0.4			0.4	Pass	
LCS - % Recovery									
Heavy Metals									
Cadmium			%	104			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S21-My61675	NCP	%	111			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Cadmium	S21-My61674	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	N21-Jn00916	CP	%	7.4	6.4	15	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

APPENDIX 3
RAIL SLEEPER WASTE CLASSIFICATION

Intended for
John Holland Rail

Document type
Waste Classification Report

Date
26 March 2020

RAIL SLEEPER WASTE CLASSIFICATION TARAGO LOOP EXTENSION

RAMBOLL Bright ideas. Sustainable change.

RAIL SLEEPER WASTE CLASSIFICATION
TARAGO LOOP EXTENSION

Project name	**Tarago Loop Rail Sleeper Waste Classification**
Project no.	**318000780**
Recipient	**Wayne D'Souza**
Document type	**Report**
Version	**Draft**
Date	**26/03/2030**
Prepared by	**Lyon McLeod**
Checked by	**Fiona Robinson**
Approved by	**Stephen Maxwell**
Description	**The report presents a waste classification assessment for rail sleepers at the site of Tarago Loop Extension**
Ref	**318000780-T15-001**

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CONTENTS

APPENDICES

1. INTRODUCTION

Ramboll Australia Pty Ltd (Ramboll) was commissioned by John Holland Rail to complete a waste classification in accordance with the *NSW EPA Waste Classification Guidelines (2014).* The classification was required for railway sleepers removed as part of the Tarago Loop Extension. The objective of the waste classification was to classify the railway sleepers for off-site disposal from the site.

1.1 Scope of Works

The scope of works included the following tasks:

- Preparation of a site-specific Health and Safety Plan for the site works
- Collection of four samples from the rail sleepers by hand
- Laboratory analysis of four samples (including QA/QC) for potential contaminants of concern
- Evaluated quality control and quality assurance for the sampling program
- Comparison of laboratory results to relevant site and waste classification guidelines
- Preparation of this report.

2. FIELD INVESTIGATIONS AND OBSERVATIONS

2.1 Sample Collection

Field sampling of the railway sleepers was completed 18 March 2020 by an environmental engineer suitably experienced as a contaminated land consultant. At the time of fieldwork sleepers were stockpiled within the corridor and occupied approximately 50 m^3 as shown in **Photo 1**.

Sleepers were observed to be aged, moderately degraded and laden with dust that was stained green at some locations.

Photo 1 – Location of sleeper within the rail corridor

Four samples were selected for laboratory analysis to exceed the minimum sampling density for stockpiles of 3 per 75m^3 prescribed in the *National Environment Protection Measure (NEPC 2013)*. Samples from the railway sleepers were selected for testing based on visual assessment for staining or other signs of contamination and targeted areas with the potential for contamination.

Samples for laboratory testing were recovered from the rail sleepers using a hand held drill and a hand saw create drill shavings and saw dust. Samples comprised materials recovered from the surface of the sleeper and at depths of up to 2 cm below the surface of the sleeper.

A total of four primary samples were recovered, SLE01, SLE02, SLE03 and SLE04.

2.2 Quality Assurance/ Quality Control

Quality assurance and quality control completed for the project is included in **Table 1**.

Table 1 QA/QC Review

Element	Field and Laboratory QA/QC
Sampling	Samples were collected 18 March 2020 by an experienced Environmental Engineer from Ramboll using a cordless drill and hand saw. Samples were placed directly into laboratory-supplied soil jars using single use gloved hands.
Decontamination	All reusable sampling equipment was cleaned thoroughly between sampling points.
Sample Handling	Samples were collected into laboratory-supplied soil jars and stored in a cooler box chilled with ice.
Chain of Custody	Samples were sent to the laboratory under chain of custody conditions.
Field Quality Control Samples	One duplicate sample pair (SLE02/ D01_180320) was sent to the laboratory for analysis. Relative percentage differences (RPDs) were calculated. RPDs for Lead (70%), Copper (31.4%) and TCLP lead (129%) exceed the adopted RPD (30%) and is likely attributed to heterogeneity in the distribution of contaminants within the sampled material. For the waste classification assessment, the maximum recorded concentration of lead and TCLP lead was adopted to provide a conservative assessment. The NSW Waste Guidelines (EPA, 2014) do not provide a criterion for Copper.
Laboratories Used	The primary laboratory was Eurofins and laboratory reports are NATA stamped.
Laboratory Quality Control Samples	Eurofins completed quality control sampling, including analysis of method blanks, laboratory duplicates, laboratory control samples and matrix spikes. Results were within required parameters aside from an elevated relative percent difference (RPD) for duplicate results for moisture content, which is not considered to affect the usability of the data.
Laboratory Reports	Laboratory reports relevant to this waste classification are attached in **Appendix 2.**

Based on the field and laboratory quality assurance completed the data is considered to be reliable for the purpose of determining a waste classification.

3. WASTE CLASSIFICATION

Waste is classified in the *NSW EPA Waste Classification Guidelines (2014)* following a five step process which assess pre-classification followed by chemical classification of the waste. A review against each of the waste classification steps for the railway sleeper waste is outlined in **Table 2**. Once a waste's classification has been established under a particular pre-classification below, there is no need to go to the next classification. The waste has that classification and must be managed accordingly.

