



**Kleinfelder Australia Pty Ltd**

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31 March 2022

MLB22R137887

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Veolia Australia and New Zealand  
PO Box 1141, Camden, NSW 2571

**Attention: Douglas Craven**

**Subject:** Soil Classification Report  
HMAS Harman Naval Base, ACT

Dear Douglas,

The purpose of this letter is to identify that one stockpile (SP02), generated from Stage 1 roadway removal works at HMAS Harman Naval Base, ACT has been assessed against the following guidelines:

- ACT Government, 2021. Environmental standards: Assessment and classification of liquid and non-liquid wastes.
- NSW Environment Protection Authority (EPA), 2014. Waste classification guidelines: Part 1 Classifying Waste.
- NSW EPA, 2016. Addendum to the waste classification guidelines (2014) – Part 1: Classifying waste (for PFAS).
- Heads of EPA Australia and New Zealand, 2020. PFAS National Environmental Management Plan Version 2.0.
- ACT Government - Requirements for the Reuse and Disposal of Contaminated Soil in the ACT. Environment Protection Contaminated Sites Information Sheet 4 - Table 1: Reuse Criteria. April 2019

Stockpile SP02 is classified as 'general solid waste' in accordance with ACT EPA and NSW EPA waste classification guidelines based on total contaminant concentrations and leachable concentrations of lead and nickel.

Total and leachable PFAS concentrations were reported below the laboratory limit of reporting for four samples analysed. Based on the PFAS results, SP02 may be disposed on to an unlined landfill.

Within the ACT, re-use of soils is a determination that is made by the ACT EPA. However, based on the information reviewed and analytical data obtained, Kleinfelder consider the soil from SP02 to be suitable for reuse off-Site in a commercial/industrial land use setting. The Pialligo Stone Quarry, located in Pialligo, ACT, has been identified as a suitable reuse site for soils comprising SP02. To aid the ACT EPA application for reuse of soils comprising SP02, a letter of acceptance from Pialligo Stone Quarry is attached to this report.



## 1 INTRODUCTION

Kleinfelder Australia Pty Ltd (Kleinfelder) was commissioned by Veolia Australia and New Zealand (Veolia) to classify a stockpile (SP02) at the HMAS Harman Naval Base, Jerrabomberra, ACT, herein referred to as 'the Site' for off-Site disposal.

HMAS Harman is a Royal Australian Navy (RAN) base that serves as a communications and logistics facility. The base was established in the late 1930s as the Royal Australian Navy Wireless/Transmitting Station Canberra. The base hosts reserve units from the Australia Army and Royal Australian Air Force and cadet units of the Australian Navy Cadets, Australian Army Cadets and Australian Air Force Cadets.

HMAS Harman is located approximately eight kilometres (km) south-east of Parliament House at the border with NSW (Queanbeyan). The base is located on a relatively flat terrain with mild elevations towards the western side. Main connection roads run on the northern side of the base. The base is bounded to the south by the Queanbeyan Nature Reserve.

This report should be read in conjunction with the statement of limitations included in **Attachment 1**.

### 1.1 SITE DETAILS

Site details are summarised in **Table 1.1** below.

**Table 1.1: Site Details**

Item	Details
Site Name	HMAS Harman Naval Base
Site Address	MacDonald Avenue, Jerrabomberra, ACT 2619
Block and Section	Block: 2249 (area = 44.71 hectares) Section: Jerrabomberra registered Rural (source: ACTmapi: <a href="https://app2.actmapi.act.gov.au/actmapi/index.html?viewer=basic">https://app2.actmapi.act.gov.au/actmapi/index.html?viewer=basic</a> )
Lot/DP	DP 11108
Zoning	NUZ1: Broadacre
Overlays	MAAR: Main Avenues and Approach Routes
Site Owner	Department of Defence (Navy)
Current Site Status	Occupied by Department of Defence

### 1.2 BACKGROUND

A stockpile was generated from excavation of the remaining portion of Yerralee Road/Newman Crescent (Stage 1 road upgrade works).

The area from which the stockpile was generated was the subject of preliminary soil classification March 2021<sup>1</sup> via in-situ soil sampling; this preliminary classification identified the contaminants of potential concern (COPC) for which the stockpile samples were submitted for laboratory testing. The COPC include:

- Benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN)
- Total recoverable hydrocarbons (TRH)
- Polycyclic aromatic hydrocarbons (PAH)
- Metals (arsenic, cadmium, chromium, copper, mercury, nickel, lead and zinc)

<sup>1</sup> Aurecon Australasia Pty Ltd, 2021. HMAS Harman pavement upgrade Waste Classification Report. April 2021.



- Per- and polyfluoroalkyl substances (PFAS).

COPC that were not of potential concern following the Aurecon soil investigation completed within the Stage 1 roadway upgrade area include:

- Asbestos
- Chromium (VI)
- Chlorinated hydrocarbons
- Phenols
- Organophosphorus pesticides (OPCs)
- Organochlorine pesticides (OCPs)
- Polychlorinated biphenyls (PCBs)

As part of waste recovery Veolia have separated, to the extent practicable bitumen from the stockpile for recycling.

Kleinfelder understands Veolia's objective is to dispose of the stockpile off-Site to a licenced waste disposal facility in New South Wales, following consideration of potential soil re-use options.

### 1.3 OBJECTIVES

The primary objective of the soil assessment was to determine the soil classification of SP02 in accordance with:

- ACT Government, 2021. Environmental standards: Assessment and classification of liquid and non-liquid wastes.
- NSW EPA, 2014. Waste classification guidelines: Part 1 classifying waste.
- NSW EPA, 2016. Addendum to the waste classification guidelines (2014) – Part 1: classifying waste (for PFAS)

The secondary objective of the soil assessment was to determine potential re-use of soils comprising SP02 in accordance with ACT Government requirements, specifically:

- ACT Government, 2019. Environment protection contaminated sites information sheet 4. Requirements for the reuse and disposal of contaminated soil in the ACT.
- National Environment Protection Council, 2013. National Environment Protection (Assessment of Site Contamination) Amendment Measure. (NEPM)

### 1.4 WORKS COMPLETED

To achieve the objective, Kleinfelder completed the following works:

- Developed a project health, safety, environment and quality plan (HSEQP) and job loss analysis (JLA) prior to commencement of work.
- Collected soil samples from stockpile SP02.
- Logged and screened soil samples for volatile organic compounds using a photoionisation detector (PID).
- Submitted soil samples to a laboratory that has National Association of Testing Authorities (NATA) accreditation to determine the contaminants of potential concern in soil.
- Evaluated COPC concentrations in accordance with applicable ACT EPA and NSW soil classification guidelines.
- Prepared this waste classification report and disposal letter/waste classification certificate for the stockpile in accordance with ACT EPA and NSW EPA requirements.

## 2 SOIL ASSESSMENT CRITERIA

Soil assessment criteria for the off-Site disposal of soil was adopted from:

- ACT Government, 2021. Environmental standards: Assessment and classification of liquid and non-liquid wastes.



- NSW Environment Protection Authority (EPA), 2014. Waste classification guidelines: Part 1 Classifying waste.
- NSW EPA, 2016. Addendum to the waste classification guidelines (2014) – Part 1: Classifying waste (for PFAS).
- Heads of EPA Australia and New Zealand, 2020. PFAS National Environmental Management Plan Version 2.0.

NEPM commercial/Industrial health and ecological investigation/screening levels (HIL/HSL D, EIL/ESL D) were adopted to assess the suitability of soil for on-Site reuse, in addition to re-use criteria from the ACT Government (2019).

### 3 FIELD OBSERVATIONS

The stockpile (SP02) was measured in the field and estimated to be approximately 700 m<sup>3</sup>. The soil type was predominantly red/brown silty/sandy clay with gravel (shale).

No odorous or stained soils were noted during soil logging and sample collection.

Aside from the rare asphalt, anthropogenic material (i.e., concrete, wire, plastic, potential asbestos containing materials) was not observed in the stockpile.

Field records, including a sketch of SP02, sample locations and sample descriptions are included in **Attachment 2**.

### 4 SOIL SAMPLING AND ANALYSIS PROGRAM

Contaminants of concern were identified during the preliminary in-situ soil investigation (May 2021).

A total of 12 primary soil samples were collected from SP02 using a trowel were submitted to Eurofins Environment Testing (Eurofins) in Dandenong, Victoria for COPC analysis on 2 March 2022.

The sampling works were conducted in accordance with Australian Standard 4482.1<sup>2</sup>. Soil samples were transported in appropriately prepared containers under chain-of-custody (COC) documentation. Of the 12 primary samples collected, 10 soil samples were analysed for the COPC below:

- BTEXN
- TRH
- PAH
- Metals (arsenic, cadmium, chromium, copper, mercury, nickel, lead and zinc)

In addition to the above:

- Four samples were analysed for PFAS (expected to be diffuse, based on the previous investigation).
- Four samples were analysed for PFAS leachability
- Two samples were analysed for lead leachability
- One sample was analysed for nickel leachability

Soil sample laboratory results are summarised in **Tables 1-6** (attached) and the laboratory certificate of analysis is presented in **Attachment 3**.

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<sup>2</sup>Australian Standard AS4482.1 – 2005. Guide to investigation and sampling of sites with potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds



## 5 LABORATORY RESULTS AND CHARACTERISATION

Soil laboratory results from March 2022 are summarised in **Tables 1-6** (attached). Copies of the laboratory certificates of analysis, including internal QA/QC results and COC documentation for the primary and secondary laboratories inclusive of laboratory QA/QC outliers are contained in **Attachment 3**. The QC/QC assessment is provided **Attachment 4**.

Based on a review of the quality control data available Kleinfelder considers that there is an acceptable degree of confidence in the data. Field QA/QC results are summarised in **Tables 7-10** (attached).

### 5.1 BTEXN AND TOTAL RECOVERABLE HYDROCARBONS

BTEXN concentrations were reported below the laboratory LORs.

TRH concentrations were reported below the laboratory LORs and/or below the ACT EPA and NSW EPA general solid waste criteria and below the ACT EPA soil reuse criteria.

### 5.2 PAH

PAH concentrations were reported above the laboratory LOR but below the ACT EPA and NSW EPA general solid waste criteria in two soil samples (SP02\_01 and SP02\_03).

The laboratory benzo(a)pyrene LOR (0.5 mg/kg) is higher than the ACT EPA soil reuse criteria (0.2 mg/kg). Based on the concentration of benzo(a)pyrene reported below the laboratory LOR in all samples analysed and low PAH concentrations reported in two samples, it is probable that benzo(a)pyrene concentrations in the samples analysed is below 0.2 mg/kg.

### 5.3 METALS

Lead and/or nickel concentrations exceeded the ACT EPA and NSW EPA general solid waste CT1 criteria (100 mg/kg and 40 mg/kg, respectively) in three soil samples.

Total lead concentrations in SP02\_05 and SP02\_06 were reported at 210 mg/kg and 540 mg/kg, respectively and total nickel concentrations in SP02\_08 were reported at 45 mg/kg.

Leachable lead concentrations were reported below the ACT EPA and NSW EPA general solid waste maximum specific contaminant concentration (SCC1) in SP02\_05 (0.23 mg/L) and SP02\_06 (0.02 mg/L).

Leachable nickel concentrations were reported below the laboratory LOR and below the ACT EPA and NSW EPA general solid waste maximum specific contaminant concentration (SCC1) in SP02\_08 (< 0.01 mg/L).

The metal concentrations in five soil samples exceeded ACT EPA soil reuse maximum total concentrations:

- Cadmium (3.0 mg/kg) – SP02\_05 (5.1 mg/kg)
- Chromium (total, 50 mg/kg) – SP02\_04, SP02\_05, SP02\_08 and SP02\_09 (51 mg/kg to 81 mg/kg)
- Lead (100 mg/kg) – SP02\_05 (210 mg/kg) and SP02\_06 (540 mg/kg)
- Zinc (200 mg/kg) – SP02\_05 (290 mg/kg) and SP02\_06 (370 mg/kg)

### 5.4 PFAS

PFAS (PFOS, PFOA, PFHxS) were reported at concentrations below the laboratory LOR in the four samples, consistent with the 5 in-situ soil samples collected during the preliminary investigation in March 2021 and are therefore below the off-Site disposal screening criteria.

Leachable (TCLP) PFOA and PFOS + PFHxS concentrations were reported below the laboratory LOR.

Total and leachable PFAS (PFOA and PFOS + PFHxS) concentrations were reported below the NEMP interim landfill acceptance criteria for unlined landfills (0.07 µg/L) and are also below the NSW EPA general solid waste SCC1 and TCLP1 concentrations.



## 5.5 CATEGORISATION OF STOCKPILED SOIL FOR OFF-SITE DISPOSAL

Stockpile SP02 is classified as 'general solid waste' in accordance with ACT EPA and NSW EPA waste classification guidelines, based on total contaminant concentrations reported below the general solid waste maximum specific contaminant concentrations (SCC1) and leachable concentrations of lead and nickel below the general solid waste maximum leachable concentrations (TCLP1).

Total and leachable PFAS concentrations were below the LOR indicating the soil is suitable for disposal within an unlined landfills.

The waste classification letter for the stockpile is provided in **Attachment 5**. A copy of the NATA-endorsed analytical report and accompanying COC documentation are provided in **Attachment 3**.

## 5.6 POTENTIAL REUSE OF SP02 SOIL

### 5.6.1 ACT EPA Soil Re-Use Criteria

Based on the ACT EPA soil reuse criteria, SP02 soil is suitable for reuse based on the aesthetic properties of SP02 (i.e., absence of odorous and stained soils and absence of anthropogenic materials).

The concentrations of some metals may preclude the reuse of SP02, based on exceedances of the ACT EPA soil reuse criteria for cadmium, chromium (total), lead and zinc (including 95% upper confidence limits) in some samples analysed. Subsequent analysis completed for lead exceedances showed some potential for leachability of lead.

Based on the current and historical Site use, activities are unlikely to have resulted in gross contamination of soils underlying the road. The shale gravel was originally virgin excavated natural material, and the underlying natural soils are considered to be excavated natural material.

Based on this review, it is Kleinfelder's opinion that the soil is suitable for off-Site reuse. The soil will be transported to a suitable off-Site commercial/industrial location for re-use (Pialligo Stone Quarry), pending ACT EPA approval. The letter of acceptance from Pialligo Stone Quarry for receipt of soil (SP02) is provided in **Attachment 6**.

### 5.6.2 NEPM 2013

The concentrations of COPCs in soil from SP02 were reported below the adopted NEPM human health criteria for commercial/industrial land use, suggesting low risk to potential human and ecological receptors in this setting.

According to the NEPM the stockpiled soil from SP02 is suitable for on-Site re-use, if the soil meets geotechnical suitable, or alternatively could be used in beautification areas.

### 5.6.3 NEMP 2020

Total and leachable PFAS concentrations reported below the laboratory LORs and therefore below the PFAS NEMP residential soil criteria, indicating that the stockpiled soil is suitable for re-use.

## 6 CONCLUSIONS AND RECOMMENDATIONS

The classification assigned in this report allows for off-Site disposal of stockpile SP02 as 'general solid waste'. Soil from SP02 may be disposed of off-Site to an unlined landfill.

During stockpile removal, should odorous or stained soil be encountered, these sections should be segregated and classified separately.

Within the ACT, re-use of soils is a determination that is made by the ACT EPA. However, based on the information reviewed and analytical data obtained, Kleinfelder consider the soil from SP02 to be suitable for reuse off-Site in a commercial/industrial land use setting. The Pialligo Stone Quarry, located in Pialligo, ACT, has been identified as a suitable reuse site for soils comprising SP02. To aid the ACT EPA application for reuse of soils comprising SP02, a letter of acceptance from Pialligo Stone Quarry is included in **Attachment 6**.



If you require additional information or clarification, please contact the undersigned at (03) 9907 6000.

Sincerely,

**Kleinfelder Australia Pty Ltd**



Environmental Scientist



Client Account Manager

## Attachments

### Tables

- Table 1: Soil Analytical Data – BTEXN, TRH
- Table 2: Soil Analytical Data - Metals
- Table 3: Soil Analytical Data - PAHs
- Table 4: Soil Analytical Data – PFAS
- Table 5: Soil Classification – ACT EPA and NSW EPA Guidelines
- Table 6: Soil Classification – ACT EPA Soil Reuse Criteria
- Table 7: Quality Control Sample Analysis (Duplicate) - BTEXN, TRH
- Table 8: Quality Control Sample Analysis (Duplicate) – Metals
- Table 9: Quality Control Sample Analysis (Duplicate) – PAHs
- Table 10: Quality Control Sample Analysis (Rinsate) - BTEXN, TRH

## Attachments

- Attachment 1: Statement of Limitations
- Attachment 2: Field Records
- Attachment 3: Laboratory Certificates of Analysis
- Attachment 4: QA/QC Assessment
- Attachment 5: Waste Classification Letter
- Attachment 6: Acceptance Letter – Pialligo Stone Quarry



# TABLES





Table 1  
Soil Analytical Data - BTEXN, TRH  
HMAS Harman Naval Base, ACT

Analyte	BTEXN							Total Recoverable Hydrocarbons								
	Benzene	Toluene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	Total Xylenes	Naphthalene	C <sub>6</sub> - C <sub>10</sub>	C <sub>6</sub> - C <sub>10</sub> minus BTEX (F1)	>C <sub>10</sub> - C <sub>16</sub>	>C <sub>10</sub> - C <sub>16</sub> minus Naphthalene (F2)	>C <sub>16</sub> - C <sub>34</sub>	>C <sub>34</sub> - C <sub>40</sub>	>C <sub>10</sub> - C <sub>40</sub> (sum)		
LOR	0.1	0.1	0.1	0.2	0.1	0.3	0.5	20	20	50	50	100	100	100		
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		
ESL-D (Coarse) - Commercial/Industrial (NEPM 2013)		75	135	165	--	--	180	--	215	--	170	1,700	3,300	--		
HSL (Vapour Intrusion) D - SAND (NEPM 2013)		0 m - <1 m		3.0	NL	NL	--	--	230	NL	--	260	NL	--	--	--
Sample Name	Sample Date	Start Depth (m)	BTEXN							Total Recoverable Hydrocarbons						
SP02_01	02-Mar-22	0.3	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1	< 0.3	< 0.5	< 20	< 20	< 50	< 50	<b>150</b>	<b>330 *</b>	<b>550 *</b>
SP02_02	02-Mar-22	0.3	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1	< 0.3	< 0.5	< 20	< 20	< 50	< 50	< 100	< 100	< 100
SP02_03	02-Mar-22	0.4	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1	< 0.3	< 0.5	< 20	< 20	< 50	< 50	< 100	< 100	< 100
SP02_04	02-Mar-22	0.2	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1	< 0.3	< 0.5	< 20	< 20	< 50	< 50	< 100	< 100	< 100
SP02_05	02-Mar-22	0.2	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1	< 0.3	< 0.5	< 20	< 20	< 50	< 50	< 100	< 100	< 100
SP02_06	02-Mar-22	0.2	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1	< 0.3	< 0.5	< 20	< 20	< 50	< 50	< 100	< 100	< 100
SP02_07	02-Mar-22	0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1	< 0.3	< 0.5	< 20	< 20	< 50	< 50	< 100	< 100	< 100
SP02_08	02-Mar-22	0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1	< 0.3	< 0.5	< 20	< 20	< 50	< 50	< 100	< 100	< 100
SP02_09	02-Mar-22	0.2	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1	< 0.3	< 0.5	< 20	< 20	< 50	< 50	<b>150</b>	<b>180</b>	<b>330</b>
SP02_10	02-Mar-22	0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1	< 0.3	< 0.5	< 20	< 20	< 50	< 50	< 100	<b>110</b>	<b>110</b>

**Notes:**

< - Less than laboratory limit of reporting

NL - Not limiting

mg/kg - Milligrams per kilogram

BTEXN - Benzene, toluene, ethylbenzene, total xylenes, naphthalene

**Bold** indicates a detection above the laboratory limit of reporting

\*\*\* denotes duplicate/triplicate sample result adopted for analytical use due to RPD >50%

RPD - Relative Percentage Difference

**Criteria:**

National Environment Protection (Assessment of Site Contamination) Measure (NEPM 2013).



