PRELIMINARY SITE (CONTAMINATION) ASSESSMENT

NEWCASTLE GOLF CLUB

Prepared for PRINCIPLE LIVING PTY LTD

Prepared by RCA Australia

RCA ref 15442-401/2

NOVEMBER 2023

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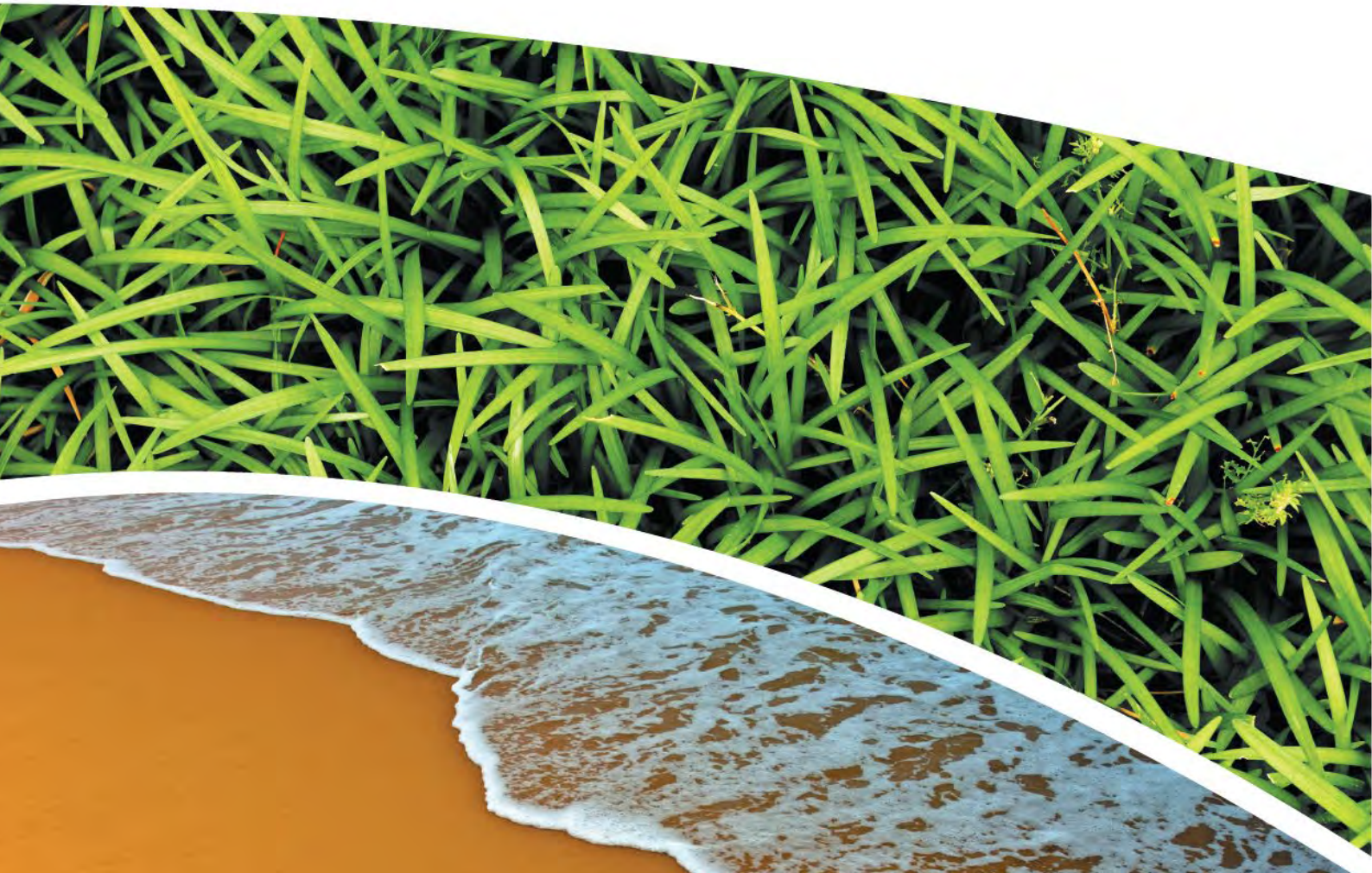

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30 November 2023

Principle Living Pty Ltd
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Attention: Chris Old

PRELIMINARY SITE (CONTAMINATION) ASSESSMENT
NEWCASTLE GOLF CLUB

EXECUTIVE SUMMARY

This report presents the findings of a preliminary site (contamination) assessment undertaken at Newcastle Golf Club, 4 and 4A Vardon Road, Fern Bay as part of a development application to develop a portion of the Newcastle Golf Club (NGC) for seniors' living. The works were undertaken for Principle Living Pty Ltd, the proponents of the development.

The assessment comprised a desktop assessment of site historical use and consideration of potential contamination as well as soil sampling at a total of fourteen (14) locations throughout the site, with soil samples collected from near the surface up to 1m below the ground surface along with two (2) surface water samples.

The site has been used since before 1915 as part of the Newcastle Golf Course and with the possible exception of localised filling and use of chemicals for the maintenance of the course it was not considered likely to be contaminated due to the site use. There were a number of contaminating activities undertaken in the area of the site however none were considered to be close enough to have impacted at the site; information from the NSW EPA indicated that the site was unlikely to have been impacted by a historical chromium release incident or PFAS originating from the Williamtown RAAF base.

No indications of contamination were identified at the site either during the contamination or the concurrent geotechnical assessment however foam was generated during the geotechnical processing of samples and as such RCA considered that there was potential for PFAS to be present at the site; assessment of this potential was included in the scope of work. There was a limited amount of fill identified at the site; the maximum depth being 0.9m.

No concentrations of hydrocarbons, metals, pesticides, herbicides of PFAS were detected in the soil at concentrations which may pose a risk to human health or the environment. PFAS was not identified in surface water.

Based on the site history assessment and results of soil and water samples, RCA considers that there has been sufficient assessment to consider that there is a negligible potential for hydrocarbon, metals, pesticide and herbicide contamination within the soil. The source of the PFAS has not been confirmed however is considered to be associated with historical suppression of bushfires in the area or surface water contamination from the nearby Williamtown PFAS Management Area. The concentrations are not considered to pose a risk to human health or the environment as part of the proposed use.

RCA considers that the site is suitable for the proposed residential development without further assessment, remediation or long term management. Industry best practice will be adequate to mitigate any risk to works involved with construction and other soil disturbance activities.

Groundwater has not been assessed and must not be used or otherwise extracted as part of the proposed development without consideration of potential contamination and all soils removed from the site must be classified and tracked in accordance with the requirements of the NSW waste legislation.

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SUMMARY OF RESULTS

1 INTRODUCTION

This report presents the findings of a preliminary site (contamination) assessment undertaken at Newcastle Golf Club, 4 and 4A Vardon Road, Fern Bay.

It is understood that Newcastle Golf Club (NGC) and Principle Living Pty Ltd (Principle Living) have entered into an agreement to develop a portion of the site for seniors' living and undertake upgrades in other areas of the existing golf course.

The following are the development's key components:

- Site preparation & establishment activities – clearing existing vegetation, demolition of existing golf course via earthworks, bulk earthworks.
- Establishment of vehicular access from Nelson Bay Road.
- Construction and occupancy of a seniors living development comprising:
  - Three (3) apartment buildings containing 125 serviced self-care dwellings.
  - Forty seven (47) single storey (villas) serviced self-care dwellings.
- Carparking – 295 spaces across the site with each villa being provided with a double garage (94 spaces) and 201 basement carparking spaces within the three (3) apartment buildings.
- Provision of pedestrian and vehicular access to and from the site.
- Establishment of a Community centre & administration building.
- Pickle ball courts, lawn bowls facility, open space, landscaping, picnic shelter, public art, open lawn area for passive recreational activities and formal striking planting.
- Civil works including internal access roads, pedestrian linkages to Nelson Bay Road and the golf club.
- Connection to Country 'Keeping Place'.
- Extension and enhancement of physical infrastructure utilities as needed.

It is understood that this investigation is required to support the development application for the project.

The assessment was initially undertaken at the request of David Rosewarne of Avid Project Management Pty Ltd on behalf of Principle Living; the report has been finalised at the direct request of Principle Living.

2 SITE IDENTIFICATION AND DESCRIPTION

The Newcastle Golf Club is described as 4 and 4A Vardon Road, Fern Bay, NSW and as Lot 105 DP 614883 and Lot 4 DP 823114 respectively. The site of the assessment, the proposed development for seniors' living, is part Lot 4 DP823114.

Additional site details are shown in **Table 1**.

Table 1 *Site Details*

Current zoning (Ref [1])	RE2 – Private Recreation
Current use(s) **Proposed use**	Golf Course with club facilities to the south of the site. Seniors' living.
Size of site	6ha – seniors' living development. 76ha – Newcastle Golf Course
Land use to the: **North**	Residential – Bayview Village over 50s lifestyle village, then bushland further north
South	Fern Bay Public School and residential properties
East	Residential properties and bushland and Stockland Beach
West	Nelson Bay Road, then residential – Palm Lake Resort over 50s, then bushland and the Hunter River
Nearest sensitive receptor (human health)	Directly north, east and south, including residential and a school with residential on the western side of Nelson Bay Road
Nearest sensitive receptor (environmental)	Hunter River (North Arm) approximately 100m to the west at the closest point to the site.

Drawing 1, **Appendix A** shows the locality and the layout of the site. The proposed development layout is included as **Appendix B**.

3 SITE HISTORY AND BACKGROUND INFORMATION

3.1 SITE NOTIFICATIONS

The Section 10.7 Planning Certificate as specified under the Environmental Planning and Assessment Regulation 2021 includes information associated with any restrictions for the use of the land.

Information relevant to this obtained from the section 10.7 certificates for both Lots and relevant to the site is contained in **Table 2**.

Table 2 *Planning Advice Contained in the 10.7 Certificate*

Part 2 relevant Information	• Multiple SEPP applies to the site. • Port Stephens Local Environmental Plan 2013. • Port Stephens Development Control Plan 2014. • Housing Code - Complying development under the General Housing Code **MAY NOT** be carried out on the land. • Inland Code - Complying development under the Inland Code **MAY NOT** be carried out on the land. • Rural Housing Code - Complying development under the Rural Housing Code **MAY NOT** be carried out on the land. • Low Rise Medium Density Code - Complying development under the Low Rise Medium Density Housing Code **MAY NOT** be carried out on the land. • Greenfield Housing Code - Complying development under the Greenfield Housing Code **MAY NOT** be carried out on the land. • Housing Alterations Code - Complying development under the Housing Alterations Code **MAY NOT** be carried out on the land. • General Development Code - Complying development under the General Development Code **MAY NOT** be carried out on the land. • Commercial and Industrial Alterations Code - Complying development under the Commercial and Industrial Alterations code **MAY NOT** be carried out on the land. • Commercial and Industrial (New Buildings and Additions) Code - Complying development under the Commercial and Industrial (new buildings and additions) code **MAY NOT** be carried out on the land. • Container Recycling Facilities Code – Complying development under the Container Recycling Facilities Code **MAY NOT** be carried out on the land. • Subdivision Code – Complying development under the Subdivision Code **MAY NOT** be carried out on the land. • Demolition Code - Complying development under the Demolition Code **MAY NOT** be carried out on the land. • Fire Safety Code – Complying development under the Fire Safety code MAY NOT be carried out on the land. • The land **IS NOT** subject to annual charges under section 496B of the Local Government Act 1993 for coastal protection services relating to existing coastal protection works to which the owner (or any previous owner) of the land has consented. • The land **IS NOT** within a proclaimed or declared mine subsidence district. • Council's records indicate that the land the subject of this Certificate **IS NOT** affected by any road widening or road realignment under. • Council's records indicate that the land subject of this certificate **IS NOT** affected by RAAF Base Williamtown & Salt Ash Air Weapons Range 2025 Australian Noise Exposure Forecast (10th August 2011) or the Aircraft Noise Planning Area under the Port Council Aircraft Noise Policy. • Flood Planning Area - Development on the land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings or any other purpose **IS** subject to flood related development controls. • The Port Stephens Local Environmental Plan 2013 **DOES NOT** provide for the acquisition of this land, or part thereof, by a public authority. • The land **IS NOT** a Biodiversity Certified and or Biodiversity Stewardship Site.

Part 2 relevant Information continued	• Native Vegetation Clearing Set Asides - The land **DOES NOT** contain a set aside area under section 60ZC of the Local Land Services Act 2013. • Part of the land **IS** identified as bush fire prone land in Council's records. • Council **HAS NOT** been notified of any Property Vegetation Plans under the Native Vegetation Act 2003 (and that continues in force) that affect the land to which this certificate applies. • The land **IS NOT** affected by an order under the Trees (Disputes Between Neighbours) Act 2006 (of which Council is aware). • The land **IS NOT** affected by a direction by the Minister, in force under section 75P(2) (c1) of the Environmental Planning and Assessment Act 1979. • Site compatibility certificates and conditions for seniors housing – Council **IS NOT** aware of a site compatibility certificate (seniors housing) issued in respect of the subject land and **NO** terms referred to in clause 18(2) of the policy have been imposed as a condition of development consent in respect of the land to which this certificate relates. • Site compatibility certificates for infrastructure, schools or TAFE establishments – Council **IS NOT** aware of a valid site compatibility certificate (infrastructure) or site compatibility certificate (schools, or TAFE establishments) in respect of proposed development on the land. • Site compatibility certificates and conditions for affordable rental housing - Council **IS NOT** aware of a current site compatibility certificate issued under State Environmental Planning Policy (Affordable Rental Housing) 2009 and the e land IS NOT affected by any terms of a kind (of which Council is aware) referred to in clause 17(1) or 38(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 that have been imposed as conditions of consent to a development application granted after 11th October, 2007 in respect of the land. • Paper subdivision information – **NOT APPLICABLE**. • Site verification certificates – Council **IS NOT** aware of a current site verification certificate in respect of the land. • Loose-fill asbestos insulation – The land **DOES NOT** include any residential dwelling identified on the Loose-Fill Asbestos Insulation Register as containing loose-fill asbestos ceiling insulation. • There are **NO** affected building notices and building product rectification orders. • There are **NO** prescribed matters under section 59(2) of the Contaminated Land Management Act 1997 to be disclosed.

Of note: Only part 2 of the 10.7 certificates was supplied.

RCA undertook a search of Heritage NSW heritage register[1] for Fern Bay and identified that there are no Aboriginal Places or items on the State Heritage Register within vicinity of the site.

RCA undertook a search of the Department of Climate Change, Energy, the Environment and Water heritage register[2] for Fern Bay and identified that there are no Aboriginal Places or items on the State Heritage Register within vicinity of the site.

[1] http://www.environment.nsw.gov.au/heritageapp/heritagesearch.aspx

[2] http://www.environment.gov.au/heritage/publications/australian-heritage-database

3.2 NEWCASTLE GOLF COURSE HISTORY

RCA undertook a search of the Newcastle Golf Club website[3] which stated the original golf course was founded in Broadmeadow in 1905. In 1913-1914 work commenced on the construction of the Newcastle Golf Club 9 hole course at the current location. The additional 9 holes were commission in the 1930s.

3.3 HISTORICAL PHOTOGRAPHS

RCA undertook a search through the collections of the Newcastle Library[4] and did not identify photographs relevant to the site.

RCA undertook a search through the State Library of NSW[5] for photographs relevant to the site and did not find any photographs relevant to the site.

RCA reviewed historical aerial photographs and **Table 3** summarises the observations at the site and the surrounding environment.

Table 3 *Aerial Photograph Review*

1954 B&W	 The site is within the western portion of the Newcastle golf course, that being two (2) fairways and surrounding vegetation. A building (club house) located to the south west along with what appears to be a carpark to the east, located in the current carpark's location. There are residential properties along with bushland directly to the south of the site. There are several residential dwellings to the west of the site. The area to the north consists of bushland and agricultural land. The area to the east consists of bushland with several tracks. There appears to be several residential buildings east of the southern boundary of the golf course.

[3] https://www.newcastlegolfclub.com.au/cms

[4] http://www.newcastle.nsw.gov.au/Library/Heritage-History/Search-the-Collection/Hunter-PhotoBank

[5] http://archival.sl.nsw.gov.au/home

1966 B&W	 The site has changed little. The building (club house) appears to have been upgraded. The area to the south has changed slightly with several buildings visible directly south of the site, likely Fern Bay Public School along with what appears to be tennis courts. Several additional residential dwellings are visible to the west of the site on the western side of Nelson Bay Road. The area to the north has changed with clearing of bushland, potentially for additional agricultural/grazing land.
1975 B&W	 The site has changed little., The club house appears to now be a new building situated to the north east of the previous building. The former club house appears to be partially demolished. The carpark appears to be asphalt, with a driveway heading south north from Vardon Road. The area to the south appears to have changed little, except for a large area of the bushland to the south east appearing to be cleared of most of the vegetation and divided into equal rectangle parcels of land, running from west to east towards the edge of Stockton Beach, that being the Stockton Rifle Range. The area to the west has additional residential dwellings running parrel to Nelson Bay Road. The area to the north has minor changes including scattered residential dwellings and a dam. The area to the east has changed little since the previous photograph.

1984 B&W	 The site has changed little since the previous photograph. The partly demolished former club house now demolished. There appears to be a building, (shed) south of the club house. There appears to be more buildings (Newcastle Links Motel) directly south and west of the driveway. There is a new street with residential dwellings running off Vardon Road to the north, which is surrounded by the Golf Course. The area to the west has changed little except for several additional residential dwellings. The area directly north of the site has a new small subdivision (Bayview Village). The area further to the north has changed little.
1993 Colour	 The site has changed little. The club house appearing to have a new roof, with an additional building (shed) next to the shed mentioned in the 1984 photograph. The area to the south and west have changed little, with the tennis courts appearing to have been upgraded. The area to the north (Bayview Village) has been further developed with an area appearing to be for recreational purpose within the middle of the site along with another residential area to the east of original area. A residential property is further to the north, including several buildings near the dam viewed in the 1976 photograph. The area to the east has changed little, with the buildings first observed in the 1954 photograph appearing to be overgrown with vegetation and possible unoccupied and derelict.

2001 Colour	 The site has changed little. The addition of small sheds or large storage containers near the previously mentioned sheds. There appears to be additional buildings within Fern Bay Public School, with little changing in the south. The area to the west has changed little. The area directly to the north (Bayview Village) appears to have several additional residential dwellings. The residential property further north appears to have been demolished, with scattered large debris.
2010 Colour	 The site appears to have changed little. The Newcastle Links Motel appears to have had some upgrades to the buildings and carpark. The Fern Bay Public School appears to have additional buildings along with tennis club. The area to the west appears to have a large area of land cleared of vegetation north of the residential buildings. The area to the north (Bayview Village) appears to have an additional area consisting of residential dwellings along with a lawn bowls green and club and tennis court. Thew dam previously mentioned to the north is part of Bayview Village and appears to have been slightly modified along with a path around the edge. There are two (2) new subdivisions, with one to the north to the west of Nelson Bay Road (The Cove) and the other to the north east, east of Nelson Bay Road (Seaside, Fern Bay). The area to the east has changed little.

2019 Colour	 The site has changed little. Additional building (shed) near the sheds mentioned previously, with a large building (shed) on the boundary of the site, directly north of Fern Bay Public School. The area to the south has changed little, with additional buildings and other infrastructure in Fern Bay Public School and the tennis court. The area to the west now has Palm Lake Resort. The area to the north has additional areas including housing and parkland/recreational areas to both the subdivisions (The Cove and Seaside). The area to the east appears to have changed little.

Reviewed documentation is included in **Appendix B**.

3.4 CONTAMINATED LAND PUBLIC RECORD

RCA undertook a search of the NSW EPA public lands register[6] and did not find any record of Environment Protection licences, applications, notices, audits or pollution studies and reduction programs applicable to the site. Licenses were identified for one (1) site within Stockton:

- Hunter Water Corporation – Off Fullerton Street, Stockton, POEO licence surrender in 1999, with licence variation in 2002, with surrender of licence in 2003. The property address is unknown, though Fullerton Street, within Stockton, is at minimum 1.3km south of the site and therefore not considered to present a contamination risk to the site.

RCA undertook a search of sites notified[7] to the NSW EPA as potentially requiring regulation (as updated 9 October 2023) and confirmed that the site is not notified, with two (2) sites within Fern Bay and Stockton:

- Former service station, 37 Fullerton (1006 Nelson Bay Road) Street, Fern Bay – regulation under CLM Act not required. The site is approximately 400m south of the site and therefore not considered to present a contamination risk to the site.
- Former Coroba Landfill, 310 Fullerton Street, Stockton - regulation under CLM Act not required. The site is approximately 2.4km south of the site and therefore not considered to present a contamination risk to the site.

[6] http://www.epa.nsw.gov.au/publicregister/

[7] http://www.epa.nsw.gov.au/clm/publiclist.htm

RCA undertook a search of the NSW EPA gasworks database[8] and determined that there are no known gasworks within vicinity of the site.

RCA undertook a search of the NSW Office of Fair Trading asbestos insulation register[9] and determined the absence of loose-fill asbestos insulation in the buildings at the site.

RCA undertook a search of the Department of Defence register[10] for unexploded ordnance and determined that there is no known unexploded ordnance on site. The site is bounded on the north eastern by a slight potential for unexploded ordnance. There is an area of substantial potential of unexploded ordnance approximately 3.5km to the north east of the site.

RCA undertook a search of the Department of Industry naturally occurring asbestos maps[11] and determined that there are no known point occurrences or geological units with medium to high asbestos potential.

3.5 WILLIAMTOWN PFAS MANAGEMENT AREA

The Williamtown PFAS (per- and polyfluoroalkyl substances) Management Area comprises three (3) zones in the vicinity of the Williamtown RAAF base:

- Primary Management Zone, this area has significantly higher levels of PFAS.
- Secondary Management Zone, this area has some elevated PFAS.
- The Broader Management Zone is topographically and hydrologically downgradient, with PFAS detection potentially occurring now and in the future.

These areas[12] are shown in **Figure 1** below.

[8] http://www.epa.nsw.gov.au/clm/gasworkslocation.htm

[9] http://www.fairtrading.nsw.gov.au/ftw/Tenants_and_home_owners/Loose_fill_asbestos_insulation/Public_Search/LFAI_Public_Register.page

[10] https://uxo-map.defence.gov.au

[11] https://trade.maps.arcgis.com/apps/PublicInformation/index.html?appid=87434b6ec7dd4aba8cb664d8e646fb06

[12] https://www.epa.nsw.gov.au/working-together/community-engagement/community-news/raaf-williamtown-contamination

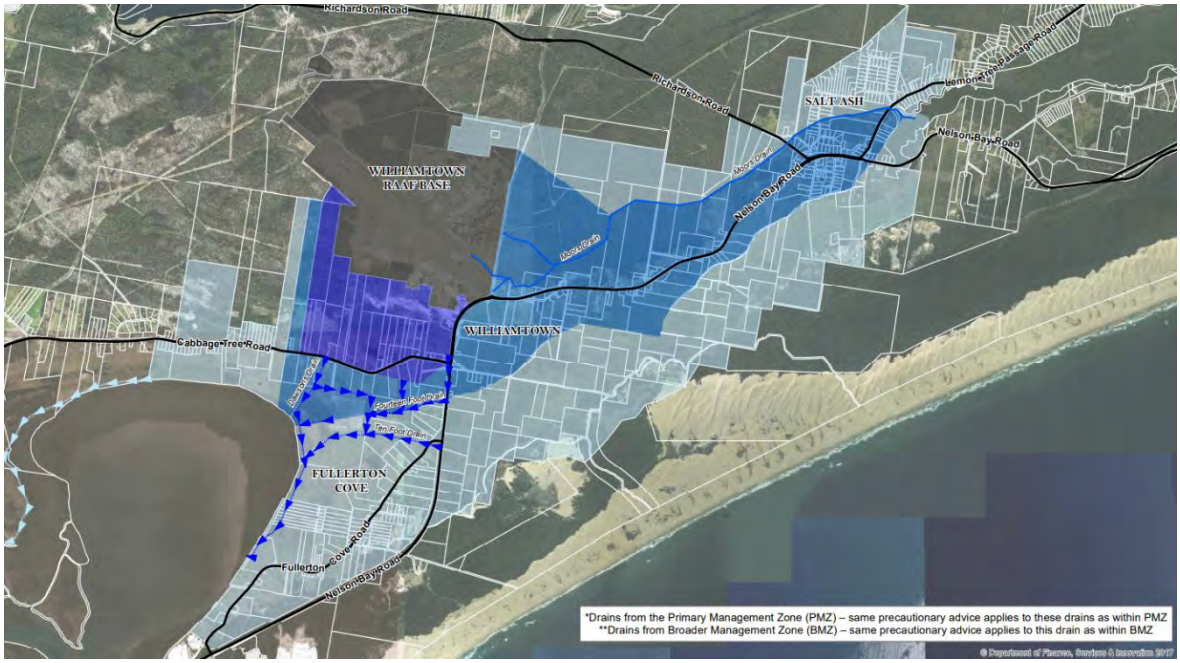


Figure 1 *Williamtown Management Area*

The site is located approximately 8km south of the Williamtown RAAF base and approximately 1km south of the extent of the mapped Broader Management Zone as shown on **Drawing 1**, **Appendix A**.