Table 2 Waste Classification

Waste Classification Steps	Assessment
Step 1: Is the waste special waste?	No, the waste does not meet the criteria of special waste.
Step 2: Is the waste liquid waste?	No, the waste comprises timber sleepers.
Step 3: Is the waste pre-classified?	Yes, the waste is preclassified as construction and demolition waste as being waste derived from 'the construction, replacement, repair or alteration of infrastructure development such as roads, tunnels, sewage, water, electricity, telecommunications and airports'. However, as the waste was suspected to be impacted by lead ore concentrate additional chemical waste classification was considered warranted.
Step 4: Does the waste possess hazardous characteristics?	No, the waste does not meet the characteristics of pre-classified hazardous waste.
Step 5: Determining a waste's classification using chemical assessment.	Chemical classification of the four timber samples is presented in the attached **Table A1** provided in **Appendix 1**. Based on the mean[1] total and leachable chemical concentrations present, the waste is classified as General Solid Waste.
Waste Classification	**General Solid Waste**

1. A mean rather than 95%UCLaverage sample concentration was adopted as n=4.

Based on the pre-classification and the supplementary sampling completed the railway sleepers are classified as general solid waste and can be disposed of to an off-site facility licenced to receive this waste type.

This assessment has not considered the suitability of the sleepers for reuse on the site. The railway sleepers are considered to be a waste material and cannot legally be reused off the site.

4. LIMITATIONS

This document is issued in confidence to John Holland Rail for the purposes of waste classification in accordance with NSW Waste Guidelines (EPA, 2014).

Whilst reasonable attempts have been made to ensure that the contents of this report are accurate and complete at the time of writing, Ramboll Australia Pty Ltd disclaims any responsibility for loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this report.

5. REFERENCES

NEPC 2013 *National Environment Protection (Assessment of Site Contamination) Measure 1999 amended 2013*

NSW Environment Protection Authority (EPA) 2014 *Waste Classification Guidelines, Part 1: Classifying waste*

APPENDIX 1
RESULTS SUMMARY TABLE

Table A1: Waste Classification Results

	CT1 - General Solid Waste[1]	CT2 - Restricted Solid Waste[1]	SCC1 - General Solid Waste[2]	SCC2 - Restricted Solid Waste[2]	TCLP1 - General Solid Waste[2]	TCLP2 - Restricted Solid Waste[2]	Units	LOR					
Sample Type:									Primary	Primary	Primary	Primary	Duplicate
Sample number:									S20-Ma28575	S20-Ma28576	S20-Ma28577	S20-Ma28578	S20-Ma28579
Sample date:									18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20
Sample ID:									SLE01	SLE02	SLE03	SLE04	D01_180320
Project Name:									John Holland	John Holland	John Holland	John Holland	John Holland
Compound:													
Site:									Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop
Sampling Method:									NA	NA	NA	NA	NA
Sample Description									Woodchips	Woodchips	Woodchips	Woodchips	Woodchips
Analyte grouping/Analyte							**Units**	**LOR**					
Total Metals													
Arsenic	**100**	**400**	**500**	**2000**			mg/kg	5	< 2	6.9	6.5	< 2	4.6
Cadmium	**20**	**80**	**100**	**400**			mg/kg	1	15	11	7.6	11	11
Chromium (VI)	**100**	**400**	**1900**	**7600**			mg/kg	2	< 5	11	14	< 5	< 5
Copper							mg/kg	5	140	430	1700	230	590
Lead	**100**	**400**	**1500**	**6000**			mg/kg	5	**240**	**1300**	**1300**	**560**	**2700**
Mercury	**4**	**16**	**50**	**200**			mg/kg	0.1	< 0.1	< 0.1	0.2	< 0.1	< 0.1
Nickel	**40**	**160**	**1050**	**4200**			mg/kg	2	< 5	11	11	5.7	< 5
Zinc							mg/kg	5	2800	1200	1300	1100	1300
Organophosphorus Pesticides (OP)													
Azinphos-methyl							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bolstar							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorfenvinphos							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos	**4**	**16**	**7.5**	**30**			mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos							mg/kg	< 2	< 2	< 2	< 2	< 2	< 2
Demeton-O							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Demeton-S							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorvos							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dimethoate							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Disulfoton							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
EPN							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethion							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethoprop							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl parathion							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fensulfothion							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Malathion							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Merphos							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl parathion							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos							mg/kg	< 2	< 2	< 2	< 2	< 2	< 2
Naled							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Omethoate							mg/kg	< 2	< 2	< 2	< 2	< 2	< 2
Phorate							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pyrazophos							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ronnel							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Terbufos							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tokuthion							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloronate							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Polynuclear Aromatic Hydrocarbons													
Acenaphthene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	**0.8**	**3.2**	**10**	**23**			mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (lower bound) *							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *							mg/kg	< 0.6	0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *							mg/kg	< 0.7	1.2	1.2	1.2	1.2	1.2
Benzo(b&j)fluoranthene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene							mg/kg	< 0.6	1.7	1.1	0.5	< 0.5	< 0.5
Phenanthrene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	**200**	**800**	**200**	**800**			mg/kg	< 0.6	1.7	1.1	0.5	< 0.5	< 0.5
TRH - 1999 NEPM Fractions (after silica gel clean-up)													
TRH C10-C14 (after silica gel clean-up)							mg/kg	< 100	< 100	< 100	< 100	220	< 100
TRH C10-C36 (Total) (after silica gel clean-up)	**10000**	**40000**	**10000**	**40000**			mg/kg	< 250	1200	< 250	750	< 250	2110
TRH C15-C28 (after silica gel clean-up)							mg/kg	< 250	300	< 250	320	< 250	510
TRH C29-C36 (after silica gel clean-up)							mg/kg	< 250	900	< 250	430	< 250	1600
Total Recoverable Hydrocarbons - NEPM 2013 Fractions													
TRH >C10-C16 (after silica gel clean-up)							mg/kg	< 250	< 250	< 250	< 250	< 250	< 250
TRH >C16-C34 (after silica gel clean-up)							mg/kg	< 500	1100	< 500	650	< 500	1700
TRH >C34-C40 (after silica gel clean-up)							mg/kg	< 500	< 500	< 500	< 500	< 500	840
Metals TCLP													
Arsenic					**5**	**20**	mg/L	0.1	--	--	--	--	--
Cadmium					**1**	**4**	mg/L	0.05	--	--	--	--	--
Chromium (VI)					**5**	**20**	mg/L	0.1	--	--	--	--	--
Copper							mg/L	0.1	--	--	--	--	--
Lead					**5**	**20**	mg/L	0.1	0.14	0.9	0.97	0.79	4.2
Nickel					**2**	**8**	mg/L	0.1	--	--	--	--	--
Zinc							mg/L	0.1	--	--	--	--	--
Mercury							mg/L	0.001	--	--	--	--	--