Table 2  
Soil Analytical Data - Metals  
HMAS Harman Naval Base, ACT

Analyte			Metals												
			Arsenic	Beryllium	Cadmium	Hexavalent Chromium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
LOR			2.0	2.0	0.4	1.0	5.0	5.0	5.0	0.1	5.0	5.0	2.0	2.0	5.0
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EIL D - Commercial/Industrial (NEPM 2013)			160					1,800							
HIL D - Commercial/Industrial (NEPM 2013)			3,000	500	900	3,600	--	240,000	1,500	730	--	6,000	10,000	--	400,000
Sample Name	Sample Date	Start Depth (m)													
SP02_01	02-Mar-22	0.3	<b>6.2</b>	-	< 0.4	-	<b>38</b>	<b>18</b>	<b>39</b>	< 0.1	-	<b>13</b>	-	-	<b>36</b>
SP02_02	02-Mar-22	0.3	<b>4.0</b>	-	< 0.4	-	<b>22</b>	<b>13</b>	<b>37</b>	< 0.1	-	<b>8.1</b>	-	-	<b>41</b>
SP02_03	02-Mar-22	0.4	<b>6.7</b>	-	< 0.4	-	<b>48</b>	<b>19</b>	<b>17</b>	< 0.1	-	<b>11</b>	-	-	<b>28</b>
SP02_04	02-Mar-22	0.2	<b>7.5</b>	-	<b>1.1</b>	-	<b>52</b>	<b>20</b>	<b>67</b>	< 0.1	-	<b>13</b>	-	-	<b>81</b>
SP02_05	02-Mar-22	0.2	<b>6.4</b>	-	<b>5.1</b>	-	<b>52</b>	<b>22</b>	<b>210</b>	< 0.1	-	<b>11</b>	-	-	<b>290</b>
SP02_06	02-Mar-22	0.2	<b>5.5</b>	-	<b>2.3</b>	-	<b>33</b>	<b>18</b>	<b>540</b>	<b>0.1</b>	-	<b>10</b>	-	-	<b>370</b>
SP02_07	02-Mar-22	0.1	<b>4.1</b>	-	< 0.4	-	<b>36</b>	<b>14</b>	<b>15</b>	< 0.1	-	<b>28</b>	-	-	<b>28</b>
SP02_08	02-Mar-22	0.1	<b>11</b>	-	< 0.4	-	<b>81</b>	<b>33</b>	<b>41</b>	< 0.1	-	<b>45</b>	-	-	<b>22</b>
SP02_09	02-Mar-22	0.2	<b>6.1</b>	-	< 0.4	-	<b>51</b>	<b>17</b>	<b>54</b>	< 0.1	-	<b>9.9</b>	-	-	<b>36</b>
SP02_10	02-Mar-22	0.1	<b>6.1</b>	-	< 0.4	-	<b>30</b>	<b>21</b>	<b>30</b>	< 0.1	-	<b>9.5</b>	-	-	<b>47</b>

**Notes:**

< - Less than laboratory limit of reporting  
mg/kg - Milligrams per kilogram

**Bold** indicates a detection above the laboratory limit of reporting

**Criteria:**

National Environment Protection (Assessment of Site Contamination) Measure (NEPM 2013).



Table 3  
Soil Analytical Data - PAHs  
HMAS Harman Naval Base, ACT

Analyte			Polycyclic Aromatic Hydrocarbons																			
			Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Chrysene	Benzo[a]anthracene	Benzo[b]fluoranthene	Benzo[k]fluoranthene	Benzo[a]pyrene	Indeno[1,2,3-c,d]pyrene	Dibenz[a,h]anthracene	Benzo[g,h,i]perylene	Total PAH	Benzo[a]pyrene TEQ (Zero)	Benzo[a]pyrene TEQ (Half LOR)	
LOR			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
ESL-D (Coarse) - Commercial/Industrial (NEPM 2013)			--	--	--	--	--	--	--	--	--	--	--	172 <sup>1</sup>	--	--	--	--	--	--	--	
EIL D - Commercial/Industrial (NEPM 2013)			370	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
HIL D - Commercial/Industrial (NEPM 2013)			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4,000	40	40	--	
HSL (Vapour Intrusion) D - SAND (NEPM 2013)			0 m - <1 m	NL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Sample Name	Sample Date	Start Depth (m)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<b>0.5</b>	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<b>0.5</b>	< 0.5	<b>0.6</b>
SP02_01	02-Mar-22	0.3	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<b>0.6</b>
SP02_02	02-Mar-22	0.3	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<b>0.6</b>
SP02_03	02-Mar-22	0.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<b>0.6</b>	<b>0.8</b>	< 0.5	< 0.5	< 0.5	<b>0.6</b>	< 0.5	<b>0.6</b>	<b>2.6</b>	< 0.5	< 0.5	<b>0.7</b>
SP02_04	02-Mar-22	0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<b>0.6</b>
SP02_05	02-Mar-22	0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<b>0.6</b>
SP02_06	02-Mar-22	0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<b>0.6</b>
SP02_07	02-Mar-22	0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<b>0.6</b>
SP02_08	02-Mar-22	0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<b>0.6</b>
SP02_09	02-Mar-22	0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<b>0.6</b>
SP02_10	02-Mar-22	0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<b>0.6</b>

**Notes:**  
 < - Less than laboratory limit of reporting  
 LOR - Laboratory limit of reporting  
 NL - Not limiting  
 mg/kg - Milligrams per kilogram  
**Bold** indicates a detection above the laboratory limit of reporting

**Criteria:**  
 National Environment Protection (Assessment of Site Contamination) Measure (NEPM 2013).  
 1 CRC CARE, 2017. Technical report no. 39. Risk-based management and remediation guidance for benzo(a)pyrene. High reliability ecological guideline value for fresh B(a)P - commercial and industrial land use



Table 4  
Soil Analytical Data - PFAS  
HMAS Harman Naval Base, ACT

Analyte	Perfluoroalkyl Sulfonic Acids												Perfluoroalkyl Carboxylic Acids																			
	Perfluorobutane sulfonic acid (PFBS)		Perfluoropentane sulfonic acid (PFPeS)		Perfluorohexane sulfonic acid (PFHxS)		Perfluoroheptane sulfonate (PFHpS)		Perfluorooctane sulfonic acid (PFOS)		Perfluorodecanesulfonic acid (PFDS)		Perfluorobutanoic acid (PFBA)		Perfluoropentanoic acid (PFPeA)		Perfluorohexanoic acid (PFHxA)		Perfluoroheptanoic acid (PFHpA)		Perfluorooctanoic acid (PFOA)		Perfluorononanoic acid (PFNA)		Perfluorodecanoic acid (PFDA)		Perfluoroundecanoic acid (PFUnDA)		Perfluorododecanoic acid (PFDoDA)			
LOR	0.01	5.0	0.01	5.0	0.01	5.0	0.01	5.0	0.01	5.0	0.01	5.0	0.05	5.0	0.01	5.0	0.01	5.0	0.01	5.0	0.01	5.0	0.01	5.0	0.01	5.0	0.01	5.0	0.01	5.0	0.01	5.0
Units	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg		
NEMP Landfill Acceptance Criteria - Unlined	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.56	50,000	--	--	--	--	--	--	--	--		
NEMP Landfill Acceptance Criteria - Clay/Single Composite Lined	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.6	50,000	--	--	--	--	--	--	--	--		
NEMP Landfill Acceptance Criteria - Double Composite Lined	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	56	50,000	--	--	--	--	--	--	--	--		
Sample Name	Sample Date	Start Depth (m)	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.05	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0		
SP02_02	02-Mar-22	0.3	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.05	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0		
SP02_04	02-Mar-22	0.2	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.05	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0		
SP02_07	02-Mar-22	0.1	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.05	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0		
SP02_09	02-Mar-22	0.2	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.05	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0		

**Notes:**  
 -- Not analysed  
 < - Less than laboratory limit of reporting  
 µg/L - Micrograms per litre  
**Bold** indicates a detection above the laboratory limit of reporting

**Criteria:**  
 Heads of EPAs Australia and New Zealand (HEPA) 'PFAS National Environmental Management Plan Version 2.0' January 2020



Table 4  
Soil Analytical Data - PFAS  
HMAS Harman Naval Base, ACT

Analyte	Perfluoroalkyl Sulfonamides																(n:2) Fluorotelomer Sulfonic Acids								Sum of PFHxS and PFOS					
	Perfluorotridecanoic acid (PFTTrDA)		Perfluorotetradecanoic acid (PFTTeDA)		Perfluorooctane sulfonamide (FOSA)		N-Methyl-perfluorooctane sulfonamide (MeFOSA)		N-Ethyl-perfluorooctane sulfonamide (EtFOSA)		N-Methyl-perfluorooctane sulfonamidoethanol (MeFOSE)		N-Ethyl-perfluorooctane sulfonamidoethanol (EtFOSE)		N-Methyl-perfluorooctane sulfonamidoacetic acid (MeFOSAA)		N-Ethyl-perfluorooctane sulfonamidoacetic acid (EtFOSAA)		4:2 Fluorotelomer sulfonic acid (4:2 FTS)		6:2 Fluorotelomer sulfonic acid (6:2 FTS)		8:2 Fluorotelomer sulfonic acid (8:2 FTS)				10:2 Fluorotelomer sulfonic acid (10:2 FTS)			
LOR	0.01	5.0	0.01	5.0	0.05	5.0	0.05	5.0	0.05	5.0	0.05	5.0	0.05	5.0	0.05	10	0.05	10	0.01	5.0	0.05	10	0.01	5.0	0.01	5.0	0.01	5.0	0.01	5.0
Units	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg	µg/L	µg/kg
NEMP Landfill Acceptance Criteria - Unlined	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.07	20,000	
NEMP Landfill Acceptance Criteria - Clay/Single Composite Lined	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.7	50,000	
NEMP Landfill Acceptance Criteria - Double Composite Lined	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7	50,000	
Sample Name	Sample Date	Start Depth (m)	< 0.01	< 5.0	< 0.01	< 5.0	< 0.05	< 5.0	< 0.05	< 5.0	< 0.05	< 5.0	< 0.05	< 5.0	< 0.05	< 10	< 0.05	< 10	< 0.01	< 5.0	< 0.05	< 10	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0
SP02_02	02-Mar-22	0.3	< 0.01	< 5.0	< 0.01	< 5.0	< 0.05	< 5.0	< 0.05	< 5.0	< 0.05	< 5.0	< 0.05	< 5.0	< 0.05	< 10	< 0.05	< 10	< 0.01	< 5.0	< 0.05	< 10	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0
SP02_04	02-Mar-22	0.2	< 0.01	< 5.0	< 0.01	< 5.0	< 0.05	< 5.0	< 0.05	< 5.0	< 0.05	< 5.0	< 0.05	< 5.0	< 0.05	< 10	< 0.05	< 10	< 0.01	< 5.0	< 0.05	< 10	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0
SP02_07	02-Mar-22	0.1	< 0.01	< 5.0	< 0.01	< 5.0	< 0.05	< 5.0	< 0.05	< 5.0	< 0.05	< 5.0	< 0.05	< 5.0	< 0.05	< 10	< 0.05	< 10	< 0.01	< 5.0	< 0.05	< 10	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0
SP02_09	02-Mar-22	0.2	< 0.01	< 5.0	< 0.01	< 5.0	< 0.05	< 5.0	< 0.05	< 5.0	< 0.05	< 5.0	< 0.05	< 5.0	< 0.05	< 10	< 0.05	< 10	< 0.01	< 5.0	< 0.05	< 10	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0	< 0.01	< 5.0

**Notes:**  
 - - Not analysed  
 < - Less than laboratory limit of reporting  
 µg/L - Micrograms per litre  
**Bold** indicates a detection above the laboratory limit of repc

**Criteria:**  
 Heads of EPAs Australia and New Zealand (HEPA) 'PFAS Nat



Table 4  
Soil Analytical Data - PFAS  
HMAS Harman Naval Base, ACT

Analyte			Sum of PFAS			
			Sum of PFAS (WA DER List)		Sum of PFAS	
LOR			0.05	10	0.1	50
Units			µg/L	µg/kg	µg/L	µg/kg
NEMP Landfill Acceptance Criteria - Unlined			--	--	--	--
NEMP Landfill Acceptance Criteria - Clay/Single Composite Lined			--	--	--	--
NEMP Landfill Acceptance Criteria - Double Composite Lined			--	--	--	--
Sample Name	Sample Date	Start Depth (m)				
SP02_02	02-Mar-22	0.3	< 0.05	< 10	< 0.1	< 50
SP02_04	02-Mar-22	0.2	< 0.05	< 10	< 0.1	< 50
SP02_07	02-Mar-22	0.1	< 0.05	< 10	< 0.1	< 50
SP02_09	02-Mar-22	0.2	< 0.05	< 10	< 0.1	< 50

**Notes:**  
 - - Not analysed  
 < - Less than laboratory limit of reporting  
 µg/L - Micrograms per litre  
**Bold** indicates a detection above the laboratory limit of reporting

**Criteria:**  
 Heads of EPAs Australia and New Zealand (HEPA) 'PFAS Nat



Table 5  
Soil Classification - ACT EPA and NSW EPA Guidelines  
HMAS Harman Naval Base, ACT

Sample ID	SP02_01	SP02_02	SP02_03	SP02_04	SP02_05	SP02_06	SP02_07	SP02_08	SP02_09	SP02_10
Sample Date	02-Mar-22	02-Mar-22	02-Mar-22	02-Mar-22	02-Mar-22	02-Mar-22	02-Mar-22	02-Mar-22	02-Mar-22	02-Mar-22

	GENERAL SOLID WASTE upper limits <sup>1</sup>	RESTRICTED WASTE upper limits <sup>2</sup>	GENERAL SOLID WASTE upper limits <sup>3</sup>	RESTRICTED WASTE upper limits <sup>4</sup>										
	CT1 (mg/kg)	CT2 (mg/kg)	SCC1 (mg/kg)	SCC2 (mg/kg)	SP02_01	SP02_02	SP02_03	SP02_04	SP02_05	SP02_06	SP02_07	SP02_08	SP02_09	SP02_10
<b>Selected Metals</b>														
Arsenic	100	400	500	2,000	6.2	4.0	6.7	7.5	6.4	5.5	4.1	11	6.1	6.1
Beryllium	20	80	100	400	-	-	-	-	-	-	-	-	-	-
Cadmium	20	80	100	400	< 0.4	< 0.4	< 0.4	1.1	5.1	2.3	< 0.4	< 0.4	< 0.4	< 0.4
Copper	--	--	--	--	18	13	19	20	22	18	14	33	17	21
Lead	100	400	1,500	6,000	39	37	17	67	210	540	15	41	54	30
Lead (TCLP1 mg/L)	--	--	5.0	--	-	-	-	-	0.23	0.02	-	-	-	-
Lead (TCLP2 mg/L)	--	--	--	20	-	-	-	-	-	-	-	-	-	-
Molybdenum	100	400	1,000	4,000	-	-	-	-	-	-	-	-	-	-
Nickel	40	160	1,050	4,200	13	8.1	11	13	11	10	28	45	9.9	9.5
Nickel (TCLP1 mg/L)	--	--	2.0	--	-	-	-	-	-	-	-	< 0.01	-	-
Nickel (TCLP2 mg/L)	--	--	--	8.0	-	-	-	-	-	-	-	-	-	-
Selenium	20	80	50	200	-	-	-	-	-	-	-	-	-	-
Silver	100	400	180	720	-	-	-	-	-	-	-	-	-	-
Zinc	--	--	--	--	36	41	28	81	290	370	28	22	36	47
Mercury	4.0	16	50	200	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chromium (VI)	100	400	1,900	7,600	-	-	-	-	-	-	-	-	-	-
<b>Miscellaneous</b>														
Cyanide	320	1,280	5,900	23,600	-	-	-	-	-	-	-	-	-	-
Cyanide (amenable)	70	280	300	1,200	-	-	-	-	-	-	-	-	-	-
Fluoride	3,000	12,000	10,000	40,000	-	-	-	-	-	-	-	-	-	-
Polychlorinated Biphenyls	50	50	50	50	-	-	-	-	-	-	-	-	-	-
<b>Monocyclic Aromatic Hydrocarbons (MAH)</b>														
Benzene	10	40	18	72	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	288	1,152	518	2,073	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	600	2,400	1,080	4,320	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Meta- & Para- Xylene	1,000	4,000	1,000	4,000	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Styrene	60	240	108	432	-	-	-	-	-	-	-	-	-	-
Ortho-Xylene	1,000	4,000	1,000	4,000	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
<b>Total Petroleum Hydrocarbons (TPH)</b>														
(C6-C9)	650	2,600	650	2,600	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
(C10-C14)	--	--	--	--	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
(C15-C28)	--	--	--	--	69	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
(C29-C36)	--	--	--	--	150	81	71	< 50	< 50	< 50	67	< 50	140	84
(C10-C36)	10,000	40,000	10,000	40,000	219	81	71	< 50	< 50	< 50	67	< 50	140	84
<b>Organic Species</b>														
2,4-Dinitrotoluene	2.6	10.4	4.68	18.7	-	-	-	-	-	-	-	-	-	-
<b>Volatile Halogenated Compounds</b>														
Vinyl chloride	4.0	16	7.2	28.8	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	14	56	25	100	-	-	-	-	-	-	-	-	-	-
Dichloromethane (Methylene Chloride)	172	688	310	1,240	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	--	--	--	--	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	--	--	--	--	-	-	-	-	-	-	-	-	-	-
Chloroform	120	480	216	864	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	600	2,400	1,080	4,320	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	10	40	18	72	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	10	40	18	72	-	-	-	-	-	-	-	-	-	-
Trichloroethene	10	40	18	72	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	24	96	43.2	172.8	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	14	56	25.2	100.8	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	200	800	360	1,440	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	26	104	46.8	187.2	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	--	--	--	--	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	2,000	8,000	3,600	14,400	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	150	600	270	1,080	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	86	344	155	620	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	--	--	--	--	-	-	-	-	-	-	-	-	-	-
Cresol (total)	4,000	16,000	7,200	28,800	-	-	-	-	-	-	-	-	-	-
Methyl ethyl ketone (MEK)	4,000	16,000	7,200	28,800	-	-	-	-	-	-	-	-	-	-
Nitrobenzene	40	160	72	288	-	-	-	-	-	-	-	-	-	-
Sum of volatile chlorinated hydrocarbons	--	--	--	--	-	-	-	-	-	-	-	-	-	-
Sum of other chlorinated hydrocarbons	--	--	--	--	-	-	-	-	-	-	-	-	-	-
Total Xylenes	1,000	4,000	1,800	7,200	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
<b>Phenolic Compounds (Halogenated)</b>														
2-Chlorophenol	--	--	--	--	-	-	-	-	-	-	-	-	-	-



Table 5  
Soil Classification - ACT EPA and NSW EPA Guidelines  
HMAS Harman Naval Base, ACT

2,4-Dichlorophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dichlorophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloro-3-Methylphenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	8,000	32,000	14,400	57,600	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	40	160	72	288	--	--	--	--	--	--	--	--	--	--	--
2,3,5,6-Tetrachlorophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,5 & 2,3,4,6-Tetrachlorophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sum of Phenols (halogenated)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenolic Compounds (Non-halogenated)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylphenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3- & 4-Methylphenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Nitrophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Nitrophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methyl-4,6-dinitrophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dinoseb	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Cyclohexyl-4,6-Dinitrophenol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sum of Phenols (non-halogenated)	288	1,152	518	2,073	--	--	--	--	--	--	--	--	--	--	--
Polynuclear Aromatic Hydrocarbons	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthene	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	--	--	--	--	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)anthracene	--	--	--	--	< 0.5	< 0.5	0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	--	--	--	--	< 0.5	< 0.5	0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b+j) & Benzo(k) fluoroanthene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.8	3.2	10	23	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1,2,3.cd)pyrene	--	--	--	--	< 0.5	< 0.5	0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a,h)anthracene	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g,h,i)perylene	--	--	--	--	< 0.5	< 0.5	0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Sum of polycyclic aromatic hydrocarbons	200	800	200	800	0.5	< 0.5	2.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Organochlorine Pesticides (OCPs)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
alpha-BHC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene (HCB)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
beta-BHC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
gamma-BHC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
delta-BHC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Heptachlor	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aldrin	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Heptachlor epoxide	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlordane	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorpyrifos	4.0	16	7.5	30	--	--	--	--	--	--	--	--	--	--	--
Endosulfan 1	60	240	108	432	--	--	--	--	--	--	--	--	--	--	--
4,4'-DDE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dieldrin	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Endrin aldehyde	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Endrin	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Endosulfan 2	60	240	108	432	--	--	--	--	--	--	--	--	--	--	--
4,4'-DDD	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Endosulfan sulfate	60	240	108	432	--	--	--	--	--	--	--	--	--	--	--
4,4'-DDT	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methoxychlor	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sum of organochlorine pesticides	60	240	60	240	--	--	--	--	--	--	--	--	--	--	--
Sum of Aldrin + Dieldrin	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sum of DDD + DDE + DDT	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-D	200	800	360	1,440	--	--	--	--	--	--	--	--	--	--	--
Sum of other organochlorine pesticides	250	1,000	250	1,000	--	--	--	--	--	--	--	--	--	--	--
Per- and polyfluoroalkyl substances (PFAS) <sup>5</sup>	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Perfluorooctanoic acid (PFOA)	--	--	18	72	--	< 0.005	--	< 0.005	--	--	< 0.005	--	< 0.005	--	--
PFOA (TCLP1 mg/L)	--	--	0.5	--	--	< 0.00001	--	< 0.00001	--	--	< 0.00001	--	< 0.00001	--	--
PFOA (TCLP2 mg/L)	--	--	--	2.0	--	--	--	--	--	--	--	--	--	--	--
Sum of PFHxS and PFOS	--	--	1.8	7.2	--	< 0.005	--	< 0.005	--	--	< 0.005	--	< 0.005	--	--
Sum of PFHxS and PFOS (TCLP1 mg/L)	--	--	0.05	--	--	< 0.00001	--	< 0.00001	--	--	< 0.00001	--	< 0.00001	--	--
Sum of PFHxS and PFOS (TCLP2 mg/L)	--	--	--	0.2	--	--	--	--	--	--	--	--	--	--	--

Notes:

"--" Denotes no threshold value available

"-" Denotes sample not analysed

1 General solid waste contaminant threshold 1 - ACT Government, 2021. Environmental Standards: Assessment and Classification of Liquid (Table 1) and Non-liquid Wastes and NSW Environment Protection Authority (EPA), 2014. Waste classification guidelines: Part 1 Classifying Waste (Table 1).