3.6 ORICA INCIDENT

Orica, located on Kooragang Island had an incident involving the emission of hexavalent chromium into the atmosphere in August 2011.

RCA undertook a search of the NSW EPA reporting and incidents page[13] to determine the extent. The map by the then Office of Environment and Heritage shows that that the wind at the time of the incident was from the north west, blowing towards Stockton, with seventy (70) sampling locations undertaken. Of the seventy (70) samples, eleven (11) samples detected hexavalent chromium, with no risk to human health risks identified. The site is situated approximately 3km to the north of the area of sample collection.

[13] https://www.epa.nsw.gov.au/reporting-and-incidents/report-pollution/orica-kooragang-island-incident

3.7 GEOLOGY AND HYDROGEOLOGY

RCA reviewed published geological and hydrogeological maps and summarised the findings in **Table 4**.

Table 4 *Geology and Hydrogeology*

Soil type	The Newcastle Coalfield 1:100,000 geology map indicates the site is underlain by Cainozoic Quaternary sand.
Acid sulfate soil	The Williamtown acid sulfate soil (ASS) risk map indicates that the site mostly lies over an area of aeolian dune sand with a low risk of ASS at depths of greater than 3m.
Groundwater use	Groundwater use is currently undertaken at the site for the upkeep of the golf course.
Number of monitoring wells on site	There are no known groundwater monitoring wells within the site. There are several monitoring wells within the vicinity of the site. Bore GW054990, unknown use, is located approximately 50m west of the golf course, GW bore GW054683, utilised for general use is approximately 100m south of the site, GW054639 utilised for general use is approximately 400m south of the site and GW202537 utilised for dewatering is approximately 480m north of the site.
Depth to groundwater	Depth of groundwater was unknown prior to the commencement of works.
Estimated Groundwater flow direction	Unknown, though considered likely to the west towards Fullerton Cove, with several onsite water courses flowing from east to west into Fullerton Cove.
Background water quality	Unknown.

The groundwater information is attached in **Appendix C**.

3.8 INTEGRITY ASSESSMENT

Information obtained from the Council and NSW EPA is presumed to be accurate, however is limited to information that has been obtained and documented. The mapping of the Management Area was undertaken in December 2017 and notes that the Zones may change with migration of PFAS contamination over time.

Information obtained from aerial photography is limited in that it only provides a snapshot of the site in time.

Overall RCA considers that the site history review is adequate to provide a general understanding of the past nature of land use at the site.

4 GENERAL SITE CONDITIONS AND OBSERVATIONS

RCA undertook a site inspection on 17 May 2021 and recorded the following observations in **Table 5**.

Table 5 *General Site Conditions and Observations*

Topography	The site is slightly undulating north to south, with the northern portion generally relatively flat.
Site condition	The site is part of an active golf course (photograph 1).
Condition of Building and roads	There were no buildings within the site. There are several asphalt footpath/golf cart roads that are in good condition (photograph 2).
Visual Signs of contamination	There were no visual signs of contamination within the site.
Signs of erosion	There were no signs of erosion within the site.
Presence of drums or waste	There were no presence of drums or waste within the site.
Identification of potential asbestos bearing materials	There were no visual signs of asbestos containing materials within the site.
Visible signs of plant stress	There were no signs of plant stress within the site, though there were some patches with exposed soil due to pooled surface water, these areas were low lying (photograph 3).
Odours noticeable on site	There were no noticeable odours within the site.
Evidence of current or former petroleum facilities	There were no signs of any former or current petroleum facilities.
Chemicals stored on site	Chemicals were not observed, although it is presumed that there may be chemicals i.e., herbicides, for weed control.
Evidence of waste burial: (anecdotal or otherwise)	There was no evidence of any waste being buried during the inspection or site works.

The location of photographs taken during the site inspection are shown on **Drawing 2, Appendix A** and attached in **Appendix D**.

5 PRELIMINARY CONCEPTUAL SITE MODEL

Based on RCA's understanding, the site has been utilised as a golf course since 1915, with construction between 1913 and 1914. Prior to 1913 the site was undeveloped bushland/sand dunes.

- Historical filling of the site:
  - Significant filling does not appear to be likely however there may have been some fill placed to lessen the grade for the purpose of fairway construction/features. Contaminants of concern are considered to be hydrocarbons and metals. Asbestos may be present if anthropogenic material is present within the fill.
  - Risks associated with this material are considered to be limited to direct exposure by ingestion or dermal contact. The presence of asbestos would give rise to an inhalation risk.
  - Off-site impacts are considered to be related only to the potential for groundwater contamination although there is likely to be additional fill within the region and groundwater contamination would not be solely due to contamination at the site.
- Application of herbicide and pesticide chemicals:
  - Risks associated with this material are considered to be limited to direct exposure by ingestion or dermal contact.
  - Off-site impacts are considered to be related only to the potential for transportation/migration of stormwater or groundwater contamination.
- Presence of PFAS. The site is outside the Williamtown Management Area by approximately 1km, and therefore not considered likely to be a risk, however the possibility cannot be discounted as the NSW EPA mapping was 3.5years old and the contamination may be migrating in ground and surface water.
  - Risks associated with this material are considered to be limited to direct exposure by ingestion or dermal contact.
- Presence of acid sulfate soils. The Williamtown acid sulfate soil (ASS) risk map indicates that the site mostly lies over and area of aeolian dune sand with a low risk of ASS at depths of greater than 3m.
  - The presence of actual or potential acid sulfate soils pose a risk of acid generation which may impact on buried infrastructure, environmental receptors and impact on removal of soil from site.
  - The risks associated with acid generation is the corrosion of buried infrastructure, acidification of the groundwater and surface water receptors and associated mobility of some contaminants, particularly metals.

6 SAMPLING AND ANALYTICAL QUALITY PLAN

No formal sampling and analytical quality plan (SAQP) was developed for the project. The scope of work was provided in RCA proposal dated 18 March 2021 for the works and following sections detail the basis for the scope.

6.1 STEP 1 – STATE THE PROBLEM

Based on the preliminary conceptual site model, there is potential for hydrocarbon, metals, herbicides and pesticides and asbestos contamination arising from filling and application of chemicals to the golf course. If present, contamination may pose constraints to any proposed works and future use of the site may require specific management.

6.2 STEP 2 – IDENTIFY THE GOALS AND DECISIONS

The key uncertainty that the investigation has attempted to address was:

- Do the concentrations of contaminants (hydrocarbons, metals, herbicides and pesticides and asbestos) exceed acceptable levels to preclude the site from being used for residential uses under the current land zone?

In order to resolve this uncertainty, decisions were to be made as to the presence and significance of potential contamination such that management measures can be designed to reduce risk. The specific decisions to be made were to:

- Investigate past and present potential contamination sources.
- Determine the nature of contamination.
- Determine the geology and hydrogeology.
- Determine the potential and actual contaminant migration routes.
- Determine whether contaminants exceed acceptable levels.
- Determine whether further investigation or management is required.

6.3 STEP 3 – IDENTIFY INPUTS TO THE DECISIONS

The specific types of information needed to resolve the decision statements in Step 2 were noted as follows:

- Adequate conceptual site model.
- Soil material type.
- Analytical data for the collected samples.
- Appropriate assessment criteria for the media being investigated and the approved use of the land.
- Appropriate field methods.
- Appropriate laboratory analysis methods.

The ASC NEPM (Ref [2]) document has been approved by the NSW EPA for use on potentially contaminated sites and supersedes most of the preceding reference documents. The criteria from the ASC NEPM (Ref [2]) was to be used to determine the significance of any contamination found.

Best practise in alignment with council's requirements under the relevant State Environmental Planning Policy (Ref [3]) prescribes assessment on the basis of the most sensitive allowable site use. RCA therefore considers the criteria as defined for the residential with soil access to be appropriate for assessment of human health risk from the soil at the site. The ecological risk has been assessed under the criteria defined for areas of urban residential and public open space land use.

Full details of the relevant guidelines are included in **Appendix E**. Note that additional guidelines have been included based on fieldwork observations and additional works being undertaken as discussed in later sections of this report.

6.4 STEP 4 – DEFINE THE BOUNDARIES OF THE INVESTIGATION

The horizontal extent of the assessment has been defined by the cadastral lot as shown in the site plan (**Drawing 1**, **Appendix A**), and was interpreted in the field based on site features including fencing and the buildings.

The vertical extent has been determined by consideration of the conceptual site model and the objectives of the assessment and was to comprise:

- Surface sample (0.1m) for the purposes of soil assessment. If there are any visual or olfactory indications of contamination during the test pitting, additional samples were to be collected.

Groundwater was not being assessed.

Practical constraints that could interfere with sampling include:

- Fences.
- Water bodies.
- Permissions.
- Health and safety issues.

The financial constraints for sampling were to be according to the accepted proposal. Any deviations from this costing determined during the fieldwork were to be discussed and agreed to prior to additional costs being incurred.

6.5 STEP 5 – DEVELOP THE DECISION RULES

The Data Quality Indicators (DQI) that were implemented for the project are detailed in **Table 6**.

Table 6 *Data Quality Indicators Implemented for the Assessment*

DQI	Determined by	Criteria
Accuracy	Internal – surrogates, laboratory control samples, matrix spikes, method blanks. External – trip spikes, field blanks and equipment washes.	Surrogate, LCS, spike - recovery data to be 70-130%. Blanks and equipment washes – results to be < PQL. Relative percentage difference (RPD) of duplicates: • 60% RPD at concentration levels greater than ten times the PQL. • 85% RPD at concentrations between five to ten times the PQL. • 100% RPD at concentration levels between two and five times the PQL. Where concentration levels are less than two times the PQL, the Absolute Difference (AD) shall be calculated. Data will be considered acceptable if the AD <2.5 times the PQL.
Precision	Internal – laboratory duplicates External – intralaboratory duplicates.	RPD of duplicates: • 50% RPD at concentration levels greater than ten times the PQL. • 75% RPD at concentrations between five to ten times the PQL. • 100% RPD at concentration levels between two and five times the PQL. Where concentration levels are less than two times the PQL, the Absolute Difference (AD) shall be calculated. Data will be considered acceptable if the AD <2.5 times the PQL.
Completeness	The percentage of completed data points, taking in account consideration of other DQI.	95%
Representativeness	Whether there has been sufficient sampling by appropriate methodology with relevant analysis to determine that the assessment is representative of the site conditions.	
Comparability	• All samples collected during this sampling programme will be obtained by adequately trained RCA personnel using consistent sampling methodologies throughout the project. • All samples must be received by the laboratory cool and appropriately preserved for the requested analysis with sufficient time within the specified holding time. • All laboratory analyses will be conducted by NATA accredited methodologies that comply with the international standard methods. • Comparable analytes such as TRH C_6-C_{10} and BTEX, PAH and TRH >C_{10}-C_{40}, and metals should show some concurrence between analytical results and to identified field observations.	

6.6 STEP 6 – ACCEPTABLE LIMITS ON DECISION ERRORS

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

- Closeness of the result to the guideline concentrations.
- Data analysis and the acceptance of 95% UCL as the true mean value of the data set and understanding that a conclusive statement made on these grounds has a 5% chance of being inaccurate.
- Specific contaminant of concern (e.g., response to carcinogens may be more conservative).
- The area of site in question and the potential lateral and vertical extent of questionable information.
- Whether the uncertainty can be effectively managed by site management controls.

If any of the data validation procedures or criteria identified were not followed or met, this will have constituted a non-conformance. The significance of the non-conformance was to have determined if rectification was required.

6.7 STEP 7 – OPTIMISATION OF THE DESIGN OF THE COLLECTION OF DATA

The scope of work comprised collection of soil samples from ten (10) soil sampling locations to depths of up to 0.1m below the surface based on a judgmental sampling pattern to provide characterisation of potential contamination within surface soils throughout the site. Deeper samples were to be collected during a concurrent geotechnical investigation in the event that there were visual or olfactory indications of contamination in the deeper soils.

Disturbed soil samples were to have been collected directly from the hand tools at all locations. This method was chosen to minimise disturbance to the ground or other potential underground infrastructure.

Decontamination of soil sampling equipment was to have been undertaken by brushing of excess soil from the sampling equipment between locations.

Soil samples were to have been laboratory analysed for BTEX, TRH (C_6-C_{40}), PAH and metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), pesticides and herbicides.

Samples were to have been stored in the field in an insulated container on ice and sent to the laboratory within 24 hours of sampling under Chain of Custody (COC) documentation.

ALS was to have been used as the primary analysing laboratory for all analyses as well as quality assurance samples due to its NATA accreditation and experience with potentially contaminated soil.

The scope is summarised in **Table 7** below.

Table 7 *Sampling Strategy*

Contaminating activity	Potential Contaminants of Concern	Sampling Strategy	Rationale for Sampling Strategy and Sampling Locations
Historical filling.	TRH, BTEX, PAH and metals.	Collection of soil samples at 0.1 m below the surface. Additional samples will be collected based on field observations of contamination or to characterise strata. Hand tools will be utilised due to limited excavation depths.	The ten (10) locations were chosen to provide characterisation of potential contamination within the fill at the site and from on-site and off-site sources. A judgmental sampling pattern was employed based on available site history information regarding potential contaminants of concern and site walkover. Of note: Speciation of chromium for hexavalent chromium was to be undertaken if total chromium results where above the criteria.
Application of chemicals.	Herbicides and pesticide (OCP and OPP).		

7 FIELDWORK

An environmental scientist experienced in the handling of potentially contaminated soil undertook the fieldwork on 17 May 2021. The scope of work included:

- A site inspection.
- The collection of surface soil samples from nine (9) locations on the site:
    - Samples were collected from fill and natural materials from depth of approximately 0.1 metres below the existing ground surface (mbgs) using hand tools.
- All soil samples were laboratory analysed for OCP, OPP, herbicides and metals (arsenic, cadmium, chromium, copper, nickel, lead, zinc, mercury):
    - Four (4) samples were additionally laboratory analysed for TRH, BTEX and PAH.

Sample locations are shown on **Drawing 2**, **Appendix A**. RCA note that an additional sample was collected in error to the north of the proposed development extent; the results of this sample have not been included in this report.

During the processing of samples for geotechnical laboratory analysis, a foam like substance, refer **Figure 2** below, was observed to be generated by the washing of samples collected from TP8 at 0.3m and TP10 at 0.3m in depth. This foam was considered to be potentially associated with PFAS contamination.

Figure 2 *Foam observed from the washing of soil samples as part of geotechnical processing.*

Sample extracts were washed on the following working day and one of the samples (TP8 0.3m) was identified to not produce any foam. Foam was generated from the sample from TP10 at 0.3m again and from a sample from TP11 at 0.3m. RCA therefore recommended that further works were undertaken to characterise the potential PFAS contamination at the site.

An environmental scientist returned to the site on 27 May 2021 with the assistance of a technician to collect additional soil samples and surface water samples:

- The collection of ten (10) soil samples from five (5) locations on the site.
    - Samples were collected from fill and natural materials from depth of approximately 0.4mbgs and 0.9mbgs using a hand auger.
    - Two (2) locations were targeted to the areas of the samples in which foam had been generated by washing of samples and the remaining three (3) were spread across the site.
- Logging of boreholes including description of samples for texture, colour, odour, moisture content (and well construction). Logs are attached in **Appendix F**.
- Re-instatement of all excavations.
- Collection of surface water samples from two (2) locations on the site.
- Analysis of ten (10) soil samples and two (2) water samples for PFAS.

Sample locations are shown on **Drawing 2**, **Appendix A**.

RCA was informed that groundwater was used at the site however a sample was not collected due to miscommunication.

No contamination issues were identified on the site during fieldwork; no indications of foam were identified during fieldwork however given the use of hand tools this was not considered to be definitive indication of its absence.

The fill and natural materials were generally consistent across the bore locations, consisting of fill comprising sand to 0.1m, with natural silty sand, silty clayey sand, sandy silty clay and medium to coarse sand. Information about the deeper soils is presented in the report for the concurrent geotechnical assessment.

8 QUALITY ASSURANCE/QUALITY CONTROL

RCA has assessed the quality assurance and control in **Appendix G** and found it to be acceptable for the purpose of site assessment.

9 RESULTS

All soil and surface water results are compared to the relevant criteria in **Appendix H**. The following sections present a summary.

9.1 SOIL

- BTEX concentrations were not detected and are considered below the relevant criteria (Ref [2]).
- TRH concentrations were not detected and are considered below the relevant criteria (Ref [2]).
- PAH concentrations were not detected are considered below the relevant criteria (Ref [2]).
- Metal concentrations were not detected or detected at low concentrations below the relevant human health and ecological criteria (Ref [2]).
- Pesticide concentrations were not detected and are considered below the relevant human health and ecological criteria (Ref [2]).
- Herbicide concentrations were not detected and are considered below the relevant human health and ecological criteria (Ref [2]).
- PFAS concentrations were not detected in all but two (2) samples; all concentrations were below the relevant criteria (Ref [2]).

9.2 SURFACE WATER

PFAS concentrations were not detected in either of the surface water samples and are considered below the relevant human health and ecological criteria (Ref [4]).

10 SITE CONTAMINATION CHARACTERISATION

The collection of soil samples from fourteen (14) locations is not in accordance with the minimum seventy (70) sampling locations as recommended by the NSW EPA guidelines (Ref [5]) for a site of 5ha. The reduction in locations is considered sufficient for the understanding of the potential for presence of contamination within the proposed development area on the western portion of Newcastle Golf Course. Nine (9) locations were surface samples with five (5) locations sampled to a maximum depth of 1m.

The site history indicated that the site has been occupied by the Newcastle Golf Course since at least 1915, with the land vacant bushland prior. No contaminating activities were identified within vicinity of the site that were considered to be potentially impacting at the site; the site was outside of the areas considered potentially impacted by a historical pollution incident from Orica and by PFAS originating from the RAAF base at Williamtown. Contaminating activities were considered to be related to the importation of fill and the use of chemicals.

Significant fill was not identified by the assessment although the concurrent geotechnical assessment has identified fill to a depth of 0.9mbgs at TP4 (refer **Drawing 2**, **Appendix A**).

No contamination which may pose a risk to human health or the environment was identified in any of the soil samples. In combination with the site history assessment, RCA considers that there has been sufficient assessment to consider that there is a negligible potential for hydrocarbon, metals, pesticides and herbicides contamination within the soil.

PFAS contamination below the ecological and human health criteria (Ref [4]) has been identified in shallow soils at HA2 and HA4 which are both situated in the south of the site; samples in the areas of the materials in which foam was generated during geotechnical testing did not exhibit detectable concentrations of PFAS. As such the source of the foam is unknown however does not appear to be due to significant PFAS concentrations. The source of the PFAS in the southern portion of the site is unknown however is considered to be a diffuse distribution resulting from suppression of historical bushfires in the area or due to surface water contamination from the nearby Williamtown PFAS Management Area. As there were no detectable concentrations in surface water at the time of the assessment it is not considered that surface water is a continuing source, and the samples were above the level of groundwater such that groundwater is not considered the source of the PFAS. The sampling for PFAS has been limited however the maximum concentration was approximately 20% of the most stringent criterion for residential land use, and 0.20% of the recreational land criterion, such that it is not considered that there is significant potential for contamination to pose a risk to human health. The earthworks design comprises significant (>1m) cut across approximately a third of the southern portion of the site with another third of the portion primarily significant (>1m) fill such that shallow PFAS concentrations are unlikely to be accessible. The areas which comprise either shallow (<1m) cut or fill comprise are minimal and will be subject to building footprints. The remainder of the site will not be excavated will be recreational land.

RCA considers that the site will be suitable for the proposed development without further investigation, remediation or management. The potential presence of PFAS is to be taken into account and testing is to be undertaken in accordance with the NSW EPA guidelines (Ref [6]) as part of classification for any beneficial re-use or disposal of surplus soil. The implementation of industry best practice dust minimisation, sediment and erosion control and occupational hygiene practices is considered to be adequate to manage any potential exposure to workers undertaking soil disturbance works.

11 CONCLUSIONS

This report has presented the findings of a preliminary site (contamination) assessment undertaken at a portion of the Newcastle Golf Course situated at 4 and 4A Vardon Road, Fern Bay, NSW.

The assessment comprised a desktop assessment of site historical use and consideration of potential contamination as well consisted of a site inspection and onsite sampling and analysis of nineteen (19) soil samples from fourteen (14) locations on the site along with the sampling of two (2) surface water locations for analysis of potential contaminants of concern (TRH, BTEX, PAH, pesticides, herbicides and PFAS).

The site has been used in association with the Newcastle Golf Course since its development from virgin bushland in 1915. There were no contaminating activities identified at the site, with the potential exception of importation of fill and use of chemicals (pesticides and herbicides) as part of the maintenance of the Course. Similarly, there were no contaminating activities identified within vicinity of the site; there are three (3) sites with environmental protection licences / notified to the NSW EPA however these are all too distant to be considered likely to have impacted at the site. There was a historical pollution incident originating from the Orica facility on Kooragang Island in 2011 however NSW EPA maps indicate that the site is approximately 3km to the north of the area of impact. The site is mapped by the NSW EPA as being approximately 1km to the south of the extent of Williamtown PFAS Management Area.

The site inspection did not identify any visual or olfactory indications of contamination; a minimal amount of fill (0.1m) was encountered by the assessment. A concurrent geotechnical assessment identified a maximum depth of fill as 0.9m at TP4; no visual or olfactory indications of contamination were identified of the deeper (maximum 2.3m below the surface) soils during fieldwork. A slight foam was observed in groundwater encountered in some test pits (refer **Appendix D**) however this was not, at time of fieldwork, considered to be indicative of the presence of contamination.

Foam was identified to be generated during the processing of geotechnical samples and following further consideration of this, RCA identified that there was the potential for PFAS to be present at the site. Further fieldwork was undertaken in the areas in which the samples which generated foam were collected from as well as other areas of the site for the purpose of completeness. Samples were collected of the surface water in two (2) locations to assess the potential for this to be the source of PFAS.

No contamination which may pose a risk to human health or the environment was identified in any of the soil samples and as such, RCA considers that the site is suitable for the proposed development without further assessment, remediation or formal management. Groundwater has not been assessed and must not be used or otherwise extracted as part of the proposed development without consideration of potential contamination.

