King Bay Lateral Project (formerly known as Perdaman Lateral)
Native Vegetation Clearing Permit Supporting Document

E-REP-194

Australian Gas Infrastructure Group

Date: 26 November 2024

Document Revision History

Rev	Date	Reviewer	Approver	Revision Description
1	24/11/2024	JZ Khoo	M. Kenny	Final for submission

Table of Contents

EXECUTIVE SUMMARY ..... **III**

ABBREVIATIONS ..... **IV**

1. INTRODUCTION **1**

1.1 Background *1*
1.2 Location, Ownership and Zoning *4*
1.3 Proposal Description *6*

2. PHYSICAL ENVIRONMENT **8**

2.1 Biogeographical Regions *8*
2.2 Climate *8*
2.3 Land Use *8*
2.4 Land Systems and Soils *8*
2.5 Hydrology *10*
2.6 Environmentally Sensitive Areas *13*
2.7 Heritage *13*

3. BIOLOGICAL ENVIRONMENT **15**

3.1 Ecological Surveys *15*
3.2 Flora and Vegetation *17*
3.3 Terrestrial Fauna *22*

4. AVOIDANCE AND MITIGATION MEASURES **30**

4.1 Environmental Mitigation Measures *30*

5. ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES **41**

5.1 Comprises a high level of biological diversity *42*
5.2 Potential impact on any significant habitat for fauna indigenous to Western Australia *42*
5.3 Potential impact on any rare flora *43*
5.4 Potential of any threatened ecological communities *43*
5.5 Significance as a remnant of native vegetation in the area that has been extensively cleared *43*
5.6 Impact on any watercourses and/or wetlands *44*
5.7 Potential to cause appreciable land degradation *44*
5.8 Potential to impact on the environmental values of adjacent or nearby conservation areas *45*
5.9 Potential deterioration in the quality of surface or underground water *45*
5.10 Potential of clearing to cause, or exacerbate, the incidence of flooding *46*

6. STAKEHOLDER CONSULTATION **47**

7. REFERENCES **49**

APPENDICES **51**

List of Tables

Table 1-1: Required Approvals for the Proposal 4
Table 1-2: Land Tenements within the Clearing Area 5
Table 2-1: Land Systems within the Clearing Area 9
Table 2-2: Generalised Lithologies and Particle Size Analysis Results 9
Table 3-1: Flora and Vegetation Studies 15
Table 3-2: Pre-European Vegetation Associations 17
Table 3-3: Vegetation Types 18
Table 3-4: Habitat Types 23
Table 3-5: Conservation Significant Fauna Likelihood of Occurrence Assessment 28
Table 4-1: Summary of Proposed Environment Mitigation Measures 31
Table 5-1: Summary of assessment against the ten clearing principles 41
Table 6-1:Key stakeholders for the Proposal 47
Table 6-2: Stakeholder Consultation 47

List of Figures

Figure 1-1: Regional Context of the Proposal 2
Figure 1-2: Clearing Area and Proposal Elements 3
Figure 2-1: Land Systems 11
Figure 2-2: Local Hydrology 12
Figure 3-1: Ecological Survey Effort 16
Figure 3-2: Pre-European Vegetation Association 19
Figure 3-3: Vegetation Types Recorded within the Clearing Area 20
Figure 3-4: Vegetation Condition 21
Figure 3-5: Terrestrial Fauna Habitat 25
Figure 3-6: Terrestrial Fauna Habitats Recorded in the APM survey (APM 2019) 26

EXECUTIVE SUMMARY

DBNGP (WA) Nominees Pty Ltd (the Proponent) is proposing to develop the King Bay Lateral Project (the Proposal; formerly known as Perdaman Lateral Project), which is located within the Burrup Peninsula of the Pilbara region of Western Australia, approximately 20 km north of Karratha and 8 km north of Dampier. The Proposal will consist of a 550 m-long pipeline, and supporting infrastructure, to transport natural gas from the existing Dampier to Bunbury Natural Gas Pipeline (DBNGP) to the proposed Perdaman Urea Plant development (Project Ceres).

This document has been prepared to support the application for a Native Vegetation Clearing Permit (NVCP), under Part V Division 2 of the *Environmental Protection Act 1986* (EP Act), for the Proposal. The application is seeking approval for a Purpose Permit to clear no more than 0.21 ha of native vegetation within a 1.43 ha Clearing Area to facilitate the development of the Proposal.

A total of 10 flora species (nine native and one introduced) from eight genera and five families were recorded within the Clearing Area (ELA 2024). Whilst no fauna species were recorded within the Clearing Area during the recent survey (ELA 2024), eight conservation significant fauna species are considered as having the potential to occur, based on the availability of potentially suitable habitat and proximity of previous records. Historical nearby fauna surveys have also recorded 30 mammal species, 150 bird species, 49 reptiles and two amphibians (Cardno 2020).