Blank Cell indicates no criterion available
LOR = Limit of Reporting
NSW EPA Waste Classification Guidelines - Part 1: Classification of Waste
[1] Maximum values of specific contaminant concentration (SCC) for classification without TCLP
[2] Maximum values for leachable concentration and specific contaminant concentration when used together
[3] PFOS and PFHxS are to be summed for comparison against the TCLP and SCC values.
[4] Values are the same for general solid waste (putrescible) and general solid waste (non-putrescible).
PFOS/PFOA values adopted from Addendum to the Waste Classification Guidelines (2014) – Part 1: classifying waste, October 2016 (NSW EPA). Noting these values have been based on the enHealth TDI values
Blank cell indicates no screening criterion available
For Limit of Reporting (LOR) refer to laboratory certificates of analysis
--- Indicates sample not analysed
Concentration in **red** font and grey box exceed CT1 screening value
Concentration in **blue** font and grey box exceed CT2 screening value
Concentration in **orange** font and grey box exceed SCC1 or TCLP1 screening value
Concentration in **green** font and grey box exceed SCC2 or TCLP 2 screening value
Concentrations below the LOR noted as <value

	Sample Type:	Primary	Duplicate	
	Sample number:	S20-Ma28576	S20-Ma28579	
	Sample date:	18-Mar-20	18-Mar-20	
	Sample ID:	SLE02	D01_180320	
	Project Name:	John Holland	John Holland	
	Compound:			RPD
	Site:	Tarago Rail Loop	Tarago Rail Loop	
	Sampling Method:	NA	NA	
	Sample Description	Woodchips	Woodchips	