2 Restricted solid waste contaminated threshold 2 - ACT Government, 2021. Environmental Standards: Assessment (Table 1) and Classification of Liquid and Non-liquid Wastes and NSW Environment Protection Authority (EPA), 2014. Waste classification guidelines: Part 1 Classifying Waste (Table 1).

3 General solid waste specific contaminant concentration 1 - ACT Government, 2021. Environmental Standards: Assessment and Classification of Liquid and Non-liquid Wastes (Table 2) and NSW Environment Protection Authority (EPA), 2014. Waste classification guidelines: Part 1 Classifying Waste (Table 2).

4 Restricted solid waste specific contaminant concentration 2 - ACT Government, 2021. Environmental Standards: Assessment and Classification of Liquid and Non-liquid Wastes (Table 2) and NSW Environment Protection Authority (EPA), 2014. Waste classification guidelines: Part 1 Classifying Waste (Table 2).

5 NSW EPA, 2016. Addendum to the Waste Classification Guidelines (2014) - Part 1: classifying waste (for PFAS).

"TCLP1/TCLP2" denotes leachable concentration



Table 6  
Soil Classification - ACT EPA Soil Reuse Criteria  
HMAS Harman Naval Base, ACT

Sample ID	SP02_01	SP02_02	SP02_03	SP02_04	SP02_05	SP02_06	SP02_07	SP02_08	SP02_09	SP02_10	
Sample Date	02-Mar-22	02-Mar-22	02-Mar-22	02-Mar-22	02-Mar-22	02-Mar-22	02-Mar-22	02-Mar-22	02-Mar-22	02-Mar-22	
<b>ACT EPA Soil Reuse Criteria<sup>1</sup> Maximum total concentration (mg/kg)</b>											
Arsenic	20	6.2	4.0	6.7	7.5	6.4	5.5	4.1	11	6.1	6.1
Barium	300	-	-	-	-	-	-	-	-	-	-
Beryllium	2.0	-	-	-	-	-	-	-	-	-	-
Cadmium	3.0	< 0.4	< 0.4	< 0.4	1.1	5.1	2.3	< 0.4	< 0.4	< 0.4	< 0.4
Chromium (total)	50	38	22	48	52	52	33	36	81	51	30
Chromium (VI)	1.0	-	-	-	-	-	-	-	-	-	-
Cobalt	100	-	-	-	-	-	-	-	-	-	-
Copper	100	18	13	19	20	22	18	14	33	17	21
Lead	100	39	37	17	67	210	540	15	41	54	30
Manganese	500	-	-	-	-	-	-	-	-	-	-
Mercury (total)	1.0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	10	-	-	-	-	-	-	-	-	-	-
Nickel	60	13	8.1	11	13	11	10	28	45	9.9	9.5
Selenium	10	-	-	-	-	-	-	-	-	-	-
Silver	10	-	-	-	-	-	-	-	-	-	-
Tin (total)	50	-	-	-	-	-	-	-	-	-	-
Zinc	200	36	41	28	81	290	370	28	22	36	47
Tributyltin (reported as Sn)	0.005	-	-	-	-	-	-	-	-	-	-
Other pesticides <sup>2</sup>	2.0	-	-	-	-	-	-	-	-	-	-
DDT + DDD + DDE	2.0	-	-	-	-	-	-	-	-	-	-
C6 to C9 petroleum hydrocarbons	65	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
C10 to C36 petroleum hydrocarbons	1,000	219	81	71	< 50	< 50	< 50	67	< 50	140	84
Benzene	1.0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	1.0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	3.0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Xylene (total)	14	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Naphthalene	3.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Polycyclic aromatic hydrocarbons (total)	20	0.5	< 0.5	2.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Polychlorinated biphenyls (PCB)	2.0	-	-	-	-	-	-	-	-	-	-
Phenols	25	-	-	-	-	-	-	-	-	-	-
Cyanide (total)	32	-	-	-	-	-	-	-	-	-	-
Fluoride	300	-	-	-	-	-	-	-	-	-	-

Notes:

<sup>1</sup>ACT Government - Requirements for the Reuse and Disposal of Contaminated Soil in the ACT. Environment Protection Contaminated Sites Information Sheet 4 - Table 1: Reuse Criteria. April 2019

<sup>2</sup>Aldrin, Dieldrin, Chlordane, Heptachlor, Hexachlorobenzene (HCB), Lindane and Benzene Hexachloride (BHC)

Yellow highlight denotes analyte concentration exceeds adopted screening criteria



Table 7  
Quality Control Sample Analysis (Duplicate) - BTEXN, TRH  
HMAS Harman Naval Base, ACT

Analyte			BTEXN						Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons							
			Benzene	Toluene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	Total Xylenes	Naphthalene	C <sub>6</sub> - C <sub>9</sub>	C <sub>10</sub> - C <sub>14</sub>	C <sub>15</sub> - C <sub>28</sub>	C <sub>29</sub> - C <sub>36</sub>	C <sub>10</sub> - C <sub>36</sub> sum	C <sub>6</sub> - C <sub>10</sub>	C <sub>6</sub> - C <sub>10</sub> minus BTEX (F1)	>C <sub>10</sub> - C <sub>16</sub>	>C <sub>10</sub> - C <sub>16</sub> minus Naphthalene (F2)	>C <sub>16</sub> - C <sub>34</sub>	>C <sub>34</sub> - C <sub>40</sub>	>C <sub>10</sub> - C <sub>40</sub> (sum)
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample Name	Sample Date	Sample Type	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1	< 0.3	< 0.5	< 20	< 20	69	150	219	< 20	< 20	< 50	< 50	150	170	320
SP02_01_03022022	02-Mar-22	Primary	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1	< 0.3	< 0.5	< 20	< 20	88	250	338	< 20	< 20	< 50	< 50	220	330	550
QC01_03022022	02-Mar-22	Duplicate	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1	< 0.3	< 0.5	< 20	< 20	88	250	338	< 20	< 20	< 50	< 50	220	330	550
Relative Percentage Difference			NC	NC	NC	NC	NC	NC	NC	NC	NC	24%	50%	43%	NC	NC	NC	NC	38%	64%	53%

**Notes:**  
 < - Less than laboratory limit of reporting  
 NC - Not calculated  
 mg/kg - Milligrams per kilogram  
 BTEXN - Benzene, toluene, ethylbenzene, total xylenes, naphthalene



Table 8  
 Quality Control Sample Analysis (Duplicate) - Metals  
 HMAS Harman Naval Base, ACT

Analyte			Metals							
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample Name	Sample Date	Sample Type								
SP02_01_03022022	02-Mar-22	Primary	6.2	< 0.4	38	18	39	< 0.1	13	36
QC01_03022022	02-Mar-22	Duplicate	5.5	< 0.4	44	16	26	< 0.1	13	45
Relative Percentage Difference			12%	NC	15%	12%	40%	NC	0%	22%

**Notes:**  
 < - Less than laboratory limit of reporting  
 NC - Not calculated  
 mg/kg - Milligrams per kilogram



Table 9  
Quality Control Sample Analysis (Duplicate) - PAHs  
HMAS Harman Naval Base, ACT

Analyte			Polycyclic Aromatic Hydrocarbons																		
			Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Chrysene	Benzo[a]anthracene	Benzo[b]fluoranthene	Benzo[k]fluoranthene	Benzo[a]pyrene	Indeno[1,2,3-c,d]pyrene	Dibenz[a,h]anthracene	Benzo[g,h,i]perylene	Total PAH	Benzo[a]pyrene TEQ (Zero)	Benzo[a]pyrene TEQ (Half LOR)
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
Sample Name	Sample Date	Sample Type																			
SP02_01_03022022	02-Mar-22	Primary	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5	< 0.5	0.6
QC01_03022022	02-Mar-22	Duplicate	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6
Relative Percentage Difference			NC	NC	NC	NC	NC	NC	NC	0%	NC	NC	NC	NC	NC	NC	NC	NC	0%	NC	0%

**Notes:**  
 < - Less than laboratory limit of reporting  
 LOR - Laboratory limit of reporting  
 NC - Not calculated  
 mg/kg - Milligrams per kilogram  
 RPD - Relative Percentage Difference



Table 10  
Quality Control Sample Analysis (Rinsate) - BTEXN, TRH  
HMAS Harman Naval Base, ACT

Analyte			BTEXN					Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons								
			Benzene	Toluene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	Total Xylenes	Naphthalene	C <sub>6</sub> - C <sub>9</sub>	C <sub>10</sub> - C <sub>14</sub>	C <sub>15</sub> - C <sub>28</sub>	C <sub>29</sub> - C <sub>36</sub>	C <sub>10</sub> - C <sub>36</sub> sum	C <sub>6</sub> - C <sub>10</sub>	C <sub>6</sub> - C <sub>10</sub> minus BTEX (F1)	>C <sub>10</sub> - C <sub>16</sub>	>C <sub>10</sub> - C <sub>16</sub> minus Naphthalene (F2)	>C <sub>16</sub> - C <sub>34</sub>	>C <sub>34</sub> - C <sub>40</sub>	>C <sub>10</sub> - C <sub>40</sub> (sum)
Units			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Name	Sample Date	Sample Type																			
QC05_03022022	02-Mar-22	Rinsate	< 0.001	< 0.001	< 0.001	< 0.002	< 0.001	< 0.003	< 0.01	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.02	< 0.02	< 0.05	< 0.05	< 0.1	< 0.1	< 0.1

**Notes:**  
 < - Less than laboratory limit of reporting  
 mg/L - Milligrams per litre  
 BTEXN - Benzene, toluene, ethylbenzene, total xylenes, naphthalene



# ATTACHMENT 1: STATEMENT OF LIMITATIONS





## LIMITATIONS

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## ATTACHMENT 2: FIELD RECORDS



**PID Calibration Certificate**

Instrument      PhoCheck  
                     Tiger  
Serial No.        T-107189



Air-Met Scientific Pty Ltd  
1300 137 067

Item	Test	Pass	Comments			
Battery	Charge Condition	✓				
	Fuses	✓				
	Capacity	✓				
	Recharge OK?	✓				
Switch/keypad	Operation	✓				
Display	Intensity	✓				
	Operation (segments)	✓				
Grill Filter	Condition	✓				
	Seal	✓				
Pump	Operation	✓				
	Filter	✓				
	Flow	✓				
	Valves, Diaphragm	✓				
PCB	Condition	✓				
Connectors	Condition	✓				
Sensor	PID	✓	10.6 ev			
Alarms	Beeper	✓	Low	High	TWA	STEL
	Settings	✓	50ppm	100ppm		
Software	Version	✓				
Data logger	Operation	✓				
Download	Operation	✓				
Other tests:						

**Certificate of Calibration**

This is to certify that the above instrument has been calibrated to the following specifications:

Diffusion mode      Aspirated mode

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No	Instrument Reading
PID Lamp		95ppm Isobutylene	NIST	ME846	95ppm Isobutylene

**Calibrated by:** \_\_\_\_\_

**Calibration date:**                      23/02/2022

**Next calibration due:**                    22/08/2022



VALIDATION & STOCKPILE SAMPLING LOG

Project Number: \_\_\_\_\_ Site Name: HMAS - Naval Site Address: Macdonnell Ave

Date: 02/03/22 Field Manager: MK

Date Sampled	Field Staff	Stockpile / Excavation ID	Sample Location (e.g. Base, West, etc.)	Sample ID	Sample Depth	PID (ppm)	Sample Description	
02/03/22	MK	SPO2	West	SPO2-01	1.0	0.3	Silty Sandy CLAY, w Gravel, Red Brown, L/M Plus - QCD 01 & 02	
			North	SPO2-02	1.0	0.3		
			N	03	2.0	0.6		
			N	04	1.0	0.3		
			E	05	2.0	0.2		
			E	06	1.0	0.2		
			S	07	2.0	0.1		
			S	08	1.0	0.1		
			S	09	2.0	0.2		
			Central W	10	2.0	0.1		
			Central Central	11	1.5	0.2		↳ HPFAS sample
			Central E	12	2.0	0.2		↳

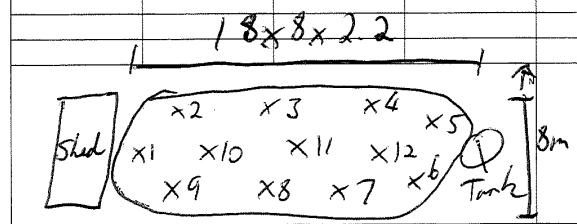


Diagram location: \_\_\_\_\_

COMMENTS: Unable to take too many photos due to Naval Base.



# ATTACHMENT 3: LABORATORY CERTIFICATES OF ANALYSIS





Environment Testing

Kleinfelder Australia Pty Ltd (VIC)  
Level 1, 95 Coventry St  
South Melbourne  
VIC 3205



NATA Accredited  
Accreditation Number 1261  
Site Number 1254

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

Attention: [REDACTED]

**Report** 870354-L  
Project name VEOLIA - HMAS HARMAN NAVAL BASE  
Project ID 20225461.001A  
Received Date Mar 11, 2022

Client Sample ID			SP02_05	SP02_06	SP02_08
Sample Matrix			AUS Leachate	AUS Leachate	AUS Leachate
Eurofins Sample No.			M22-Ma22634	M22-Ma22635	M22-Ma24147
Date Sampled			Feb 02, 2022	Feb 03, 2022	Feb 03, 2022
Test/Reference	LOR	Unit			
<b>Heavy Metals</b>					
Lead	0.01	mg/L	0.23	0.02	-
Nickel	0.01	mg/L	-	-	< 0.01
<b>AUS Leaching Procedure</b>					
Leachate Fluid <sup>C01</sup>		comment	1.0	1.0	1.0
pH (initial)	0.1	pH Units	6.2	5.5	6.1
pH (Leachate fluid)	0.1	pH Units	5.0	5.0	5.0
pH (off)	0.1	pH Units	5.2	5.2	5.2

**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 - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Melbourne	Mar 11, 2022	28 Days
AUS Leaching Procedure			
pH (initial) - Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes	Melbourne	Mar 11, 2022	0 Days
pH (Leachate fluid) - Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes	Melbourne	Mar 11, 2022	0 Days
pH (off) - Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes	Melbourne	Mar 11, 2022	0 Days



Environment Testing

web: www.eurofins.com.au  
email: EnviroSales@eurofins.com

**Eurofins Environment Testing Australia Pty Ltd**

ABN: 50 005 085 521

**Melbourne**

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

**Sydney**

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

**Brisbane**

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

**Newcastle**

4/52 Industrial Drive  
Mayfield East NSW 2304  
PO Box 60 Wickham 2293  
Phone : +61 2 4968 8448  
NATA # 1261 Site # 25079

**Eurofins ARL Pty Ltd**

ABN: 91 05 0159 898

**Perth**

46-48 Banksia Road  
Welshpool WA 6106  
Phone : +61 8 6253 4444  
NATA # 2377 Site # 2370

**Eurofins Environment Testing NZ Limited**

NZBN: 9429046024954

**Auckland**

35 O'Rorke Road  
Penrose, Auckland 1061  
Phone : +64 9 526 45 51  
IANZ # 1327

**Christchurch**

43 Detroit Drive  
Rolleston, Christchurch 7675  
Phone : 0800 856 450  
IANZ # 1290

**Company Name:** Kleinfelder Australia Pty Ltd (VIC)  
**Address:** Level 1, 95 Coventry St  
South Melbourne  
VIC 3205  
**Project Name:** VEOLIA - HMAS HARMAN NAVAL BASE  
**Project ID:** 20225461.001A

**Order No.:**  
**Report #:** 870354  
**Phone:** 03 9907 6000  
**Fax:** 03 9907 6001

**Received:** Mar 11, 2022 9:11 AM  
**Due:** Mar 17, 2022  
**Priority:** 3 Day  
**Contact Name:** [REDACTED]

**Eurofins Analytical Services Manager:** [REDACTED]

Sample Detail						Lead	Nickel	AUS Leaching Procedure
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X
Sydney Laboratory - NATA # 1261 Site # 18217								
Brisbane Laboratory - NATA # 1261 Site # 20794								
Mayfield Laboratory - NATA # 1261 Site # 25079								
Perth Laboratory - NATA # 2377 Site # 2370								
External Laboratory								
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
1	SP02_05	Feb 02, 2022		AUS Leachate	M22-Ma22634	X		X
2	SP02_06	Feb 03, 2022		AUS Leachate	M22-Ma22635	X		X
3	SP02_08	Feb 03, 2022		AUS Leachate	M22-Ma24147		X	X
<b>Test Counts</b>						2	1	3

## 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.

### Units

**mg/kg:** milligrams per kilogram

**mg/L:** milligrams per litre

**µg/L:** micrograms per litre

**ppm:** parts per million

**ppb:** parts per billion

**%:** Percentage

**org/100 mL:** Organisms per 100 millilitres

**NTU:** Nephelometric Turbidity Units

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

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	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.
<b>NCP</b>	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.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

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

Results <10 times the LOR: No Limit

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

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

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

### 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. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>										
<b>Heavy Metals</b>										
Lead				mg/L	< 0.01			0.01	Pass	
Nickel				mg/L	< 0.01			0.01	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code	
<b>Spike - % Recovery</b>										
<b>Heavy Metals</b>										
					Result 1					
Lead		M22-Ma24147	CP	%	97		75-125	Pass		
Nickel		M22-Ma24147	CP	%	99		75-125	Pass		
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code	
<b>Duplicate</b>										
<b>Heavy Metals</b>										
					Result 1	Result 2	RPD			
Lead		M22-Ma24147	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Nickel		M22-Ma24147	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	

### Comments

Eurofins | Environment Testing accreditation number 1261, site 18217 is currently in progress of a controlled transition to a new custom built location at 179 Magowar Road, Girraween, NSW 2145. All results on this report denoted as being performed by Eurofins | Environment Testing Unit F3, Building F, 16 Mars road, Lane Cove West, NSW 2066, corporate site 18217, will have been performed on either Lane Cove or new Girraween site

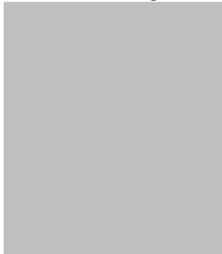
### Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
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:



Analytical Services Manager  
Senior Analyst-Metal (VIC)

### General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.



Environment Testing

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**Melbourne**  
6 Monterey Road  
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NATA # 1261 Site # 1254

**Sydney**  
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NATA # 1261 Site # 18217

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NATA # 1261 Site # 20794

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NATA # 1261 Site # 25079

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43 Detroit Drive  
Rolleston, Christchurch 7675  
Phone : 0800 856 450  
IANZ # 1290

web: www.eurofins.com.au  
email: EnviroSales@eurofins.com

**Company Name:** Kleinfelder Australia Pty Ltd (VIC)  
**Address:** Level 1, 95 Coventry St  
South Melbourne  
VIC 3205  
**Project Name:** VEOLIA - HMAS HARMAN NAVAL BASE  
**Project ID:** 20225461.001A

**Order No.:**  
**Report #:** 870354  
**Phone:** 03 9907 6000  
**Fax:** 03 9907 6001

**Received:** Mar 11, 2022 9:11 AM  
**Due:** Mar 17, 2022  
**Priority:** 3 Day  
**Contact Name:** [REDACTED]

**Eurofins Analytical Services Manager:** [REDACTED]

Sample Detail						Lead	Nickel	AUS Leaching Procedure
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>						X	X	X
<b>Sydney Laboratory - NATA # 1261 Site # 18217</b>								
<b>Brisbane Laboratory - NATA # 1261 Site # 20794</b>								
<b>Mayfield Laboratory - NATA # 1261 Site # 25079</b>								
<b>Perth Laboratory - NATA # 2377 Site # 2370</b>								
<b>External Laboratory</b>								
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
1	SP02_05	Feb 02, 2022		AUS Leachate	M22-Ma22634	X		X
2	SP02_06	Feb 03, 2022		AUS Leachate	M22-Ma22635	X		X
3	SP02_08	Feb 03, 2022		AUS Leachate	M22-Ma24147		X	X
<b>Test Counts</b>						2	1	3

**Eurofins Environment Testing Australia Pty Ltd**

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IANZ # 1327

**Christchurch**  
43 Detroit Drive  
Rolleston, Christchurch 7675  
Phone : 0800 856 450  
IANZ # 1290

## Sample Receipt Advice

**Company name:** Kleinfelder Australia Pty Ltd (VIC)  
**Contact name:** [REDACTED]  
**Project name:** VEOLIA - HMAS HARMAN NAVAL BASE  
**Project ID:** 20225461.001A  
**Turnaround time:** 3 Day  
**Date/Time received:** Mar 11, 2022 9:11 AM  
**Eurofins reference:** 870354

## Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 15 degrees Celsius.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- N/A** Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A** Custody Seals intact (if used).