Classification of any soil is removed from the site is to include PFAS in the analytical suite and all material removed from site must be tracked to demonstrate that it has been suitably managed, transported and placed in accordance with the requirements of the NSW waste legislation. Documents to be maintained comprise:

- Load sheets – truck registration being loaded, time loaded, approximate quantity, description of material being loaded, details of person doing the recording.
- Receival sheets – truck registration received, time received, approximate quantity, description of material being received, details of person doing the recording.
    - Dockets from a licensed waste facility will be required if this is the final placement of the material.
- Truck dockets as maintained by the driver transporting the loads.

These records should be kept in readiness for provision to a regulatory authority upon request.

12 LIMITATIONS

This report has been prepared for Principle Living Pty Ltd in accordance with an agreement with RCA Australia (RCA). The services performed by RCA have been conducted in a manner consistent with that generally exercised by members of its profession and consulting practice.

This report has been prepared for the sole use of Principle Living Pty Ltd. The report may not contain sufficient information for purposes of other uses or for parties other than Principle Living Pty Ltd. This report shall only be presented in full and may not be used to support objectives other than those stated in the report without written permission from RCA Australia.

The information in this report is considered accurate at the date of issue with regard to the current conditions of the site. Conditions can vary across any site that cannot be explicitly defined by investigation.

Environmental conditions including contaminant concentrations can change in a limited period of time. This should be considered if the report is used following a significant period of time after the date of issue.

Yours faithfully

RCA AUSTRALIA

Fiona Brooker
Environmental Services Manager
BEng(Env)

REFERENCES

[1] Newcastle Local Environment Plan 2012 under the Environmental Planning and Assessment Act 1979, published 31 March 2021.

[2] NEPC, *National Environment Protection (Assessment of Site Contamination) Measure*, 1999 as amended 2013.

[3] *State Environmental Planning Policy (SEPP): Remediation of Land*, August 1998. It is noted that the SEPP55 was replaced after the issue of this report by the State Environmental Planning Policy (Resilience and Hazards) 2021. The relevant principles remain applicable as documented in this report.

[4] HEPA, *PFAS National Environmental Management Plan*, January 2020.

[5] NSW EPA, *Sampling Design Guidelines*, September 1995. It is noted that the guidelines were updated after the issue of the draft report as per Ref [6] below. The recommendations for number of samples is considered relevant.

[6] NSW EPA, *Contaminated Land Guidelines: Sampling Design Part 1 – Application*, August 2022.

[7] CRC Care, *Technical Report 10, Health screening levels for petroleum in soil and groundwater*, September 2011.

[8] Standards Australia, *Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds*, AS 4482.1-2005.

GLOSSARY

95%UCL_{ave}	A statistical calculation – 95% Upper Confidence Limit of the arithmetic mean of the data set.
ASC NEPM	National Environment Protection (Assessment of Site
EIL	Ecological investigation level. Relates to soil concentrations which may pose a risk to ecological health.
ESL	Ecological screening level. Relates to vapour risk from petroleum hydrocarbons which may pose a risk to ecological health.
HIL	Health investigation level. Relates to soil concentrations which may pose a risk to human health in soil.
HSL	Health screening level. Relates to the vapour risk from petroleum hydrocarbons which may pose a risk to human health in soil.
In-Situ	In place, without excavation.
Intralaboratory	A sample split into two and sent blind to the sample laboratory for comparative analysis.
ISL	Investigation screening levels for soil. Comprised of HIL/EIL and HSL/ESL
kg	kilogram, 1000 gram.
LEP	Local environment plan. A planning tool for the Local Government.
NEPC	National Environment Protection Council.

NSW EPA	NSW Environment Protection Authority – made a separate entity in 2011 to regulates the contaminated land industry.
PQL	Practical Quantitation Limit.
QA	Quality Assurance.
QC	Quality Control.
RPD	Relative Percentage Difference.

Chemical Compounds

BTEXN	Benzene, toluene, ethylbenzene, xylene, naphthalene. Straight chain hydrocarbons which are volatile. Occur naturally in crude oil, gas emissions from volcanoes and forest fires. Present in emissions from motor vehicles and aircrafts, cigarette smoke, processing of petroleum products, and during the production of numerous goods.
OCP	Organochlorin pesticides. Persistent, bio-accumulative pesticides used in many commercial products to protect crops, livestock, buildings and households from the damaging effects of insects.
OPP	Organophosphorous pesticides. Persistent pesticides, some of which are accumulative, used in many commercial products to protect crops, livestock, buildings and households from the damaging effects of insects.
PAH	Polycyclic aromatic hydrocarbons. Multi-ring compounds found in fuels, oils and creosote. These are also common combustion products.
PFAS	Per- and polyfluoroalkyl substances (PFAS) are a group of manufacture chemicals that includes PFOA, PFOS, GenX, and many other chemicals. PFAS have been manufactured and used in a variety of industries around the globe, including in the United States since the 1940s. PFOA and PFOS have been the most extensively produced and studied of these chemicals. Both chemicals are very persistent in the environment and in the human body – meaning they don't break down and they can accumulate over time. There is evidence that exposure to PFAS can lead to adverse human health effects.
TRH / TPH	Total recoverable / petroleum hydrocarbons. Mixture of (typically) straight chain chemicals mainly comprising hydrocarbon and carbons found in compounds sourced from crude oil. Fractions are based on behaviour in soil / water and contain many individual chemicals.

Appendix A

Drawings

LEGEND

- Approximate site boundary
- Approximate proposed development boundary
- Approximate photograph location and direction
- Surface water

Aerial image taken from Nearmap, April 14 2021
(used in accordance with commercial licence)

0 45 90 180 270 360
metres

N

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

SITE LOCATION AND LOCALITY PLAN
PRELIMINARY SITE (CONTAMINATION) ASSESSMENT
NEWCASTLE GOLF CLUB
VARDON ROAD, FERN BAY

CLIENT	Avid Project Management Pty Ltd			RCA Ref	15442-401/2
DRAWN BY	RJL/FB	SCALE	1:5,025 (A3)	DRAWING No 1	REV 0
APPROVED BY	FB	DATE	30/11/2023	OFFICE	NEWCASTLE

LEGEND

- Approximate site boundary
- Approximate hand auger location
- Approximate surface soil sample location
- Approximate surface water sample location
- Approximate geotechnical test pit location

Aerial image taken from Nearmap, April 14 2021
(used in accordance with commercial licence)

0 45 90 180 270 360
metres

N

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

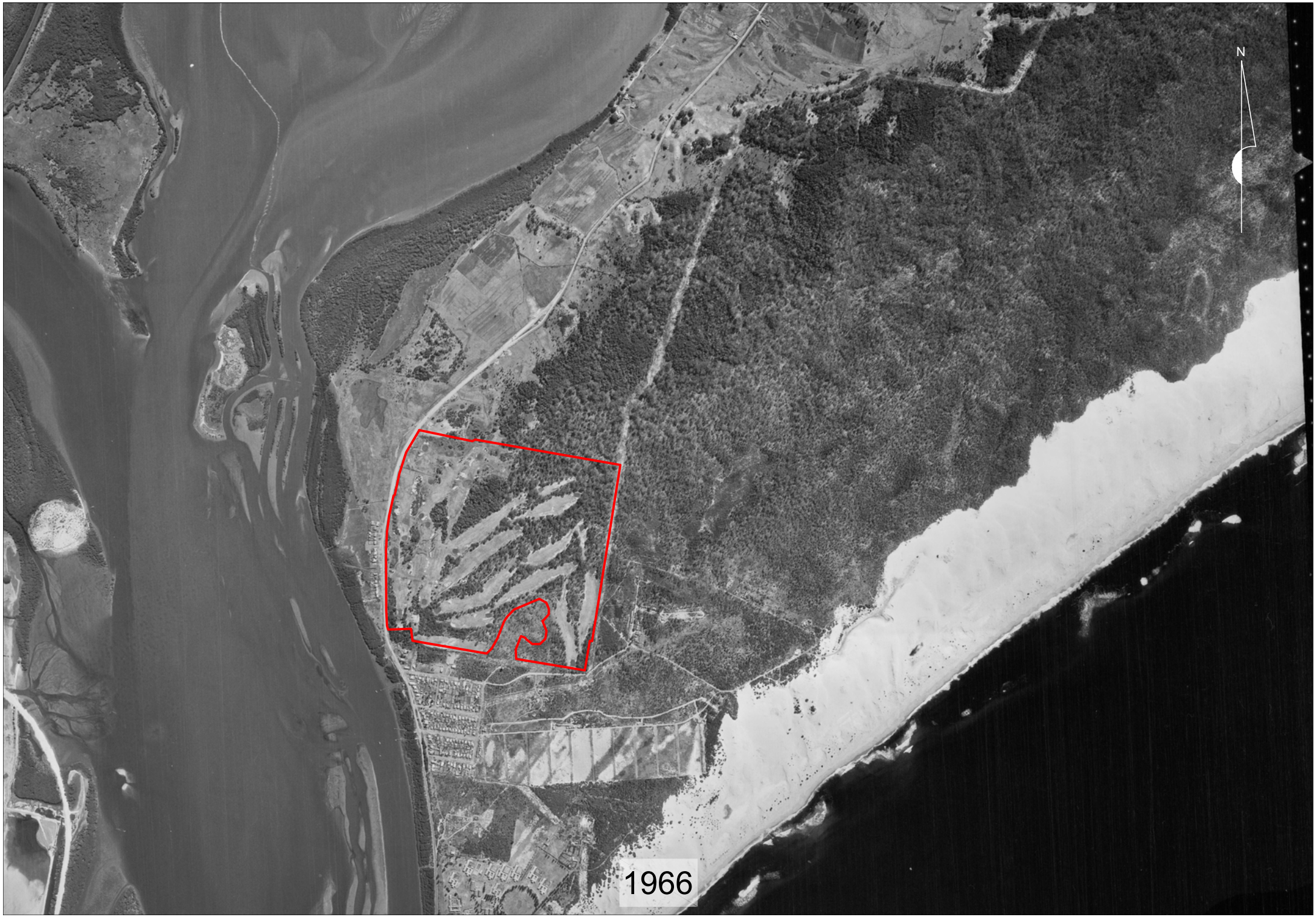
SAMPLE LOCATION PLAN
PRELIMINARY SITE (CONTAMINATION) ASSESSMENT
NEWCASTLE GOLF CLUB
VARDON ROAD, FERN BAY

CLIENT	Avid Project Management Pty Ltd			RCA Ref	15442-401/2
DRAWN BY	RJL/FB	SCALE	1:5,000 (A3)	DRAWING No 2	REV 0
APPROVED BY	FB	DATE	30/11/2023	OFFICE	NEWCASTLE

Appendix B

Historical Photographs and S10.7


N
1954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1966


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1975


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2001


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2010


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2019

PORT STEPHENS COUNCIL

ABN 16 744 377 876

PLANNING CERTIFICATE PURSUANT TO SECTION 10.7 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

APPLICANT DETAILS:

INFOTRACK PTY LIMITED
GPO Box 4029
SYDNEY NSW 2001

Reference: **s10.7**

Issue Date: **24/03/2021**

PROPERTY DESCRIPTION:

4 Vardon Road FERN BAY NSW 2295 **Parcel No: 2153**
LOT: 105 DP: 614883

Disclaimer
Information contained in this certificate relates only to the land for which this certificate is issued on the day it is issued. This information is provided in good faith and Council shall not incur any liability in respect of any such advice. Council relies on state agencies for advice and accordingly can only provide that information in accordance with the advice. Verification of the currency of agency advice should occur. For further information, please contact Council by telephoning (02) 4980 0255 or email plancert@portstephens.nsw.gov.au.

Title Information
Title information shown on this Planning Certificate is provided from Council's records and may not conform to information shown on the current Certificate of Title. Easements, restrictions as to user, rights of way and other similar information shown on the title of the land are not provided on this planning certificate.

Inspection of the land
The Council has made no inspection of the land for the purposes of this Planning Certificate.

PART A: INFORMATION PROVIDED UNDER SECTION 10.7(2)

Matters contained in this certificate apply only to the land on the date of issue.

1. Names of relevant planning instruments and DCPs

(1) The name of each environmental planning instrument that applies to the development on the land.

State Environmental Planning Policies

State Environmental Planning Policy No 21 – Caravan Parks

State Environmental Planning Policy No 33 – Hazardous and Offensive Development

State Environmental Planning Policy No 36 – Manufactured Home Estates

State Environmental Planning Policy No 50 – Canal Estate Development

State Environmental Planning Policy No 55 – Remediation of Land

State Environmental Planning Policy No 64 – Advertising and Signage

State Environmental Planning Policy No 65 – Design Quality of Residential Apartment Development

State Environmental Planning Policy (Affordable Rental Housing) 2006

State Environmental Planning Policy (Building Sustainability Index BASIX) 2004

State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017

State Environmental Planning Policy (Exempt and Complying Development Codes) 2008

State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004

State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (State and Regional Development) 2011

State Environmental Planning Policy (State Significant Precincts) 2005

State Environmental Planning Policy (Primary Production & Rural Development) 2019

State Environmental Planning Policy (Koala Habitat Protection) 2019

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017

State Environmental Planning Policy (Coastal Management) 2018

Local Environmental Plan

Port Stephens Local Environmental Plan 2013

(2) The name of each proposed environmental planning instrument that will apply to the carrying out of development on the land and that is or has been the subject of community consultation or on public exhibition under the Act (unless Secretary has

notified the Council that the making of the proposed instrument has been deferred indefinitely or has not been approved).

Draft State Environmental Planning Policies
No draft State Environmental Planning Policies affect the site the subject of this Certificate.

Draft Local Environmental Plan
No draft Local Environmental Plans currently exist which affect the site the subject of this certificate.

Development Control Plans
(3) The name of each development control plan that applies to the carrying out of development on the land.

Port Stephens Development Control Plan 2014.

2. Zoning and land use under relevant Local Environmental Plan(s)
What is the identity of the zoning for the land?

RE2 Private Recreation

Land Use Table – RE2 Private Recreation

(a) The land is zoned RE2 Private Recreation under the provisions of Part 2 in the Port Stephens Local Environmental Plan 2013.

(b) **Item 2 – Permitted without consent**

Bee keeping; Home occupations

(c) **Item 3 – Permitted with consent**

Aquaculture; Boat launching ramps; Boat sheds; Building identification signs; Business identification signs; Camping grounds; Caravan parks; Cemeteries; Charter and tourism boating facilities; Centre-based child care facilities; Community facilities; Eco-tourist facilities; Electricity generating works; Emergency services facilities; Environmental facilities; Environmental protection works; Flood mitigation works; Function centres; Health services facilities; Home-based child care; Home businesses; Hotel or motel accommodation; Information and education facilities; Kiosks; Marinas; Markets; Mooring pens; Moorings; Neighbourhood shops; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Registered clubs; Research stations; Respite day care centres; Restaurants or cafes; Roads; Roadside stalls; Serviced apartments; Water recreation structures; Water supply systems; Wharf or boating facilities.

(d) **Item 4 - Prohibited**

Health consulting rooms; Medical centres; Water treatment facilities; Any development not specified in item 2 or 3

(e) **Development Standard for the erection of a dwelling-house**

No development standard that fixes a minimum land dimension for the erection of a dwelling-house applies to the land.

(f) Does the land include or comprise a critical habitat?
Port Stephens Local Environmental Plan 2013 does not identify the land as including or comprising critical habitat.

(g) Is the land in a heritage conservation area?
The land is not located within a heritage conservation area under the Port Stephens Local Environmental Plan 2013.

(h) Is an item of environmental heritage situated on the land?
The land is not identified as containing an item of environmental heritage significance under the provisions in Port Stephens Local Environmental Plan 2013.

Note. The land subject of this certificate does not have a site specific clause applying to it.

2A. Zoning and land use under *State Environmental Planning Policy (Sydney Region Growth Centres) 2006*

Not applicable to the Port Stephens Local Government Area.

3. Complying Development
Whether or not the land to which the certificate relates is land on which complying development may be carried out under *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*?

Housing Code
Complying development under the General Housing Code MAY NOT be carried out on the land.

Inland Code
Complying development under the Inland Code MAY NOT be carried out on the land.

Rural Housing Code
Complying development under the Rural Housing Code MAY NOT be carried out on the land.

Low Rise Medium Density Code
Complying development under the Low Rise Medium Density Housing Code MAY NOT be carried out on the land.

Greenfield Housing Code
Complying development under the Greenfield Housing Code MAY NOT be carried out on the land.

Housing Alterations Code
Complying development under the Housing Alterations Code MAY NOT be carried out on the land.

General Development Code
Complying development under the General Development Code MAY NOT be carried out on the land.

Commercial and Industrial Alterations Code
Complying development under the Commercial and Industrial Alterations code MAY NOT be carried out on the land.

Commercial and Industrial (New Buildings and Additions) Code

Complying development under the Commercial and Industrial (new buildings and additions) code MAY NOT be carried out on the land.

Container Recycling Facilities Code
Complying development under the Container Recycling Facilities Code MAY NOT be carried out on the land.

Subdivisions Code
Complying development under the Subdivision Code MAY NOT be carried out on the land.

Demolition Code
Complying development under the Demolition Code MAY NOT be carried out on the land.

Fire Safety Code
Complying development under the Fire Safety code MAY NOT be carried out on the land.

Note. If the land is a lot to which the Housing Code, Rural Housing Code, Low Rise Medium Density Housing Code, Greenfield Housing Code, Housing Alterations Code, General Development Code, or Commercial and Industrial (New Buildings and Additions) Code (within the meaning of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* applies, complying development may be carried out on any part of the lot that is not affected by the provisions of clause 1.19 of that Policy

4. (Repealed)

4A. (Repealed)

4B. Annual charges under *Local Government Act 1993* for coastal protection services that relate to existing coastal protection works

The land is not subject to annual charges under section 496B of the *Local Government Act 1993* for coastal protection services relating to existing coastal protection works to which the owner (or any previous owner) of the land has consented.

Note. "existing coastal protection works" are works to reduce the impact of coastal hazards on land (such as seawalls, revetments, groynes and beach nourishment) that existed before the commencement of section 553B of the *Local Government Act 1993.*

5. Mine Subsidence
Whether or not the land is proclaimed to be a mine subsidence district within the meaning of section 15 of the *Mine Subsidence Compensation Act 1961* or within an area declared to be a mine subsidence district under the *Coal Mine Subsidence Compensation Act 2017*.

The land is not within a proclaimed or declared mine subsidence district.

6. Road widening and road realignment
Council's records indicate that the land the subject of this Certificate is not affected by any road widening or road realignment under:- (1) Section 25 of the Roads Act 1993; or (2) any environmental planning instrument; or (3) any resolution of the Council.

7. Council and other public authority policies on hazard risk restrictions

Council's records indicate that the land subject of this certificate IS NOT affected by RAAF Base Williamtown & Salt Ash Air Weapons Range 2025 Australian Noise Exposure Forecast (10th August 2011) or the Aircraft Noise Planning Area under the Port Council Aircraft Noise Policy.

7A. Flood related development controls information

FLOOD PLANNING AREA - Development on the land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings or any other purpose is subject to flood related development controls. If you wish to apply for a Flood Certificate, please refer to Council's Flood Certificate Information on our website at www.portstephens.nsw.gov.au

8. Land reserved for acquisition

Whether or not any environmental planning instrument or proposed environmental planning instrument makes provision in relation to the acquisition of the land by a public authority, as referred to in Section 3.15 of the Environmental Planning and Assessment Act 1979 (the Act).

The Port Stephens Local Environmental Plan 2013 DOES NOT provide for the acquisition of this land, or part thereof, by a public authority as referred to in Section 3.15 of the Act.

9. Contributions plans

The name of each contributions plan applying to the land

* Port Stephens Local Infrastructure Contributions Plan 2020.
* Port Stephens Fixed Local Infrastructure Contributions Plan 2020.

Note. These documents specify development contributions required towards the cost of providing additional community services or facilities if a property is developed. They are available on request from Council or can be viewed www.portstephens.nsw.gov.au.

9A. Biodiversity certified land

If the land is biodiversity certified land under Part 8 of the *Biodiversity Conservation Act 2016*, a statement to that effect.

No

Note. Biodiversity certified land includes land certified under Part 7AA of the *Threatened Species Conservation Act 1995* that is taken to be certified under Part 8 of the *Biodiversity Conservation Act 2016*.

10. Biodiversity stewardship sites

If the land is a biodiversity stewardship site under a biodiversity stewardship agreement under Part 5 of the *Biodiversity Conservation Act 2016*, a statement to that effect (but only if the council has been notified of the existence of the agreement by the Chief Executive of the Office of Environment and Heritage).

No

Note. Biodiversity stewardship agreements include biobanking agreements under Part 7A of the *Threatened Species Conservation Act 1995* that are taken to be biodiversity stewardship agreements under Part 5 of the *Biodiversity Conservation Act 2016*.

10A. Native vegetation clearing set asides

If the land contains a set aside area under section 60ZC of the *Local Land Services Act 2013*, a statement to that effect (but only if the council has been notified of the existence of the set aside area by Local Land Services or it is registered in the public register under that section).

The land DOES NOT contain a set aside area under section 60ZC of the Local Land Services Act 2013.

11. Bush fire prone land

Whether or not some, all or none of the land is bush fire prone land.

Part of the land is identified as bush fire prone land in Council's records. Further details of any applicable restrictions on development of the land may be obtained on application to Council. For further information, please contact Council's Duty Officer by telephoning 49880115.

12. Property vegetation plans

If the land is land to which a property vegetation plan under the *Native Vegetation Act 2003* (and that continues in force) applies, a statement to that effect (but only if the council has been notified of the existence of the plan by the person or body that approved the plan under that Act).

Council has not been notified of any Property Vegetation Plans under the Native Vegetation Act 2003 (and that continues in force) that affect the land to which this certificate applies.

13. Orders under *Trees (Disputes Between Neighbours) Act 2006*

Whether an order has been made under the *Trees (Disputes Between Neighbours) Act 2006* to carry out work in relation to a tree on the land (but only if the council has been notified of the order).

The land is not affected by an order under the *Trees (Disputes Between Neighbours) Act 2006* (of which Council is aware).

14. Directions under Part 3A

Whether there is a direction by the Minister in force under section 75P(2)(c1) of the Act.

The land is not affected by a direction by the Minister, in force under section 75P(2)(c1) of the *Environmental Planning and Assessment Act 1979*.

15. Site compatibility certificates and conditions for seniors housing

If the land is land to which *State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004* applies:

(a) Whether or not Council is aware of a current site compatibility certificate (seniors housing), in respect of the proposed development on the land.

Council is not aware of a site compatibility certificate (seniors housing) issued in respect of the subject land.

(b) Whether or not any terms of a kind referred to in clause 18(2) of that Policy that have been imposed as a condition of consent to a development application granted after October 2007 in respect of the land.

No terms referred to in clause 18(2) of the policy have been imposed as a condition of development consent in respect of the land to which this certificate relates.

16. Site compatibility certificates for infrastructure, schools or TAFE establishments

Whether or not Council is aware of a valid site compatibility certificate (infrastructure) or site compatibility certificate (schools, or TAFE establishments) in respect of proposed development on the land.

Council is not aware of a valid site compatibility certificate (infrastructure) or site compatibility certificate (schools, or TAFE establishments) in respect of proposed development on the land.

17. Site compatibility certificates and conditions for affordable rental housing

(1) Whether or not Council is aware of a current site compatibility certificate (affordable rental housing) in respect of proposed development on the land.

Council is not aware of a current site compatibility certificate issued under *State Environmental Planning Policy (Affordable Rental Housing) 2009*.