Analyte grouping/Analyte	Units	LOR			
Total Metals					
Arsenic	mg/kg	5	6.9	4.6	40.0
Cadmium	mg/kg	1	11	11	0.0
Chromium (VI)	mg/kg	2	11	< 5	nc
Copper	mg/kg	5	430	590	**31.4**
Lead	mg/kg	5	1300	2700	**70.0**
Mercury	mg/kg	0.1	< 0.1	< 0.1	nc
Nickel	mg/kg	2	11	< 5	nc
Zinc	mg/kg	5	1200	1300	8.0
Organophosphorus Pesticides (OP)					
Azinphos-methyl	mg/kg	< 0.2	< 0.2	< 0.2	nc
Bolstar	mg/kg	< 0.2	< 0.2	< 0.2	nc
Chlorfenvinphos	mg/kg	< 0.2	< 0.2	< 0.2	nc
Chlorpyrifos	mg/kg	< 0.2	< 0.2	< 0.2	nc
Chlorpyrifos-methyl	mg/kg	< 0.2	< 0.2	< 0.2	nc
Coumaphos	mg/kg	< 2	< 2	< 2	nc
Demeton-O	mg/kg	< 0.2	< 0.2	< 0.2	nc
Demeton-S	mg/kg	< 0.2	< 0.2	< 0.2	nc
Diazinon	mg/kg	< 0.2	< 0.2	< 0.2	nc
Dichlorvos	mg/kg	< 0.2	< 0.2	< 0.2	nc
Dimethoate	mg/kg	< 0.2	< 0.2	< 0.2	nc
Disulfoton	mg/kg	< 0.2	< 0.2	< 0.2	nc
EPN	mg/kg	< 0.2	< 0.2	< 0.2	nc
Ethion	mg/kg	< 0.2	< 0.2	< 0.2	nc
Ethoprop	mg/kg	< 0.2	< 0.2	< 0.2	nc
Ethyl parathion	mg/kg	< 0.2	< 0.2	< 0.2	nc
Fenitrothion	mg/kg	< 0.2	< 0.2	< 0.2	nc
Fensulfothion	mg/kg	< 0.2	< 0.2	< 0.2	nc
Fenthion	mg/kg	< 0.2	< 0.2	< 0.2	nc
Malathion	mg/kg	< 0.2	< 0.2	< 0.2	nc
Merphos	mg/kg	< 0.2	< 0.2	< 0.2	nc
Methyl parathion	mg/kg	< 0.2	< 0.2	< 0.2	nc
Mevinphos	mg/kg	< 0.2	< 0.2	< 0.2	nc
Monocrotophos	mg/kg	< 2	< 2	< 2	nc
Naled	mg/kg	< 0.2	< 0.2	< 0.2	nc
Omethoate	mg/kg	< 2	< 2	< 2	nc
Phorate	mg/kg	< 0.2	< 0.2	< 0.2	nc
Pirimiphos-methyl	mg/kg	< 0.2	< 0.2	< 0.2	nc
Pyrazophos	mg/kg	< 0.2	< 0.2	< 0.2	nc
Ronnel	mg/kg	< 0.2	< 0.2	< 0.2	nc
Terbufos	mg/kg	< 0.2	< 0.2	< 0.2	nc
Tetrachlorvinphos	mg/kg	< 0.2	< 0.2	< 0.2	nc
Tokuthion	mg/kg	< 0.2	< 0.2	< 0.2	nc
Trichloronate	mg/kg	< 0.2	< 0.2	< 0.2	nc
Polynuclear Aromatic Hydrocarbons					
Acenaphthene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Acenaphthylene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Anthracene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Benz(a)anthracene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Benzo(a)pyrene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Benzo(a)pyrene TEQ (lower bound) *	mg/kg	< 0.5	< 0.5	< 0.5	nc
Benzo(a)pyrene TEQ (medium bound) *	mg/kg	< 0.6	0.6	0.6	0.0
Benzo(a)pyrene TEQ (upper bound) *	mg/kg	< 0.7	1.2	1.2	0.0
Benzo(b&j)fluoranthene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Benzo(g.h.i)perylene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Benzo(k)fluoranthene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Chrysene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Dibenz(a.h)anthracene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Fluoranthene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Fluorene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Naphthalene	mg/kg	< 0.6	1.1	< 0.5	nc
Phenanthrene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Pyrene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Total PAH*	mg/kg	< 0.6	1.1	< 0.5	nc
TRH - 1999 NEPM Fractions (after silica gel clean-up)					
TRH C10-C14 (after silica gel clean-up)	mg/kg	< 100	< 100	< 100	nc
TRH C10-C36 (Total) (after silica gel clean-up)	mg/kg	< 250	< 250	2110	nc
TRH C15-C28 (after silica gel clean-up)	mg/kg	< 250	< 250	510	nc
TRH C29-C36 (after silica gel clean-up)	mg/kg	< 250	< 250	1600	nc
Total Recoverable Hydrocarbons - NEPM 2013 Fractions					
TRH >C10-C16 (after silica gel clean-up)	mg/kg	< 250	< 250	< 250	nc
TRH >C16-C34 (after silica gel clean-up)	mg/kg	< 500	< 500	1700	nc
TRH >C34-C40 (after silica gel clean-up)	mg/kg	< 500	< 500	840	nc
Metals TCLP					
Arsenic	mg/L	0.1	--	--	--
Cadmium	mg/L	0.05	--	--	--
Chromium (VI)	mg/L	0.1	--	--	--
Copper	mg/L	0.1	--	--	--
Lead	mg/L	0.1	0.9	4.2	**129.4**
Nickel	mg/L	0.1	--	--	--
Zinc	mg/L	0.1	--	--	--
Mercury	mg/L	0.001	--	--	--

LOR = Limit of Reporting
<value = Less than the laboratory Limit of Reporting (LOR)
Bold shaded cells exceed RPD >30% and both samples have recorded concetrations >10 x LOR
Bold indicates when above the acceptance criteria for Trip Spikes/Blanks and Rinsates
nc = not calculated as one or more results are below the LOR.

APPENDIX 2
LABORATORY CERTIFICATES

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

Laboratory	Address	Phone / Email
☐ Sydney Laboratory	Unit F3 Bld.F, 16 Mars Rd, Lane Cove West, NSW 2066	02 9900 8400 EnviroSampleNSW@eurofins.com
☐ Brisbane Laboratory	Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172	07 3902 4600 EnviroSampleQLD@eurofins.com
☐ Perth Laboratory	Unit 2, 91 Leach Highway, Kewdale WA 6105	08 9251 9600 EnviroSampleWA@eurofins.com
☐ Melbourne Laboratory	2 Kingston Town Close, Oakleigh, VIC 3166	03 8564 5000 EnviroSampleVic@eurofins.com

Company	Ramboll	Project №	318000780	Project Manager	Stephen Maxwell
Sampler(s)	JB				
Address	50 Glebe Road the Junction	Project Name		EDD Format (ESdat, EQuIS, Custom)	Excel and PDF
Handed over by	JB				
Email for Invoice	smaxwell@ramboll.com asiapac-accounts@ramboll.com				
Email for Results	smaxwell@ramboll.com jblackwell@ramboll.com jblackwell@ramboll.com				
Contact Name	Stephen Maxwell				
Phone №					
Special Directions					
Purchase Order					
Quote ID №	180813RAMN_1				

Analyses (Note: Where metals are requested, please specify "Total" or "Filtered") SUITE code must be used to attract SUITE pricing.