## Notes

## Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

**Harry Bacalis on phone : or by email: HarryBacalis@eurofins.com**

Results will be delivered electronically via email to Angelina Bosnjak - ABosnjak@kleinfelder.com.

*Note: A copy of these results will also be delivered to the general Kleinfelder Australia Pty Ltd (VIC) email address.*

**#AU\_CAU001\_EnviroSampleVic**

---

**From:** [redacted]@Kleinfelder.com>  
**Sent:** Friday, 11 March 2022 9:11 AM  
**To:** [redacted]  
**Cc:** #AU\_CAU001\_EnviroSampleVic  
**Subject:** RE: Leachability - 869105

**CAUTION: EXTERNAL EMAIL - Sent from an email domain that is not formally trusted by Eurofins.**  
Do not click on links or open attachments unless you recognise the sender and are certain that the content is safe.

Hi [redacted]

Can you put for 3-day TAT?

R, 870354  
11/3/22

Cheers,

[redacted]

[redacted]

**From:** [redacted]@eurofins.com>  
**Sent:** Friday, 11 March 2022 8:48 AM  
**To:** [redacted]@Kleinfelder.com>  
**Cc:** #AU\_CAU001\_EnviroSampleVic <EnviroSampleVic@eurofins.com>  
**Subject:** RE: Leachability - 869105

**External Email**

---

Thanks Angelina – we can usually do this on a 1 DAY?

Kind regards,

[redacted]  
**Phone:** [redacted]  
**Mobile:** [redacted]  
**Email:** [redacted]@eurofins.com

This e-mail including its attachments may contain confidential and proprietary information. Any unauthorized disclosure or use of this e-mail including its attachments is prohibited and may be prosecuted. If you are not the intended recipient, please inform the sender by an e-mail reply and delete the message. Transmission by e-mail is not secure and can result in errors or omissions in the content of the message. Despite state-of-the-art precautions we cannot guarantee that e-mails and attachments are free from viruses. We accept no liability for viruses or any transmission-related errors and omissions. You need to always virus-check any e-mails and attachments.  
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**From:** [redacted]@Kleinfelder.com>  
**Sent:** Friday, 11 March 2022 8:17 AM  
**To:** [redacted]@eurofins.com>  
**Subject:** Leachability - 869105

**CAUTION: EXTERNAL EMAIL - Sent from an email domain that is not formally trusted by Eurofins.**

Do not click on links or open attachments unless you recognise the sender and are certain that the content is safe.

Hi [redacted]

Can you run leachability for the following samples:

SPO2\_05 (lead)

SPO2\_06 (lead)

Can you complete on 3-day TAT – what is the minimum time required to run these tests?

Cheers,

[redacted]  
Environmental Scientist

Level 1, 95 Coventry St  
South Melbourne, VIC 3205

o| [redacted]  
d| [redacted]  
m| [redacted]

Ma14163 - QT742 - FD402  
Ma14164 - ↓ ↓



*This email may contain confidential information. If you have received this email—including any attachments—in error, please notify the sender promptly and delete the email and any attachments from all of your systems.*

**#AU\_CAU001\_EnviroSampleVic**

**From:** [redacted]@Kleinfelder.com>  
**Sent:** Friday, 11 March 2022 4:49 PM  
**To:** #AU\_CAU001\_EnviroSampleVic; [redacted]  
**Subject:** RE: Eurofins Sample Receipt Advice - Report 870354 : Site VEOLIA - HMAS HARMAN NAVAL BASE (20225461.001A)

↑  
add to report.

**CAUTION: EXTERNAL EMAIL** - Sent from an email domain that is not formally trusted by Eurofins.  
Do not click on links or open attachments unless you recognise the sender and are certain that the content is safe.

Hi [redacted]

Can you also add leachability analysis for:

SP02\_08 for nickel → M914166-47742-FD402

3 day TAT for this one too

Cheers,

**From:** [redacted]@eurofins.com <EnviroSampleVic@eurofins.com>  
**Sent:** Friday, 11 March 2022 10:38 AM  
**To:** [redacted]@Kleinfelder.com>  
**Subject:** Eurofins Sample Receipt Advice - Report 870354 : Site VEOLIA - HMAS HARMAN NAVAL BASE (20225461.001A)

External Email

Dear Valued Client,

Please find attached a Sample Receipt Advice (SRA), a Summary Sheet and a scanned copy of your Chain-of-Custody (COC). It is important that you check this documentation to ensure that the details are correct such as the Client Job Number, Turn Around Time, any comments in the Notes section and sample numbers as well as the requested analysis. If there are any irregularities then please contact your Eurofins | mgt Analytical Services Manager as soon as possible to make certain that they get changed.

Regards

**Sample Receipt**

**Eurofins Environment Testing**  
**6 Monterey Road Dandenong South VIC 3175**  
**AUSTRALIA**

870354

**Eurofins Environment Testing Australia Pty Ltd**

ABN: 50 005 085 521

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

**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

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PO Box 60 Wickham 2293  
Phone : +61 2 4968 8448  
NATA # 1261 Site # 25079

**Eurofins ARL Pty Ltd**

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NATA # 2377 Site # 2370

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**Christchurch**  
43 Detroit Drive  
Rolleston, Christchurch 7675  
Phone : 0800 856 450  
IANZ # 1290

## Sample Receipt Advice

**Company name:** Kleinfelder Australia Pty Ltd (VIC)  
**Contact name:** [REDACTED]  
**Project name:** VEOLIA - HMAS HARMAN NAVAL BASE  
**Project ID:** 20225461.001A  
**Turnaround time:** 3 Day  
**Date/Time received:** Mar 7, 2022 9:00 AM  
**Eurofins reference:** 869105

## Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 15 degrees Celsius.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

## Notes

## Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

**Harry Bacalis on phone : or by email: HarryBacalis@eurofins.com**

Results will be delivered electronically via email to Angelina Bosnjak - ABosnjak@kleinfelder.com.

*Note: A copy of these results will also be delivered to the general Kleinfelder Australia Pty Ltd (VIC) email address.*



Environment Testing

Kleinfelder Australia Pty Ltd (VIC)  
Level 1, 95 Coventry St  
South Melbourne  
VIC 3205



NATA Accredited  
Accreditation Number 1261  
Site Number 1254

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

Attention:

Report **869105-L**  
Project name **VEOLIA - HMAS HARMAN NAVAL BASE**  
Project ID **20225461.001A**  
Received Date **Mar 07, 2022**

Client Sample ID			SP02_02	SP02_04	SP02_07	SP02_09
Sample Matrix			AUS Leachate	AUS Leachate	AUS Leachate	AUS Leachate
Eurofins Sample No.			M22-Ma14174	M22-Ma14175	M22-Ma14176	M22-Ma14177
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
<b>AUS Leaching Procedure</b>						
Leachate Fluid <sup>C01</sup>		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	5.3	5.3	5.2	5.1
pH (Leachate fluid)	0.1	pH Units	5.0	5.0	5.0	5.0
pH (off)	0.1	pH Units	5.1	5.1	5.1	5.1
<b>Perfluoroalkyl carboxylic acids (PFCAs)</b>						
Perfluorobutanoic acid (PFBA) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
Perfluoropentanoic acid (PFPeA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorohexanoic acid (PFHxA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoroheptanoic acid (PFHpA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorooctanoic acid (PFOA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorononanoic acid (PFNA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorodecanoic acid (PFDA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoroundecanoic acid (PFUnDA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorododecanoic acid (PFDoDA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorotridecanoic acid (PFTTrDA) <sup>N15</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorotetradecanoic acid (PFTeDA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C4-PFBA (surr.)	1	%	113	112	109	105
13C5-PFPeA (surr.)	1	%	140	122	118	98
13C5-PFHxA (surr.)	1	%	98	92	89	85
13C4-PFHpA (surr.)	1	%	85	80	80	72
13C8-PFOA (surr.)	1	%	121	111	110	97
13C5-PFNA (surr.)	1	%	79	75	75	80
13C6-PFDA (surr.)	1	%	49	48	46	47
13C2-PFUnDA (surr.)	1	%	47	38	45	50
13C2-PFDoDA (surr.)	1	%	38	32	44	47
13C2-PFTeDA (surr.)	1	%	27	26	56	86
<b>Perfluoroalkyl sulfonamido substances</b>						
Perfluorooctane sulfonamide (FOSA) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05

Client Sample ID			SP02_02 AUS Leachate M22-Ma14174 Mar 02, 2022	SP02_04 AUS Leachate M22-Ma14175 Mar 02, 2022	SP02_07 AUS Leachate M22-Ma14176 Mar 02, 2022	SP02_09 AUS Leachate M22-Ma14177 Mar 02, 2022
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
<b>Perfluoroalkyl sulfonamido substances</b>						
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
13C8-FOSA (surr.)	1	%	72	69	64	63
D3-N-MeFOSA (surr.)	1	%	82	95	83	106
D5-N-EtFOSA (surr.)	1	%	116	140	124	170
D7-N-MeFOSE (surr.)	1	%	56	51	45	53
D9-N-EtFOSE (surr.)	1	%	53	50	45	54
D5-N-EtFOSAA (surr.)	1	%	22	33	11	10
D3-N-MeFOSAA (surr.)	1	%	10	12	13	18
<b>Perfluoroalkyl sulfonic acids (PFASs)</b>						
Perfluorobutanesulfonic acid (PFBS) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorononanesulfonic acid (PFNS) <sup>N15</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS) <sup>N15</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoropentanesulfonic acid (PFPeS) <sup>N15</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorohexanesulfonic acid (PFHxS) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) <sup>N15</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorooctanesulfonic acid (PFOS) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorodecanesulfonic acid (PFDS) <sup>N15</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	108	98	90	89
18O2-PFHxS (surr.)	1	%	85	83	82	75
13C8-PFOS (surr.)	1	%	67	51	54	53
<b>n:2 Fluorotelomer sulfonic acids (n:2 FTSA)</b>						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C2-4:2 FTSA (surr.)	1	%	90	103	100	95
13C2-6:2 FTSA (surr.)	1	%	51	74	75	72
13C2-8:2 FTSA (surr.)	1	%	117	164	129	154
13C2-10:2 FTSA (surr.)	1	%	39	58	70	78
<b>PFASs Summations</b>						
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
Sum of PFASs (n=30)*	0.1	ug/L	< 0.1	< 0.1	< 0.1	< 0.1

**Sample History**

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

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

Description	Testing Site	Extracted	Holding Time
AUS Leaching Procedure			
pH (initial) - Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes	Melbourne	Mar 08, 2022	0 Days
pH (Leachate fluid) - Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes	Melbourne	Mar 08, 2022	0 Days
pH (off) - Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes	Melbourne	Mar 08, 2022	0 Days
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 08, 2022	28 Days
Perfluoroalkyl sulfonamido substances - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 08, 2022	28 Days
Perfluoroalkyl sulfonic acids (PFASs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 08, 2022	28 Days
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 08, 2022	28 Days
PFASs Summations - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 07, 2022	



Environment Testing

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NATA # 1261 Site # 25079

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**Christchurch**  
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Phone : 0800 856 450  
IANZ # 1290

**Company Name:** Kleinfelder Australia Pty Ltd (VIC)  
**Address:** Level 1, 95 Coventry St  
South Melbourne  
VIC 3205  
**Project Name:** VEOLIA - HMAS HARMAN NAVAL BASE  
**Project ID:** 20225461.001A

**Order No.:**  
**Report #:** 869105  
**Phone:** 03 9907 6000  
**Fax:** 03 9907 6001

**Received:** Mar 7, 2022 9:00 AM  
**Due:** Mar 10, 2022  
**Priority:** 3 Day  
**Contact Name:** [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail						HOLD	Polycyclic Aromatic Hydrocarbons	AUS Leaching Procedure	Metals M8	BTEX and Naphthalene	Moisture Set	Total Recoverable Hydrocarbons	Per- and Polyfluoroalkyl Substances (PFASs)
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>						X	X	X	X	X	X	X	X
<b>Sydney Laboratory - NATA # 1261 Site # 18217</b>													
<b>Brisbane Laboratory - NATA # 1261 Site # 20794</b>													
<b>Mayfield Laboratory - NATA # 1261 Site # 25079</b>													
<b>Perth Laboratory - NATA # 2377 Site # 2370</b>													
<b>External Laboratory</b>													
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID								
1	SP02_01	Mar 02, 2022		Soil	M22-Ma14159	X	X	X	X	X	X	X	
2	SP02_02	Mar 02, 2022		Soil	M22-Ma14160	X	X	X	X	X	X	X	
3	SP02_03	Mar 02, 2022		Soil	M22-Ma14161	X	X	X	X	X	X	X	
4	SP02_04	Mar 02, 2022		Soil	M22-Ma14162	X	X	X	X	X	X	X	
5	SP02_05	Mar 02, 2022		Soil	M22-Ma14163	X	X	X	X	X	X	X	
6	SP02_06	Mar 02, 2022		Soil	M22-Ma14164	X	X	X	X	X	X	X	
7	SP02_07	Mar 02, 2022		Soil	M22-Ma14165	X	X	X	X	X	X	X	
8	SP02_08	Mar 02, 2022		Soil	M22-Ma14166	X	X	X	X	X	X	X	
9	SP02_09	Mar 02, 2022		Soil	M22-Ma14167	X	X	X	X	X	X	X	



Environment Testing

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<b>Melbourne</b> 6 Monterey Road Dandenong South VIC 3175 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254	<b>Sydney</b> Unit F3, Building F 16 Mars Road Lane Cove West NSW 2066 Phone : +61 2 9900 8400 NATA # 1261 Site # 18217	<b>Brisbane</b> 1/21 Smallwood Place Murarrie QLD 4172 Phone : +61 7 3902 4600 NATA # 1261 Site # 20794	<b>Newcastle</b> 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448 NATA # 1261 Site # 25079
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<b>Company Name:</b> Kleinfelder Australia Pty Ltd (VIC)	<b>Order No.:</b>	<b>Received:</b> Mar 7, 2022 9:00 AM
<b>Address:</b> Level 1, 95 Coventry St South Melbourne VIC 3205	<b>Report #:</b> 869105	<b>Due:</b> Mar 10, 2022
<b>Project Name:</b> VEOLIA - HMAS HARMAN NAVAL BASE	<b>Phone:</b> 03 9907 6000	<b>Priority:</b> 3 Day
<b>Project ID:</b> 20225461.001A	<b>Fax:</b> 03 9907 6001	<b>Contact Name:</b> [REDACTED]
<b>Eurofins Analytical Services Manager :</b> [REDACTED]		

Sample Detail						HOLD	Polycyclic Aromatic Hydrocarbons	AUS Leaching Procedure	Metals M8	BTEX and Naphthalene	Moisture Set	Total Recoverable Hydrocarbons	Per- and Polyfluoroalkyl Substances (PFASs)
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>						X	X	X	X	X	X	X	X
<b>Sydney Laboratory - NATA # 1261 Site # 18217</b>													
<b>Brisbane Laboratory - NATA # 1261 Site # 20794</b>													
<b>Mayfield Laboratory - NATA # 1261 Site # 25079</b>													
<b>Perth Laboratory - NATA # 2377 Site # 2370</b>													
<b>External Laboratory</b>													
10	SP02_10	Mar 02, 2022		Soil	M22-Ma14168		X		X	X	X	X	
11	SP02_11	Mar 02, 2022		Soil	M22-Ma14169	X							
12	SP02_12	Mar 02, 2022		Soil	M22-Ma14170	X							
13	QC01	Mar 02, 2022		Soil	M22-Ma14171		X		X	X	X	X	
14	QC02	Mar 02, 2022		Soil	M22-Ma14172	X							
15	QC05	Mar 02, 2022		Water	M22-Ma14173				X		X		
16	SP02_02	Mar 02, 2022		AUS Leachate	M22-Ma14174			X					X
17	SP02_04	Mar 02, 2022		AUS Leachate	M22-Ma14175			X					X
18	SP02_07	Mar 02, 2022		AUS Leachate	M22-Ma14176			X					X
19	SP02_09	Mar 02, 2022		AUS Leachate	M22-Ma14177			X					X
<b>Test Counts</b>						3	11	4	11	12	11	12	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.

### Units

**mg/kg:** milligrams per kilogram

**mg/L:** milligrams per litre

**µg/L:** micrograms per litre

**ppm:** parts per million

**ppb:** parts per billion

**%:** Percentage

**org/100 mL:** Organisms per 100 millilitres

**NTU:** Nephelometric Turbidity Units

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

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	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.
<b>NCP</b>	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.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

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

Results <10 times the LOR: No Limit

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

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

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

### 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. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Perfluoroalkyl carboxylic acids (PFCAs)</b>				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M22-Ma14174	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
<b>Duplicate</b>									
<b>Perfluoroalkyl sulfonamido substances</b>				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	M22-Ma14174	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-Ma14174	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-Ma14174	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	M22-Ma14174	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	M22-Ma14174	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-Ma14174	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-Ma14174	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
<b>Duplicate</b>									
<b>Perfluoroalkyl sulfonic acids (PFSAs)</b>				Result 1	Result 2	RPD			
Perfluorobutanesulfonic acid (PFBS)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanesulfonic acid (PFNS)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanesulfonic acid (PFDS)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	M22-Ma14174	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-Ma14174	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

**Comments**

Eurofins | Environment Testing accreditation number 1261, site 18217 is currently in progress of a controlled transition to a new custom built location at 179 Magowar Road, Girraween, NSW 2145. All results on this report denoted as being performed by Eurofins | Environment Testing Unit F3, Building F, 16 Mars road, Lane Cove West, NSW 2066, corporate site 18217, will have been performed on either Lane Cove or new Girraween site

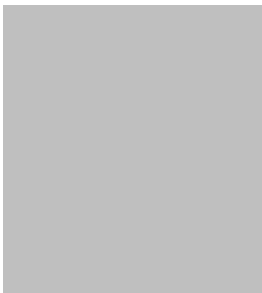
**Sample Integrity**

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
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

**Authorised by:**



Analytical Services Manager  
Senior Analyst-PFAS (VIC)

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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Environment Testing

Kleinfelder Australia Pty Ltd (VIC)  
Level 1, 95 Coventry St  
South Melbourne  
VIC 3205



NATA Accredited  
Accreditation Number 1261  
Site Number 1254

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

Attention:

Report **869105-S**  
Project name **VEOLIA - HMAS HARMAN NAVAL BASE**  
Project ID **20225461.001A**  
Received Date **Mar 07, 2022**

Client Sample ID			SP02_01	SP02_02	SP02_03	SP02_04
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-Ma14159	M22-Ma14160	M22-Ma14161	M22-Ma14162
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons</b>						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	69	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	150	81	71	< 50
TRH C10-C36 (Total)	50	mg/kg	219	81	71	< 50
Naphthalene <sup>N02</sup>	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	150	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	170	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	320	< 100	< 100	< 100
<b>BTEX</b>						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	82	84	84	84
<b>Polycyclic Aromatic Hydrocarbons</b>						
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	0.7	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.3	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	0.8	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene <sup>N07</sup>	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	0.6	< 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	0.6	< 0.5
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			SP02_01	SP02_02	SP02_03	SP02_04
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-Ma14159	M22-Ma14160	M22-Ma14161	M22-Ma14162
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons</b>						
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	0.6	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 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	0.5	< 0.5	2.6	< 0.5
2-Fluorobiphenyl (surr.)	1	%	107	57	72	80
p-Terphenyl-d14 (surr.)	1	%	84	140	116	128
<b>Heavy Metals</b>						
Arsenic	2	mg/kg	6.2	4.0	6.7	7.5
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	1.1
Chromium	5	mg/kg	38	22	48	52
Copper	5	mg/kg	18	13	19	20
Lead	5	mg/kg	39	37	17	67
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	13	8.1	11	13
Zinc	5	mg/kg	36	41	28	81
<b>% Moisture</b>						
	1	%	15	11	12	12
<b>Perfluoroalkyl carboxylic acids (PFCAs)</b>						
Perfluorobutanoic acid (PFBA) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
Perfluoropentanoic acid (PFPeA) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
Perfluorohexanoic acid (PFHxA) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
Perfluoroheptanoic acid (PFHpA) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
Perfluorooctanoic acid (PFOA) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
Perfluorononanoic acid (PFNA) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
Perfluorodecanoic acid (PFDA) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
Perfluoroundecanoic acid (PFUnDA) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
Perfluorododecanoic acid (PFDoDA) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
Perfluorotridecanoic acid (PFTrDA) <sup>N15</sup>	5	ug/kg	-	< 5	-	< 5
Perfluorotetradecanoic acid (PFTeDA) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
13C4-PFBA (surr.)	1	%	-	96	-	102
13C5-PFPeA (surr.)	1	%	-	131	-	86
13C5-PFHxA (surr.)	1	%	-	97	-	95
13C4-PFHpA (surr.)	1	%	-	93	-	94
13C8-PFOA (surr.)	1	%	-	102	-	109
13C5-PFNA (surr.)	1	%	-	90	-	75
13C6-PFDA (surr.)	1	%	-	105	-	94
13C2-PFUnDA (surr.)	1	%	-	125	-	133
13C2-PFDoDA (surr.)	1	%	-	112	-	109
13C2-PFTeDA (surr.)	1	%	-	105	-	107
<b>Perfluoroalkyl sulfonamido substances</b>						
Perfluorooctane sulfonamide (FOSA) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5