(2) Whether or not any terms of a kind referred to in clause 17 (1) or 38 (1) of *State Environmental Planning Policy (Affordable Rental Housing) 2009* that have been imposed as a condition of consent to a development application in respect of the land.

The land is not affected by any terms of a kind (of which Council is aware) referred to in clause 17(1) or 38(1) of *State Environmental Planning Policy (Affordable Rental Housing) 2009* that have been imposed as conditions of consent to a development application granted after 11th October, 2007 in respect of the land.

18. Paper subdivison information

(1) The name of any development plan adopted by a relevant authority that applies to the land or that is proposed to be subject to a consent ballot.
(2) The date of any subdivision order that applies to the land.
(3) Words and expressions used in this clause have the same meaning as they have in Part 16C of *Environmental Planning and Assessment Regulation 2000*.

Not applicable.

19. Site verification certificates

Whether or not Council is aware of a current site verification certificate, in respect of the land.

Council is not aware of a current site verification certificate in respect of the land.

20. Loose-fill asbestos insulation

Whether or not the land includes any residential premises (as defined in Division 1A of Part 8 of the *Home Building Act 1989*) that are listed on a register of residential premises that contain or have contained loose-fill asbestos insulation.

The land DOES NOT include any residential dwelling identified on the Loose-Fill Asbestos Insulation Register as containing loose-fill asbestos ceiling insulation. For further information, please contact Department of Fair Trading by telephoning 13 77 88 or go to their website at www.fairtrading.nsw.gov.au.

21. Affected building notices and building product rectification orders

(1) Whether nor not there is any affected building notice of which the council is aware that is in force in respect of the land.
There is no affected building notice in force in respect of the land.

(2) A statement of:

(a) Whether there is any building product rectification order of which the council is aware that is in force in respect of the land and has not been fully complied with.

No

(b) Whether any notice of intention to make a building product rectification order of which the council is aware has been given in respect of the land and is outstanding.

No

Additional matters

Note. The following matters are prescribed by section 59 (2) of the Contaminated Land Management Act 1997 as additional matters to be specified in a planning certificate**:**

(c) Whether or not the land to which the certificate relates is significantly contaminated land within the meaning of that Act.
(d) Whether or not the land to which the certificate relates is subject to a management order within the meaning of that Act.
(e) Whether or not the land to which the certificate relates is the subject of an approved voluntary management proposal within the meaning of the Act.
(f) Whether or not the land to which this certificate relates is subject to an ongoing maintenance order within the meaning of that Act.
(g) Whether or not the land to which the certificate relates is the subject of a site audit statement within the meaning of that Act – if a copy of such statement has been provided at any time to the local authority issuing the certificate.

There are no prescribed matters under section 59(2) of the Contaminated Land Management Act 1997 to be disclosed.

Issued by Port Stephens Council Development Services Group,
on behalf of **Wayne Wallis,General Manager**

PORT STEPHENS COUNCIL

ABN 16 744 377 876

PLANNING CERTIFICATE PURSUANT TO SECTION 10.7 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

APPLICANT DETAILS:

INFOTRACK PTY LIMITED
GPO Box 4029
SYDNEY NSW 2001

Reference: **s10.7**

Issue Date: **24/03/2021**

PROPERTY DESCRIPTION:

4A Vardon Road FERN BAY NSW 2295 **Parcel No: 27791**
LOT: 4 DP: 823114

Disclaimer
Information contained in this certificate relates only to the land for which this certificate is issued on the day it is issued. This information is provided in good faith and Council shall not incur any liability in respect of any such advice. Council relies on state agencies for advice and accordingly can only provide that information in accordance with the advice. Verification of the currency of agency advice should occur. For further information, please contact Council by telephoning (02) 4980 0255 or email plancert@portstephens.nsw.gov.au.

Title Information
Title information shown on this Planning Certificate is provided from Council's records and may not conform to information shown on the current Certificate of Title. Easements, restrictions as to user, rights of way and other similar information shown on the title of the land are not provided on this planning certificate.

Inspection of the land
The Council has made no inspection of the land for the purposes of this Planning Certificate.

PART A: INFORMATION PROVIDED UNDER SECTION 10.7(2)

Matters contained in this certificate apply only to the land on the date of issue.

1. Names of relevant planning instruments and DCPs

(1) The name of each environmental planning instrument that applies to the development on the land.

State Environmental Planning Policies

State Environmental Planning Policy No 21 – Caravan Parks

State Environmental Planning Policy No 33 – Hazardous and Offensive Development

State Environmental Planning Policy No 36 – Manufactured Home Estates

State Environmental Planning Policy No 50 – Canal Estate Development

State Environmental Planning Policy No 55 – Remediation of Land

State Environmental Planning Policy No 64 – Advertising and Signage

State Environmental Planning Policy No 65 – Design Quality of Residential Apartment Development

State Environmental Planning Policy (Affordable Rental Housing) 2006

State Environmental Planning Policy (Building Sustainability Index BASIX) 2004

State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017

State Environmental Planning Policy (Exempt and Complying Development Codes) 2008

State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004

State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (State and Regional Development) 2011

State Environmental Planning Policy (State Significant Precincts) 2005

State Environmental Planning Policy (Primary Production & Rural Development) 2019

State Environmental Planning Policy (Koala Habitat Protection) 2019

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017

State Environmental Planning Policy (Coastal Management) 2018

Local Environmental Plan

Port Stephens Local Environmental Plan 2013

(2) The name of each proposed environmental planning instrument that will apply to the carrying out of development on the land and that is or has been the subject of community consultation or on public exhibition under the Act (unless Secretary has

notified the Council that the making of the proposed instrument has been deferred indefinitely or has not been approved).

Draft State Environmental Planning Policies
No draft State Environmental Planning Policies affect the site the subject of this Certificate.

Draft Local Environmental Plan
No draft Local Environmental Plans currently exist which affect the site the subject of this certificate.

Development Control Plans
(3) The name of each development control plan that applies to the carrying out of development on the land.

Port Stephens Development Control Plan 2014.

2. Zoning and land use under relevant Local Environmental Plan(s)
What is the identity of the zoning for the land?

RE2 Private Recreation

Land Use Table – RE2 Private Recreation

(a) The land is zoned RE2 Private Recreation under the provisions of Part 2 in the Port Stephens Local Environmental Plan 2013.

(b) **Item 2 – Permitted without consent**

Bee keeping; Home occupations

(c) **Item 3 – Permitted with consent**

Aquaculture; Boat launching ramps; Boat sheds; Building identification signs; Business identification signs; Camping grounds; Caravan parks; Cemeteries; Charter and tourism boating facilities; Centre-based child care facilities; Community facilities; Eco-tourist facilities; Electricity generating works; Emergency services facilities; Environmental facilities; Environmental protection works; Flood mitigation works; Function centres; Health services facilities; Home-based child care; Home businesses; Hotel or motel accommodation; Information and education facilities; Kiosks; Marinas; Markets; Mooring pens; Moorings; Neighbourhood shops; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Registered clubs; Research stations; Respite day care centres; Restaurants or cafes; Roads; Roadside stalls; Serviced apartments; Water recreation structures; Water supply systems; Wharf or boating facilities.

(d) **Item 4 - Prohibited**

Health consulting rooms; Medical centres; Water treatment facilities; Any development not specified in item 2 or 3

(e) **Development Standard for the erection of a dwelling-house**

No development standard that fixes a minimum land dimension for the erection of a dwelling-house applies to the land.

(f) Does the land include or comprise a critical habitat?
Port Stephens Local Environmental Plan 2013 does not identify the land as including or comprising critical habitat.

(g) Is the land in a heritage conservation area?
The land is not located within a heritage conservation area under the Port Stephens Local Environmental Plan 2013.

(h) Is an item of environmental heritage situated on the land?
The land is not identified as containing an item of environmental heritage significance under the provisions in Port Stephens Local Environmental Plan 2013.

Note. The land subject of this certificate does not have a site specific clause applying to it.

2A. Zoning and land use under *State Environmental Planning Policy (Sydney Region Growth Centres) 2006*

Not applicable to the Port Stephens Local Government Area.

3. Complying Development
Whether or not the land to which the certificate relates is land on which complying development may be carried out under *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*?

Housing Code
Complying development under the General Housing Code MAY NOT be carried out on the land.

Inland Code
Complying development under the Inland Code MAY NOT be carried out on the land.

Rural Housing Code
Complying development under the Rural Housing Code MAY NOT be carried out on the land.

Low Rise Medium Density Code
Complying development under the Low Rise Medium Density Housing Code MAY NOT be carried out on the land.

Greenfield Housing Code
Complying development under the Greenfield Housing Code MAY NOT be carried out on the land.

Housing Alterations Code
Complying development under the Housing Alterations Code MAY NOT be carried out on the land.

General Development Code
Complying development under the General Development Code MAY NOT be carried out on the land.

Commercial and Industrial Alterations Code
Complying development under the Commercial and Industrial Alterations code MAY NOT be carried out on the land.

Commercial and Industrial (New Buildings and Additions) Code

Complying development under the Commercial and Industrial (new buildings and additions) code MAY NOT be carried out on the land.

Container Recycling Facilities Code
Complying development under the Container Recycling Facilities Code MAY NOT be carried out on the land.

Subdivisions Code
Complying development under the Subdivision Code MAY NOT be carried out on the land.

Demolition Code
Complying development under the Demolition Code MAY NOT be carried out on the land.

Fire Safety Code
Complying development under the Fire Safety code MAY NOT be carried out on the land.

Note. If the land is a lot to which the Housing Code, Rural Housing Code, Low Rise Medium Density Housing Code, Greenfield Housing Code, Housing Alterations Code, General Development Code, or Commercial and Industrial (New Buildings and Additions) Code (within the meaning of the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* applies, complying development may be carried out on any part of the lot that is not affected by the provisions of clause 1.19 of that Policy

4. (Repealed)

4A. (Repealed)

4B. Annual charges under *Local Government Act 1993* for coastal protection services that relate to existing coastal protection works

The land is not subject to annual charges under section 496B of the *Local Government Act 1993* for coastal protection services relating to existing coastal protection works to which the owner (or any previous owner) of the land has consented.

Note. "existing coastal protection works" are works to reduce the impact of coastal hazards on land (such as seawalls, revetments, groynes and beach nourishment) that existed before the commencement of section 553B of the *Local Government Act 1993.*

5. Mine Subsidence
Whether or not the land is proclaimed to be a mine subsidence district within the meaning of section 15 of the *Mine Subsidence Compensation Act 1961* or within an area declared to be a mine subsidence district under the *Coal Mine Subsidence Compensation Act 2017*.

The land is not within a proclaimed or declared mine subsidence district.

6. Road widening and road realignment
Council's records indicate that the land the subject of this Certificate is not affected by any road widening or road realignment under:- (1) Section 25 of the Roads Act 1993; or (2) any environmental planning instrument; or (3) any resolution of the Council.

7. Council and other public authority policies on hazard risk restrictions

Council's records indicate that the land subject of this certificate IS NOT affected by RAAF Base Williamtown & Salt Ash Air Weapons Range 2025 Australian Noise Exposure Forecast (10th August 2011) or the Aircraft Noise Planning Area under the Port Council Aircraft Noise Policy.

7A. Flood related development controls information

FLOOD PLANNING AREA - Development on the land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings or any other purpose is subject to flood related development controls. If you wish to apply for a Flood Certificate, please refer to Council's Flood Certificate Information on our website at www.portstephens.nsw.gov.au

8. Land reserved for acquisition

Whether or not any environmental planning instrument or proposed environmental planning instrument makes provision in relation to the acquisition of the land by a public authority, as referred to in Section 3.15 of the Environmental Planning and Assessment Act 1979 (the Act).

The Port Stephens Local Environmental Plan 2013 DOES NOT provide for the acquisition of this land, or part thereof, by a public authority as referred to in Section 3.15 of the Act.

9. Contributions plans

The name of each contributions plan applying to the land

* Port Stephens Local Infrastructure Contributions Plan 2020.
* Port Stephens Fixed Local Infrastructure Contributions Plan 2020.

Note. These documents specify development contributions required towards the cost of providing additional community services or facilities if a property is developed. They are available on request from Council or can be viewed www.portstephens.nsw.gov.au.

9A. Biodiversity certified land

If the land is biodiversity certified land under Part 8 of the *Biodiversity Conservation Act 2016*, a statement to that effect.

No

Note. Biodiversity certified land includes land certified under Part 7AA of the *Threatened Species Conservation Act 1995* that is taken to be certified under Part 8 of the *Biodiversity Conservation Act 2016*.

10. Biodiversity stewardship sites

If the land is a biodiversity stewardship site under a biodiversity stewardship agreement under Part 5 of the *Biodiversity Conservation Act 2016*, a statement to that effect (but only if the council has been notified of the existence of the agreement by the Chief Executive of the Office of Environment and Heritage).

No

Note. Biodiversity stewardship agreements include biobanking agreements under Part 7A of the *Threatened Species Conservation Act 1995* that are taken to be biodiversity stewardship agreements under Part 5 of the *Biodiversity Conservation Act 2016*.

10A. Native vegetation clearing set asides

If the land contains a set aside area under section 60ZC of the *Local Land Services Act 2013*, a statement to that effect (but only if the council has been notified of the existence of the set aside area by Local Land Services or it is registered in the public register under that section).

The land DOES NOT contain a set aside area under section 60ZC of the Local Land Services Act 2013.

11. Bush fire prone land

Whether or not some, all or none of the land is bush fire prone land.

Part of the land is identified as bush fire prone land in Council's records. Further details of any applicable restrictions on development of the land may be obtained on application to Council. For further information, please contact Council's Duty Officer by telephoning 49880115.

12. Property vegetation plans

If the land is land to which a property vegetation plan under the *Native Vegetation Act 2003* (and that continues in force) applies, a statement to that effect (but only if the council has been notified of the existence of the plan by the person or body that approved the plan under that Act).

Council has not been notified of any Property Vegetation Plans under the Native Vegetation Act 2003 (and that continues in force) that affect the land to which this certificate applies.

13. Orders under *Trees (Disputes Between Neighbours) Act 2006*

Whether an order has been made under the *Trees (Disputes Between Neighbours) Act 2006* to carry out work in relation to a tree on the land (but only if the council has been notified of the order).

The land is not affected by an order under the *Trees (Disputes Between Neighbours) Act 2006* (of which Council is aware).

14. Directions under Part 3A

Whether there is a direction by the Minister in force under section 75P(2)(c1) of the Act.

The land is not affected by a direction by the Minister, in force under section 75P(2)(c1) of the *Environmental Planning and Assessment Act 1979*.

15. Site compatibility certificates and conditions for seniors housing

If the land is land to which *State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004* applies:

(a) Whether or not Council is aware of a current site compatibility certificate (seniors housing), in respect of the proposed development on the land.

Council is not aware of a site compatibility certificate (seniors housing) issued in respect of the subject land.

(b) Whether or not any terms of a kind referred to in clause 18(2) of that Policy that have been imposed as a condition of consent to a development application granted after October 2007 in respect of the land.

No terms referred to in clause 18(2) of the policy have been imposed as a condition of development consent in respect of the land to which this certificate relates.

16. Site compatibility certificates for infrastructure, schools or TAFE establishments

Whether or not Council is aware of a valid site compatibility certificate (infrastructure) or site compatibility certificate (schools, or TAFE establishments) in respect of proposed development on the land.

Council is not aware of a valid site compatibility certificate (infrastructure) or site compatibility certificate (schools, or TAFE establishments) in respect of proposed development on the land.

17. Site compatibility certificates and conditions for affordable rental housing

(1) Whether or not Council is aware of a current site compatibility certificate (affordable rental housing) in respect of proposed development on the land.

Council is not aware of a current site compatibility certificate issued under *State Environmental Planning Policy (Affordable Rental Housing) 2009*.

(2) Whether or not any terms of a kind referred to in clause 17 (1) or 38 (1) of *State Environmental Planning Policy (Affordable Rental Housing) 2009* that have been imposed as a condition of consent to a development application in respect of the land.

The land is not affected by any terms of a kind (of which Council is aware) referred to in clause 17(1) or 38(1) of *State Environmental Planning Policy (Affordable Rental Housing) 2009* that have been imposed as conditions of consent to a development application granted after 11th October, 2007 in respect of the land.

18. Paper subdivison information

(1) The name of any development plan adopted by a relevant authority that applies to the land or that is proposed to be subject to a consent ballot.
(2) The date of any subdivision order that applies to the land.
(3) Words and expressions used in this clause have the same meaning as they have in Part 16C of *Environmental Planning and Assessment Regulation 2000*.

Not applicable.

19. Site verification certificates

Whether or not Council is aware of a current site verification certificate, in respect of the land.

Council is not aware of a current site verification certificate in respect of the land.

20. Loose-fill asbestos insulation

Whether or not the land includes any residential premises (as defined in Division 1A of Part 8 of the *Home Building Act 1989*) that are listed on a register of residential premises that contain or have contained loose-fill asbestos insulation.

The land DOES NOT include any residential dwelling identified on the Loose-Fill Asbestos Insulation Register as containing loose-fill asbestos ceiling insulation. For further information, please contact Department of Fair Trading by telephoning 13 77 88 or go to their website at www.fairtrading.nsw.gov.au.

21. Affected building notices and building product rectification orders

(1) Whether nor not there is any affected building notice of which the council is aware that is in force in respect of the land.
There is no affected building notice in force in respect of the land.

(2) A statement of:

(a) Whether there is any building product rectification order of which the council is aware that is in force in respect of the land and has not been fully complied with.

No

(b) Whether any notice of intention to make a building product rectification order of which the council is aware has been given in respect of the land and is outstanding.

No

Additional matters

Note. The following matters are prescribed by section 59 (2) of the Contaminated Land Management Act 1997 as additional matters to be specified in a planning certificate**:**

(c) Whether or not the land to which the certificate relates is significantly contaminated land within the meaning of that Act.
(d) Whether or not the land to which the certificate relates is subject to a management order within the meaning of that Act.
(e) Whether or not the land to which the certificate relates is the subject of an approved voluntary management proposal within the meaning of the Act.
(f) Whether or not the land to which this certificate relates is subject to an ongoing maintenance order within the meaning of that Act.
(g) Whether or not the land to which the certificate relates is the subject of a site audit statement within the meaning of that Act – if a copy of such statement has been provided at any time to the local authority issuing the certificate.

There are no prescribed matters under section 59(2) of the Contaminated Land Management Act 1997 to be disclosed.

Issued by Port Stephens Council Development Services Group,
on behalf of **Wayne Wallis,General Manager**

Appendix C

Registered Groundwater Well Information


GW202537
Aqua Ave
Pontoon Ave
Bayway Village
Palm Lake
Resort Fern Bay
Fern Bay Access Trail
GW054990
B63
Newcastle Golf Club
Newcastle Links
Fern Bay
Community Hall
Fern Bay Store
GW054683
GTA Accounting
Rankin Rd
Taylor Rd
Popplewell Rd
Braid Rd
GW054639
Thurlow's Island

WaterNSW
Work Summary

GW202537

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): DEWATERING (GROU, INDUSTRIAL

Work Type: Spear
Work Status: Supply Obtained
Construct.Method: Jetted - Water
Owner Type: Private

Commenced Date:
Completion Date: 22/10/2012
Final Depth: 4.50 m
Drilled Depth: 4.50 m

Contractor Name: PUMP AFFINITY
Driller: Gilbert Milton
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m): 1.000
Salinity Description:
Yield (L/s): 3.120

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	GLOUCESTER	STOCKTON	26//270695
Licensed:			

Region: 20 - Hunter
River Basin: 210 - HUNTER RIVER
Area/District:
CMA Map: 9232-2N
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6363666.000
Easting: 387510.000
Latitude: 32°51'33.6"S
Longitude: 151°47'51.9"E

GS Map: -
MGA Zone: 56
Coordinate Source: GPS - Global

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	4.50	60			Jetted - Water
1		Annulus	Waterworn/Rounded	3.00	4.50	60	60		Ungraded, Q:0.500m3, PL:Poured/Shovelled
1	1	Casing	Pvc Class 9	0.00	4.40	60	54		Seated on Bottom, Glued
1	1	Opening	Slots - Horizontal	4.40	4.50	60		0	Casing - Drilled Holes, PVC Class 9, Glued, SL: 100.0mm, A: 100.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
1.00	4.50	3.50	Unknown	1.00	1.50	3.12		01:00:00	441.00

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	4.50	4.50	Sand, light colour, medium grained	Sand	

Remarks

22/10/2012: Form A Remarks:
Nat Carling, 6-Dec-2012; GPS provided by the driller.

***** End of GW202537 *****

WaterNSW
Work Summary

GW054639

Licence: | **Licence Status:**

Authorised Purpose(s):
Intended Purpose(s): GENERAL USE

Work Type: Spear
Work Status: Supply Obtained
Construct.Method:
Owner Type: Private

Commenced Date: | **Final Depth:** 7.00 m
Completion Date: 01/11/1980 | **Drilled Depth:**

Contractor Name: (None)
Driller:
Assistant Driller:

Property: | **Standing Water Level (m):**
GWMA: | **Salinity Description:**
GW Zone: | **Yield (L/s):**

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	GLOUCESTER	STOCKTON	L5 DP500831 (8)
Licensed:			

Region: 20 - Hunter | **CMA Map:** 9232-2S
River Basin: 210 - HUNTER RIVER | **Grid Zone:** | **Scale:**
Area/District:

Elevation: 0.00 m (A.H.D.) | **Northing:** 6361856.000 | **Latitude:** 32°52'32.3"S
Elevation Source: (Unknown) | **Easting:** 387249.000 | **Longitude:** 151°47'41.1"E

GS Map: - | **MGA Zone:** 56 | **Coordinate Source:** GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Opening	Screen	-100.00	0.00			1	
1	1	Casing	Steel	0.00	0.00	38			

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
4.90	4.90	0.00	(Unknown)						

***** End of GW054639 *****

WaterNSW
Work Summary

GW054683

Licence: | **Licence Status:**

Authorised Purpose(s):
Intended Purpose(s): GENERAL USE

Work Type: Spear
Work Status:
Construct.Method: Pre-drilled
Owner Type: Private

Commenced Date: | **Final Depth:** 12.80 m
Completion Date: 01/08/1980 | **Drilled Depth:**

Contractor Name: (None)
Driller:
Assistant Driller:

Property: | **Standing Water Level (m):**
GWMA: | **Salinity Description:** invalid code
GW Zone: | **Yield (L/s):**

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	GLOUCESTER	STOCKTON	L14 (8)
Licensed:			

Region: 20 - Hunter | **CMA Map:** 9232-2N
River Basin: 210 - HUNTER RIVER | **Grid Zone:** | **Scale:**
Area/District:

Elevation: 0.00 m (A.H.D.) | **Northing:** 6362228.000 | **Latitude:** 32°52'20.3"S
Elevation Source: (Unknown) | **Easting:** 387453.000 | **Longitude:** 151°47'49.1"E

GS Map: - | **MGA Zone:** 56 | **Coordinate Source:** GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	P.V.C.	0.00	0.00	51			
1	1	Opening	Screen	11.90	12.80			1	Stainless Steel

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
8.20	8.20	0.00	Unconsolidated	8.20					

*** End of GW054683 ***

WaterNSW
Work Summary

GW054990

Licence: | **Licence Status:**

Authorised Purpose(s):
Intended Purpose(s): NOT KNOWN

Work Type: Spear
Work Status:
Construct.Method: Auger
Owner Type: Private

Commenced Date:
Completion Date: 01/02/1980

Final Depth: 4.00 m
Drilled Depth: 4.00 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property:
GWMA:
GW Zone:

Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	GLOUCESTER	STOCKTON	L13 DP39356 (8)
Licensed:			

Region: 20 - Hunter
River Basin: 210 - HUNTER RIVER
Area/District:

CMA Map: 9232-2N
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)

Northing: 6362715.000
Easting: 387005.000

Latitude: 32°52'04.3"S
Longitude: 151°47'32.1"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,ACC.MAP

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	4.00	4.00	Sand Water Supply	Sand	

***** End of GW054990 *****

Appendix D

Site Photographs

PHOTOGRAPH 1 *View north down the fairway.*

PHOTOGRAPH 2 *View south of fairway and asphalt footpath.*

PHOTOGRAPH 3 *View North west of low lying area of the fairway.*

PHOTOGRAPH 4 *Test pit TP6, thin layer of fill, with sand directly beneath, with groundwater seepage.*

Appendix E

Screening Levels and Guidelines

NATIONAL ENVIRONMENT PROTECTION (ASSESSMENT OF SITE CONTAMINATION) MEASURE 1999 AS AMENDED 2013

Soil

The investigation and screening levels (ISL) utilised for the assessment of the soil on site were sourced from the National Environment Protection Measure for the Assessment of Site Contamination (ASC NEPM, Ref [2]). These ISL are not derived as acceptance criteria for contamination at a site, but as levels above which specific consideration of risk, based on the site use and potential exposure, is required. If a risk is determined as present, then remediation and/or management must be undertaken.