Turnaround Time (TAT) Requirements (Default will be 5 days if not ticked)

☐ Overnight (9am)*
☐ 1 Day* ☐ 2 Day*
☑ 3 Day* ☐ 5 Day
* Surcharges apply
☐ Other ( )

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	TRH C10 - C40 (following silica gel cleanup)	PAH	M8 (As, Cd, Cr, Cu, Pb, Ni, Zn, Hg)	OPP	TCLP BaP and Pb										1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	SLE01	18/03/20	Timber	X	X	X	X	X																		
2	SLE02	18/03/20	Timber	X	X	X	X	X																		
3	SLE03	18/03/20	Timber	X	X	X	X	X																		
4	SLE04	18/03/20	Timber	X	X	X	X	X																		
5	D01_180320	18/03/20	Timber	X	X	X	X	X																		
8																										
9																										
10																										
	Total Counts			5	5	5	5	5																		

Method of Shipment	☐ Courier (#) ☐ Hand Delivered ☐ Postal	Name		Signature		Date	__/__/__	Time	__:__
Eurofins | mgt Laboratory Use Only	Received By	Suzanne Ford	(SYD) | BNE | MEL | PER | ADL | NTL | DRW	Signature	[signature]	Date	19/3/2020	Time	6:45PM
	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	__/__/__	Time	__:__
								Temperature	
								Report №	708717

Eurofins Environment Testing Australia Pty Ltd trading as Eurofins | mgt

eurofins | Environment Testing

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Dandenong South Vic 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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Brisbane
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Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261 Site # 23736

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com web : www.eurofins.com.au

Sample Receipt Advice

Company name:	**Ramboll Australia Pty Ltd**
Contact name:	Stephen Maxwell
Project ID:	318000780
COC number:	Not provided
Turn around time:	3 Day
Date/Time received:	Mar 19, 2020 6:45 AM
Eurofins reference:	**708717**

Sample information

☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

☑ All samples have been received as described on the above COC.

☑ COC has been completed correctly.

☑ Attempt to chill was evident.

☑ Appropriately preserved sample containers have been used.

☑ All samples were received in good condition.

☑ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.

☑ Appropriate sample containers have been used.

☒ Split sample sent to requested external lab.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Andrew Black on Phone : (+61) 2 9900 8490 or by e.mail: AndrewBlack@eurofins.com

Results will be delivered electronically via e.mail to Stephen Maxwell - smaxwell@ramboll.com.

Note: A copy of these results will also be delivered to the general Ramboll Australia Pty Ltd email address.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **708717-S**
Project name
Project ID 318000780
Received Date Mar 19, 2020

Client Sample ID			**SLE01**	**SLE02**	**SLE03**	**SLE04**
Sample Matrix			**Woodchips**	**Woodchips**	**Woodchips**	**Woodchips**
Eurofins Sample No.			**S20-Ma28575**	**S20-Ma28576**	**S20-Ma28577**	**S20-Ma28578**
Date Sampled			**Mar 18, 2020**	**Mar 18, 2020**	**Mar 18, 2020**	**Mar 18, 2020**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	1.7	1.1	0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	1.7	1.1	0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	91	89	89	95
p-Terphenyl-d14 (surr.)	1	%	88	85	85	92
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Bolstar	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos	2	mg/kg	< 2	< 2	< 2	< 2
Demeton-S	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2

Client Sample ID			SLE01	SLE02	SLE03	SLE04
Sample Matrix			Woodchips	Woodchips	Woodchips	Woodchips
Eurofins Sample No.			S20-Ma28575	S20-Ma28576	S20-Ma28577	S20-Ma28578
Date Sampled			Mar 18, 2020	Mar 18, 2020	Mar 18, 2020	Mar 18, 2020
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
EPN	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethoprop	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Malathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Merphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos	2	mg/kg	< 2	< 2	< 2	< 2
Naled	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Omethoate	2	mg/kg	< 2	< 2	< 2	< 2
Phorate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ronnel	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Terbufos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Triphenylphosphate (surr.)	1	%	123	120	120	126
TRH - 2013 NEPM Fractions (after silica gel clean-up)						
TRH >C10-C16 (after silica gel clean-up)	50	mg/kg	< 250	< 250	< 250	< 250
TRH >C16-C34 (after silica gel clean-up)	100	mg/kg	1100	< 500	650	< 500
TRH >C34-C40 (after silica gel clean-up)	100	mg/kg	< 500	< 500	< 500	< 500
TRH - 1999 NEPM Fractions (after silica gel clean-up)						
TRH C10-C36 (Total) (after silica gel clean-up)	100	mg/kg	1200	< 250	750	< 250
TRH C10-C14 (after silica gel clean-up)	50	mg/kg	< 100	< 100	< 100	220
TRH C15-C28 (after silica gel clean-up)	100	mg/kg	300	< 250	320	< 250
TRH C29-C36 (after silica gel clean-up)	100	mg/kg	900	< 250	430	< 250
Heavy Metals						
Arsenic	2	mg/kg	< 2	6.9	6.5	< 2
Cadmium	0.4	mg/kg	15	11	7.6	11
Chromium	5	mg/kg	< 5	11	14	< 5
Copper	5	mg/kg	140	430	1700	230
Lead	5	mg/kg	240	1300	1300	560
Mercury	0.1	mg/kg	< 0.1	< 0.1	0.2	< 0.1
Nickel	5	mg/kg	< 5	11	11	5.7
Zinc	5	mg/kg	2800	1200	1300	1100