Client Sample ID			SP02_01	SP02_02	SP02_03	SP02_04
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-Ma14159	M22-Ma14160	M22-Ma14161	M22-Ma14162
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
<b>Perfluoroalkyl sulfonamido substances</b>						
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) <sup>N11</sup>	10	ug/kg	-	< 10	-	< 10
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) <sup>N11</sup>	10	ug/kg	-	< 10	-	< 10
13C8-FOSA (surr.)	1	%	-	109	-	104
D3-N-MeFOSA (surr.)	1	%	-	102	-	105
D5-N-EtFOSA (surr.)	1	%	-	102	-	107
D7-N-MeFOSE (surr.)	1	%	-	89	-	124
D9-N-EtFOSE (surr.)	1	%	-	99	-	103
D5-N-EtFOSAA (surr.)	1	%	-	100	-	118
D3-N-MeFOSAA (surr.)	1	%	-	94	-	111
<b>Perfluoroalkyl sulfonic acids (PFASs)</b>						
Perfluorobutanesulfonic acid (PFBS) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
Perfluorononanesulfonic acid (PFNS) <sup>N15</sup>	5	ug/kg	-	< 5	-	< 5
Perfluoropropanesulfonic acid (PFPrS) <sup>N15</sup>	5	ug/kg	-	< 5	-	< 5
Perfluoropentanesulfonic acid (PFPeS) <sup>N15</sup>	5	ug/kg	-	< 5	-	< 5
Perfluorohexanesulfonic acid (PFHxS) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
Perfluoroheptanesulfonic acid (PFHpS) <sup>N15</sup>	5	ug/kg	-	< 5	-	< 5
Perfluorooctanesulfonic acid (PFOS) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
Perfluorodecanesulfonic acid (PFDS) <sup>N15</sup>	5	ug/kg	-	< 5	-	< 5
13C3-PFBS (surr.)	1	%	-	104	-	97
18O2-PFHxS (surr.)	1	%	-	105	-	91
13C8-PFOS (surr.)	1	%	-	82	-	89
<b>n:2 Fluorotelomer sulfonic acids (n:2 FTSA)</b>						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) <sup>N11</sup>	10	ug/kg	-	< 10	-	< 10
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) <sup>N11</sup>	5	ug/kg	-	< 5	-	< 5
13C2-4:2 FTSA (surr.)	1	%	-	101	-	96
13C2-6:2 FTSA (surr.)	1	%	-	112	-	106
13C2-8:2 FTSA (surr.)	1	%	-	94	-	86
13C2-10:2 FTSA (surr.)	1	%	-	90	-	113
<b>PFASs Summations</b>						
Sum (PFHxS + PFOS)*	5	ug/kg	-	< 5	-	< 5
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	-	< 5	-	< 5
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	-	< 5	-	< 5
Sum of WA DWER PFAS (n=10)*	10	ug/kg	-	< 10	-	< 10
Sum of PFASs (n=30)*	50	ug/kg	-	< 50	-	< 50

Client Sample ID			SP02_05	SP02_06	SP02_07	SP02_08
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-Ma14163	M22-Ma14164	M22-Ma14165	M22-Ma14166
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons</b>						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	67	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	67	< 50
Naphthalene <sup>N02</sup>	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
<b>BTEX</b>						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	80	79	78	80
<b>Polycyclic Aromatic Hydrocarbons</b>						
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 <sup>N07</sup>	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	< 0.5	< 0.5	< 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	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	80	69	81	86
p-Terphenyl-d14 (surr.)	1	%	120	127	136	132
<b>Heavy Metals</b>						
Arsenic	2	mg/kg	6.4	5.5	4.1	11
Cadmium	0.4	mg/kg	5.1	2.3	< 0.4	< 0.4
Chromium	5	mg/kg	52	33	36	81
Copper	5	mg/kg	22	18	14	33

Client Sample ID			SP02_05	SP02_06	SP02_07	SP02_08
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-Ma14163	M22-Ma14164	M22-Ma14165	M22-Ma14166
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
<b>Heavy Metals</b>						
Lead	5	mg/kg	210	540	15	41
Mercury	0.1	mg/kg	< 0.1	0.1	< 0.1	< 0.1
Nickel	5	mg/kg	11	10	28	45
Zinc	5	mg/kg	290	370	28	22
<b>% Moisture</b>						
% Moisture	1	%	9.3	14	9.8	12
<b>Perfluoroalkyl carboxylic acids (PFCAs)</b>						
Perfluorobutanoic acid (PFBA) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
Perfluoropentanoic acid (PFPeA) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
Perfluorohexanoic acid (PFHxA) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
Perfluoroheptanoic acid (PFHpA) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
Perfluorooctanoic acid (PFOA) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
Perfluorononanoic acid (PFNA) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
Perfluorodecanoic acid (PFDA) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
Perfluoroundecanoic acid (PFUnDA) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
Perfluorododecanoic acid (PFDoDA) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
Perfluorotridecanoic acid (PFTrDA) <sup>N15</sup>	5	ug/kg	-	-	< 5	-
Perfluorotetradecanoic acid (PFTeDA) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
13C4-PFBA (surr.)	1	%	-	-	85	-
13C5-PFPeA (surr.)	1	%	-	-	114	-
13C5-PFHxA (surr.)	1	%	-	-	82	-
13C4-PFHpA (surr.)	1	%	-	-	84	-
13C8-PFOA (surr.)	1	%	-	-	93	-
13C5-PFNA (surr.)	1	%	-	-	74	-
13C6-PFDA (surr.)	1	%	-	-	88	-
13C2-PFUnDA (surr.)	1	%	-	-	106	-
13C2-PFDoDA (surr.)	1	%	-	-	94	-
13C2-PFTeDA (surr.)	1	%	-	-	88	-
<b>Perfluoroalkyl sulfonamido substances</b>						
Perfluorooctane sulfonamide (FOSA) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) <sup>N11</sup>	10	ug/kg	-	-	< 10	-
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) <sup>N11</sup>	10	ug/kg	-	-	< 10	-
13C8-FOSA (surr.)	1	%	-	-	93	-
D3-N-MeFOSA (surr.)	1	%	-	-	90	-
D5-N-EtFOSA (surr.)	1	%	-	-	87	-
D7-N-MeFOSE (surr.)	1	%	-	-	90	-
D9-N-EtFOSE (surr.)	1	%	-	-	86	-
D5-N-EtFOSAA (surr.)	1	%	-	-	75	-
D3-N-MeFOSAA (surr.)	1	%	-	-	78	-

Client Sample ID			SP02_05	SP02_06	SP02_07	SP02_08
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M22-Ma14163	M22-Ma14164	M22-Ma14165	M22-Ma14166
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit				
<b>Perfluoroalkyl sulfonic acids (PFSA)</b>						
Perfluorobutanesulfonic acid (PFBS) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
Perfluorononanesulfonic acid (PFNS) <sup>N15</sup>	5	ug/kg	-	-	< 5	-
Perfluoropropanesulfonic acid (PFPrS) <sup>N15</sup>	5	ug/kg	-	-	< 5	-
Perfluoropentanesulfonic acid (PFPeS) <sup>N15</sup>	5	ug/kg	-	-	< 5	-
Perfluorohexanesulfonic acid (PFHxS) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
Perfluoroheptanesulfonic acid (PFHpS) <sup>N15</sup>	5	ug/kg	-	-	< 5	-
Perfluorooctanesulfonic acid (PFOS) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
Perfluorodecanesulfonic acid (PFDS) <sup>N15</sup>	5	ug/kg	-	-	< 5	-
13C3-PFBS (surr.)	1	%	-	-	90	-
18O2-PFHxS (surr.)	1	%	-	-	71	-
13C8-PFOS (surr.)	1	%	-	-	88	-
<b>n:2 Fluorotelomer sulfonic acids (n:2 FTSA)</b>						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) <sup>N11</sup>	10	ug/kg	-	-	< 10	-
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) <sup>N11</sup>	5	ug/kg	-	-	< 5	-
13C2-4:2 FTSA (surr.)	1	%	-	-	83	-
13C2-6:2 FTSA (surr.)	1	%	-	-	89	-
13C2-8:2 FTSA (surr.)	1	%	-	-	70	-
13C2-10:2 FTSA (surr.)	1	%	-	-	88	-
<b>PFASs Summations</b>						
Sum (PFHxS + PFOS)*	5	ug/kg	-	-	< 5	-
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	-	-	< 5	-
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	-	-	< 5	-
Sum of WA DWER PFAS (n=10)*	10	ug/kg	-	-	< 10	-
Sum of PFASs (n=30)*	50	ug/kg	-	-	< 50	-

Client Sample ID			SP02_09	SP02_10	QC01
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M22-Ma14167	M22-Ma14168	M22-Ma14171
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit			
<b>Total Recoverable Hydrocarbons</b>					
TRH C6-C9	20	mg/kg	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	88
TRH C29-C36	50	mg/kg	140	84	250
TRH C10-C36 (Total)	50	mg/kg	140	84	338
Naphthalene <sup>N02</sup>	0.5	mg/kg	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	20	mg/kg	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	50	mg/kg	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	150	< 100	220
TRH >C34-C40	100	mg/kg	180	110	330
TRH >C10-C40 (total)*	100	mg/kg	330	110	550

Client Sample ID			SP02_09	SP02_10	QC01
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M22-Ma14167	M22-Ma14168	M22-Ma14171
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit			
<b>BTEX</b>					
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	83	91	98
<b>Polycyclic Aromatic Hydrocarbons</b>					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene <sup>N07</sup>	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	76	70	80
p-Terphenyl-d14 (surr.)	1	%	126	124	123
<b>Heavy Metals</b>					
Arsenic	2	mg/kg	6.1	6.1	5.5
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	51	30	44
Copper	5	mg/kg	17	21	16
Lead	5	mg/kg	54	30	26
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	9.9	9.5	13
Zinc	5	mg/kg	36	47	45
<b>% Moisture</b>					
	1	%	12	12	13
<b>Perfluoroalkyl carboxylic acids (PFCAs)</b>					
Perfluorobutanoic acid (PFBA) <sup>N11</sup>	5	ug/kg	< 5	-	-
Perfluoropentanoic acid (PFPeA) <sup>N11</sup>	5	ug/kg	< 5	-	-
Perfluorohexanoic acid (PFHxA) <sup>N11</sup>	5	ug/kg	< 5	-	-
Perfluoroheptanoic acid (PFHpA) <sup>N11</sup>	5	ug/kg	< 5	-	-
Perfluorooctanoic acid (PFOA) <sup>N11</sup>	5	ug/kg	< 5	-	-
Perfluorononanoic acid (PFNA) <sup>N11</sup>	5	ug/kg	< 5	-	-
Perfluorodecanoic acid (PFDA) <sup>N11</sup>	5	ug/kg	< 5	-	-

Client Sample ID			SP02_09	SP02_10	QC01
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M22-Ma14167	M22-Ma14168	M22-Ma14171
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit			
<b>Perfluoroalkyl carboxylic acids (PFCAs)</b>					
Perfluoroundecanoic acid (PFUnDA) <sup>N11</sup>	5	ug/kg	< 5	-	-
Perfluorododecanoic acid (PFDoDA) <sup>N11</sup>	5	ug/kg	< 5	-	-
Perfluorotridecanoic acid (PFTTrDA) <sup>N15</sup>	5	ug/kg	< 5	-	-
Perfluorotetradecanoic acid (PFTeDA) <sup>N11</sup>	5	ug/kg	< 5	-	-
13C4-PFBA (surr.)	1	%	105	-	-
13C5-PFPeA (surr.)	1	%	76	-	-
13C5-PFHxA (surr.)	1	%	97	-	-
13C4-PFHpA (surr.)	1	%	101	-	-
13C8-PFOA (surr.)	1	%	100	-	-
13C5-PFNA (surr.)	1	%	85	-	-
13C6-PFDA (surr.)	1	%	97	-	-
13C2-PFUnDA (surr.)	1	%	123	-	-
13C2-PFDoDA (surr.)	1	%	113	-	-
13C2-PFTeDA (surr.)	1	%	115	-	-
<b>Perfluoroalkyl sulfonamido substances</b>					
Perfluorooctane sulfonamide (FOSA) <sup>N11</sup>	5	ug/kg	< 5	-	-
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) <sup>N11</sup>	5	ug/kg	< 5	-	-
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) <sup>N11</sup>	5	ug/kg	< 5	-	-
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) <sup>N11</sup>	5	ug/kg	< 5	-	-
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) <sup>N11</sup>	5	ug/kg	< 5	-	-
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) <sup>N11</sup>	10	ug/kg	< 10	-	-
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) <sup>N11</sup>	10	ug/kg	< 10	-	-
13C8-FOSA (surr.)	1	%	112	-	-
D3-N-MeFOSA (surr.)	1	%	105	-	-
D5-N-EtFOSA (surr.)	1	%	110	-	-
D7-N-MeFOSE (surr.)	1	%	90	-	-
D9-N-EtFOSE (surr.)	1	%	113	-	-
D5-N-EtFOSAA (surr.)	1	%	102	-	-
D3-N-MeFOSAA (surr.)	1	%	97	-	-
<b>Perfluoroalkyl sulfonic acids (PFSA)</b>					
Perfluorobutanesulfonic acid (PFBS) <sup>N11</sup>	5	ug/kg	< 5	-	-
Perfluorononanesulfonic acid (PFNS) <sup>N15</sup>	5	ug/kg	< 5	-	-
Perfluoropropanesulfonic acid (PFPrS) <sup>N15</sup>	5	ug/kg	< 5	-	-
Perfluoropentanesulfonic acid (PFPeS) <sup>N15</sup>	5	ug/kg	< 5	-	-
Perfluorohexanesulfonic acid (PFHxS) <sup>N11</sup>	5	ug/kg	< 5	-	-
Perfluoroheptanesulfonic acid (PFHpS) <sup>N15</sup>	5	ug/kg	< 5	-	-
Perfluorooctanesulfonic acid (PFOS) <sup>N11</sup>	5	ug/kg	< 5	-	-
Perfluorodecanesulfonic acid (PFDS) <sup>N15</sup>	5	ug/kg	< 5	-	-
13C3-PFBS (surr.)	1	%	100	-	-
18O2-PFHxS (surr.)	1	%	92	-	-
13C8-PFOS (surr.)	1	%	95	-	-

Client Sample ID			SP02_09	SP02_10	QC01
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M22-Ma14167	M22-Ma14168	M22-Ma14171
Date Sampled			Mar 02, 2022	Mar 02, 2022	Mar 02, 2022
Test/Reference	LOR	Unit			
<b>n:2 Fluorotelomer sulfonic acids (n:2 FTSA)</b>					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) <sup>N11</sup>	5	ug/kg	< 5	-	-
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) <sup>N11</sup>	10	ug/kg	< 10	-	-
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) <sup>N11</sup>	5	ug/kg	< 5	-	-
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) <sup>N11</sup>	5	ug/kg	< 5	-	-
13C2-4:2 FTSA (surr.)	1	%	109	-	-
13C2-6:2 FTSA (surr.)	1	%	95	-	-
13C2-8:2 FTSA (surr.)	1	%	88	-	-
13C2-10:2 FTSA (surr.)	1	%	115	-	-
<b>PFASs Summations</b>					
Sum (PFHxS + PFOS)*	5	ug/kg	< 5	-	-
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	< 5	-	-
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	< 5	-	-
Sum of WA DWER PFAS (n=10)*	10	ug/kg	< 10	-	-
Sum of PFASs (n=30)*	50	ug/kg	< 50	-	-

**Sample History**

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

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

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Mar 08, 2022	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Mar 08, 2022	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Mar 08, 2022	14 Days
<b>BTEX and Naphthalene</b>			
<b>BTEX</b> - Method: LTM-ORG-2010 BTEX and Volatile TRH	Melbourne	Mar 08, 2022	14 Days
<b>Polycyclic Aromatic Hydrocarbons</b> - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Melbourne	Mar 08, 2022	14 Days
<b>Metals M8</b> - Method: - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Melbourne	Mar 08, 2022	28 Days
<b>% Moisture</b> - Method: LTM-GEN-7080 Moisture	Melbourne	Mar 07, 2022	14 Days
<b>Per- and Polyfluoroalkyl Substances (PFASs)</b>			
<b>Perfluoroalkyl carboxylic acids (PFCAs)</b> - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 08, 2022	28 Days
<b>Perfluoroalkyl sulfonamido substances</b> - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 08, 2022	28 Days
<b>Perfluoroalkyl sulfonic acids (PFSAs)</b> - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 08, 2022	28 Days
<b>n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)</b> - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 08, 2022	28 Days
<b>PFASs Summations</b> - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 07, 2022	



Environment Testing

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**Address:** Level 1, 95 Coventry St  
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**Project Name:** VEOLIA - HMAS HARMAN NAVAL BASE  
**Project ID:** 20225461.001A

**Order No.:**  
**Report #:** 869105  
**Phone:** 03 9907 6000  
**Fax:** 03 9907 6001

**Received:** Mar 7, 2022 9:00 AM  
**Due:** Mar 10, 2022  
**Priority:** 3 Day  
**Contact Name:** [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail						HOLD	Polycyclic Aromatic Hydrocarbons	AUS Leaching Procedure	Metals M8	BTEX and Naphthalene	Moisture Set	Total Recoverable Hydrocarbons	Per- and Polyfluoroalkyl Substances (PFASs)
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>						X	X	X	X	X	X	X	X
<b>Sydney Laboratory - NATA # 1261 Site # 18217</b>													
<b>Brisbane Laboratory - NATA # 1261 Site # 20794</b>													
<b>Mayfield Laboratory - NATA # 1261 Site # 25079</b>													
<b>Perth Laboratory - NATA # 2377 Site # 2370</b>													
<b>External Laboratory</b>													
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID								
1	SP02_01	Mar 02, 2022		Soil	M22-Ma14159	X	X	X	X	X	X	X	
2	SP02_02	Mar 02, 2022		Soil	M22-Ma14160	X	X	X	X	X	X	X	
3	SP02_03	Mar 02, 2022		Soil	M22-Ma14161	X	X	X	X	X	X	X	
4	SP02_04	Mar 02, 2022		Soil	M22-Ma14162	X	X	X	X	X	X	X	
5	SP02_05	Mar 02, 2022		Soil	M22-Ma14163	X	X	X	X	X	X	X	
6	SP02_06	Mar 02, 2022		Soil	M22-Ma14164	X	X	X	X	X	X	X	
7	SP02_07	Mar 02, 2022		Soil	M22-Ma14165	X	X	X	X	X	X	X	
8	SP02_08	Mar 02, 2022		Soil	M22-Ma14166	X	X	X	X	X	X	X	
9	SP02_09	Mar 02, 2022		Soil	M22-Ma14167	X	X	X	X	X	X	X	



Environment Testing

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<b>Company Name:</b>	Kleinfelder Australia Pty Ltd (VIC)	<b>Order No.:</b>		<b>Received:</b>	Mar 7, 2022 9:00 AM
<b>Address:</b>	Level 1, 95 Coventry St South Melbourne VIC 3205	<b>Report #:</b>	869105	<b>Due:</b>	Mar 10, 2022
<b>Project Name:</b>	VEOLIA - HMAS HARMAN NAVAL BASE	<b>Phone:</b>	03 9907 6000	<b>Priority:</b>	3 Day
<b>Project ID:</b>	20225461.001A	<b>Fax:</b>	03 9907 6001	<b>Contact Name:</b>	
				<b>Eurofins Analytical Services Manager :</b>	

Sample Detail						HOLD	Polycyclic Aromatic Hydrocarbons	AUS Leaching Procedure	Metals M8	BTEX and Naphthalene	Moisture Set	Total Recoverable Hydrocarbons	Per- and Polyfluoroalkyl Substances (PFASs)
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X
Sydney Laboratory - NATA # 1261 Site # 18217													
Brisbane Laboratory - NATA # 1261 Site # 20794													
Mayfield Laboratory - NATA # 1261 Site # 25079													
Perth Laboratory - NATA # 2377 Site # 2370													
External Laboratory													
10	SP02_10	Mar 02, 2022		Soil	M22-Ma14168		X		X	X	X	X	
11	SP02_11	Mar 02, 2022		Soil	M22-Ma14169	X							
12	SP02_12	Mar 02, 2022		Soil	M22-Ma14170	X							
13	QC01	Mar 02, 2022		Soil	M22-Ma14171		X		X	X	X	X	
14	QC02	Mar 02, 2022		Soil	M22-Ma14172	X							
15	QC05	Mar 02, 2022		Water	M22-Ma14173				X		X		
16	SP02_02	Mar 02, 2022		AUS Leachate	M22-Ma14174			X					X
17	SP02_04	Mar 02, 2022		AUS Leachate	M22-Ma14175			X					X
18	SP02_07	Mar 02, 2022		AUS Leachate	M22-Ma14176			X					X
19	SP02_09	Mar 02, 2022		AUS Leachate	M22-Ma14177			X					X
<b>Test Counts</b>						3	11	4	11	12	11	12	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.