Assessment ISL are based on:

- Human Health.

  Intentionally conservative health investigation levels (HIL) have been derived for four (4) generic land use settings.

  - HIL 'A' - Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry). This category includes children's day care centres, preschools and primary schools.
  - HIL 'B' - Residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high rise buildings and flats.
  - HIL 'C' - Public open space such as parks, playgrounds, playing fields (e.g. ovals) secondary schools and footpaths. It does not include undeveloped public open space (such as urban bushland and reserves).
  - HIL 'D' - Commercial/industrial such as shops, offices, factories and industrial sites.

  The exposure scenario(s) for the derivation of the relevant land use setting is set out in the table(s) below.

  Health screening levels (HSL) have been determined for risks associated from vapour intrusion from petroleum[14] compound contamination for the same land use settings. These HSL are additionally based on the fraction of compound, the soil texture and the depth of the encountered soil.

  Direct hydrocarbon contact criteria are not provided in the ASC NEPM (Ref [2]), however these are provided in CRC Care Technical Report 10 (Ref [7]) which is the source document for the HSL.

- Ecological Health

  These levels are considered to apply to soil within two (2) metres of the surface, the root zone and habitation zone of many species.

  Ecological investigation levels (EIL) have been determined for arsenic, copper, chromium III, DDT, naphthalene, nickel, lead and zinc in soil based on species sensitivity model and for three (3) generic land use settings:

[14] Laboratory analysis of hydrocarbons is being reported as total recoverable hydrocarbons (TRH). This testing method includes all forms of hydrocarbons, not just petroleum hydrocarbons and therefore can be considered a conservative measure against the chosen TPH criteria. Further laboratory analysis using a silica gel clean up (TRH_{sg}) is considered to enable a better identification of the extent of petroleum based contamination.

- Areas of ecological significance – for areas where the primary intention is for the conservation and protection of the natural environment. Protection level of 99%.
- Urban residential areas and public open space – broadly equivalent to the HIL A, HIL B and HIL C land use settings. Protection level of 80%.
- Commercial and industrial land uses – considered to be broadly equivalent to HIL D land use setting. Protection level of 60%.

Methodology for the derivation of EIL for other contaminants is available in the ASC NEPM (Ref [2]) and requires additional soil character data.

Ecological screening levels (ESL) have been determined for petroleum compound contamination. Due to limitations in the data only moderate reliability ESL have been determined for fractions $<C_{16}$, applied generically in fine and coarse grained soils. ESL for petroleum fractions $> C_{16}$, BTEX and naphthalene are considered low reliability.

- Aesthetics

Aesthetic considerations operate separately to the HIL/HSL and EIL/ESL assessment. Issues to be considered include:

- Highly malodorous soils or extracted groundwater (e.g. strong residual petroleum hydrocarbon odours, hydrogen sulphide in soil or extracted groundwater, organosulfur compounds).
- Hydrocarbon sheen on surface water.
- Discoloured chemical deposits or soil staining with chemical waste other than of a very minor nature.
- Large monolithic deposits of otherwise low-risk material, e.g. gypsum as powder or plasterboard, cement kiln dust.
- Presence of putrescible refuse including material that may generate hazardous levels of methane such as a deep-fill profile of green waste or large quantities of timber waste.
- Soils containing residue from animal burial (e.g. former abattoir sites).

Site assessment requires consideration of the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity. For example, higher expectations for soil quality would apply to residential properties with gardens compared with industrial settings.

Tier 1 assessment comprises the comparison of the soil data with the HIL/HSL and EIL/ESL. In the event that some concentrations are in excess of the relevant criteria, the summary statistics of the data set may be utilised for assessment purpose. Consideration of a range of statistics is recommended; at a minimum the $95\%UCL_{ave}$ should be compared to the relevant criteria as long as:

- No single value exceeds 250% of the relevant criterion.
- The standard deviation of the results for each analyte is less than 50% of the relevant criterion.

In addition to appropriate consideration and application of the HSL and ESL, there are a number of policy considerations which reflect the nature and properties of petroleum hydrocarbons:

- Formation of observable light non-aqueous phase liquids (LNAPL).
- Fire and explosive hazards.
- Effects on buried infrastructure e.g., penetration of, or damage to, in-ground services by hydrocarbons.

The ASC NEPM (Ref [2]) has therefore provided management limits, the application of which will require consideration of site-specific factors such as the depth of building basements and services and depth to groundwater, to determine the maximum depth to which the limits should apply. The management limits may have less relevance at operating industrial sites (including mine sites) which have no or limited sensitive receptors in the area of potential impact. When the management limits are exceeded, further site-specific assessment and management may enable any identified risk to be addressed.

The presence of site hydrocarbon contamination at the levels of the management limits does not imply that there is no need for administrative notification or controls in accordance with jurisdiction requirements.

The following figure has been taken from the ASC NEPM (Ref [2]) to illustrate the assessment methodology in regard to petroleum contamination.

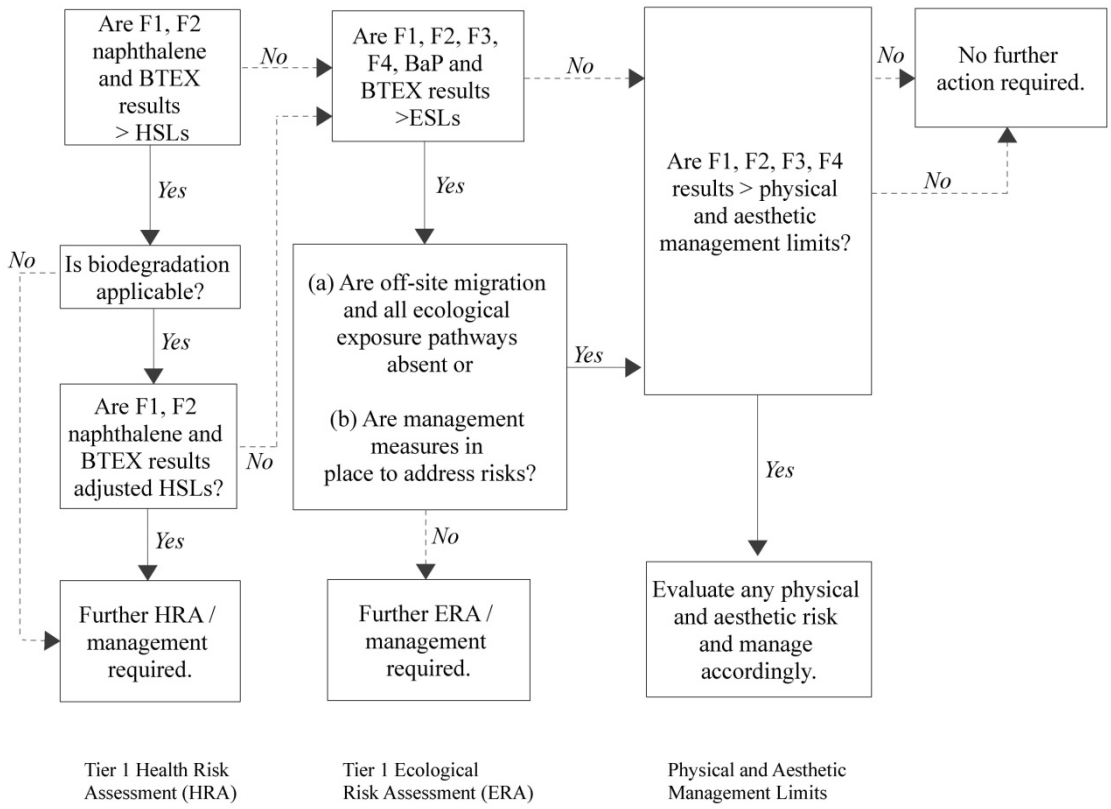

Figure 3 *Flowchart for the Tier 1 human and ecological risk assessment of petroleum hydrocarbon contamination – application of HSL and ESL and consideration of management limits*

PFAS NATIONAL ENVIRONMENTAL MANAGEMENT PLAN 2018

Soil

The criteria utilised for the assessment of the soil on site were sourced from the PFAS National Environmental management Plan (NEMP, Ref [4]). These criteria are screening levels and are not derived as acceptance criteria for contamination at a site, but as levels above which specific consideration of risk, based on the site use and potential exposure, is required.

Assessment criteria for soils are based on land use as detailed earlier in this Appendix for the ASC NEPM (Ref [2]):

Water

Criteria are based on differing protection values of ecosystems: 99%, 95%, 90% and 80% for both fresh and marine water. The NEMP (Ref [4]) note that the 99% criteria may be below the ambient background concentrations and that the criteria are close to the level of laboratory detection. This investigation has adopted the 95% protection criteria for slightly to moderately disturbed systems.

Criteria for the drinking water are provided and RCA have utilised these criteria for the consideration of human health. The NEMP (Ref [4]) notes that exceeding the values does not constitute a risk if other pathways are controlled.

Residential with Garden/Accessible soil

Summary of Exposure Pathways	Abbreviations	Units	Parameters	
			Adult	Child
Body weight	BW_A or BW_C	kg	70	15
Exposure duration	ED_A or ED_C	years	29	6
Exposure frequency	EF	days	365	365
Soil/dust ingestion rate[1]	IR_{SA} or IR_{SC}	mg/day	50 [2]	100 [2]
Soil/dust to skin adherence factor	AF	$mg/cm^2/day$	0.5	0.5
Skin surface area	SA_A or SA_C	cm^2	20 000	6100
Fraction of skin exposed	F_s	%	31.5	44.3
Dermal absorption factor	DAF	%	Chemical specific values applied	
Time spent indoors on site each day	ET_i	hours	20	20
Time spent outdoors on site each day	ET_o	hours	4	4
Home-grown fraction of vegetables consumed	F_{HG}	%	10	10
Vegetable & fruit consumption rate	C_y (veg and fruit)	g/day	400	280
Averaging time for carcinogens ('lifetime')	AT_{NT}	years	70	70
Dust lung retention factor	RF	%	37.5	37.5

Soil ingestion rates for children are based on a child aged 2-3 years where normal hand-to-mouth activity is assumed and does not account for pica behaviour

Soil ingestion rates for the HIL A scenario include the ingestion of both outdoor soil, including soil adhering to home-grown produce, and indoor dust (derived from outdoor soil tracked indoors)

Appendix F

Field Sheets and Bore Logs

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

ENVIRONMENTAL SAMPLE COLLECTION RECORD

CLIENT: Newcastle Golf Club
PROJECT: Contamination Investigation
LOCATION: Newcastle Golf Course, Fern Bay.
PROJECT MANAGER: FB/MA

DATE: 17/5/21
PROJECT No: 15492
CLIENT REF:

Sample ID	Location	Depth (m)	PID (ppm)	Sample Type	Sample Description	Comments	Lab (y / n)
SS1					fine/medium sand pale grey		
SS2					" " " grey/brown		
SS3					" / " " grey/brown		
SS4					" / " " " / "		
SS5					" / " " dark brown		
SS6					" " " grey/brown		
SS7					" " " " "	QA1	
SS8					" " " grey		
SS9					" " " brown/dark brown		
SS10					Sandy clay dark brown		

RCA Australia	Sampled by:	Date:
Office:	Checked by:	Date:

ENVIRONMENTAL HAND AUGER
HA2

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

PROJECT No: 15442
CLIENT: Avid Project Management Pty Ltd
PROJECT: Preliminary Site (Contamination) Assessment
LOCATION: Newcastle Golf Club Vardon Road, Fern Bay

DATE: 27/05/2021
SURFACE RL:
COORDS:
EXCAVATION METHOD: Hand Auger

Borehole Information				Field Material Information						
WATER	FIELD TEST	SAMPLE	DEPTH (m)	GRAPHIC LOG	DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents) (ROCK NAME; grain size, colour, minor constituents)	PID (ppm)	MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	STRUCTURE/AESTHETICS AND ADDITIONAL OBSERVATIONS
Not Encountered		0.40m HA2a 0.50m 0.90m HA2b 1.00m	0.5 1.00 1.5		Silty SAND, fine to medium grained, brown becoming dark brown at 0.4m HAND AUGER HA2 TERMINATED AT 1.00 m		M		NATURAL

LOGGED: RJL | CHECKED: FB | DATE: 21/06/2021

ENVIRONMENTAL HAND AUGER
HA4

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

PROJECT No: 15442
CLIENT: Avid Project Management Pty Ltd
PROJECT: Preliminary Site (Contamination) Assessment
LOCATION: Newcastle Golf Club Vardon Road, Fern Bay

DATE: 27/05/2021
SURFACE RL:
COORDS:
EXCAVATION METHOD: Hand Auger

Borehole Information				Field Material Information						
WATER	FIELD TEST	SAMPLE	DEPTH (m)	GRAPHIC LOG	DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents) (ROCK NAME; grain size, colour, minor constituents)	PID (ppm)	MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	STRUCTURE/AESTHETICS AND ADDITIONAL OBSERVATIONS
Not Encountered		0.40m HA4a 0.50m 0.90m HA2b 1.00m	0.5 1.00 1.5		Silty Clayey SAND, pale grey, with trace of rootlets becoming dark brown at 0.4m HAND AUGER HA4 TERMINATED AT 1.00 m		M		NATURAL

LOGGED: RJL | CHECKED: FB | DATE: 21/06/2021

ENVIRONMENTAL HAND AUGER
HA9

SHEET 1 OF 1

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

PROJECT No: 15442
CLIENT: Avid Project Management Pty Ltd
PROJECT: Preliminary Site (Contamination) Assessment
LOCATION: Newcastle Golf Club Vardon Road, Fern Bay

DATE: 27/05/2021
SURFACE RL:
COORDS:
EXCAVATION METHOD: Hand Auger

Borehole Information				Field Material Information						
WATER	FIELD TEST	SAMPLE	DEPTH (m)	GRAPHIC LOG	DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents) (ROCK NAME; grain size, colour, minor constituents)	PID (ppm)	MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	STRUCTURE/AESTHETICS AND ADDITIONAL OBSERVATIONS
Not Encountered		0.40m HA9a 0.50m 0.90m HA9b 1.00m	0.5 0.70 1.00 1.5		Sandy Silty CLAY, dark brown becoming wet at 0.6m Silty Clayey SAND, dark brown HAND AUGER HA9 TERMINATED AT 1.00 m		M		NATURAL Grass on Surface

LOGGED: RJL | CHECKED: FB | DATE: 21/06/2021

ENVIRONMENTAL HAND AUGER
HA10

SHEET 1 OF 1

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

PROJECT No: 15442
CLIENT: Avid Project Management Pty Ltd
PROJECT: Preliminary Site (Contamination) Assessment
LOCATION: Newcastle Golf Club Vardon Road, Fern Bay

DATE: 27/05/2021
SURFACE RL:
COORDS:
EXCAVATION METHOD: Hand Auger

Borehole Information				Field Material Information						
WATER	FIELD TEST	SAMPLE	DEPTH (m)	GRAPHIC LOG	DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents) (ROCK NAME; grain size, colour, minor constituents)	PID (ppm)	MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	STRUCTURE/AESTHETICS AND ADDITIONAL OBSERVATIONS
Not Encountered		0.40m HA10a 0.50m 0.90m HA10b 1.00m	0.10 0.5 0.60 1.00 1.5		Clayey SAND, pale grey Sandy Silty CLAY, dark brown, with trace of rootlets Clayey Silty SAND, dark brown, with trace of rootlets becoming wet at 0.8m HAND AUGER HA10 TERMINATED AT 1.00 m		M W		NATURAL

LOGGED: RJL | CHECKED: FB | DATE: 21/06/2021

ENVIRONMENTAL HAND AUGER

HA11

SHEET 1 OF 1

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

PROJECT No: 15442
CLIENT: Avid Project Management Pty Ltd
PROJECT: Preliminary Site (Contamination) Assessment
LOCATION: Newcastle Golf Club Vardon Road, Fern Bay

DATE: 27/05/2021
SURFACE RL:
COORDS:
EXCAVATION METHOD: Hand Auger

Borehole Information				Field Material Information						
WATER	FIELD TEST	SAMPLE	DEPTH (m)	GRAPHIC LOG	DESCRIPTION (SOIL NAME; plasticity/grain size, colour, particle shape, secondary components, minor constituents) (ROCK NAME; grain size, colour, minor constituents)	PID (ppm)	MOISTURE/ WEATHERING	CONSISTENCY/ RELATIVE DENSITY/ STRENGTH	STRUCTURE/AESTHETICS AND ADDITIONAL OBSERVATIONS
Not Encountered		0.40m BH11a 0.50m 0.90m BH10b 1.00m	0.10 0.5 1.00 1.5		FILL, SAND, pale brown		M		FILL
					SAND, medium to coarse grained, pale brown/pale grey		M		NATURAL
					becoming yellow at 0.4m				
					becoming pale yellow at 0.7m				
					HAND AUGER HA11 TERMINATED AT 1.00 m				

LOGGED: RJL | CHECKED: FB | DATE: 21/06/2021

Appendix G

Quality Assurance Review and Laboratory Report Sheets

A total of one (1) intralaboratory soil duplicate samples were submitted blind to the laboratory for analysis with the samples. This represents a percentage of 10% in accordance with the frequency recommended by the Australian Standard AS 4482.1 (Ref [8]) and RCA protocol.

RCA omitted the field blank due to the low potential for cross contamination during the sampling process, trip blank and trip spike due to the low potential for cross contamination during the transport process and the equipment wash due to the low potential for cross contamination from the sampling equipment.

ALS was chosen as the primary laboratory. This laboratory used for analysis is NATA accredited and is experienced in the analytical requirements for potentially contaminated soil and water. ALS

ALS undertook internal quality assurance testing; results are contained within the laboratory report sheets, included in this **Appendix**, noting that these have been edited to remove the sample collected in error to the north of the site. **Table 8** presents a summary of their review.

Table 8 *Internal Quality Assurance Review*

	Number Samples (including QA)	Laboratory Duplicates	Spikes	Laboratory Control Samples	Laboratory Blanks
Requirement		**10%**	**5%**	**One every batch**	
Soil					
Metals (As, Cd, Cr, Cu, Ni, Pb, Zn)	10	1 (3)	1 (1)	2	2
Mercury	10	1 (2)	1 (0)	2	2
TRH C_6-C_{10}	4	1 (0)	1 (0)	1	1
TRH >C_{10}-C_{40}	4	1 (1)	1 (0)	1	1
BTEX	4	1 (0)	1 (0)	1	1
PAH	4	1 (0)	1 (0)	1	1
OCP/OPP	10	2 (0)	1 (0)	1	1
Herbicides	10	1 (0)	1 (0)	1	1
PFAS	10	1 (1)	1 (0)	1	1
Water					
PFAS	2	0 (1)	0	1	1

Numbers in brackets refer the tests undertaken on samples not from this project but within the same laboratory batch.

ALS have undertaken laboratory quality assurance testing in accordance with the ASC NEPM (Ref [2]) with the exception of spikes for PFAS. This slight shortfall is not considered significant due to the small number of samples.

With regards to the results of quality assurance:

- Holding Times were within laboratory specified time frames.
- Recoveries of laboratory control samples were within the acceptance criteria of 70-130%.
- Recoveries of laboratory control samples were within the acceptance criteria.

- Recoveries of Spikes were within acceptance criteria of 70-130%.
- Relative Percentage Differences for duplicates were within acceptance criteria as defined for intralaboratory duplicates further in this **Appendix**.
- No Laboratory Blank result was detected above the practical quantification limit (PQL).

RCA have assessed the data in accordance with the DQI as specified in Section 6.5 as follows:

- Accuracy
  - The accuracy of the data has been assessed by internal means (surrogates, laboratory control samples, matrix spikes and method blanks) as being acceptable. All results were within the acceptance criteria as detailed earlier in this **Appendix**.
- Precision
  - The precision of the data has been assessed by internal means (duplicates) as being acceptable.
  - The prevision of the data has been assessed by external means (intralaboratory duplicates) as being acceptable.
- Completeness
  - All data that was sought during the investigation was able to be retrieved. Chain of custody were completed for all samples. As such, completeness is considered 100%.
- Representativeness
  - This assessment has considered soil contaminant concentrations on-site. The method of sampling was appropriate for the potential contaminants. As such the soil data is considered representative of the concentrations at the site.
- Comparability
  - Works were undertaken by personnel experienced in the sampling of potentially contaminated soil and surface water.
  - All samples were appropriately preserved for the requested analysis and all soil samples were kept on ice or in the refrigerator between sampling and analysis.
  - All laboratory analyses have been conducted by NATA accredited methodologies that comply with the international standard methods.
  - Comparable analytes such as TRH C_6-C_{10} and BTEX shown some concurrence between analytical results. The detected concentrations show some concurrence with field observations of the presence of contamination.

  As such it is considered that the comparability of the data is appropriate.

It is therefore considered that the data obtained from this testing is accurate and reliable in as far as it can be ascertained.