Client Sample ID			D01_180320
Sample Matrix			Woodchips
Eurofins Sample No.			S20-Ma28579
Date Sampled			Mar 18, 2020
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2
Acenaphthene	0.5	mg/kg	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5
Anthracene	0.5	mg/kg	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5
Chrysene	0.5	mg/kg	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5
Fluorene	0.5	mg/kg	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5
Naphthalene	0.5	mg/kg	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5
Pyrene	0.5	mg/kg	< 0.5
Total PAH*	0.5	mg/kg	< 0.5
2-Fluorobiphenyl (surr.)	1	%	95
p-Terphenyl-d14 (surr.)	1	%	91
Organophosphorus Pesticides			
Azinphos-methyl	0.2	mg/kg	< 0.2
Bolstar	0.2	mg/kg	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2
Coumaphos	2	mg/kg	< 2
Demeton-S	0.2	mg/kg	< 0.2
Demeton-O	0.2	mg/kg	< 0.2
Diazinon	0.2	mg/kg	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2
Dimethoate	0.2	mg/kg	< 0.2
Disulfoton	0.2	mg/kg	< 0.2
EPN	0.2	mg/kg	< 0.2
Ethion	0.2	mg/kg	< 0.2
Ethoprop	0.2	mg/kg	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2
Fenthion	0.2	mg/kg	< 0.2
Malathion	0.2	mg/kg	< 0.2
Merphos	0.2	mg/kg	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2
Mevinphos	0.2	mg/kg	< 0.2
Monocrotophos	2	mg/kg	< 2
Naled	0.2	mg/kg	< 0.2
Omethoate	2	mg/kg	< 2

Client Sample ID			D01_180320
Sample Matrix			**Woodchips**
Eurofins Sample No.			**S20-Ma28579**
Date Sampled			**Mar 18, 2020**
Test/Reference	LOR	Unit	
Organophosphorus Pesticides			
Phorate	0.2	mg/kg	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2
Ronnel	0.2	mg/kg	< 0.2
Terbufos	0.2	mg/kg	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2
Tokuthion	0.2	mg/kg	< 0.2
Trichloronate	0.2	mg/kg	< 0.2
Triphenylphosphate (surr.)	1	%	131
TRH - 2013 NEPM Fractions (after silica gel clean-up)			
TRH >C10-C16 (after silica gel clean-up)	50	mg/kg	< 250
TRH >C16-C34 (after silica gel clean-up)	100	mg/kg	1700
TRH >C34-C40 (after silica gel clean-up)	100	mg/kg	840
TRH - 1999 NEPM Fractions (after silica gel clean-up)			
TRH C10-C36 (Total) (after silica gel clean-up)	100	mg/kg	2110
TRH C10-C14 (after silica gel clean-up)	50	mg/kg	< 100
TRH C15-C28 (after silica gel clean-up)	100	mg/kg	510
TRH C29-C36 (after silica gel clean-up)	100	mg/kg	1600
Heavy Metals			
Arsenic	2	mg/kg	4.6
Cadmium	0.4	mg/kg	11
Chromium	5	mg/kg	< 5
Copper	5	mg/kg	590
Lead	5	mg/kg	2700
Mercury	0.1	mg/kg	< 0.1
Nickel	5	mg/kg	< 5
Zinc	5	mg/kg	1300

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Polycyclic Aromatic Hydrocarbons	Sydney	Mar 20, 2020	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Organophosphorus Pesticides	Sydney	Mar 20, 2020	14 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS			
Metals M8	Sydney	Mar 20, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
TRH - 2013 NEPM Fractions (after silica gel clean-up)	Sydney	Mar 20, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
TRH - 1999 NEPM Fractions (after silica gel clean-up)	Sydney	Mar 20, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name:
Project ID: 318000780

Order No.:
Report #: 708717
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Mar 19, 2020 6:45 AM
Due: Mar 24, 2020
Priority: 3 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Benzo(a)pyrene	Lead	Polycyclic Aromatic Hydrocarbons	Organophosphorus Pesticides	USA Leaching Procedure	Metals M8	TRH (after Silica Gel cleanup)
Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	SLE01	Mar 18, 2020		Woodchips	S20-Ma28575			X	X		X	X
2	SLE02	Mar 18, 2020		Woodchips	S20-Ma28576			X	X		X	X
3	SLE03	Mar 18, 2020		Woodchips	S20-Ma28577			X	X		X	X
4	SLE04	Mar 18, 2020		Woodchips	S20-Ma28578			X	X		X	X
5	D01_180320	Mar 18, 2020		Woodchips	S20-Ma28579			X	X		X	X
6	SLE01	Mar 18, 2020		US Leachate	S20-Ma28580	X	X			X		
7	SLE02	Mar 18, 2020		US Leachate	S20-Ma28581	X	X			X		
8	SLE03	Mar 18, 2020		US Leachate	S20-Ma28582	X	X			X		
9	SLE04	Mar 18, 2020		US Leachate	S20-Ma28583	X	X			X		
10	DO1_180320	Mar 18, 2020		US Leachate	S20-Ma28584	X	X			X		