### Units

**mg/kg:** milligrams per kilogram

**mg/L:** milligrams per litre

**µg/L:** micrograms per litre

**ppm:** parts per million

**ppb:** parts per billion

**%:** Percentage

**org/100 mL:** Organisms per 100 millilitres

**NTU:** Nephelometric Turbidity Units

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

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	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.
<b>NCP</b>	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.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

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

Results <10 times the LOR: No Limit

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

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

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

### 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. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

**Quality Control Results**

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons</b>							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
<b>Method Blank</b>							
<b>BTEX</b>							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
<b>Method Blank</b>							
<b>Polycyclic Aromatic Hydrocarbons</b>							
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	
<b>Method Blank</b>							
<b>Heavy Metals</b>							
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	
<b>Method Blank</b>							
<b>Perfluoroalkyl carboxylic acids (PFCAs)</b>							
Perfluorobutanoic acid (PFBA)	ug/kg	< 5			5	Pass	
Perfluoropentanoic acid (PFPeA)	ug/kg	< 5			5	Pass	
Perfluorohexanoic acid (PFHxA)	ug/kg	< 5			5	Pass	

Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Perfluoroheptanoic acid (PFHpA)	ug/kg	< 5		5	Pass	
Perfluorooctanoic acid (PFOA)	ug/kg	< 5		5	Pass	
Perfluorononanoic acid (PFNA)	ug/kg	< 5		5	Pass	
Perfluorodecanoic acid (PFDA)	ug/kg	< 5		5	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/kg	< 5		5	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/kg	< 5		5	Pass	
Perfluorotridecanoic acid (PFTrDA)	ug/kg	< 5		5	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/kg	< 5		5	Pass	
<b>Method Blank</b>						
<b>Perfluoroalkyl sulfonamido substances</b>						
Perfluorooctane sulfonamide (FOSA)	ug/kg	< 5		5	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/kg	< 5		5	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/kg	< 5		5	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	ug/kg	< 5		5	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	ug/kg	< 5		5	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/kg	< 10		10	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/kg	< 10		10	Pass	
<b>Method Blank</b>						
<b>Perfluoroalkyl sulfonic acids (PFSA's)</b>						
Perfluorobutanesulfonic acid (PFBS)	ug/kg	< 5		5	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/kg	< 5		5	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/kg	< 5		5	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/kg	< 5		5	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/kg	< 5		5	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/kg	< 5		5	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/kg	< 5		5	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/kg	< 5		5	Pass	
<b>Method Blank</b>						
<b>n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)</b>						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/kg	< 5		5	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	ug/kg	< 10		10	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/kg	< 5		5	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/kg	< 5		5	Pass	
<b>LCS - % Recovery</b>						
<b>Total Recoverable Hydrocarbons</b>						
TRH C6-C9	%	118		70-130	Pass	
TRH C10-C14	%	102		70-130	Pass	
Naphthalene	%	88		70-130	Pass	
TRH C6-C10	%	117		70-130	Pass	
TRH >C10-C16	%	98		70-130	Pass	
<b>LCS - % Recovery</b>						
<b>BTEX</b>						
Benzene	%	90		70-130	Pass	
Toluene	%	94		70-130	Pass	
Ethylbenzene	%	96		70-130	Pass	
m&p-Xylenes	%	101		70-130	Pass	
Xylenes - Total*	%	100		70-130	Pass	
<b>LCS - % Recovery</b>						
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	%	75		70-130	Pass	
Acenaphthylene	%	71		70-130	Pass	
Anthracene	%	70		70-130	Pass	
Benz(a)anthracene	%	77		70-130	Pass	
Benzo(a)pyrene	%	97		70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(b&j)fluoranthene	%	103			70-130	Pass	
Benzo(g,h,i)perylene	%	93			70-130	Pass	
Benzo(k)fluoranthene	%	83			70-130	Pass	
Chrysene	%	93			70-130	Pass	
Dibenz(a,h)anthracene	%	89			70-130	Pass	
Fluoranthene	%	71			70-130	Pass	
Fluorene	%	70			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	93			70-130	Pass	
Naphthalene	%	75			70-130	Pass	
Phenanthrene	%	97			70-130	Pass	
Pyrene	%	75			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Heavy Metals</b>							
Arsenic	%	94			80-120	Pass	
Cadmium	%	97			80-120	Pass	
Chromium	%	109			80-120	Pass	
Copper	%	101			80-120	Pass	
Lead	%	106			80-120	Pass	
Mercury	%	99			80-120	Pass	
Nickel	%	98			80-120	Pass	
Zinc	%	97			80-120	Pass	
<b>LCS - % Recovery</b>							
<b>Perfluoroalkyl carboxylic acids (PFCAs)</b>							
Perfluorobutanoic acid (PFBA)	%	92			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	69			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	81			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	81			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	99			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	72			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	69			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	99			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	97			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	75			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	54			50-150	Pass	
<b>LCS - % Recovery</b>							
<b>Perfluoroalkyl sulfonamido substances</b>							
Perfluorooctane sulfonamide (FOSA)	%	87			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	93			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	87			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	%	78			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	%	89			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	82			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	87			50-150	Pass	
<b>LCS - % Recovery</b>							
<b>Perfluoroalkyl sulfonic acids (PFSAs)</b>							
Perfluorobutanesulfonic acid (PFBS)	%	88			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	%	129			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	%	97			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	90			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	78			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	66			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	104			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	101			50-150	Pass	
<b>LCS - % Recovery</b>							

Test			Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>n:2 Fluorotelomer sulfonic acids (n:2 FTSA)</b>								
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	86		50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)			%	83		50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	79		50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	85		50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>								
<b>Polycyclic Aromatic Hydrocarbons</b>				Result 1				
Acenaphthene	M22-Ma13807	NCP	%	88		70-130	Pass	
Acenaphthylene	M22-Ma13807	NCP	%	84		70-130	Pass	
Anthracene	M22-Ma13807	NCP	%	85		70-130	Pass	
Benz(a)anthracene	M22-Ma13807	NCP	%	71		70-130	Pass	
Benzo(a)pyrene	M22-Ma13807	NCP	%	71		70-130	Pass	
Benzo(b&j)fluoranthene	M22-Ma13807	NCP	%	89		70-130	Pass	
Benzo(g,h,i)perylene	M22-Ma13807	NCP	%	96		70-130	Pass	
Benzo(k)fluoranthene	M22-Ma13807	NCP	%	83		70-130	Pass	
Chrysene	M22-Ma13807	NCP	%	92		70-130	Pass	
Dibenz(a,h)anthracene	M22-Ma13807	NCP	%	82		70-130	Pass	
Fluoranthene	M22-Ma13807	NCP	%	79		70-130	Pass	
Fluorene	M22-Ma13807	NCP	%	79		70-130	Pass	
Indeno(1,2,3-cd)pyrene	M22-Ma13807	NCP	%	89		70-130	Pass	
Naphthalene	M22-Ma13807	NCP	%	94		70-130	Pass	
Phenanthrene	M22-Ma13807	NCP	%	71		70-130	Pass	
Pyrene	M22-Ma13807	NCP	%	79		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Perfluoroalkyl carboxylic acids (PFCAs)</b>				Result 1				
Perfluorobutanoic acid (PFBA)	M22-Ma11633	NCP	%	102		50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M22-Ma11633	NCP	%	131		50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M22-Ma11633	NCP	%	88		50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M22-Ma11633	NCP	%	86		50-150	Pass	
Perfluorooctanoic acid (PFOA)	M22-Ma11633	NCP	%	102		50-150	Pass	
Perfluorononanoic acid (PFNA)	M22-Ma11633	NCP	%	80		50-150	Pass	
Perfluorodecanoic acid (PFDA)	M22-Ma11633	NCP	%	90		50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M22-Ma11633	NCP	%	117		50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M22-Ma11633	NCP	%	99		50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	M22-Ma11633	NCP	%	80		50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M22-Ma11633	NCP	%	63		50-150	Pass	
<b>Spike - % Recovery</b>								
<b>Perfluoroalkyl sulfonamido substances</b>				Result 1				
Perfluorooctane sulfonamide (FOSA)	M22-Ma11633	NCP	%	82		50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-Ma11633	NCP	%	95		50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-Ma11633	NCP	%	89		50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	M22-Ma11633	NCP	%	70		50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	M22-Ma11633	NCP	%	96		50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-Ma11633	NCP	%	91		50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-Ma11633	NCP	%	102		50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>								
<b>Perfluoroalkyl sulfonic acids (PFSA's)</b>				Result 1				
Perfluorobutanesulfonic acid (PFBS)	M22-Ma11633	NCP	%	94		50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M22-Ma11633	NCP	%	150		50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M22-Ma11633	NCP	%	103		50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M22-Ma11633	NCP	%	103		50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M22-Ma11633	NCP	%	98		50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M22-Ma11633	NCP	%	78		50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M22-Ma11633	NCP	%	90		50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M22-Ma11633	NCP	%	130		50-150	Pass	
<b>Spike - % Recovery</b>								
<b>n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)</b>				Result 1				
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-Ma11633	NCP	%	106		50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	M22-Ma11633	NCP	%	91		50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-Ma11633	NCP	%	97		50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-Ma11633	NCP	%	85		50-150	Pass	
<b>Spike - % Recovery</b>								
<b>Total Recoverable Hydrocarbons</b>				Result 1				
TRH C6-C9	M22-Ma14165	CP	%	99		70-130	Pass	
TRH C10-C14	M22-Ma14165	CP	%	95		70-130	Pass	
Naphthalene	M22-Ma14165	CP	%	100		70-130	Pass	
TRH C6-C10	M22-Ma14165	CP	%	97		70-130	Pass	
TRH >C10-C16	M22-Ma14165	CP	%	88		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>BTEX</b>				Result 1				
Benzene	M22-Ma14165	CP	%	84		70-130	Pass	
Toluene	M22-Ma14165	CP	%	83		70-130	Pass	
Ethylbenzene	M22-Ma14165	CP	%	80		70-130	Pass	
m&p-Xylenes	M22-Ma14165	CP	%	84		70-130	Pass	
o-Xylene	M22-Ma14165	CP	%	84		70-130	Pass	
Xylenes - Total*	M22-Ma14165	CP	%	84		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Heavy Metals</b>				Result 1				
Arsenic	M22-Ma14165	CP	%	91		75-125	Pass	
Cadmium	M22-Ma14165	CP	%	105		75-125	Pass	
Chromium	M22-Ma14165	CP	%	89		75-125	Pass	
Copper	M22-Ma14165	CP	%	95		75-125	Pass	
Lead	M22-Ma14165	CP	%	95		75-125	Pass	
Mercury	M22-Ma14165	CP	%	97		75-125	Pass	
Nickel	M22-Ma14165	CP	%	90		75-125	Pass	
Zinc	M22-Ma14165	CP	%	101		75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Polycyclic Aromatic Hydrocarbons</b>				Result 1	Result 2	RPD			
Acenaphthene	M22-Ma09657	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M22-Ma09657	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M22-Ma09657	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M22-Ma09657	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M22-Ma09657	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	M22-Ma09657	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g,h,i)perylene	M22-Ma09657	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M22-Ma09657	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	M22-Ma09657	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a,h)anthracene	M22-Ma09657	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M22-Ma09657	NCP	mg/kg	0.5	< 0.5	19	30%	Pass	
Fluorene	M22-Ma09657	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M22-Ma09657	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M22-Ma09657	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M22-Ma09657	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M22-Ma09657	NCP	mg/kg	0.6	< 0.5	16	30%	Pass	
<b>Duplicate</b>									
<b>Perfluoroalkyl carboxylic acids (PFCAs)</b>				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass	
<b>Duplicate</b>									
<b>Perfluoroalkyl sulfonamido substances</b>				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-Ma14162	CP	ug/kg	< 10	< 10	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-Ma14162	CP	ug/kg	< 10	< 10	<1	30%	Pass	

Duplicate				Result 1	Result 2	RPD		
<b>Perfluoroalkyl sulfonic acids (PFSA)</b>								
Perfluorobutanesulfonic acid (PFBS)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass
<b>Duplicate</b>								
<b>n:2 Fluorotelomer sulfonic acids (n:2 FTSA)</b>								
1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass
1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2 FTSA)	M22-Ma14162	CP	ug/kg	< 10	< 10	<1	30%	Pass
1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass
1H,1H,2H,2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-Ma14162	CP	ug/kg	< 5	< 5	<1	30%	Pass
<b>Duplicate</b>								
<b>Total Recoverable Hydrocarbons</b>								
TRH C6-C9	M22-Ma14164	CP	mg/kg	< 20	< 20	<1	30%	Pass
TRH C10-C14	M22-Ma14164	CP	mg/kg	< 20	< 20	<1	30%	Pass
TRH C15-C28	M22-Ma14164	CP	mg/kg	< 50	< 50	<1	30%	Pass
TRH C29-C36	M22-Ma14164	CP	mg/kg	< 50	< 50	<1	30%	Pass
Naphthalene	M22-Ma14164	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
TRH C6-C10	M22-Ma14164	CP	mg/kg	< 20	< 20	<1	30%	Pass
TRH >C10-C16	M22-Ma14164	CP	mg/kg	< 50	< 50	<1	30%	Pass
TRH >C16-C34	M22-Ma14164	CP	mg/kg	< 100	< 100	<1	30%	Pass
TRH >C34-C40	M22-Ma14164	CP	mg/kg	< 100	< 100	<1	30%	Pass
<b>Duplicate</b>								
<b>BTEX</b>								
Benzene	M22-Ma14164	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Toluene	M22-Ma14164	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Ethylbenzene	M22-Ma14164	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
m&p-Xylenes	M22-Ma14164	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
o-Xylene	M22-Ma14164	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Xylenes - Total*	M22-Ma14164	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass
<b>Duplicate</b>								
<b>Heavy Metals</b>								
Arsenic	M22-Ma14164	CP	mg/kg	5.5	4.9	11	30%	Pass
Chromium	M22-Ma14164	CP	mg/kg	33	34	5.0	30%	Pass
<b>Duplicate</b>								
				Result 1	Result 2	RPD		
% Moisture	M22-Ma14164	CP	%	14	15	5.0	30%	Pass

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M22-Ma14165	CP	mg/kg	4.1	4.2	2.0	30%	Pass	
Cadmium	M22-Ma14165	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	M22-Ma14165	CP	mg/kg	36	38	5.0	30%	Pass	
Copper	M22-Ma14165	CP	mg/kg	14	14	4.0	30%	Pass	
Lead	M22-Ma14165	CP	mg/kg	15	15	4.0	30%	Pass	
Mercury	M22-Ma14165	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	M22-Ma14165	CP	mg/kg	28	29	3.0	30%	Pass	
Zinc	M22-Ma14165	CP	mg/kg	28	29	5.0	30%	Pass	

### Comments

Eurofins | Environment Testing accreditation number 1261, site 18217 is currently in progress of a controlled transition to a new custom built location at 179 Magowar Road, Girraween, NSW 2145. All results on this report denoted as being performed by Eurofins | Environment Testing Unit F3, Building F, 16 Mars road, Lane Cove West, NSW 2066, corporate site 18217, will have been performed on either Lane Cove or new Girraween site

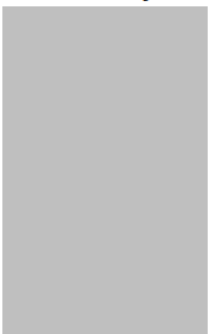
### Sample Integrity

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

### Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
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
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

### Authorised by:



Analytical Services Manager  
Senior Analyst-Volatile (VIC)  
Senior Analyst-Organic (VIC)  
Senior Analyst-Metal (VIC)  
Senior Analyst-PFAS (VIC)

### 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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Environment Testing

Kleinfelder Australia Pty Ltd (VIC)  
Level 1, 95 Coventry St  
South Melbourne  
VIC 3205



NATA Accredited  
Accreditation Number 1261  
Site Number 1254

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

Attention: [REDACTED]

Report **869105-W**  
Project name **VEOLIA - HMAS HARMAN NAVAL BASE**  
Project ID **20225461.001A**  
Received Date **Mar 07, 2022**

Client Sample ID	LOR	Unit	QC05 Water M22-Ma14173 Mar 02, 2022
Sample Matrix			
Eurofins Sample No.			
Date Sampled			
Test/Reference	LOR	Unit	
<b>Total Recoverable Hydrocarbons</b>			
TRH C6-C9	0.02	mg/L	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1
<b>BTEX</b>			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	85

### Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Mar 09, 2022	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Mar 08, 2022	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Mar 09, 2022	7 Days
<b>BTEX and Naphthalene</b> BTEX - Method: LTM-ORG-2010 BTEX and Volatile TRH	Melbourne	Mar 08, 2022	14 Days



Environment Testing

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Eurofins Environment Testing Australia Pty Ltd

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**Brisbane**  
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Rolleston, Christchurch 7675  
Phone : 0800 856 450  
IANZ # 1290

**Company Name:** Kleinfelder Australia Pty Ltd (VIC)  
**Address:** Level 1, 95 Coventry St  
South Melbourne  
VIC 3205  
**Project Name:** VEOLIA - HMAS HARMAN NAVAL BASE  
**Project ID:** 20225461.001A

**Order No.:**  
**Report #:** 869105  
**Phone:** 03 9907 6000  
**Fax:** 03 9907 6001

**Received:** Mar 7, 2022 9:00 AM  
**Due:** Mar 10, 2022  
**Priority:** 3 Day  
**Contact Name:** [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail						HOLD	Polycyclic Aromatic Hydrocarbons	AUS Leaching Procedure	Metals M8	BTEX and Naphthalene	Moisture Set	Total Recoverable Hydrocarbons	Per- and Polyfluoroalkyl Substances (PFASs)
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>						X	X	X	X	X	X	X	X
<b>Sydney Laboratory - NATA # 1261 Site # 18217</b>													
<b>Brisbane Laboratory - NATA # 1261 Site # 20794</b>													
<b>Mayfield Laboratory - NATA # 1261 Site # 25079</b>													
<b>Perth Laboratory - NATA # 2377 Site # 2370</b>													
<b>External Laboratory</b>													
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID								
1	SP02_01	Mar 02, 2022		Soil	M22-Ma14159	X	X	X	X	X	X	X	
2	SP02_02	Mar 02, 2022		Soil	M22-Ma14160	X	X	X	X	X	X	X	
3	SP02_03	Mar 02, 2022		Soil	M22-Ma14161	X	X	X	X	X	X	X	
4	SP02_04	Mar 02, 2022		Soil	M22-Ma14162	X	X	X	X	X	X	X	
5	SP02_05	Mar 02, 2022		Soil	M22-Ma14163	X	X	X	X	X	X	X	
6	SP02_06	Mar 02, 2022		Soil	M22-Ma14164	X	X	X	X	X	X	X	
7	SP02_07	Mar 02, 2022		Soil	M22-Ma14165	X	X	X	X	X	X	X	
8	SP02_08	Mar 02, 2022		Soil	M22-Ma14166	X	X	X	X	X	X	X	
9	SP02_09	Mar 02, 2022		Soil	M22-Ma14167	X	X	X	X	X	X	X	



Environment Testing

web: www.eurofins.com.au  
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Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

<b>Melbourne</b> 6 Monterey Road Dandenong South VIC 3175 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254	<b>Sydney</b> Unit F3, Building F 16 Mars Road Lane Cove West NSW 2066 Phone : +61 2 9900 8400 NATA # 1261 Site # 18217	<b>Brisbane</b> 1/21 Smallwood Place Murarrie QLD 4172 Phone : +61 7 3902 4600 NATA # 1261 Site # 20794	<b>Newcastle</b> 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448 NATA # 1261 Site # 25079
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Eurofins ARL Pty Ltd

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<b>Perth</b> 46-48 Banksia Road Welshpool WA 6106 Phone : +61 8 6253 4444 NATA # 2377 Site # 2370
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City and Environment Directorate  
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Eurofins Environment Testing NZ Limited

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--------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------

<b>Company Name:</b> Kleinfelder Australia Pty Ltd (VIC)	<b>Order No.:</b>	<b>Received:</b> Mar 7, 2022 9:00 AM
<b>Address:</b> Level 1, 95 Coventry St South Melbourne VIC 3205	<b>Report #:</b> 869105	<b>Due:</b> Mar 10, 2022
<b>Project Name:</b> VEOLIA - HMAS HARMAN NAVAL BASE	<b>Phone:</b> 03 9907 6000	<b>Priority:</b> 3 Day
<b>Project ID:</b> 20225461.001A	<b>Fax:</b> 03 9907 6001	<b>Contact Name:</b> [REDACTED]
<b>Eurofins Analytical Services Manager :</b> [REDACTED]		

Sample Detail						HOLD	Polycyclic Aromatic Hydrocarbons	AUS Leaching Procedure	Metals M8	BTEX and Naphthalene	Moisture Set	Total Recoverable Hydrocarbons	Per- and Polyfluoroalkyl Substances (PFASs)
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>						X	X	X	X	X	X	X	X
<b>Sydney Laboratory - NATA # 1261 Site # 18217</b>													
<b>Brisbane Laboratory - NATA # 1261 Site # 20794</b>													
<b>Mayfield Laboratory - NATA # 1261 Site # 25079</b>													
<b>Perth Laboratory - NATA # 2377 Site # 2370</b>													
<b>External Laboratory</b>													
10	SP02_10	Mar 02, 2022		Soil	M22-Ma14168		X		X	X	X	X	
11	SP02_11	Mar 02, 2022		Soil	M22-Ma14169	X							
12	SP02_12	Mar 02, 2022		Soil	M22-Ma14170	X							
13	QC01	Mar 02, 2022		Soil	M22-Ma14171		X		X	X	X	X	
14	QC02	Mar 02, 2022		Soil	M22-Ma14172	X							
15	QC05	Mar 02, 2022		Water	M22-Ma14173				X		X		
16	SP02_02	Mar 02, 2022		AUS Leachate	M22-Ma14174			X					X
17	SP02_04	Mar 02, 2022		AUS Leachate	M22-Ma14175			X					X
18	SP02_07	Mar 02, 2022		AUS Leachate	M22-Ma14176			X					X
19	SP02_09	Mar 02, 2022		AUS Leachate	M22-Ma14177			X					X
<b>Test Counts</b>						3	11	4	11	12	11	12	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.