Quality Assurance Type	Primary PQL		Intralaboratory Duplicate		RPD %
Sample Identification			SS7	QA1	
Sample Depth (m)			0.01		
Date			17/5/21		
Sample Profile			Sand		
Sample Purpose			Assessment		
Sample collected by			RCA - RJL		
Metals					
Arsenic	5		2.5	2.5	*0.0*
Cadmium	1		0.5	0.5	*0.0*
Chromium	2		1	1	*0.0*
Copper	5		8	8	*0.0*
Mercury	0.1		0.05	0.05	*0.0*
Lead	5		10	10	*0.0*
Nickel	2		1	1	*0.0*
Zinc	5		26	25	*3.9*
Organochlorine Pesticides (OCP)					
alpha-BHC	0.05		0.025	0.025	*0.0*
HCB	0.05		0.025	0.025	*0.0*
b-BHC	0.05		0.025	0.025	*0.0*
g-BHC (Lindane)	0.05		0.025	0.025	*0.0*
d-BHC	0.05		0.025	0.025	*0.0*
Heptachlor	0.05		0.025	0.025	*0.0*
Aldrin	0.05		0.025	0.025	*0.0*
Heptachlor epoxide	0.05		0.025	0.025	*0.0*
trans-Chlordane	0.05		0.025	0.025	*0.0*
alpha-Endosulfan	0.05		0.025	0.025	*0.0*
cis-Chlordane	0.05		0.025	0.025	*0.0*
Dieldrin	0.05		0.025	0.025	*0.0*
DDE	0.05		0.025	0.025	*0.0*
Endrin	0.05		0.025	0.025	*0.0*
beta-Endosulfan	0.05		0.025	0.025	*0.0*
DDD	0.05		0.025	0.025	*0.0*
Endrin Aldehyde	0.05		0.025	0.025	*0.0*
Endosulfan sulfate	0.05		0.025	0.025	*0.0*
DDT	0.2		0.1	0.1	*0.0*
Endrin Ketone	0.05		0.025	0.025	*0.0*
Methoxychlor	0.2		0.1	0.1	*0.0*
Organophosphorous Pesticides (OPP)					
Chlorpyrifos	0.05		0.025	0.025	*0.0*
Bolstar	0.05		0.025	0.025	*0.0*
Demeton - O	0.05		0.025	0.025	*0.0*
Diazinon	0.2		0.1	0.1	*0.0*
Dichlorvos	0.05		0.025	0.025	*0.0*
Disulfoton	0.05		0.025	0.025	*0.0*
Ethion	0.2		0.1	0.1	*0.0*
Fenitrothion	0.05		0.025	0.025	*0.0*
Fensulfothion	0.05		0.025	0.025	*0.0*
Fenthion	0.05		0.025	0.025	*0.0*
Merphos	0.2		0.1	0.1	*0.0*
Methyl azinphos	0.05		0.025	0.025	*0.0*
Methyl parathion	0.05		0.025	0.025	*0.0*
Mevinphos (Phosdrin)	0.05		0.025	0.025	*0.0*
Naled	0.05		0.025	0.025	*0.0*
Phorate	0.05		0.025	0.025	*0.0*
Ronnel	0.05		0.025	0.025	*0.0*
Tokuthion	0.05		0.025	0.025	*0.0*
Trichloronate	0.05		0.025	0.025	*0.0*
Herbicides					
4-Chlorophenoxy acetic acid	0.02		0.02	0.02	*0.0*
2.4-DB	0.02		0.02	0.02	*0.0*
Dicamba	0.02		0.02	0.02	*0.0*
Mecoprop	0.02		0.02	0.02	*0.0*
MCPA	0.02		0.02	0.02	*0.0*
2.4-DP	0.02		0.02	0.02	*0.0*
2.4-D	0.02		0.02	0.02	*0.0*
Triclopyr	0.02		0.02	0.02	*0.0*
2.4.5-TP (Silvex)	0.02		0.02	0.02	*0.0*
2.4.5-T	0.02		0.02	0.02	*0.0*
MCPB	0.02		0.02	0.02	*0.0*
Picloram	0.02		0.02	0.02	*0.0*
Clopyralid	0.02		0.02	0.02	*0.0*
Fluroxypyr	0.02		0.02	0.02	*0.0*

All units in mg/kg

PQL = Practical Quantitation Limit.

Results underlined were not detected and are reported as half the detection limit for statistical purpose.

BOLD identifies where RPD results

>50 where sample results are >10 x PQL

>75 where sample results are > 5 to ≤10 x PQL

>100 where sample results are >2 to ≤5 x PQL

*AD>2.5 * PQL where sample results are ≤2 x PQL*

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2118463**	Page	: 1 of 14
Client	: **ROBERT CARR & ASSOCIATES P/L**	Laboratory	: Environmental Division Sydney
Contact	: MS FIONA BROOKER	Contact	: Grace White
Address	: PO BOX 175 CARRINGTON NSW, AUSTRALIA 2294	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 4902 9200	Telephone	: +61 2 8784 8555
Project	: 15442	Date Samples Received	: 18-May-2021 16:28
Order number	: ----	Date Analysis Commenced	: 19-May-2021
C-O-C number	: ----	Issue Date	: 27-May-2021 21:40
Sampler	: R LAMONT		
Site	: ----		
Quote number	: SYBQ/400/18		
No. of samples received	: 11		
No. of samples analysed	: 11		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

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

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP202: Particular samples required dilution due to matrix interferences. LOR values have been adjusted accordingly.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SS1	SS2	SS3	SS4	SS5
			Sampling date / time	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00
Compound	CAS Number	LOR	Unit	ES2118463-001	ES2118463-002	ES2118463-003	ES2118463-004	ES2118463-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	8.6	8.6	2.7	5.4	24.2
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	<2	3	<2	2	<2
Copper	7440-50-8	5	mg/kg	<5	12	<5	9	<5
Lead	7439-92-1	5	mg/kg	<5	20	<5	13	8
Nickel	7440-02-0	2	mg/kg	<2	2	<2	<2	<2
Zinc	7440-66-6	5	mg/kg	8	49	15	65	24
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.4	0.2	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SS1	SS2	SS3	SS4	SS5
				Sampling date / time	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00
Compound	CAS Number	LOR	Unit		ES2118463-001	ES2118463-002	ES2118463-003	ES2118463-004	ES2118463-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	<0.5	----	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SS1	SS2	SS3	SS4	SS5
				Sampling date / time	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00
Compound	CAS Number	LOR	Unit		ES2118463-001	ES2118463-002	ES2118463-003	ES2118463-004	ES2118463-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	----	**0.6**	----	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	----	**1.2**	----	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	<10	----	<10
C10 - C14 Fraction	----	50	mg/kg		<50	----	<50	----	<50
C15 - C28 Fraction	----	100	mg/kg		<100	----	<100	----	<100
C29 - C36 Fraction	----	100	mg/kg		**110**	----	<100	----	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		**110**	----	<50	----	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	<10	----	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	<10	----	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	----	<50	----	<50
>C16 - C34 Fraction	----	100	mg/kg		**110**	----	<100	----	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	----	<100	----	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		**110**	----	<50	----	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	<50	----	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	<0.2	----	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	<0.5	----	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	----	<0.2	----	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	----	<0.5	----	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SS1	SS2	SS3	SS4	SS5
				Sampling date / time	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00
Compound	CAS Number	LOR	Unit		ES2118463-001	ES2118463-002	ES2118463-003	ES2118463-004	ES2118463-005
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
Naphthalene	91-20-3	1	mg/kg		<1	----	<1	----	<1
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		<0.02	<0.04	<0.02	<0.04	<0.04
2.4-DB	94-82-6	0.02	mg/kg		<0.02	<0.04	<0.02	<0.04	<0.04
Dicamba	1918-00-9	0.02	mg/kg		<0.02	<0.04	<0.02	<0.04	<0.04
Mecoprop	93-65-2	0.02	mg/kg		<0.02	<0.04	<0.02	<0.04	<0.04
MCPA	94-74-6	0.02	mg/kg		<0.02	<0.04	<0.02	<0.04	<0.04
2.4-DP	120-36-5	0.02	mg/kg		<0.02	<0.04	<0.02	<0.04	<0.04
2.4-D	94-75-7	0.02	mg/kg		<0.02	<0.04	<0.02	<0.04	<0.04
Triclopyr	55335-06-3	0.02	mg/kg		<0.02	<0.04	<0.02	<0.04	<0.04
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		<0.02	<0.04	<0.02	<0.04	<0.04
2.4.5-T	93-76-5	0.02	mg/kg		<0.02	<0.04	<0.02	<0.04	<0.04
MCPB	94-81-5	0.02	mg/kg		<0.02	<0.04	<0.02	<0.04	<0.04
Picloram	1918-02-1	0.02	mg/kg		<0.02	<0.04	<0.02	<0.04	<0.04
Clopyralid	1702-17-6	0.02	mg/kg		<0.02	<0.04	<0.02	<0.04	<0.04
Fluroxypyr	69377-81-7	0.02	mg/kg		<0.02	<0.04	<0.02	<0.04	<0.04
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		84.0	85.6	83.6	92.1	107
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		87.9	84.4	83.5	81.6	96.8
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		96.4	----	98.7	----	95.3
2-Chlorophenol-D4	93951-73-6	0.5	%		94.4	----	96.6	----	93.4
2.4.6-Tribromophenol	118-79-6	0.5	%		103	----	104	----	99.5
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		99.4	----	100	----	98.8
Anthracene-d10	1719-06-8	0.5	%		108	----	109	----	107
4-Terphenyl-d14	1718-51-0	0.5	%		95.7	----	97.8	----	95.6
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		93.7	----	103	----	95.5
Toluene-D8	2037-26-5	0.2	%		93.3	----	105	----	95.8
4-Bromofluorobenzene	460-00-4	0.2	%		92.4	----	104	----	95.4
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		67.6	70.9	64.0	57.4	69.9

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SS6	SS7	SS8	SS9	SS10
				Sampling date / time	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00
Compound	CAS Number	LOR	Unit		ES2118463-006	ES2118463-007	ES2118463-008	ES2118463-009	ES2118463-010
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		10.8	5.7	3.2	3.3	47.9
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		<2	<2	<2	<2	10
Copper	7440-50-8	5	mg/kg		8	8	6	<5	34
Lead	7439-92-1	5	mg/kg		13	10	9	6	40
Nickel	7440-02-0	2	mg/kg		<2	<2	<2	<2	14
Zinc	7440-66-6	5	mg/kg		61	26	28	25	50
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		0.7	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SS6	SS7	SS8	SS9	SS10
				Sampling date / time	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00
Compound	CAS Number	LOR	Unit		ES2118463-006	ES2118463-007	ES2118463-008	ES2118463-009	ES2118463-010
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		----	----	<0.5	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		----	----	<0.5	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		----	----	<0.5	----	<0.5
Fluorene	86-73-7	0.5	mg/kg		----	----	<0.5	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		----	----	<0.5	----	<0.5
Anthracene	120-12-7	0.5	mg/kg		----	----	<0.5	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		----	----	<0.5	----	**0.8**
Pyrene	129-00-0	0.5	mg/kg		----	----	<0.5	----	**0.8**
Benz(a)anthracene	56-55-3	0.5	mg/kg		----	----	<0.5	----	<0.5
Chrysene	218-01-9	0.5	mg/kg		----	----	<0.5	----	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SS6	SS7	SS8	SS9	SS10
				Sampling date / time	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00
Compound	CAS Number	LOR	Unit		ES2118463-006	ES2118463-007	ES2118463-008	ES2118463-009	ES2118463-010
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		----	----	<0.5	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		----	----	<0.5	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		----	----	<0.5	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		----	----	<0.5	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		----	----	<0.5	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		----	----	<0.5	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		----	----	<0.5	----	1.6
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		----	----	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		----	----	0.6	----	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		----	----	1.2	----	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		----	----	<10	----	<10
C10 - C14 Fraction	----	50	mg/kg		----	----	<50	----	120
C15 - C28 Fraction	----	100	mg/kg		----	----	<100	----	300
C29 - C36 Fraction	----	100	mg/kg		----	----	<100	----	250
^ C10 - C36 Fraction (sum)	----	50	mg/kg		----	----	<50	----	670
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		----	----	<10	----	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		----	----	<10	----	<10
>C10 - C16 Fraction	----	50	mg/kg		----	----	<50	----	130
>C16 - C34 Fraction	----	100	mg/kg		----	----	<100	----	420
>C34 - C40 Fraction	----	100	mg/kg		----	----	<100	----	150
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	----	<50	----	700
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		----	----	<50	----	130
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		----	----	<0.2	----	<0.2
Toluene	108-88-3	0.5	mg/kg		----	----	<0.5	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		----	----	<0.5	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	----	<0.5	----	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		----	----	<0.5	----	<0.5
^ Sum of BTEX	----	0.2	mg/kg		----	----	<0.2	----	<0.2
^ Total Xylenes	----	0.5	mg/kg		----	----	<0.5	----	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SS6	SS7	SS8	SS9	SS10
				Sampling date / time	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00	17-May-2021 00:00
Compound	CAS Number	LOR	Unit		ES2118463-006	ES2118463-007	ES2118463-008	ES2118463-009	ES2118463-010
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
Naphthalene	91-20-3	1	mg/kg		----	----	<1	----	<1
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	<0.04
2.4-DB	94-82-6	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	<0.04
Dicamba	1918-00-9	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	<0.04
Mecoprop	93-65-2	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	<0.04
MCPA	94-74-6	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	<0.04
2.4-DP	120-36-5	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	<0.04
2.4-D	94-75-7	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	<0.04
Triclopyr	55335-06-3	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	<0.04
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	<0.04
2.4.5-T	93-76-5	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	<0.04
MCPB	94-81-5	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	<0.04
Picloram	1918-02-1	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	<0.04
Clopyralid	1702-17-6	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	<0.04
Fluroxypyr	69377-81-7	0.02	mg/kg		<0.04	<0.04	<0.04	<0.04	<0.04
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		82.1	84.8	98.9	65.8	92.7
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		96.7	75.9	90.7	65.7	111
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	----	98.1	----	97.8
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	96.0	----	95.7
2.4.6-Tribromophenol	118-79-6	0.5	%		----	----	101	----	117
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	102	----	99.0
Anthracene-d10	1719-06-8	0.5	%		----	----	109	----	106
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	97.8	----	96.3
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		----	----	98.8	----	85.2
Toluene-D8	2037-26-5	0.2	%		----	----	105	----	87.4
4-Bromofluorobenzene	460-00-4	0.2	%		----	----	106	----	87.7
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		53.6	50.9	78.1	67.5	70.4

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QA1	----	----	----	----
				Sampling date / time	17-May-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2118463-011	--------	--------	--------	--------
					Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		**5.7**	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg		<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg		<2	----	----	----	----
Copper	7440-50-8	5	mg/kg		**8**	----	----	----	----
Lead	7439-92-1	5	mg/kg		**10**	----	----	----	----
Nickel	7440-02-0	2	mg/kg		<2	----	----	----	----
Zinc	7440-66-6	5	mg/kg		**25**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg		<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg		<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg		<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg		<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	----	----	----	----
^ **Total Chlordane (sum)**	----	0.05	mg/kg		<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg		<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	----	----	----	----
^ **Endosulfan (sum)**	115-29-7	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QA1	----	----	----	----
				Sampling date / time	17-May-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2118463-011	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	----	----	----	----
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg		<0.05	----	----	----	----
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg		<0.05	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	----	----	----	----
Malathion	121-75-5	0.05	mg/kg		<0.05	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	----	----	----	----
Parathion	56-38-2	0.2	mg/kg		<0.2	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	----	----	----	----
Ethion	563-12-2	0.05	mg/kg		<0.05	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	----	----	----	----
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		<0.04	----	----	----	----
2.4-DB	94-82-6	0.02	mg/kg		<0.04	----	----	----	----
Dicamba	1918-00-9	0.02	mg/kg		<0.04	----	----	----	----
Mecoprop	93-65-2	0.02	mg/kg		<0.04	----	----	----	----
MCPA	94-74-6	0.02	mg/kg		<0.04	----	----	----	----
2.4-DP	120-36-5	0.02	mg/kg		<0.04	----	----	----	----
2.4-D	94-75-7	0.02	mg/kg		<0.04	----	----	----	----
Triclopyr	55335-06-3	0.02	mg/kg		<0.04	----	----	----	----
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		<0.04	----	----	----	----
2.4.5-T	93-76-5	0.02	mg/kg		<0.04	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QA1	----	----	----	----
				Sampling date / time	17-May-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2118463-011	--------	--------	--------	--------
					Result	----	----	----	----
EP202A: Phenoxyacetic Acid Herbicides by LCMS - Continued									
MCPB	94-81-5	0.02	mg/kg		<0.04	----	----	----	----
Picloram	1918-02-1	0.02	mg/kg		<0.04	----	----	----	----
Clopyralid	1702-17-6	0.02	mg/kg		<0.04	----	----	----	----
Fluroxypyr	69377-81-7	0.02	mg/kg		<0.04	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**85.5**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**84.7**	----	----	----	----
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		**76.5**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130
EP202S: Phenoxyacetic Acid Herbicide Surrogate			
2.4-Dichlorophenyl Acetic Acid	19719-28-9	45	139

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES2118463**	Page	: 1 of 13
Client	: **ROBERT CARR & ASSOCIATES P/L**	Laboratory	: Environmental Division Sydney
Contact	: MS FIONA BROOKER	Contact	: Grace White
Address	: PO BOX 175 CARRINGTON NSW, AUSTRALIA 2294	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 4902 9200	Telephone	: +61 2 8784 8555
Project	: 15442	Date Samples Received	: 18-May-2021
Order number	: ----	Date Analysis Commenced	: 19-May-2021
C-O-C number	: ----	Issue Date	: 27-May-2021
Sampler	: R LAMONT		
Site	: ----		
Quote number	: SYBQ/400/18		
No. of samples received	: 11		
No. of samples analysed	: 11		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3696268)									
EN2104148-096	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	7	8	14.8	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	6	6	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	6	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	9	7	23.8	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	6	21.4	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	36	57	45.7	0% - 50%
ES2118463-006	SS6	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	8	8	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	13	13	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	61	64	4.4	0% - 50%
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3696847)									
ES2118463-007	SS7	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	8	8	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	10	10	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	26	26	0.0	No Limit
ES2118722-009	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3696847) - continued									
ES2118722-009	Anonymous	EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	<5	<5	0.0	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3696272)									
ES2118427-001	Anonymous	EA055: Moisture Content	----	0.1	%	4.5	4.0	12.9	No Limit
ES2118453-008	Anonymous	EA055: Moisture Content	----	0.1	%	4.4	4.7	7.0	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3696853)									
ES2118463-009	SS9	EA055: Moisture Content	----	0.1	%	3.3	3.5	6.5	No Limit
ES2118767-001	Anonymous	EA055: Moisture Content	----	0.1	%	37.6	34.8	7.9	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3696269)									
EN2104148-096	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES2118463-006	SS6	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.7	0.5	22.9	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3696846)									
ES2118722-009	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3685529)									
ES2118463-011	QA1	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
ES2118463-001	SS1	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3685529) - continued									
ES2118463-001	SS1	EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 3685529)									
ES2118463-011	QA1	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
ES2118463-001	SS1	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 3685529) - continued									
ES2118463-001	SS1	EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3685527)									
ES2118463-001	SS1	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3685103)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3685103) - continued									
ES2117517-042	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES2117517-050	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3685528)									
ES2118463-001	SS1	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	110	110	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3685103)									
ES2117517-042	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
ES2117517-050	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3685528)									
ES2118463-001	SS1	EP071: >C16 - C34 Fraction	----	100	mg/kg	110	120	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 3685103)									
ES2117517-042	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
ES2117517-050	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 3699217)									
ES2118463-001	SS1	EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 3699217) - continued									
ES2118463-001	SS1	EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
ES2118463-003	SS3	EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	<0.02	0.0	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3696268)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	109	88.0	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	114	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	19.6 mg/kg	111	68.0	132
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	103	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	60.8 mg/kg	104	82.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.3 mg/kg	99.6	80.0	120
EG005T: Zinc	7440-66-6	5	mg/kg	<5	139.3 mg/kg	97.0	66.0	133
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3696847)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	98.4	88.0	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	105	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	19.6 mg/kg	109	68.0	132
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	105	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	60.8 mg/kg	102	82.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.3 mg/kg	100	80.0	120
EG005T: Zinc	7440-66-6	5	mg/kg	<5	139.3 mg/kg	95.8	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3696269)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.087 mg/kg	102	70.0	125
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3696846)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.087 mg/kg	89.6	70.0	125
EP068A: Organochlorine Pesticides (OC) (QCLot: 3685529)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	84.2	69.0	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	83.6	65.0	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	91.2	67.0	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	94.9	68.0	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	91.6	65.0	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.6	67.0	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	99.5	69.0	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	93.6	62.0	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	90.1	63.0	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	103	66.0	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	91.6	64.0	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	102	66.0	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	96.7	67.0	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	100	67.0	123

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 3685529) - continued								
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	101	69.0	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	91.9	69.0	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	96.6	56.0	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	104	62.0	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	98.5	66.0	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	103	64.0	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	100.0	54.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3685529)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	106	59.0	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	99.6	62.0	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	84.6	54.0	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	101	67.0	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	83.2	70.0	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	87.5	72.0	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	90.2	68.0	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	93.8	68.0	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	86.1	69.0	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	95.0	76.0	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	87.6	64.0	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	77.2	70.0	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	80.6	69.0	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	86.6	66.0	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	104	68.0	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	92.8	62.0	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	90.2	68.0	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	105	65.0	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	90.6	41.0	123
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3685527)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	104	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	105	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	102	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	103	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	102	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	102	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	105	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	106	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	95.2	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	96.4	75.0	127

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3685527) - continued								
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	97.9	68.0	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	100.0	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	92.4	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	88.2	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	87.0	62.0	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	89.7	63.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3685103)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	98.7	68.4	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3685528)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	90.6	75.0	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	107	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	99.5	71.0	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3685103)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	98.5	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3685528)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	102	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	108	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	93.7	63.0	131
EP080: BTEXN (QCLot: 3685103)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	105	62.0	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	100	67.0	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	97.8	65.0	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	96.1	66.0	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	96.7	68.0	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	96.1	63.0	119
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 3699217)								
EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	0.1 mg/kg	81.3	54.4	128
EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.02	0.1 mg/kg	67.0	45.5	130
EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	0.1 mg/kg	95.3	51.7	135
EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	0.1 mg/kg	70.6	60.0	130
EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	0.1 mg/kg	71.2	56.8	131
EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.02	0.1 mg/kg	74.2	50.0	141
EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	0.1 mg/kg	74.5	68.5	131
EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	0.1 mg/kg	75.8	50.8	141
EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	0.1 mg/kg	64.9	40.8	126
EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	0.1 mg/kg	87.2	57.4	139

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 3699217) - continued								
EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	0.1 mg/kg	75.2	38.9	137
EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	0.1 mg/kg	73.4	48.7	129
EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	0.1 mg/kg	93.8	49.4	106
EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	0.1 mg/kg	76.7	53.2	128

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3696268)							
EN2104148-096	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	89.2	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	85.7	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	87.8	68.0	132
		EG005T: Copper	7440-50-8	250 mg/kg	82.9	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	87.2	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	83.2	70.0	130
		EG005T: Zinc	7440-66-6	250 mg/kg	94.8	66.0	133
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3696847)							
ES2118463-007	SS7	EG005T: Arsenic	7440-38-2	50 mg/kg	110	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	110	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	110	68.0	132
		EG005T: Copper	7440-50-8	250 mg/kg	107	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	111	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	106	70.0	130
		EG005T: Zinc	7440-66-6	250 mg/kg	112	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3696269)							
EN2104148-096	Anonymous	EG035T: Mercury	7439-97-6	0.5 mg/kg	84.4	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3696846)							
ES2118463-007	SS7	EG035T: Mercury	7439-97-6	5 mg/kg	108	70.0	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 3685529)							
ES2118463-001	SS1	EP068: gamma-BHC	58-89-9	0.5 mg/kg	95.9	70.0	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	103	70.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	109	70.0	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	109	70.0	130
		EP068: Endrin	72-20-8	2 mg/kg	97.0	70.0	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 3685529) - continued							
ES2118463-001	SS1	EP068: 4.4`-DDT	50-29-3	2 mg/kg	85.6	70.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3685529)							
ES2118463-001	SS1	EP068: Diazinon	333-41-5	0.5 mg/kg	105	70.0	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	89.7	70.0	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	110	70.0	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	89.4	70.0	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	101	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3685527)							
ES2118463-001	SS1	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	92.8	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	101	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3685103)							
ES2117517-042	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	103	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3685528)							
ES2118463-001	SS1	EP071: C10 - C14 Fraction	----	523 mg/kg	85.3	73.0	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	114	53.0	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	106	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3685103)							
ES2117517-042	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	104	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3685528)							
ES2118463-001	SS1	EP071: >C10 - C16 Fraction	----	860 mg/kg	100	73.0	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	110	53.0	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	64.7	52.0	132
EP080: BTEXN (QCLot: 3685103)							
ES2117517-042	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	95.6	70.0	130
		EP080: Toluene	108-88-3	2.5 mg/kg	92.2	70.0	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	92.4	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	89.3	70.0	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	92.2	70.0	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	89.0	70.0	130
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 3699217)							
ES2118463-001	SS1	EP202: Mecoprop	93-65-2	0.1 mg/kg	73.1	60.0	140
		EP202: MCPA	94-74-6	0.1 mg/kg	72.4	57.0	143
		EP202: 2.4-D	94-75-7	0.1 mg/kg	78.9	68.0	139
		EP202: Triclopyr	55335-06-3	0.1 mg/kg	82.9	51.0	145
		EP202: 2.4.5-T	93-76-5	0.1 mg/kg	82.7	57.0	142