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Sample Detail	Benzo(a)pyrene	Lead	Polycyclic Aromatic Hydrocarbons	Organophosphorus Pesticides	USA Leaching Procedure	Metals M8	TRH (after Silica Gel cleanup)
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Test Counts	5	5	5	5	5	5	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/kg	< 0.2			0.2	Pass	
Bolstar	mg/kg	< 0.2			0.2	Pass	
Chlorfenvinphos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos-methyl	mg/kg	< 0.2			0.2	Pass	
Coumaphos	mg/kg	< 2			2	Pass	
Demeton-S	mg/kg	< 0.2			0.2	Pass	
Demeton-O	mg/kg	< 0.2			0.2	Pass	
Diazinon	mg/kg	< 0.2			0.2	Pass	
Dichlorvos	mg/kg	< 0.2			0.2	Pass	
Dimethoate	mg/kg	< 0.2			0.2	Pass	
Disulfoton	mg/kg	< 0.2			0.2	Pass	
EPN	mg/kg	< 0.2			0.2	Pass	
Ethion	mg/kg	< 0.2			0.2	Pass	
Ethoprop	mg/kg	< 0.2			0.2	Pass	
Ethyl parathion	mg/kg	< 0.2			0.2	Pass	
Fenitrothion	mg/kg	< 0.2			0.2	Pass	
Fensulfothion	mg/kg	< 0.2			0.2	Pass	
Fenthion	mg/kg	< 0.2			0.2	Pass	
Malathion	mg/kg	< 0.2			0.2	Pass	
Merphos	mg/kg	< 0.2			0.2	Pass	
Methyl parathion	mg/kg	< 0.2			0.2	Pass	
Mevinphos	mg/kg	< 0.2			0.2	Pass	
Monocrotophos	mg/kg	< 2			2	Pass	
Naled	mg/kg	< 0.2			0.2	Pass	
Omethoate	mg/kg	< 2			2	Pass	
Phorate	mg/kg	< 0.2			0.2	Pass	
Pirimiphos-methyl	mg/kg	< 0.2			0.2	Pass	
Pyrazophos	mg/kg	< 0.2			0.2	Pass	
Ronnel	mg/kg	< 0.2			0.2	Pass	
Terbufos	mg/kg	< 0.2			0.2	Pass	
Tetrachlorvinphos	mg/kg	< 0.2			0.2	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Tokuthion	mg/kg	< 0.2			0.2	Pass	
Trichloronate	mg/kg	< 0.2			0.2	Pass	
Method Blank							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	mg/kg	< 50			50	Pass	
TRH >C16-C34 (after silica gel clean-up)	mg/kg	< 100			100	Pass	
TRH >C34-C40 (after silica gel clean-up)	mg/kg	< 100			100	Pass	
Method Blank							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	mg/kg	< 50			50	Pass	
TRH C15-C28 (after silica gel clean-up)	mg/kg	< 100			100	Pass	
TRH C29-C36 (after silica gel clean-up)	mg/kg	< 100			100	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	104			70-130	Pass	
Acenaphthylene	%	113			70-130	Pass	
Anthracene	%	107			70-130	Pass	
Benz(a)anthracene	%	108			70-130	Pass	
Benzo(a)pyrene	%	102			70-130	Pass	
Benzo(b&j)fluoranthene	%	98			70-130	Pass	
Benzo(g.h.i)perylene	%	101			70-130	Pass	
Benzo(k)fluoranthene	%	118			70-130	Pass	
Chrysene	%	103			70-130	Pass	
Dibenz(a.h)anthracene	%	95			70-130	Pass	
Fluoranthene	%	110			70-130	Pass	
Fluorene	%	102			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	92			70-130	Pass	
Naphthalene	%	109			70-130	Pass	
Phenanthrene	%	108			70-130	Pass	
Pyrene	%	110			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	104			70-130	Pass	
Dimethoate	%	101			70-130	Pass	
Ethion	%	109			70-130	Pass	
Fenitrothion	%	105			70-130	Pass	
Methyl parathion	%	97			70-130	Pass	
Mevinphos	%	116			70-130	Pass	
LCS - % Recovery							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	%	126			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	96			70-130	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Cadmium			%	99			70-130	Pass	
Chromium			%	96			70-130	Pass	
Copper			%	99			70-130	Pass	
Lead			%	100			70-130	Pass	
Mercury			%	93			70-130	Pass	
Nickel			%	99			70-130	Pass	
Zinc			%	96			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S20-Ma24218	NCP	%	99			70-130	Pass	
Acenaphthylene	S20-Ma24218	NCP	%	121			70-130	Pass	
Anthracene	S20-Ma24218	NCP	%	109			70-130	Pass	
Benz(a)anthracene	S20-Ma24218	NCP	%	123			70-130	Pass	
Benzo(a)pyrene	S20-Ma24218	NCP	%	105			70-130	Pass	
Benzo(b&j)fluoranthene	S20-Ma24218	NCP	%	115			70-130	Pass	
Benzo(g.h.i)perylene	S20-Ma24218	NCP	%	109			70-130	Pass	
Benzo(k)fluoranthene	S20-Ma24218	NCP	%	107			70-130	Pass	
Chrysene	S20-Ma24218	NCP	%	107			70-130	Pass	
Dibenz(a.h)anthracene	S20-Ma24218	NCP	%	109			70-130	Pass	
Fluoranthene	S20-Ma24218	NCP	%	119			70-130	Pass	
Fluorene	S20-Ma24218	NCP	%	107			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S20-Ma24218	NCP	%	104			70-130	Pass	
Naphthalene	S20-Ma24218	NCP	%	111			70-130	Pass	
Phenanthrene	S20-Ma24218	NCP	%	113			70-130	Pass	
Pyrene	S20-Ma24218	NCP	%	117			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides				Result 1					
Diazinon	S20-Ma24218	NCP	%	100			70-130	Pass	
Ethion	S20-Ma24218	NCP	%	128			70-130	Pass	
Fenitrothion	S20-Ma24218	NCP	%	127			70-130	Pass	
Methyl parathion	S20-Ma24218	NCP	%	114			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S20-Ma25156	NCP	%	86			70-130	Pass	
Cadmium	S20-Ma25156	NCP	%	95			70-130	Pass	
Chromium	S20-Ma25156	NCP	%	87			70-130	Pass	
Copper	S20-Ma25156	NCP	%	90			70-130	Pass	
Lead	S20-Ma25156	NCP	%	95			70-130	Pass	
Mercury	S20-Ma25156	NCP	%	97			70-130	Pass	
Nickel	S20-Ma25156	NCP	%	85			70-130	Pass	
Zinc	S20-Ma25156	NCP	%	92			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Chrysene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	S20-Ma24217	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	S20-Ma24217	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	S20-Ma24217	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S20-Ma25147	NCP	mg/kg	4.3	4.7	9.0	30%	Pass	
Cadmium	S20-Ma25147	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S20-Ma25147	NCP	mg/kg	12	11	8.0	30%	Pass	
Copper	S20-Ma25147	NCP	mg/kg	20	18	11	30%	Pass	
Lead	S20-Ma25147	NCP	mg/kg	64	42	40	30%	Fail	Q15
Mercury	S20-Ma25147	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Nickel	S20-Ma25147	NCP	mg/kg	11	11	1.0	30%	Pass	
Zinc	S20-Ma25147	NCP	mg/kg	140	120	17	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Andrew Black	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **708717-L**
Project name
Project ID 318000780
Received Date Mar 19, 2020