### Units

**mg/kg:** milligrams per kilogram

**mg/L:** milligrams per litre

**µg/L:** micrograms per litre

**ppm:** parts per million

**ppb:** parts per billion

**%:** Percentage

**org/100 mL:** Organisms per 100 millilitres

**NTU:** Nephelometric Turbidity Units

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

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	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.
<b>NCP</b>	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.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

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

Results <10 times the LOR: No Limit

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

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

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

### 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. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

### Quality Control Results

Test			Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>								
<b>Total Recoverable Hydrocarbons</b>								
TRH C6-C9			mg/L	< 0.02		0.02	Pass	
TRH C10-C14			mg/L	< 0.05		0.05	Pass	
TRH C15-C28			mg/L	< 0.1		0.1	Pass	
TRH C29-C36			mg/L	< 0.1		0.1	Pass	
Naphthalene			mg/L	< 0.01		0.01	Pass	
TRH C6-C10			mg/L	< 0.02		0.02	Pass	
TRH >C10-C16			mg/L	< 0.05		0.05	Pass	
TRH >C16-C34			mg/L	< 0.1		0.1	Pass	
TRH >C34-C40			mg/L	< 0.1		0.1	Pass	
<b>Method Blank</b>								
<b>BTEX</b>								
Benzene			mg/L	< 0.001		0.001	Pass	
Toluene			mg/L	< 0.001		0.001	Pass	
Ethylbenzene			mg/L	< 0.001		0.001	Pass	
m&p-Xylenes			mg/L	< 0.002		0.002	Pass	
o-Xylene			mg/L	< 0.001		0.001	Pass	
Xylenes - Total*			mg/L	< 0.003		0.003	Pass	
<b>LCS - % Recovery</b>								
<b>Total Recoverable Hydrocarbons</b>								
TRH C6-C9			%	108		70-130	Pass	
TRH C10-C14			%	106		70-130	Pass	
Naphthalene			%	86		70-130	Pass	
TRH C6-C10			%	108		70-130	Pass	
TRH >C10-C16			%	109		70-130	Pass	
<b>LCS - % Recovery</b>								
<b>BTEX</b>								
Benzene			%	93		70-130	Pass	
Toluene			%	102		70-130	Pass	
Ethylbenzene			%	102		70-130	Pass	
m&p-Xylenes			%	102		70-130	Pass	
Xylenes - Total*			%	102		70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>								
<b>Total Recoverable Hydrocarbons</b>								
TRH C6-C9			M22-Ma16720	NCP	%	106	70-130	Pass
TRH C10-C14			B22-Ma13752	NCP	%	89	70-130	Pass
Naphthalene			M22-Ma16720	NCP	%	87	70-130	Pass
TRH C6-C10			M22-Ma16720	NCP	%	106	70-130	Pass
TRH >C10-C16			B22-Ma13752	NCP	%	90	70-130	Pass
<b>Spike - % Recovery</b>								
<b>BTEX</b>								
Benzene			M22-Ma16720	NCP	%	91	70-130	Pass
Toluene			M22-Ma16720	NCP	%	99	70-130	Pass
Ethylbenzene			M22-Ma16720	NCP	%	104	70-130	Pass
m&p-Xylenes			M22-Ma16720	NCP	%	101	70-130	Pass
o-Xylene			M22-Ma16720	NCP	%	102	70-130	Pass
Xylenes - Total*			M22-Ma16720	NCP	%	101	70-130	Pass

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Total Recoverable Hydrocarbons</b>				Result 1	Result 2	RPD			
TRH C6-C9	M22-Ma16719	NCP	mg/L	0.04	0.04	2.0	30%	Pass	
TRH C10-C14	B22-Ma12673	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	B22-Ma12673	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	B22-Ma12673	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Naphthalene	M22-Ma16719	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	M22-Ma16719	NCP	mg/L	0.04	0.04	1.0	30%	Pass	
TRH >C10-C16	B22-Ma12673	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	B22-Ma12673	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	B22-Ma12673	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
<b>Duplicate</b>									
<b>BTEX</b>				Result 1	Result 2	RPD			
Benzene	M22-Ma16719	NCP	mg/L	0.004	0.004	1.0	30%	Pass	
Toluene	M22-Ma16719	NCP	mg/L	0.012	0.012	<1	30%	Pass	
Ethylbenzene	M22-Ma16719	NCP	mg/L	0.002	0.002	<1	30%	Pass	
m&p-Xylenes	M22-Ma16719	NCP	mg/L	0.007	0.007	<1	30%	Pass	
o-Xylene	M22-Ma16719	NCP	mg/L	0.003	0.003	<1	30%	Pass	
Xylenes - Total*	M22-Ma16719	NCP	mg/L	0.011	0.011	<1	30%	Pass	

**Comments**

Eurofins | Environment Testing accreditation number 1261, site 18217 is currently in progress of a controlled transition to a new custom built location at 179 Magowar Road, Girraween, NSW 2145. All results on this report denoted as being performed by Eurofins | Environment Testing Unit F3, Building F, 16 Mars road, Lane Cove West, NSW 2066, corporate site 18217, will have been performed on either Lane Cove or new Girraween site

**Sample Integrity**

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

**Qualifier Codes/Comments**

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.

**Authorised by:**



Analytical Services Manager  
Senior Analyst-Volatile (VIC)  
Senior Analyst-Organic (VIC)

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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Environment Testing

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**Melbourne**  
6 Monterey Road  
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**Company Name:** Kleinfelder Australia Pty Ltd (VIC)  
**Address:** Level 1, 95 Coventry St  
South Melbourne  
VIC 3205  
**Project Name:** VEOLIA - HMAS HARMAN NAVAL BASE  
**Project ID:** 20225461.001A

**Order No.:**  
**Report #:** 869105  
**Phone:** 03 9907 6000  
**Fax:** 03 9907 6001

**Received:** Mar 7, 2022 9:00 AM  
**Due:** Mar 10, 2022  
**Priority:** 3 Day  
**Contact Name:** [REDACTED]

**Eurofins Analytical Services Manager:** [REDACTED]

Sample Detail						HOLD	Polycyclic Aromatic Hydrocarbons	AUS Leaching Procedure	Metals M8	BTEX and Naphthalene	Moisture Set	Total Recoverable Hydrocarbons	Per- and Polyfluoroalkyl Substances (PFASs)
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>						X	X	X	X	X	X	X	X
<b>Sydney Laboratory - NATA # 1261 Site # 18217</b>													
<b>Brisbane Laboratory - NATA # 1261 Site # 20794</b>													
<b>Mayfield Laboratory - NATA # 1261 Site # 25079</b>													
<b>Perth Laboratory - NATA # 2377 Site # 2370</b>													
<b>External Laboratory</b>													
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID								
1	SP02_01	Mar 02, 2022		Soil	M22-Ma14159		X	X	X	X	X	X	
2	SP02_02	Mar 02, 2022		Soil	M22-Ma14160		X	X	X	X	X	X	X
3	SP02_03	Mar 02, 2022		Soil	M22-Ma14161		X	X	X	X	X	X	
4	SP02_04	Mar 02, 2022		Soil	M22-Ma14162		X	X	X	X	X	X	X
5	SP02_05	Mar 02, 2022		Soil	M22-Ma14163		X	X	X	X	X	X	
6	SP02_06	Mar 02, 2022		Soil	M22-Ma14164		X	X	X	X	X	X	
7	SP02_07	Mar 02, 2022		Soil	M22-Ma14165		X	X	X	X	X	X	X
8	SP02_08	Mar 02, 2022		Soil	M22-Ma14166		X	X	X	X	X	X	
9	SP02_09	Mar 02, 2022		Soil	M22-Ma14167		X	X	X	X	X	X	X



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<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>						X	X	X	X	X	X	X	X
<b>Sydney Laboratory - NATA # 1261 Site # 18217</b>													
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<b>Perth Laboratory - NATA # 2377 Site # 2370</b>													
<b>External Laboratory</b>													
10	SP02_10	Mar 02, 2022		Soil	M22-Ma14168		X		X	X	X	X	
11	SP02_11	Mar 02, 2022		Soil	M22-Ma14169	X							
12	SP02_12	Mar 02, 2022		Soil	M22-Ma14170	X							
13	QC01	Mar 02, 2022		Soil	M22-Ma14171		X		X	X	X	X	
14	QC02	Mar 02, 2022		Soil	M22-Ma14172	X							
15	QC05	Mar 02, 2022		Water	M22-Ma14173				X		X		
16	SP02_02	Mar 02, 2022		AUS Leachate	M22-Ma14174			X					X
17	SP02_04	Mar 02, 2022		AUS Leachate	M22-Ma14175			X					X
18	SP02_07	Mar 02, 2022		AUS Leachate	M22-Ma14176			X					X
19	SP02_09	Mar 02, 2022		AUS Leachate	M22-Ma14177			X					X
<b>Test Counts</b>						3	11	4	11	12	11	12	8

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Page 1 of 1

COC number:



Client:		SITE, COC AND CONTACT DATA										Laboratory:							
Kleinfelder Australia Pty Ltd Level 1, 95 Coventry Street South Melbourne VIC 3205 Phone: 03 9907 6000		Site Name:	Veolia - HMAS Harman Naval Base							Sampler Name:	[REDACTED]			Eurofins mg					
		QUOTE NUMBER								Contact Number:				melbournelab@kleinfelder.com					
		Job No.:	20225461.001A							Contact e-mail:				Dandenong South					
		Required TAT:	24 hrs	48 hrs	3 days	5 days	7 days	PM name (if not sampler):	VIC 3175										
		Data QA level:	LAB minimum unless specified:							PM e-mail:				Phone: (03) 8564 5000 Fax: (03) 8564 5090					
CHAIN OF CUSTODY		Relinquished by (print):		Received by (print):		Relinquished:		Received by:		Send Results to:									
		Matt Kiraz (sign)						(sign)		Level 1, 95 Coventry Street South Melbourne, VIC 3206									
Date / Time:		Date / Time:		Date / Time:		Date / Time:		Temp. (°C)		melbournelab@kleinfelder.com									
Notes:		Notes:		Notes:		Notes:		Notes:		Phone: 03 9907 6000									
Sample ID	Lab ID	Sample Point	Sample Type	Date	Start Depth	End Depth	Units	# Containers	Organic Analytes				Metals			Other Analytes			Comments
									TRH/BTEXN & PAH	Metals (As, Cd, Cr, Cu, Hg, Ni, Pb, Zn)	PFAS (suite of 28 analytes)	PFAS (TC/LP/ASLP)	TRH/BTEXN	HOLD					
SP02_01			Soil	2/03/2022				2	X	X									Hold all samples including PFAS.
SP02_02			Soil	2/03/2022				2	X	X	X	X							
SP02_03			Soil	2/03/2022				2	X	X									
SP02_04			Soil	2/03/2022				2	X	X	X	X							
SP02_05			Soil	2/03/2022				2	X	X									
SP02_06			Soil	2/03/2022				2	X	X									
SP02_07			Soil	2/03/2022				2	X	X	X	X							
SP02_08			Soil	2/03/2022				2	X	X									
SP02_09			Soil	2/03/2022				2	X	X	X	X							
SP02_10			Soil	2/03/2022				2	X	X									
SP02_11			Soil	2/03/2022				1	X	X									
SP02_12			Soil	2/03/2022				1	X	X									
QC01			Soil	2/03/2022				2	X	X									
QC02			Soil	2/03/2022				2	X	X									
QC05			Water	2/03/2022				5		X			X						

#869105

07/03/22

**#AU\_CAU001\_EnviroSampleVic**

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**From:** [REDACTED]  
**Sent:** Friday, 4 March 2022 10:02 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED] #AU\_CAU001\_EnviroSampleVic  
**Subject:** RE: ACT COC  
**Attachments:** HMAS\_COC\_Stage\_2.xlsx; HMAS\_COC\_Stage\_3.xlsx; HMAS\_COC\_Stockpile.xlsx

**Follow Up Flag:** Flag for follow up  
**Flag Status:** Flagged

**INFO:** INTERNAL EMAIL - Sent from your own Eurofins email domain.

Thanks [REDACTED]

[REDACTED] COC's attached, let me know when these arrive.

Kind regards,

[REDACTED]

This e-mail including its attachments may contain confidential and proprietary information. Any unauthorized disclosure or use of this e-mail including its attachments is prohibited and may be prosecuted. If you are not the intended recipient, please inform the sender by an e-mail reply and delete the message. Transmission by e-mail is not secure and can result in errors or omissions in the content of the message. Despite state-of-the-art precautions we cannot guarantee that e-mails and attachments are free from viruses. We accept no liability for viruses or any transmission-related errors and omissions. You need to always virus-check any e-mails and attachments. Eurofins companies are independent legal entities that are bound only by members of their management bodies. No other persons have representation power unless specifically authorised by proxy or other legal means.

---

**From:** [REDACTED]@kleinfelder.com>  
**Sent:** Friday, 4 March 2022 9:44 AM  
**To:** [REDACTED]@eurofins.com>  
**Cc:** [REDACTED]@Kleinfelder.com>  
**Subject:** RE: ACT COC

**CAUTION:** EXTERNAL EMAIL - Sent from an email domain that is not formally trusted by Eurofins.

Do not click on links or open attachments unless you recognise the sender and are certain that the content is safe.

Hey [REDACTED]

Please find attached COC's for samples coming from ACT today.

And thank you, hopefully they arrive shortly.

Kind regards,

[REDACTED]  
Environmental Scientist

#869105  
[REDACTED]  
07/03/22

**#AU\_CAU001\_EnviroSampleVic**

**From:** [redacted] <[redacted]@kleinfelder.com>  
**Sent:** Monday, 7 March 2022 9:07 PM  
**To:** [redacted]  
**Cc:** Melbournelab; #AU\_CAU001\_EnviroSampleVic; Matt Kiraz  
**Subject:** RE: Eurofins Sample Receipt Advice - Report 869105 : Site VEOLIA - HMAS HARMAN NAVAL BASE (20225461.001A)

**Importance:** High

**CAUTION: EXTERNAL EMAIL** - Sent from an email domain that is not formally trusted by Eurofins.  
Do not click on links or open attachments unless you recognise the sender and are certain that the content is safe.

Hi [redacted]

Can you amend the following work order:

- SP02\_11: place sample on hold
- SP02\_12: place sample on hold
- QC02: place sample on hold

869105  
E7  
7/3/22

Analysis of SP02\_01 to SP02\_10 and QC01 need to be updated to include 8 metals and PAHs (i.e. TRH/BTEXN/PAH and 8 metals)  
Please apply analytical suite codes as per quote 220207KLFV-2

Additionally, these are to be analysed on a 3 day TAT.

Cheers,

**From:** EnviroSampleVic@eurofins.com <EnviroSampleVic@eurofins.com>  
**Sent:** Monday, 7 March 2022 8:23 PM  
**To:** [redacted] <[redacted]@kleinfelder.com>  
**Cc:** Melbournelab <MelbourneLab@kleinfelder.com>; [redacted] <[redacted]@kleinfelder.com>  
**Subject:** Eurofins Sample Receipt Advice - Report 869105 : Site VEOLIA - HMAS HARMAN NAVAL BASE (20225461.001A)

**External Email**

Dear Valued Client,

Please find attached a Sample Receipt Advice (SRA), a Summary Sheet and a scanned copy of your Chain-of-Custody (COC). It is important that you check this documentation to ensure that the details are correct such as the Client Job Number, Turn Around Time, any comments in the Notes section and sample numbers as well as the requested analysis. If there are any irregularities then please contact your Eurofins Analytical Services Manager as soon as possible to make certain that they get changed.

Kind Regards,



# ATTACHMENT 4: QA/QC ASSESSMENT



# QUALITY ASSURANCE

Soil samples were collected in laboratory supplied containers, placed on ice and transferred to the analytical laboratory using appropriate sample preservation methods (where required) with relevant COC documentation.

The laboratory Eurofins Environment Testing has NATA accreditation for the analytical testing employed. As part of the internal laboratory quality assurance program the laboratories verify the reported results by running reagent blanks, matrix and surrogate spikes, laboratory control samples, blanks and repeat duplicates with each analytical batch.

## FIELD QA/QC PROGRAM

### *Sample Management*

Sample management procedures were compliant with project specifications. All samples were received at the laboratory, extracted and analysed within the respective holding times.

### *Field QA/QC Samples*

Kleinfelder adopts a relative percent difference (RPD) acceptance criterion of up to 50% in accordance with AS4482.1. Where RPDs were incalculable due to one or more QC samples with contaminant concentrations less than laboratory LOR, the LOR value has been adopted to allow RPD calculation.

One soil duplicate was collected and analysed. RPDs were calculated and are provided in **Tables 7-9** (attached). One RPD exceedance was calculated:

- TRH >C<sub>34</sub>-C<sub>40</sub> – SP02\_01 (170 mg/kg), QC01 (330 mg/kg): adopt duplicate (QC01)

The RPD exceedance is likely the result of variations in analyte concentrations reported between the primary samples and duplicate samples (analysed by the same laboratory) as a result of inherent heterogeneity of soils.

### *Rinsate Blank*

One rinsate blank was collected and analysed to test the effectiveness of the decontamination process and to assess the potential cross-contamination during sampling. Analytical results for the rinsate blank analysed were below laboratory LORs (refer to **Table 10**, attached).

## LABORATORY QA/QC PROGRAM

### *Laboratory QA/QC Samples*

The internal laboratory QA program involves the checking that samples have been analysed within the specified holding times, that the samples were received in appropriate containers, the spiking of samples (matrix and surrogate), analysing laboratory control samples (certified standards), analysing laboratory duplicate samples and method blanks.

Overall a sufficient frequency of laboratory duplicates, laboratory control samples, matrix spikes and surrogate spikes were reported to assess the accuracy of the laboratory methods and potential bias due to matrix effects and extraction efficiency.

### *Laboratory Limits of Reporting*

The laboratory LOR are generally sufficiently low to enable assessment between results and adopted screening criteria

The ACT Government guideline value for benzo(a)pyrene for soil reuse (< 0.2 mg/kg) is lower than the standard laboratory LOR for benzo(a)pyrene (< 0.5 mg/kg) adopted in this investigation. All soil results reported in March 2022 were below the laboratory LOR adopted in this investigation.