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 3699217) - continued							
ES2118463-001	SS1	EP202: Picloram	1918-02-1	0.1 mg/kg	79.9	49.0	138
		EP202: Clopyralid	1702-17-6	0.1 mg/kg	84.9	49.0	149

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2118463**	Page	: 1 of 7
Client	: **ROBERT CARR & ASSOCIATES P/L**	Laboratory	: Environmental Division Sydney
Contact	: MS FIONA BROOKER	Telephone	: +61 2 8784 8555
Project	: 15442	Date Samples Received	: 18-May-2021
Site	: ----	Issue Date	: 27-May-2021
Sampler	: R LAMONT	No. of samples received	: 11
Order number	: ----	No. of samples analysed	: 11

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Total Mercury by FIMS	3	31	9.68	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
SS1, SS2, SS3, SS4, SS5, SS6, SS7, SS8, SS9, SS10, QA1	**17-May-2021**	**----**	----	----	**25-May-2021**	31-May-2021	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
SS7, SS8, SS9, SS10, QA1	**17-May-2021**	**25-May-2021**	13-Nov-2021	✓	**26-May-2021**	13-Nov-2021	✓
Soil Glass Jar - Unpreserved (EG005T)							
SS1, SS2, SS3, SS4, SS5, SS6	**17-May-2021**	**26-May-2021**	13-Nov-2021	✓	**26-May-2021**	13-Nov-2021	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
SS7, SS8, SS9, SS10, QA1	**17-May-2021**	**25-May-2021**	14-Jun-2021	✓	**27-May-2021**	14-Jun-2021	✓
Soil Glass Jar - Unpreserved (EG035T)							
SS1, SS2, SS3, SS4, SS5, SS6	**17-May-2021**	**26-May-2021**	14-Jun-2021	✓	**26-May-2021**	14-Jun-2021	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068)							
SS1, SS2, SS3, SS4, SS5, SS6, SS7, SS8, SS9, SS10, QA1	**17-May-2021**	**19-May-2021**	31-May-2021	✓	**21-May-2021**	28-Jun-2021	✓
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068)							
SS1, SS2, SS3, SS4, SS5, SS6, SS7, SS8, SS9, SS10, QA1	**17-May-2021**	**19-May-2021**	31-May-2021	✓	**21-May-2021**	28-Jun-2021	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
SS1, SS3, SS5, SS8, SS10	**17-May-2021**	**19-May-2021**	31-May-2021	✓	**21-May-2021**	28-Jun-2021	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071)							
SS1, SS3, SS5, SS8, SS10	**17-May-2021**	**19-May-2021**	31-May-2021	✓	**21-May-2021**	28-Jun-2021	✓
Soil Glass Jar - Unpreserved (EP080)							
SS1, SS3, SS5, SS8, SS10	**17-May-2021**	**19-May-2021**	31-May-2021	✓	**22-May-2021**	31-May-2021	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP071)							
SS1, SS3, SS5, SS8, SS10	**17-May-2021**	**19-May-2021**	31-May-2021	✓	**21-May-2021**	28-Jun-2021	✓
Soil Glass Jar - Unpreserved (EP080)							
SS1, SS3, SS5, SS8, SS10	**17-May-2021**	**19-May-2021**	31-May-2021	✓	**22-May-2021**	31-May-2021	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
SS1, SS3, SS5, SS8, SS10	**17-May-2021**	**19-May-2021**	31-May-2021	✓	**22-May-2021**	31-May-2021	✓
EP202A: Phenoxyacetic Acid Herbicides by LCMS							
Soil Glass Jar - Unpreserved (EP202)							
SS1, SS2, SS3, SS4, SS5, SS6, SS7, SS8, SS9, SS10, QA1	**17-May-2021**	**27-May-2021**	31-May-2021	✓	**27-May-2021**	06-Jul-2021	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	4	38	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	31	**9.68**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	4	32	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	31	**6.45**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	32	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	31	**6.45**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	32	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	31	**6.45**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	32	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM Schedule B(3).
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	SOIL	In house: LCMS (Electrospray in negative mode). Residues of acid herbicides are extracted from soil samples under the alkaline condition. An aliquot of the alkaline aqueous phase is taken and acidified before a SPE cleanup. After eluting off from the SPE cartridge, residues of acid herbicides are dissolved in HPLC mobile phase prior to instrument analysis.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Extraction for Phenoxy Acid Herbicides in Soils.	EP202-PR	SOIL	In-House: Alkaline extract followed by SPE clean up of acidified portion of the sample extract.
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.

Preparation Methods	Method	Matrix	Method Descriptions
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2118463**

Client	: **ROBERT CARR & ASSOCIATES P/L**	Laboratory	: Environmental Division Sydney
Contact	: MS FIONA BROOKER	Contact	: Grace White
Address	: PO BOX 175 CARRINGTON NSW, AUSTRALIA 2294	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: fionab@rca.com.au	E-mail	: Grace.White@ALSGlobal.com
Telephone	: +61 02 4902 9200	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 4902 9299	Facsimile	: +61-2-8784 8500
Project	: 15442	Page	: 1 of 3
Order number	: ----	Quote number	: ES2017ROBCAR0004 (SYBQ/400/18)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: R LAMONT		

Dates

Date Samples Received	: 18-May-2021 16:28	Issue Date	: 18-May-2021
Client Requested Due Date	: 27-May-2021	Scheduled Reporting Date	: **27-May-2021**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	: ----	Temperature	: 0.4'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 11 / 11

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

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

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

Summary of Sample(s) and Requested Analysis

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

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - EP202(solids) Phenoxyacetic acids	SOIL - S-02 8 Metals (incl. Digestion)	SOIL - S-12 OC/OP Pesticides	SOIL - S-26 8 metals/TRH/BTEXN/PAH
ES2118463-001	17-May-2021 00:00	SS1	✓	✓		✓	✓
ES2118463-002	17-May-2021 00:00	SS2	✓	✓	✓	✓	
ES2118463-003	17-May-2021 00:00	SS3	✓	✓		✓	✓
ES2118463-004	17-May-2021 00:00	SS4	✓	✓	✓	✓	
ES2118463-005	17-May-2021 00:00	SS5	✓	✓		✓	✓
ES2118463-006	17-May-2021 00:00	SS6	✓	✓	✓	✓	
ES2118463-007	17-May-2021 00:00	SS7	✓	✓	✓	✓	
ES2118463-008	17-May-2021 00:00	SS8	✓	✓		✓	✓
ES2118463-009	17-May-2021 00:00	SS9	✓	✓	✓	✓	
ES2118463-010	17-May-2021 00:00	SS10	✓	✓		✓	✓
ES2118463-011	17-May-2021 00:00	QA1	✓	✓	✓	✓	

Proactive Holding Time Report

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

Requested Deliverables

ADMINISTRATOR

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

ALL INVOICES

- A4 - AU Tax Invoice (INV)	Email	administrator@rca.com.au

ENVIRO

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

FIONA BROOKER

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

Richie Lamont

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

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ **Sydney:** 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
☐ **Newcastle:** 5 Rosegum Rd, Warabrook NSW 2304 Ph:02 4968 9433 E:samples.newcastle@alsenviro.com
☐ **Brisbane:** 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
☐ **Townsville:** 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsenviro.com
☐ **Melbourne:** 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ **Adelaide:** 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ **Perth:** 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ **Launceston:** 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	RCA Australia
OFFICE:	92 Hill Street, Carrington
RCA Ref No:	15442
Fern Bay	
PROJECT MANAGER: Fiona Brooker	**CONTACT PH:** 0408 687 529
SAMPLER: R Lamont	**SAMPLER MOBILE:** 0401 002 912
COC Emailed to ALS? (YES / NO)	**EDD FORMAT (or default):**
Email Reports to: administrator@rca.com.au + enviro@rca.com.au, richiel@rca.com.au	
Email Invoice to: as above	

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

ALS QUOTE NO.: SYBQ_400_17

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

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No (N/A)
Free ice / frozen ice bricks present upon receipt? (Yes) No N/A
Random Sample Temperature on Receipt: 0·4 °C
Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
R Lamont (signature)	MM 8-21 am	MM 5pm	[signature] Flo. 04 As.
DATE/TIME: 18/5/21	DATE/TIME: 18/05/21	DATE/TIME: 18/05/21	DATE/TIME: 18/5/21 1930

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	S-26 (TRH, BTEX, PAH, Metals)	S-12 OCP/OPP	Phenoxy Acid herbicides - standard level	S-02 Metals					Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	SS1	17/05/2021	S			X	X	X						LAB OF ORIGIN: NEWCASTLE
2	SS2	17/05/2021	S				X	X	X					
3	SS3	17/05/2021	S			X	X	X						
4	SS4	17/05/2021	S				X	X	X					
5	SS5	17/05/2021	S			X	X	X						
6	SS6	17/05/2021	S				X	X	X					
7	SS7	17/05/2021	S				X	X	X					
8	SS8	17/05/2021	S			X	X	X						
9	SS9	17/05/2021	S				X	X	X					
10	SS10	17/05/2021	S			X	X	X						
11	QA1	17/05/2021	S				X	X	X					
TOTAL														

Environmental Division
Sydney
Work Order Reference
ES2118463
Telephone : 61-2-8784 8555

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2119881**	Page	: 1 of 6
Client	: **ROBERT CARR & ASSOCIATES P/L**	Laboratory	: Environmental Division Sydney
Contact	: MS FIONA BROOKER	Contact	: Grace White
Address	: PO BOX 175 CARRINGTON NSW, AUSTRALIA 2294	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 4902 9200	Telephone	: +61 2 8784 8555
Project	: 15442 Fern Bay	Date Samples Received	: 27-May-2021 09:33
Order number	: ----	Date Analysis Commenced	: 31-May-2021
C-O-C number	: ----	Issue Date	: 03-Jun-2021 10:58
Sampler	: R Lamont		
Site	: ----		
Quote number	: SYBQ/400/18		
No. of samples received	: 12		
No. of samples analysed	: 12		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Franco Lentini	LCMS Coordinator	Sydney Inorganics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	HA11/A	HA11/B	HA10/A	HA10/B	HA9/A
			Sampling date / time	27-May-2021 00:00	27-May-2021 00:00	27-May-2021 00:00	27-May-2021 00:00	27-May-2021 00:00
Compound	CAS Number	LOR	Unit	ES2119881-001	ES2119881-002	ES2119881-003	ES2119881-004	ES2119881-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**3.4**	**4.2**	**27.6**	**57.2**	**23.4**
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums								
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	**120**	**108**	**108**	**110**	**106**
13C8-PFOA	----	0.0002	%	**106**	**105**	**101**	**110**	**104**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	HA9/B	HA4/A	HA4/B	HA2/A	HA2/B
			Sampling date / time	27-May-2021 00:00	27-May-2021 00:00	27-May-2021 00:00	27-May-2021 00:00	27-May-2021 00:00
Compound	CAS Number	LOR	Unit	ES2119881-006	ES2119881-007	ES2119881-008	ES2119881-009	ES2119881-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**35.7**	**17.0**	**3.0**	**6.3**	**5.6**
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	**0.0019**	<0.0002	**0.0003**	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	**0.0002**	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums								
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	**0.0019**	<0.0002	**0.0003**	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	**0.0021**	<0.0002	**0.0003**	<0.0002
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	**102**	**104**	**110**	**102**	**106**
13C8-PFOA	----	0.0002	%	**108**	**100**	**110**	**99.5**	**104**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SW1	SW2	----	----	----
				Sampling date / time	27-May-2021 00:00	27-May-2021 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES2119881-011	ES2119881-012	--------	--------	--------
					Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<0.01	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	----	----	----
EP231P: PFAS Sums									
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	<0.01	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**105**	**108**	----	----	----
13C8-PFOA	----	0.02	%		**101**	**99.9**	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES2119881**	Page	: 1 of 5
Client	: **ROBERT CARR & ASSOCIATES P/L**	Laboratory	: Environmental Division Sydney
Contact	: MS FIONA BROOKER	Contact	: Grace White
Address	: PO BOX 175 CARRINGTON NSW, AUSTRALIA 2294	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 4902 9200	Telephone	: +61 2 8784 8555
Project	: 15442 Fern Bay	Date Samples Received	: 27-May-2021
Order number	: ----	Date Analysis Commenced	: 31-May-2021
C-O-C number	: ----	Issue Date	: 03-Jun-2021
Sampler	: R Lamont		
Site	: ----		
Quote number	: SYBQ/400/18		
No. of samples received	: 12		
No. of samples analysed	: 12		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Franco Lentini	LCMS Coordinator	Sydney Inorganics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3710196)									
ES2119698-004	Anonymous	EA055: Moisture Content	----	0.1	%	14.3	13.9	2.4	0% - 50%
ES2120318-006	Anonymous	EA055: Moisture Content	----	0.1	%	7.2	7.2	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3707576)									
EP2105926-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
ES2119881-001	HA11/A	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3707576)									
EP2105926-001	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
ES2119881-001	HA11/A	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3707576)									
EP2105926-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3707576) - continued									
EP2105926-001	Anonymous	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
ES2119881-001	HA11/A	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3709449)									
ES2119722-008	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3709449)									
ES2119722-008	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3709449)									
ES2119722-008	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3707576)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00125 mg/kg	80.8	72.0	128
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.0	67.0	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	84.0	68.0	136
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3707576)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	84.2	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.6	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.4	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	78.4	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	80.4	69.0	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3707576)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	97.2	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00125 mg/kg	84.4	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	92.4	65.0	137
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00125 mg/kg	89.2	69.2	143

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3709449)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	113	72.0	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.25 µg/L	120	68.0	131
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	100	65.0	140
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3709449)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	111	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	120	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	116	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	114	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	119	71.0	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3709449)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	109	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.25 µg/L	121	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.25 µg/L	109	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.25 µg/L	95.0	71.4	144

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3707576)							
EP2105926-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00125 mg/kg	82.0	72.0	128
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00125 mg/kg	87.2	67.0	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00125 mg/kg	87.6	68.0	136
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3707576)							
EP2105926-001	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	87.9	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	82.0	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	91.2	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	82.0	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	81.6	69.0	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3707576)							
EP2105926-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00125 mg/kg	105	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00125 mg/kg	98.0	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00125 mg/kg	115	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00125 mg/kg	106	69.2	143

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2119881**	Page	: 1 of 5
Client	: **ROBERT CARR & ASSOCIATES P/L**	Laboratory	: Environmental Division Sydney
Contact	: MS FIONA BROOKER	Telephone	: +61 2 8784 8555
Project	: 15442 Fern Bay	Date Samples Received	: 27-May-2021
Site	: ----	Issue Date	: 03-Jun-2021
Sampler	: R Lamont	No. of samples received	: 12
Order number	: ----	No. of samples analysed	: 12

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	9	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
HDPE Soil Jar (EA055)							
HA11/A, HA11/B, HA10/A, HA10/B, HA9/A, HA9/B, HA4/A, HA4/B, HA2/A, HA2/B	**27-May-2021**	**----**	----	----	**01-Jun-2021**	10-Jun-2021	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE Soil Jar (EP231X)							
HA11/A, HA11/B, HA10/A, HA10/B, HA9/A, HA9/B, HA4/A, HA4/B, HA2/A, HA2/B	**27-May-2021**	**31-May-2021**	23-Nov-2021	✓	**31-May-2021**	10-Jul-2021	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X)							
HA11/A, HA11/B, HA10/A, HA10/B, HA9/A, HA9/B, HA4/A, HA4/B, HA2/A, HA2/B	**27-May-2021**	**31-May-2021**	23-Nov-2021	✓	**31-May-2021**	10-Jul-2021	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X)								
HA11/A,	HA11/B,	**27-May-2021**	**31-May-2021**	23-Nov-2021	✓	**31-May-2021**	10-Jul-2021	✓
HA10/A,	HA10/B,							
HA9/A,	HA9/B,							
HA4/A,	HA4/B,							
HA2/A,	HA2/B							
EP231P: PFAS Sums								
HDPE Soil Jar (EP231X)								
HA11/A,	HA11/B,	**27-May-2021**	**31-May-2021**	23-Nov-2021	✓	**31-May-2021**	10-Jul-2021	✓
HA10/A,	HA10/B,							
HA9/A,	HA9/B,							
HA4/A,	HA4/B,							
HA2/A,	HA2/B							

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X)								
SW1,	SW2	**27-May-2021**	**01-Jun-2021**	23-Nov-2021	✓	**01-Jun-2021**	23-Nov-2021	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X)								
SW1,	SW2	**27-May-2021**	**01-Jun-2021**	23-Nov-2021	✓	**01-Jun-2021**	23-Nov-2021	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X)								
SW1,	SW2	**27-May-2021**	**01-Jun-2021**	23-Nov-2021	✓	**01-Jun-2021**	23-Nov-2021	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X)								
SW1,	SW2	**27-May-2021**	**01-Jun-2021**	23-Nov-2021	✓	**01-Jun-2021**	23-Nov-2021	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	9	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-house: Analysis of soils by solvent extraction followed by LC-Electrospray-MS-MS, Negative Mode using MRM using internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to a portion of soil which is then extracted with MTBE and an ion pairing reagent. A portion of extract is exchanged into the analytical solvent mixture, combined with an equal volume reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
QuECheRS Extraction of Solids	ORG71	SOIL	In house: Sequential extractions with Acetonitrile/Methanol by shaking. Extraction efficiency aided by the addition of salts under acidic conditions. Where relevant, interferences from co-extracted organics are removed with dispersive clean-up media (dSPE). The extract is either diluted or concentrated and exchanged into the analytical solvent.
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2119881**

Client	: **ROBERT CARR & ASSOCIATES P/L**	Laboratory	: Environmental Division Sydney
Contact	: MS FIONA BROOKER	Contact	: Grace White
Address	: PO BOX 175 CARRINGTON NSW, AUSTRALIA 2294	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: fionab@rca.com.au	E-mail	: Grace.White@ALSGlobal.com
Telephone	: +61 02 4902 9200	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 4902 9299	Facsimile	: +61-2-8784 8500
Project	: 15442 Fern Bay	Page	: 1 of 3
Order number	: ----	Quote number	: ES2017ROBCAR0004 (SYBQ/400/18)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: R Lamont		

Dates

Date Samples Received	: 27-May-2021 09:33	Issue Date	: 27-May-2021
Client Requested Due Date	: 03-Jun-2021	Scheduled Reporting Date	: **03-Jun-2021**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	: ----	Temperature	: -1.9'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 12 / 12

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

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

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

Summary of Sample(s) and Requested Analysis

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

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - EP231 (solids) PFAS - Short Suite (12 analytes)
ES2119881-001	27-May-2021 00:00	HA11/A	✓	✓
ES2119881-002	27-May-2021 00:00	HA11/B	✓	✓
ES2119881-003	27-May-2021 00:00	HA10/A	✓	✓
ES2119881-004	27-May-2021 00:00	HA10/B	✓	✓
ES2119881-005	27-May-2021 00:00	HA9/A	✓	✓
ES2119881-006	27-May-2021 00:00	HA9/B	✓	✓
ES2119881-007	27-May-2021 00:00	HA4/A	✓	✓
ES2119881-008	27-May-2021 00:00	HA4/B	✓	✓
ES2119881-009	27-May-2021 00:00	HA2/A	✓	✓
ES2119881-010	27-May-2021 00:00	HA2/B	✓	✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231 PFAS - Short Suite (12 analytes)
ES2119881-011	27-May-2021 00:00	SW1	✓
ES2119881-012	27-May-2021 00:00	SW2	✓

Proactive Holding Time Report

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

Requested Deliverables

ADMINISTRATOR

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

ALL INVOICES

- A4 - AU Tax Invoice (INV)	Email	administrator@rca.com.au

ENVIRO

- *AU Certificate of Analysis - NATA (COA)	Email	enviro@rca.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	enviro@rca.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	enviro@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	enviro@rca.com.au
- A4 - AU Tax Invoice (INV)	Email	enviro@rca.com.au
- Chain of Custody (CoC) (COC)	Email	enviro@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	enviro@rca.com.au

FIONA BROOKER

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

Richie Lamont

- *AU Certificate of Analysis - NATA (COA)	Email	richiel@rca.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	richiel@rca.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	richiel@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	richiel@rca.com.au
- A4 - AU Tax Invoice (INV)	Email	richiel@rca.com.au
- Chain of Custody (CoC) (COC)	Email	richiel@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	richiel@rca.com.au

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ **Sydney:** 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
☐ **Newcastle:** 5 Rosegum Rd, Warabrook NSW 2304 Ph:02 4968 9433 E:samples.newcastle@alsenviro.com
☐ **Brisbane:** 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
☐ **Townsville:** 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsenviro.com
☐ **Melbourne:** 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ **Adelaide:** 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ **Perth:** 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ **Launceston:** 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	RCA Australia	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☑ Standard TAT **(List due date):**
OFFICE:	92 Hill Street, Carrington		☐ Non Standard or urgent TAT **(List due date):**
RCA Ref No:	15442	**ALS QUOTE NO.:**	SYBQ_400_17
Fern Bay			
PROJECT MANAGER: Fiona Brooker	**CONTACT PH:** 0408 687 529		
SAMPLER: R Lamont	**SAMPLER MOBILE:** 0401 002 912		
COC Emailed to ALS? (YES / NO)	**EDD FORMAT (or default):**		
Email Reports to: administrator@rca.com.au + enviro@rca.com.au, richiel@rca.com.au			
Email Invoice to: as above			

COC SEQUENCE NUMBER (Circle)

COC:	1	2	3	4	5	6	7
OF:	1	2	3	4	5	6	7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes No N/A
Ice bricks / frozen ice packs present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: -1.9 °C
Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
RLamont	ce	ce	AWOKOW 7.40
DATE/TIME: 27/5/21	DATE/TIME: 27.5.21 9:33	DATE/TIME: 27-5-21 5pm	DATE/TIME: 27/5/21 PM

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES	PFAS Short Suite								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	HA11/A	27/05/2021	S			X								
2	HA11/B	27/05/2021	S			X								
3	HA10/A	27/05/2021	S			X								
4	HA10/B	27/05/2021	S			X								
5	HA9/A	27/05/2021	S			X								
6	HA9/B	27/05/2021	S			X								
7	HA4/A	27/05/2021	S			X								
8	HA4/B	27/05/2021	S			X								
9	HA2/A	27/05/2021	S			X								
10	HA2/B	27/05/2021	S			X								
11	SW1	27/05/2021	W			X								
12	SW2	27/05/2021	W			X								
				TOTAL										

LAB OF ORIGIN: NEWCASTLE

E-MAILED

Environmental Division Sydney
Work Order Reference
ES2119881

Telephone : +61-2-8784 8555

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

Appendix H

Summary of Results

Sample Identification	PQL	Guideline [A]					SS1	SS2	SS3	SS4	SS5	SS6	SS7	SS8	SS9
Sample Depth (m) [B]		HSL 'A'	HSL 'B'	ESL URPOS	Sensitive ML	DC A	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Date		SAND 0-<1m	SAND 1-<2m	Coarse	Coarse		17/5/21	17/5/21	17/5/21	17/5/21	17/5/21	17/5/21	17/5/21	17/5/21	17/5/21
Sample Profile							Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand Clay
Dominant Stratum [C]							Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand
Sample Purpose							Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
Sample collected by							RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)															
Benzene	0.2	0.5	0.5	50		100	<0.2	--	<0.2	--	<0.2	--	--	<0.2	--
Toluene	0.5	160	220	85		14000	<0.5	--	<0.5	--	<0.5	--	--	<0.5	--
Ethylbenzene	0.5	55	NL	70		4500	<0.5	--	<0.5	--	<0.5	--	--	<0.5	--
meta- and para-Xylene	0.5						<0.5	--	<0.5	--	<0.5	--	--	<0.5	--
ortho-Xylene	0.5						<0.5	--	<0.5	--	<0.5	--	--	<0.5	--
Total Xylenes	1	40	60	105		12000	0.5	--	0.5	--	0.5	--	--	0.5	--
Polycyclic Aromatic Hydrocarbons (PAH)															
Naphthalene	1	3	NL	170		1400	<1	--	<1	--	<1	--	--	<1	--
Total Recoverable Hydrocarbons (TRH)															
TRH C_6-C_{10}	10				700	4400	<10	--	<10	--	<10	--	--	<10	--
TRH >C_{10}-C_{16}	50			120	1000	3300	<50	--	<50	--	<50	--	--	<50	--
TRH >C_{16}-C_{34}	100			300	2500	4500	110	--	<100	--	<100	--	--	<100	--
TRH >C_{34}-C_{40}	100			2800	10000	6300	<100	--	<100	--	<100	--	--	<100	--
F1	10	45	70	180			<10	--	<10	--	<10	--	--	<10	--
F2	50	110	240				<50	--	<50	--	<50	--	--	<50	--

All results are in units of mg/kg.
Blank Cell indicates no criterion available
PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory
F1 = TRH C_6-C_{10} minus BTEX. F1 PQL deemed equal TRH C_6-C_{10}.
F2 = TRH >C_{10}-C_{16} minus naphthalene. F2 PQL deemed = TRH >C_{10}-C_{16}.
[A] ASC NEPM 1999 (amended April 2013) Vapour Based Health Screening Levels (HSL) 'A' (Residential)
[A] ASC NEPM 1999 (amended April 2013) Ecological Screening Levels (ESL) URPOS (Urban Residential and Public Open Space)
[A] ASC NEPM 1999 (amended April 2013) Management Limits (ML) Sensitive Sites (Residential, open space)
[A] CRC Care Technical Report 10, September 2011 Direct Contact (DC) Health Screening Levels 'A' (Residential)
[B] Start of sample, generally over a 0.1m interval
[C] Note that this is a generalisation for the purpose of comparing to the HSL criteria. Where two strata equally represented, most conservative criterion used
NL designates 'Not Limiting' indicating that the pore water concentration required to constitute a vapour risk is higher than the solubility capacity for that compound based on a petroleum mixture. Vapour is therefore not a risk for this compound.
Results for TRH have been compared to TPH guidelines.
Presented ESL for naphthalene is an Ecological Investigation Level
ESL are applicable for material at less than 2m depths below finished surface/ground level
For the purpose of the Tier 1 ESL/EIL assessment, all background concentrations are assumed to be zero
ESL for TRH >C_{16}-C_{34} and >C_{34}-C_{40} are low reliability
Results shown in **BOLD** are in excess of the vapour based HSL
Results shown in shading are >250% of the vapour based HSL
Results shown in underline are in excess of the ESL
Results shown in *italics* are in excess of the management limit
Results shown in patterned cells are in excess of the direct contact HSL
Where summation required (Xylene, F1, F2) calculation includes components reported as non detected as 1/2 PQL.