Client Sample ID			**SLE01**	**SLE02**	**SLE03**	**SLE04**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**S20-Ma28580**	**S20-Ma28581**	**S20-Ma28582**	**S20-Ma28583**
Date Sampled			**Mar 18, 2020**	**Mar 18, 2020**	**Mar 18, 2020**	**Mar 18, 2020**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Heavy Metals						
Lead	0.01	mg/L	0.14	0.90	0.97	0.79
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	4.0	4.2	3.9	4.2
pH (off)	0.1	pH Units	4.8	4.9	4.8	4.9
pH (USA HCl addition)	0.1	pH Units	2.0	2.0	1.7	1.8

Client Sample ID			**DO1_180320**
Sample Matrix			**US Leachate**
Eurofins Sample No.			**S20-Ma28584**
Date Sampled			**Mar 18, 2020**
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Benzo(a)pyrene	0.001	mg/L	< 0.001
Heavy Metals			
Lead	0.01	mg/L	4.2
USA Leaching Procedure			
Leachate Fluid[C01]		comment	1.0
pH (initial)	0.1	pH Units	4.0
pH (off)	0.1	pH Units	4.9
pH (USA HCl addition)	0.1	pH Units	2.0

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Polycyclic Aromatic Hydrocarbons	Sydney	Mar 20, 2020	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Heavy Metals	Sydney	Mar 23, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
USA Leaching Procedure	Sydney	Mar 20, 2020	14 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

eurofins | Environment Testing

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NATA # 1261 Site # 18217

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NATA # 1261 Site # 20794

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Kewdale WA 6105
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Site # 23736

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Phone : 0800 856 450
IANZ # 1290

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name:
Project ID: 318000780

Order No.:
Report #: 708717
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Mar 19, 2020 6:45 AM
Due: Mar 24, 2020
Priority: 3 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Benzo(a)pyrene	Lead	Polycyclic Aromatic Hydrocarbons	Organophosphorus Pesticides	USA Leaching Procedure	Metals M8	TRH (after Silica Gel cleanup)
Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	SLE01	Mar 18, 2020		Woodchips	S20-Ma28575			X	X		X	X
2	SLE02	Mar 18, 2020		Woodchips	S20-Ma28576			X	X		X	X
3	SLE03	Mar 18, 2020		Woodchips	S20-Ma28577			X	X		X	X
4	SLE04	Mar 18, 2020		Woodchips	S20-Ma28578			X	X		X	X
5	D01_180320	Mar 18, 2020		Woodchips	S20-Ma28579			X	X		X	X
6	SLE01	Mar 18, 2020		US Leachate	S20-Ma28580	X	X			X		
7	SLE02	Mar 18, 2020		US Leachate	S20-Ma28581	X	X			X		
8	SLE03	Mar 18, 2020		US Leachate	S20-Ma28582	X	X			X		
9	SLE04	Mar 18, 2020		US Leachate	S20-Ma28583	X	X			X		
10	DO1_180320	Mar 18, 2020		US Leachate	S20-Ma28584	X	X			X		

eurofins | Environment Testing

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Phone : 0800 856 450
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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name:
Project ID: 318000780

Order No.:
Report #: 708717
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Mar 19, 2020 6:45 AM
Due: Mar 24, 2020
Priority: 3 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail	Benzo(a)pyrene	Lead	Polycyclic Aromatic Hydrocarbons	Organophosphorus Pesticides	USA Leaching Procedure	Metals M8	TRH (after Silica Gel cleanup)
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Test Counts	5	5	5	5	5	5	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Heavy Metals							
Lead	mg/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	%	86			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Lead	%	99			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S20-Ma32658	NCP	%	94			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Benzo(a)pyrene	S20-Ma31473	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S20-Ma32654	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised By

Andrew Black	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.