### QA/QC CONCLUSIONS

Based on a review of the results for the Kleinfelder and laboratory QA/QC program adopted, the overall data quality is acceptable for interpretive use. Copies of the laboratory certificates of analysis, including internal QA/QC results and COC documentation for the primary and secondary laboratories inclusive of laboratory QA/QC outliers are contained in **Attachment 3**.



# ATTACHMENT 5: WASTE CLASSIFICATION LETTER





Classification of Soil for Off-site Disposal			
Prepared For:	Veolia Australia and New Zealand	Date:	21/03/2022
Project Name:	Soil Classification	Project Number:	20225461.001A
		Document Number	MLB22R137887
Site Address:	HMAS Harman Naval Base, ACT		

Site / Soil Information:	
Kleinfelder Australia Pty Ltd (Kleinfelder) was commissioned by Veolia Australia and New Zealand (Veolia) to classify a stockpile (SP02) at the HMAS Harman Naval Base, ACT for off-site disposal. Soil sampling was conducted on 2 March 2022.	
Soil Source:	Stockpiled soil from excavation of Yeeralee Road/Newman Crescent
Soil Description:	Mixture of sandy/silty clay (natural soils) and shale gravel (road-base material)
Reason for off-site disposal:	No beneficial reuse options are available on-site.
Samples collected:	<input type="checkbox"/> In-Situ <input checked="" type="checkbox"/> Stockpile: SP02
Volume of soil classified:	700 m <sup>3</sup>
Number of Samples Collected:	11
Sample IDs:	SP02_01, SP02_02, SP02_03, SP02_04, SP02_05, SP02_06, SP02_07, SP02_08, SP02_09, SP02_10, QC01
Laboratory Certificate(s):	869105-S, 869105-L and 870354-L (Eurofins)

Classification Details:	
Soil Classified As:	General solid waste (SCC1)
Classification Method	<input type="checkbox"/> 95% UCL <input checked="" type="checkbox"/> Highest Concentration
Classification Based on Analytes:	<p>Total lead concentrations reported in 2 soil samples (SP02_05 and SP02_06) exceeded ACT Government and NSW EPA General Solid Waste Criteria CT1 (100 mg/kg) but below ACT Government and NSW EPA General Solid Waste Criteria SCC1 (1,500 mg/kg). Leachable lead concentrations in SP02_05 and SP02_06 were reported below the ACT Government and NSW EPA General Solid Waste Criteria maximum leachable concentration (TCLP1).</p> <p>Total nickel concentrations reported in 1 soil sample (SP02_08) exceeded ACT Government and NSW EPA General Solid Waste Criteria CT1 (40 mg/kg) but below ACT Government and NSW EPA General Solid Waste Criteria SCC1 (1,050 mg/kg). Leachable nickel concentrations in SP02_08 were reported below the laboratory LOR.</p> <p>Total and leachable concentrations of PFAS including PFOS, PFOA and sum PFHxS+PFOS were reported below the laboratory limit of reporting and below the HEPA NEMP 2020 upper limits for unlined landfills in 4 soil samples selected for PFAS analysis (SP02_02, SP02_04, SP02_07 and SP02_09).</p> <p>Laboratory analytical results are presented in <b>Attachment 3</b>.</p>
Concentrations:	<p>SP02_05 - total lead (210 mg/kg), leachable lead (0.23 mg/L)</p> <p>SP02_06 - total lead (540 mg/kg), leachable lead (0.02 mg/L)</p> <p>SP02_08 - total nickel (45 mg/kg), leachable nickel (&lt; 0.01 mg/L)</p>

For further information, please contact me on the undersigned

Environmental Scientist  
@kleinfelder.com

**Attachments:**  
3 Laboratory Analytical Report



# ATTACHMENT 6: ACCEPTANCE LETTER – PIALIGO STONE QUARRY



3/31/22, 2:51 PM

Veolia Mail - Re: HMAS Harman, BRU acceptance request



@veolia.com>

## Re: HMAS Harman, BRU acceptance request

1 message

31 March 2022 at 14:49

To: "[REDACTED]@veolia.com>

Good afternoon [REDACTED]

Pialligo Stone Quarry would be happy to accept the material of approximately 700m3 from Block 2249 Jerrabomberra ACT if it meets the criteria from the EPA to be disposed of at our site - Block 1 section 26, Block 1 Section 25, Block 1 Section 24, Block 1 Section 23 and part of block 4 Section 18 Pialligo as per environmental authorisation number 1163.

Regards - [REDACTED]

On 31 Mar 2022, at 2:46 pm, [REDACTED]@veolia.com> wrote:

Hi [REDACTED]

We are requesting the disposal of materials at your site as offsite Beneficial Russe ( BRU).

can you please provide a letter of acceptance so we can append this to the final report.

the material is from

Block 2249

section: JERRABOMBERRA registered Rural ( please see the screenshot from ACTmapi)

The volume of material is estimated at 700m3

let me know if you require anything else

Kind regards



Remediation Project Manager

3/31/22, 2:51 PM

Veolia Mail - Re: HMAS Harman, BRU acceptance request

**VEOLIA AUSTRALIA AND NEW ZEALAND**

Mob.: [REDACTED]  
Email: [REDACTED]@veolia.com  
NSW Head Office  
Level 4, 65 Pirrama road / Pyrmont / NSW / Australia / 2009  
[www.veolia.com/anz](http://www.veolia.com/anz)

**From:** Heckenberg, Mark on behalf of Contaminated Sites  
**Sent:** Wednesday, 6 April 2022 5:04 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED]; Zhang, Jianmin; [REDACTED]  
**Subject:** RE: Offsite beneficial reuse application

OFFICIAL

Good morning [REDACTED]

Thank you for your email.

That would appear to be the case for reuse purposes for zinc and lead based on the 95%UCL calculations shown in the table below.

Regards

Mark Heckenberg | Assistant Director, Contaminated Sites

Email: [mark.heckenberg@act.gov.au](mailto:mark.heckenberg@act.gov.au)

Office of the Environment Protection Authority | Chief Minister Treasury and Economic Development Directorate | ACT Government  
480 Northbourne Avenue, Dickson ACT 2602 | GPO Box 158 Canberra ACT 2601 | [www.act.gov.au](http://www.act.gov.au)

---

**From:** [REDACTED]  
**Sent:** Tuesday, 5 April 2022 5:51 PM  
**To:** Contaminated Sites  
**Cc:** [REDACTED]; Zhang, Jianmin; [REDACTED]  
**Subject:** Re: Offsite beneficial reuse application

**CAUTION:** This email originated from outside of the ACT Government. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Hi Michael,

Thank you for the further clarification on these points. We have had our consultants look at the total metal concentrations in light of your last email.

We are particularly cognizant of your closing paragraph, *Please note where total concentrations of COPCs exceed Table 1 criteria by greater than 10% alternate disposal methods for the material must sought regardless of the leachate results*.

It appears that although the total metal 95% UCL and ASLP leachability extraction assessment would be an avenue for investigation, the total concentrations for Cadmium, Lead, Chromium and Zinc do appear to exceed 10% of the Table 1 criteria, for both individual samples and the 95% UCL<sub>average</sub> for the metal species.

Analyte	ACT EPA soil reuse criteria - max concentration (mg/kg)	Samples and concentrations exceeding ACT EPA max concentrations	Reported concentrations (mg/kg) - 95%UCL*	Samples and concentration exceeding 95% UCL*	Samples and concentration exceeding max ACT EPA soil reuse criteria (>10%)
---------	---------------------------------------------------------	-----------------------------------------------------------------	-------------------------------------------	----------------------------------------------	----------------------------------------------------------------------------

Cd	3.0	SP02_05 (5.1 mg/kg)	2.98	NIL	SP02_05 (5.1 mg/kg)
Cr (total)	50	SP02_04 (52 mg/kg) SP02_05 (52 mg/kg) SP02_08 (81 mg/kg) SP02_09 (51 mg/kg)	53	SP02_08 (81 mg/kg)	SP02_08 (81 mg/kg)
Pb <sup>#</sup>	100	SP02_05 (210 mg/kg) SP02_06 (540 mg/kg)	303	SP02_06 (540 mg/kg)	SP02_05 (210 mg/kg) SP02_06 (540 mg/kg)
Zn	200	SP02_05 (290 mg/kg) SP02_06 (370 mg/kg)	250	SP02_05 (290 mg/kg) SP02_06 (370 mg/kg)	SP02_05 (290 mg/kg) SP02_06 (370 mg/kg)

# Pb leachability was previously completed for SP02\_05 and SP02\_06 based on exceedances of NSW general solid waste CT1 criteria

With this in consideration, regardless of the additional requested PFAS data, it would seem that the further investigation and rewrite of the soil classification letter report for SP02 material would seem like a fruitless exercise.

Would I be right in assuming that based on the heavy metal information alone, approval for the material as beneficial reuse would most likely not be granted based on the total metal concentrations and alternative disposal options should be assessed? If so, we will proceed with finding an offsite disposal method rather than offsite beneficial reuse within the ACT.

I appreciate your help in the matter.

Kind regards

  
Remediation Project Manager  
VEOLIA AUSTRALIA AND NEW ZEALAND

Mob.:   
Email: @veolia.com  
NSW Head Office  
Level 4, 65 Pirrama road / Pyrmont / NSW / Australia / 2009  
[www.veolia.com/anz](http://www.veolia.com/anz)

On Tue, 5 Apr 2022 at 15:35, Contaminated Sites <[ContaminatedSites@act.gov.au](mailto:ContaminatedSites@act.gov.au)> wrote:

OFFICIAL

Dear [REDACTED],

Thank you for your email and responses to the Office of the Environment Protection Authority's comments.

Please see responses to your questions below:

Where PFAS has been identified as a COPC all samples must be analysed. Where a suitably sensitive analytical method has been used and non-detect levels of PFAS are identified leachate testing is not required.

The EPA Victoria guidance titled *Industrial Waste Resource Guidelines IWRG 702 – Soil Sampling* dated June 2009 “recommends a minimum of ten samples for 95%UCL<sub>average</sub> calculation”, therefore the number of samples analysed (10) for a stockpile of 700 cubic metres only just satisfies the requirements of this guidance.

When assessing a material's suitability for reuse in the ACT assessment must be made against the criteria contained in Table 1 of [Information Sheet 4 - Requirements for the reuse and disposal of contaminated soil in the ACT](#). Criteria from the National Environment Protection Council, *National Environment Protection (Assessment of Site Contamination) Measure 1999* do not apply.

Where minor exceedences of criteria (no greater than criteria + 10%) are identified ASLP should be undertaken to demonstrate the contaminant is not leachable. To determine appropriate leachate assessment criteria the most sensitive criteria from the [Environment Protection Regulation 2005](#) for the catchment of the receiving environment applies. The catchment of the receiving environment can be ascertained from the [Water Use and Catchment General Code](#) from the *ACT Territory Plan 2008*.

Where leachability testing is required a minimum of 25% of the samples must be analysed, with analysis undertaken on those samples with the highest total concentrations.

Please note where total concentrations of COPCs exceed Table 1 criteria by greater than 10% alternate disposal methods for the material must sought regardless of the leachate results.

Regards

Mark Heckenberg | Assistant Director, Contaminated Sites

Email: [mark.heckenberg@act.gov.au](mailto:mark.heckenberg@act.gov.au)

Office of the Environment Protection Authority | Chief Minister Treasury and Economic Development Directorate | ACT Government

480 Northbourne Avenue, Dickson ACT 2602 | GPO Box 158 Canberra ACT 2601 | [www.act.gov.au](http://www.act.gov.au)

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**From:** [REDACTED] <[\[REDACTED\]@veolia.com](mailto:[REDACTED]@veolia.com)>

**Sent:** Tuesday, 5 April 2022 2:42 PM

**To:** Contaminated Sites <[ContaminatedSites@act.gov.au](mailto:ContaminatedSites@act.gov.au)>

**Cc:** [REDACTED] Zhang, Jianmin <[Jianmin.Zhang@act.gov.au](mailto:Jianmin.Zhang@act.gov.au)>; [REDACTED]

**Subject:** Re: Offsite beneficial reuse application

**CAUTION:** This email originated from outside of the ACT Government. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Hi Michael and Janmin

Thankyou for the response, I have my consultant preparing an updated Beneficial reuse report as requested. The way the soil classification was written was more inline with a waste classification for NSW, inline with other material at the site. I have provided a summary of how we are going to adjust the new beneficial reuse report to comply with the ACT application process, please see below.

I also spoke to Jianmin today who was very helpful in clarifying some of the aspects of this application, however, there were a few aspects that might need further clarification before we process with additional analytical sampling. Luckily enough the labs still have our samples and we should be able to perform PFAS total concentration and metals leachability if required.

Summary of comments provided and proposed actions :

- NSW criteria does not apply in the ACT and must not be referenced in ACT reuse applications; **removal of the NSW waste criteria references in new report**
  - *“The EPA encourages effective waste management by promoting onsite reuse”*. Comment must be included in the report on whether on-site reuse has been considered and where not feasible why; **this was considered, we will provide info on this and why it was not used onsite in the new report.**

- *“The sampling methods used including a sketch/figure showing the 3-dimensional distribution of samplings undertaken”*. A sketch/figure showing the 3-dimensional distribution of samplings undertaken must be included in the report; **simple sketch will be amended to the new report**
- *“All samples collected must be analysed for total concentration of contaminants of concern”*. It is noted that only some samples have been analysed for the listed contaminants of potential concern identified in the report;
- **Assuming you are referring to PFAS as all other COPCs (Metals, TRH, BTEX and PAHs) were analysed.**
- **6 additional primary samples will be assessed for PFAS in the new report**
- **Can you confirm PFAS leachability (ASLP) is not required? - using the assumption that if PFAS is detected in total concentration, Beneficial reuse is not applicable or will be accepted due the presence of PFAS and assessing leachability would be excessive.**
  - *“Appropriate justification for the number of samples taken must be included in the reuse assessment report”*; **sample density is compliant and way above the Vic guidelines for the volume, - comment will be addressed in new report**
  - *“For reuse applications an assessment against the criteria in Table 1 of this Information Sheet and a clear statement that the material is suitable for reuse at the nominated reuse site”* is required. It is noted that exceedances of Table 1 criteria are quoted in the report. How is it that the material has been assessed as suitable for off-site reuse?
- **Total metal Concentrations are way below the HIL C which would be the most applicable land use scenario and below the HIL A criteria which would be a conservative assessment, even though this material will never be used in a residential setting. However, I have been informed that this line of evidence is not acceptable as an argument.**
- **95% UCL for all total metal samples will be compared to table 1 and if exceedances are reported, ASLP leachability extraction will be performed**
- **If the 95% UCL exceeds the table 1 criteria, Can you please confirm if heavy metal leachability extraction is required for all samples or if the two highest total concentration samples will suffice?**
  - *“Leachable concentration using the Australian Standard Leaching Procedure (ASLP) where a sensitive receiving environment is adjacent to a proposed reuse site. The leachate criteria must be chosen so as to be protective of groundwater quality and aquatic ecosystems both at the receiving site and the adjacent sensitive receiving environment”*
- **Leachability data will be compared to the EPA regulation 2005, however it is unclear what table it should be applied to, I'm assuming table 4.7.3? Can you please confirm?**
- **Alternatively, would the more recent ANZG 2018 criteria be adequate to assess groundwater and aquatic ecological protection ?**
  - An assessment against Waste Criteria is not required nor should be referenced in reuse assessment reports; **will be removed from new report**
  - *“Waste disposal and reuse reports must be submitted separately”*; **we are not submitting a waste disposal application for this material with ACT EPA- report will rewritten to address the reuse application only.**
  - Where statistical analysis is used to assess the material’s suitability for off-site reuse copies of all statistical calculations must be included as an appendix to the report and the results of the statistical calculations included in the results tables of the report. **PROUCL or Open UCL data will be included in the new report.**

I trust this addresses most of your comments, please provide comment or clarification if i have miss understood anything , i look forward to your response

kind regards

[REDACTED]  
*Remediation Project Manager*

**VEOLIA AUSTRALIA AND NEW ZEALAND**

Mob.:

Email [REDACTED] [veolia.com](mailto:[REDACTED]@veolia.com)

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Level 4, 65 Pirrama road / Pyrmont / NSW / Australia / 2009

[www.veolia.com/anz](http://www.veolia.com/anz)

On Mon, 4 Apr 2022 at 13:01, Contaminated Sites <[ContaminatedSites@act.gov.au](mailto:ContaminatedSites@act.gov.au)> wrote:

**OFFICIAL**

Dear [REDACTED]

Thank you for your email.

The Office of the Environment Protection Authority (OEPA) has reviewed the report titled "*Soil Classification Report HMAS Harman Naval Base, ACT*" dated 31 March 2022 by Kleinfelder Australia Pty Ltd and would not be in a position to support the report's conclusions at the time.

The following comments are provided, consistent with the requirements of [Information Sheet 4 - Requirements for the reuse and disposal of contaminated soil in the ACT](#), for your consultant's consideration, to assist in the revision of the report:

- NSW criteria does not apply in the ACT and must not be referenced in ACT reuse applications;
- *“The EPA encourages effective waste management by promoting onsite reuse”*. Comment must be included in the report on whether on-site reuse has been considered and where not feasible why;
- *“The sampling methods used including a sketch/figure showing the 3-dimensional distribution of samplings undertaken”*. A sketch/figure showing the 3-dimensional distribution of samplings undertaken must be included in the report;
- *“All samples collected must be analysed for total concentration of contaminants of concern”*. It is noted that only some samples have been analysed for the listed contaminants of potential concern identified in the report;
- *“Appropriate justification for the number of samples taken must be included in the reuse assessment report”*;
- *“For reuse applications an assessment against the criteria in Table 1 of this Information Sheet and a clear statement that the material is suitable for reuse at the nominated reuse site”* is required. It is noted that exceedances of Table 1 criteria are quoted in the report. How is it that the material has been assessed as suitable for off-site reuse?
- *“Leachable concentration using the Australian Standard Leaching Procedure (ASLP) where a sensitive receiving environment is adjacent to a proposed reuse site. The leachate criteria must be chosen so as to be protective of groundwater quality and aquatic ecosystems both at the receiving site and the adjacent sensitive receiving environment”*;
- An assessment against Waste Criteria is not required nor should be referenced in reuse assessment reports;
- *“Waste disposal and reuse reports must be submitted separately”*;
- Where statistical analysis is used to assess the material’s suitability for off-site reuse copies of all statistical calculations must be included as an appendix to the report and the results of the statistical calculations included in the results tables of the report.

Please note where exceedances of Table 1 criteria from [Information Sheet 4 - Requirements for the reuse and disposal of contaminated soil in the ACT](#) are observed the OEPA will not generally support off-site reuse.

Please have your consultant update the report to address the above comments and the requirements of [Information Sheet 4 - Requirements for the reuse and disposal of contaminated soil in the ACT](#) and resubmit the updated report in accordance with [Information sheet 11 - EPA Report Submission Requirements](#).

Regards

Mark Heckenberg | Assistant Director, Contaminated Sites

Email: [mark.heckenberg@act.gov.au](mailto:mark.heckenberg@act.gov.au)

Office of the Environment Protection Authority | Chief Minister Treasury and Economic Development Directorate | ACT Government

480 Northbourne Avenue, Dickson ACT 2602 | GPO Box 158 Canberra ACT 2601 | [www.act.gov.au](http://www.act.gov.au)

**From:** [REDACTED] <[REDACTED]@veolia.com>  
**Sent:** Friday, 1 April 2022 5:39 PM  
**To:** Contaminated Sites <ContaminatedSites@act.gov.au>  
**Cc:** [REDACTED] <[REDACTED]@veolia.com>  
**Subject:** Offsite beneficial reuse application

**CAUTION:** This email originated from outside of the ACT Government. Do not click links or open attachments unless you recognise the sender and know the content is safe.

HI ACT EPA,

I would like to apply for the material at our site to be classified as Beneficial reuse within the ACT.

The attached soil classification letter contains all aspects requested in REQUIREMENTS FOR THE REUSE AND DISPOSAL OF CONTAMINATED SOIL IN THE ACT for an assessment report.

within the attached letter are the following:

- acceptance letter
- tabulated analytical results and lab report with reuse assessment criteria
- sample methodology and field notes
- sample frequency inline with IWRG 702
- all sampling data from both sampling events

We are seeking ACT EPA review and approval of this material as offsite beneficial reuse within the ACT.

Please contact me should you require any additional information or want to discuss further.

Kind regards

[REDACTED]  
*Remediation Project Manager*

**VEOLIA AUSTRALIA AND NEW ZEALAND**

Mob.:



Email [\[redacted\]@veolia.com](mailto:[redacted]@veolia.com)

NSW Head Office

Level 4, 65 Pirrama road / Pyrmont / NSW / Australia / 2009

[www.veolia.com/anz](http://www.veolia.com/anz)

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