Sample Identification	PQL	Guideline [A]		SS1	SS2	SS3	SS4	SS5	SS6	SS7	SS8	SS9	HA2/A	HA2/B
Sample Depth (m) [B]		HIL 'A'	EIL URPOS	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.4	0.9
Date				17/5/21	17/5/21	17/5/21	17/5/21	17/5/21	17/5/21	17/5/21	17/5/21	17/5/21	27/5/21	27/5/21
Sample Profile				Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand Clay	Silty Sand	Silty Sand
Sample Purpose				Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
Sample collected by				RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL
Polycyclic Aromatic Hydrocarbons (PAH)														
Naphthalene	0.5		170	<0.5	--	<0.5	--	<0.5	--	--	<0.5	--	--	--
Acenaphthylene	0.5			<0.5	--	<0.5	--	<0.5	--	--	<0.5	--	--	--
Acenaphthene	0.5			<0.5	--	<0.5	--	<0.5	--	--	<0.5	--	--	--
Fluorene	0.5			<0.5	--	<0.5	--	<0.5	--	--	<0.5	--	--	--
Phenanthrene	0.5			<0.5	--	<0.5	--	<0.5	--	--	<0.5	--	--	--
Anthracene	0.5			<0.5	--	<0.5	--	<0.5	--	--	<0.5	--	--	--
Fluoranthene	0.5			<0.5	--	<0.5	--	<0.5	--	--	<0.5	--	--	--
Pyrene	0.5			<0.5	--	<0.5	--	<0.5	--	--	<0.5	--	--	--
Benz(a)anthracene	0.5			<0.5	--	<0.5	--	<0.5	--	--	<0.5	--	--	--
Chrysene	0.5			<0.5	--	<0.5	--	<0.5	--	--	<0.5	--	--	--
Benzo(b)&(j)fluoranthene	0.5			<0.5	--	<0.5	--	<0.5	--	--	<0.5	--	--	--
Benzo(k)fluoranthene	0.5			<0.5	--	<0.5	--	<0.5	--	--	<0.5	--	--	--
Benzo(a) pyrene	0.5		0.7	<0.5	--	<0.5	--	<0.5	--	--	<0.5	--	--	--
Indeno(1,2,3-c,d)pyrene	0.5			<0.5	--	<0.5	--	<0.5	--	--	<0.5	--	--	--
Dibenz(a,h)anthracene	0.5			<0.5	--	<0.5	--	<0.5	--	--	<0.5	--	--	--
Benzo(g,h,i)perylene	0.5			<0.5	--	<0.5	--	<0.5	--	--	<0.5	--	--	--
Carcinogenic PAH (B(a)P equivalent)	1.21	3		0.605	--	0.605	--	0.605	--	--	0.605	--	--	--
Sum of reported PAH	8	300		4	--	4	--	4	--	--	4	--	--	--
Metals														
Arsenic	5	100	100	<5	<5	<5	<5	<5	<5	<5	<5	<5	--	--
Cadmium	1	20		<1	<1	<1	<1	<1	<1	<1	<1	<1	--	--
Chromium	2	100	190	<2	3	<2	2	<2	<2	<2	<2	<2	--	--
Copper	5	6000	280	<5	12	<5	9	<5	8	8	6	<5	--	--
Mercury	0.1	40		0.4	0.2	<0.1	<0.1	<0.1	0.7	<0.1	<0.1	<0.1	--	--
Lead	5	300	1100	<5	20	<5	13	8	13	10	9	6	--	--
Nickel	2	400	30	<2	2	<2	<2	<2	<2	<2	<2	<2	--	--
Zinc	5	7400	230	8	49	15	65	24	61	26	28	25	--	--
Organochlorine Pesticides (OCP)														
alpha-BHC	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
HCB	0.05	10		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
b-BHC	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
g-BHC (Lindane)	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
d-BHC	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Heptachlor	0.05	6		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Aldrin	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Heptachlor epoxide	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
trans-Chlordane	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
alpha-Endosulfan	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
cis-Chlordane	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Dieldrin	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
DDE	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Endrin	0.05	10		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
beta-Endosulfan	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
DDD	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Endrin Aldehyde	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Endosulfan sulfate	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
DDT	0.2		180	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	--
Endrin Ketone	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Methoxychlor	0.2	300		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	--
Chlordane (cis + trans)	0.1	50		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	--	--
DDT+DDD+DDE	0.3	240		0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	--	--
Aldrin + Dieldrin	0.1	6		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	--	--
Endosulfan (aplha+beta)	0.1	270		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	--	--
Organophosphorous Pesticides (OPP)														
Chlorpyrifos	0.05	160		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Dichlorvos	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Demeton-S-methyl	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--

Sample Identification	PQL	Guideline [A]		HA4/A	HA4/B	HA9/A	HA9/B	HA10/A	HA10/B	HA11/A	HA11/B
Sample Depth (m) [B]		HIL 'A'	EIL URPOS	0.4	0.9	0.4	0.9	0.4	0.9	0.4	0.9
Date				27/5/21	27/5/21	27/5/21	27/5/21	27/5/21	27/5/21	27/5/21	27/5/21
Sample Profile				Fill - silty Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand
Sample Purpose				Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
Sample collected by				RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL	RCA - RJL
Polycyclic Aromatic Hydrocarbons (PAH)											
Naphthalene	0.5		170	--	--	--	--	--	--	--	--
Acenaphthylene	0.5			--	--	--	--	--	--	--	--
Acenaphthene	0.5			--	--	--	--	--	--	--	--
Fluorene	0.5			--	--	--	--	--	--	--	--
Phenanthrene	0.5			--	--	--	--	--	--	--	--
Anthracene	0.5			--	--	--	--	--	--	--	--
Fluoranthene	0.5			--	--	--	--	--	--	--	--
Pyrene	0.5			--	--	--	--	--	--	--	--
Benz(a)anthracene	0.5			--	--	--	--	--	--	--	--
Chrysene	0.5			--	--	--	--	--	--	--	--
Benzo(b)&(j)fluoranthene	0.5			--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	0.5			--	--	--	--	--	--	--	--
Benzo(a) pyrene	0.5		0.7	--	--	--	--	--	--	--	--
Indeno(1,2,3-c,d)pyrene	0.5			--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	0.5			--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	0.5			--	--	--	--	--	--	--	--
Carcinogenic PAH (B(a)P equivalent)	1.21	3		--	--	--	--	--	--	--	--
Sum of reported PAH	8	300		--	--	--	--	--	--	--	--
Metals											
Arsenic	5	100	100	--	--	--	--	--	--	--	--
Cadmium	1	20		--	--	--	--	--	--	--	--
Chromium	2	100	190	--	--	--	--	--	--	--	--
Copper	5	6000	280	--	--	--	--	--	--	--	--
Mercury	0.1	40		--	--	--	--	--	--	--	--
Lead	5	300	1100	--	--	--	--	--	--	--	--
Nickel	2	400	30	--	--	--	--	--	--	--	--
Zinc	5	7400	230	--	--	--	--	--	--	--	--
Organochlorine Pesticides (OCP)											
alpha-BHC	0.05			--	--	--	--	--	--	--	--
HCB	0.05	10		--	--	--	--	--	--	--	--
b-BHC	0.05			--	--	--	--	--	--	--	--
g-BHC (Lindane)	0.05			--	--	--	--	--	--	--	--
d-BHC	0.05			--	--	--	--	--	--	--	--
Heptachlor	0.05	6		--	--	--	--	--	--	--	--
Aldrin	0.05			--	--	--	--	--	--	--	--
Heptachlor epoxide	0.05			--	--	--	--	--	--	--	--
trans-Chlordane	0.05			--	--	--	--	--	--	--	--
alpha-Endosulfan	0.05			--	--	--	--	--	--	--	--
cis-Chlordane	0.05			--	--	--	--	--	--	--	--
Dieldrin	0.05			--	--	--	--	--	--	--	--
DDE	0.05			--	--	--	--	--	--	--	--
Endrin	0.05	10		--	--	--	--	--	--	--	--
beta-Endosulfan	0.05			--	--	--	--	--	--	--	--
DDD	0.05			--	--	--	--	--	--	--	--
Endrin Aldehyde	0.05			--	--	--	--	--	--	--	--
Endosulfan sulfate	0.05			--	--	--	--	--	--	--	--
DDT	0.2		180	--	--	--	--	--	--	--	--
Endrin Ketone	0.05			--	--	--	--	--	--	--	--
Methoxychlor	0.2	300		--	--	--	--	--	--	--	--
Chlordane (cis + trans)	0.1	50		--	--	--	--	--	--	--	--
DDT+DDD+DDE	0.3	240		--	--	--	--	--	--	--	--
Aldrin + Dieldrin	0.1	6		--	--	--	--	--	--	--	--
Endosulfan (aplha+beta)	0.1	270		--	--	--	--	--	--	--	--
Organophosphorous Pesticides (OPP)											
Chlorpyrifos	0.05	160		--	--	--	--	--	--	--	--
Dichlorvos	0.05			--	--	--	--	--	--	--	--
Demeton-S-methyl	0.05			--	--	--	--	--	--	--	--

Sample Identification	PQL	Guideline [A]		SS1	SS2	SS3	SS4	SS5	SS6	SS7	SS8	SS9	HA2/A	HA2/B
Sample Depth (m) [B]		HIL 'A'	EIL URPOS	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.4	0.9
Date				17/5/21	17/5/21	17/5/21	17/5/21	17/5/21	17/5/21	17/5/21	17/5/21	17/5/21	27/5/21	27/5/21
Monocrotophos	0.2			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	--
Dimethoate	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Diazinon	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Parathion-methyl	0.2			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	--
Malathion	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Fenthion	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Chlorpyrifos	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Parathion	0.2			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	--	--
Pirimphos-ethyl	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Chlorfenvinphos	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Bromophos-ethyl	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Fenamiphos	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Prothiofos	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Ethion	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Carbophenothion	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Azinphos Methyl	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	--
Herbicides														
4-Chlorophenoxy acetic acid	0.02			<0.02	<0.04	<0.02	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	--	--
2.4-DB	0.02			<0.02	<0.04	<0.02	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	--	--
Dicamba	0.02			<0.02	<0.04	<0.02	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	--	--
Mecoprop	0.02	600		<0.02	<0.04	<0.02	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	--	--
MCPA	0.02	600		<0.02	<0.04	<0.02	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	--	--
2.4-DP	0.02			<0.02	<0.04	<0.02	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	--	--
2.4-D	0.02	900		<0.02	<0.04	<0.02	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	--	--
Triclopyr	0.02			<0.02	<0.04	<0.02	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	--	--
2.4.5-TP (Silvex)	0.02			<0.02	<0.04	<0.02	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	--	--
2.4.5-T	0.02	600		<0.02	<0.04	<0.02	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	--	--
MCPB	0.02	600		<0.02	<0.04	<0.02	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	--	--
Picloram	0.02	4500		<0.02	<0.04	<0.02	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	--	--
Clopyralid	0.02			<0.02	<0.04	<0.02	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	--	--
Fluroxypyr	0.02			<0.02	<0.04	<0.02	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	--	--
Per- and poly-fluoroalkyl substances (PFAS)														
Perfluorobutane sulfonic acid (PFBS)	0.0002			--	--	--	--	--	--	--	--	--	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	0.0002			--	--	--	--	--	--	--	--	--	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	0.0002		0.01	--	--	--	--	--	--	--	--	--	0.0003	<0.0002
Perfluorobutanoic acid (PFBA)	0.001			--	--	--	--	--	--	--	--	--	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	0.0002			--	--	--	--	--	--	--	--	--	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	0.0002			--	--	--	--	--	--	--	--	--	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	0.0002			--	--	--	--	--	--	--	--	--	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	0.0002	0.1	10	--	--	--	--	--	--	--	--	--	<0.0002	<0.0002
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.0005			--	--	--	--	--	--	--	--	--	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.0005			--	--	--	--	--	--	--	--	--	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.0005			--	--	--	--	--	--	--	--	--	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	0.0005			--	--	--	--	--	--	--	--	--	<0.0005	<0.0005
PFOS + PFHxS	0.0004	0.009		--	--	--	--	--	--	--	--	--	0.0004	0.0002

All results are in units of mg/kg.

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory

[A] ASC NEPM 1999 (amended April 2013) Health Investigation Levels (HIL) 'A' (Residential).

[A] ASC NEPM 1999 (amended April 2013) Ecological Investigation Levels (EIL) URPOS (Urban Residential and Public Open Space).

[A] PFAS NEMP (2018) Health Screening Levels (HSL)

[A] PFAS NEMP (2018) Ecological Guidelines Values based on Indirect Exposure and account for bioaccumulation and off-site transport

[B] Start of sample, generally over a 0.1m interval

The Carcinogenic PAH value is calculated by multiplying the concentration of each of the 8 carcinogenic PAH compounds by its B(a)P toxic equivalence factor and summing these products.

HIL for Chromium are for Chromium VI

Presented ecological value for benzo(a)pyrene is a low reliability Ecological Screening Level

ESL are applicable for material at less than 2m depths below finished surface/ground level

For the purpose of the Tier 1 ESL/EIL assessment, all background concentrations are assumed to be zero

EIL for Naphthalene are for fresh (<2years) Naphthalene

EIL for Arsenic are for aged (>2years) Arsenic

EIL for Chromium are the added contaminant limit for aged (>2years) Chromium III in soils of 1% clay, the most conservative of the criteria.

EIL for Copper are the added contaminant limit for aged (>2years) Copper in soils of pH 6.5.

EIL for Lead are the added contaminant limit for aged (>2years) Lead.

EIL for Nickel are the added contaminant limit for aged (>2years) Nickel in soils of 5% CEC the most conservative of the criteria.

EIL for Zinc are the added contaminant limit for aged (>2years) Zinc in soils of 5% CEC and pH of 6.5, the most conservative of the criteria at pH 6.5.

EIL for DDT are for fresh (<2years) DDT

Where summation required (PAH, OCP, PFAS) calculation includes components reported as non detected as 1/2 PQL.

Results shown in **BOLD** are in excess of the HIL

Results shown in shading are >250% of the HIL

Results shown in underline are in excess of EIL

Sample Identification	PQL	Guideline [A]		HA4/A	HA4/B	HA9/A	HA9/B	HA10/A	HA10/B	HA11/A	HA11/B
Sample Depth (m) [B]		HIL 'A'	EIL URPOS	0.4	0.9	0.4	0.9	0.4	0.9	0.4	0.9
Date				27/5/21	27/5/21	27/5/21	27/5/21	27/5/21	27/5/21	27/5/21	27/5/21
Monocrotophos	0.2			--	--	--	--	--	--	--	--
Dimethoate	0.05			--	--	--	--	--	--	--	--
Diazinon	0.05			--	--	--	--	--	--	--	--
Parathion-methyl	0.2			--	--	--	--	--	--	--	--
Malathion	0.05			--	--	--	--	--	--	--	--
Fenthion	0.05			--	--	--	--	--	--	--	--
Chlorpyrifos	0.05			--	--	--	--	--	--	--	--
Parathion	0.2			--	--	--	--	--	--	--	--
Pirimphos-ethyl	0.05			--	--	--	--	--	--	--	--
Chlorfenvinphos	0.05			--	--	--	--	--	--	--	--
Bromophos-ethyl	0.05			--	--	--	--	--	--	--	--
Fenamiphos	0.05			--	--	--	--	--	--	--	--
Prothiofos	0.05			--	--	--	--	--	--	--	--
Ethion	0.05			--	--	--	--	--	--	--	--
Carbophenothion	0.05			--	--	--	--	--	--	--	--
Azinphos Methyl	0.05			--	--	--	--	--	--	--	--
Herbicides											
4-Chlorophenoxy acetic acid	0.02			--	--	--	--	--	--	--	--
2.4-DB	0.02			--	--	--	--	--	--	--	--
Dicamba	0.02			--	--	--	--	--	--	--	--
Mecoprop	0.02	600		--	--	--	--	--	--	--	--
MCPA	0.02	600		--	--	--	--	--	--	--	--
2.4-DP	0.02			--	--	--	--	--	--	--	--
2.4-D	0.02	900		--	--	--	--	--	--	--	--
Triclopyr	0.02			--	--	--	--	--	--	--	--
2.4.5-TP (Silvex)	0.02			--	--	--	--	--	--	--	--
2.4.5-T	0.02	600		--	--	--	--	--	--	--	--
MCPB	0.02	600		--	--	--	--	--	--	--	--
Picloram	0.02	4500		--	--	--	--	--	--	--	--
Clopyralid	0.02			--	--	--	--	--	--	--	--
Fluroxypyr	0.02			--	--	--	--	--	--	--	--
Per- and poly-fluoroalkyl substances (PFAS)											
Perfluorobutane sulfonic acid (PFBS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	0.0002		0.01	0.0019	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorobutanoic acid (PFBA)	0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	0.0002			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	0.0002	0.1	10	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFOS + PFHxS	0.0004	0.009		0.002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002

All results are in units of mg/kg.

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory

[A] ASC NEPM 1999 (amended April 2013) Health Investigation Levels (HIL) 'A' (Residential).

[A] ASC NEPM 1999 (amended April 2013) Ecological Investigation Levels (EIL) URPOS (Urban Residential and Public Open Space).

[A] PFAS NEMP (2018) Health Screening Levels (HSL)

[A] PFAS NEMP (2018) Ecological Guidelines Values based on Indirect Exposure and account for bioaccumulation and off-site transport

[B] Start of sample, generally over a 0.1m interval

The Carcinogenic PAH value is calculated by multiplying the concentration of each of the 8 carcinogenic PAH compounds by its B(a)P toxic equivalence factor and summing these products.

HIL for Chromium are for Chromium VI

Presented ecological value for benzo(a)pyrene is a low reliability Ecological Screening Level

ESL are applicable for material at less than 2m depths below finished surface/ground level

For the purpose of the Tier 1 ESL/EIL assessment, all background concentrations are assumed to be zero

EIL for Naphthalene are for fresh (<2years) Naphthalene

EIL for Arsenic are for aged (>2years) Arsenic

EIL for Chromium are the added contaminant limit for aged (>2years) Chromium III in soils of 1% clay, the most conservative of the criteria.

EIL for Copper are the added contaminant limit for aged (>2years) Copper in soils of pH 6.5.

EIL for Lead are the added contaminant limit for aged (>2years) Lead.

EIL for Nickel are the added contaminant limit for aged (>2years) Nickel in soils of 5% CEC the most conservative of the criteria.

EIL for Zinc are the added contaminant limit for aged (>2years) Zinc in soils of 5% CEC and pH of 6.5, the most conservative of the criteria at pH 6.5.

EIL for DDT are for fresh (<2years) DDT

Where summation required (PAH, OCP, PFAS) calculation includes components reported as non detected as 1/2 PQL.

Results shown in **BOLD** are in excess of the HIL

Results shown in shading are >250% of the HIL

Results shown in underline are in excess of EIL

Sample Identification	PQL	Ecological Guideline [A]	Human Health (Ingestion) Guideline [B]	SW1	SW1
Date		95% Marine		27/05/2021	27/05/2021
Sample Description				Clear	Clear
Sample Purpose				Assessment	Assessment
Sample collected by				RCA - RJL	RCA - RJL
Per- and poly-fluoroalkyl substances (PFAS)					
Perfluorobutane sulfonic acid (PFBS)	0.02			<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	0.02			<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	0.01	0.13		<0.01	<0.01
Perfluorobutanoic acid (PFBA)	0.1			<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	0.02			<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	0.02			<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	0.02			<0.02	<0.02
Perfluorooctanoic acid (PFOA)	0.01	220	0.56	<0.01	<0.01
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	0.05			<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	0.05			<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	0.05			<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	0.05			<0.05	<0.05
PFOS+PFHxS	0.02		0.07	0.015	0.015

All results are in units of μg/L

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory

[A] PFAS NEMP (2018) 95% Species Protection.

[A] PFAS NEMP (2018) for % Receiving Water Type.

[B] PFAS NEMP (2018) for Drinking Water.

Results shown in shading are in excess of the 99% aquatic ecosystems guidelines

Results shown in **BOLD** are in excess of the 95% aquatic ecosystems guidelines

Results shown in underline are in excess of the human health (ingestion) guideline

Where summation required (PFAS) calculation includes components reported as non detected as 1/2 PQL.