One broad vegetation type (VT01) was identified within the Clearing Area, covering 0.21 ha and classified as being in 'Poor' condition (ELA 2024). The remaining 1.22 ha of the Clearing Area is devoid of vegetation, with Mudflats (naturally devoid of vegetation and thus not assigned a vegetation condition (ELA 2024)). None of the vegetation within the Clearing Area was identified as representing any known or potential conservation significant ecological communities listed under the EPBC Act, the BC Act or by DBCA (ELA 2024).

Only the Mudflats habitat is considered to potentially provide foraging habitat to conservation significant fauna, with eight migratory waders having the potential to use the habitat when it is occasionally inundated (e.g. during king tides and heavy rainfall). The vegetation within the Low Chenopod Shrubland habitat was in 'Poor' condition and therefore not considered to provide habitat for any conservation significant fauna species (ELA 2024).

The Proposal was assessed against the Ten Principles for Clearing Native Vegetation as listed under Schedule 5 of the EP Act. Potential impacts resulting from the clearing of native vegetation have been minimised through the design and placement of the Proposal infrastructure, as well as specific control measures outlined within a project-specific Construction Environmental Management Plan and the DBNGP Environment Plan, which is proposed to be updated to include this Proposal. Based on this assessment the Proposal is unlikely to be at variance with any of the clearing principles.

ABBREVIATIONS

Abbreviation	Definition
BAM Act	*Biosecurity and Agricultural Management Act 2007*
BC Act	*Biodiversity Conservation Act 2016*
BoM	Bureau of Meteorology
DAFWA	Department of Agriculture and Food
DBCA	Department of Biodiversity, Conservation and Attractions
DBNGP	Dampier to Bunbury Natural Gas Pipeline
DBP Act	*Dampier to Bunbury Pipeline Act 1997*
DEMIRS	Department of Energy, Mines, Industry, Regulation and Safety
DGS Act	*Dangerous Goods Safety Act 2004*
DPIRD	Department of Primary Industries and Regional Development
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
ELA	Eco Logical Australia
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESA	Environmentally Sensitive Areas
IBRA	Interim Biogeographic Regionalisation for Australia
LoS	Line of Sight
MAC	Murujuga Aboriginal Corporation
NVCP	Native Vegetation Clearing Permit

Abbreviation	Definition
OSCP	Oil Spill Contingency Plan
PECs	Priority Ecological Communities
PFAS	Polyfluoroalkyl Substances
PL40	Pipeline Licence 40
PL62	Pipeline Licence 62
PP Act	*Petroleum Pipelines Act 1969*
PP regulation	Petroleum Pipelines (Environment) Regulation 2012
Project Ceres	Perdaman Urea Plant development
RiWI Act	*Rights in Water and Irrigation Act 1914*
TAN	Technical Ammonium Nitrate
TEC	Threatened Ecological Communities
VT	Vegetation Type

1. INTRODUCTION

1.1 Background

DBNGP (WA) Nominees Pty Ltd (the Proponent) is proposing to develop the King Bay Lateral Project (the Proposal; formerly known as Perdaman Lateral Project), which is located within the Burrup Peninsula of the Pilbara region of Western Australia, approximately 20 km north of Karratha and 8 km north of Dampier (Figure 1-1). The Proposal will consist of a 550 m-long pipeline, and supporting infrastructure, to transport natural gas from the existing Dampier to Bunbury Natural Gas Pipeline (DBNGP) to the proposed Perdaman Urea Plant development (Project Ceres). The supporting infrastructure includes (Figure 1-2):

- King Bay Inlet Station
- King Bay Meter Station
- Material storage/laydown areas
- Rock causeway.

1.1.1 Purpose

This Supporting Document has been prepared to support the application for a Native Vegetation Clearing Permit (NVCP), under Part V Division 2 of the *Environmental Protection Act 1986* (EP Act), for the Proposal. The application is seeking approval for a Purpose Permit to clear no more than 0.21 ha of native vegetation within a 1.43 ha Clearing Area to facilitate the development of the Proposal (Figure 1-1).

This document includes the following information:

- An overview of the Proposal
- A description of the proposed native vegetation clearing
- An overview of the existing environmental conditions of the site
- An evaluation of the potential impacts of vegetation clearing
- A detailed description of proposed avoidance and mitigation measures
- Details of stakeholder engagement
- An evaluation of the proposed clearing against the Ten Clearing Principles listed under Schedule 5 of the EP Act.

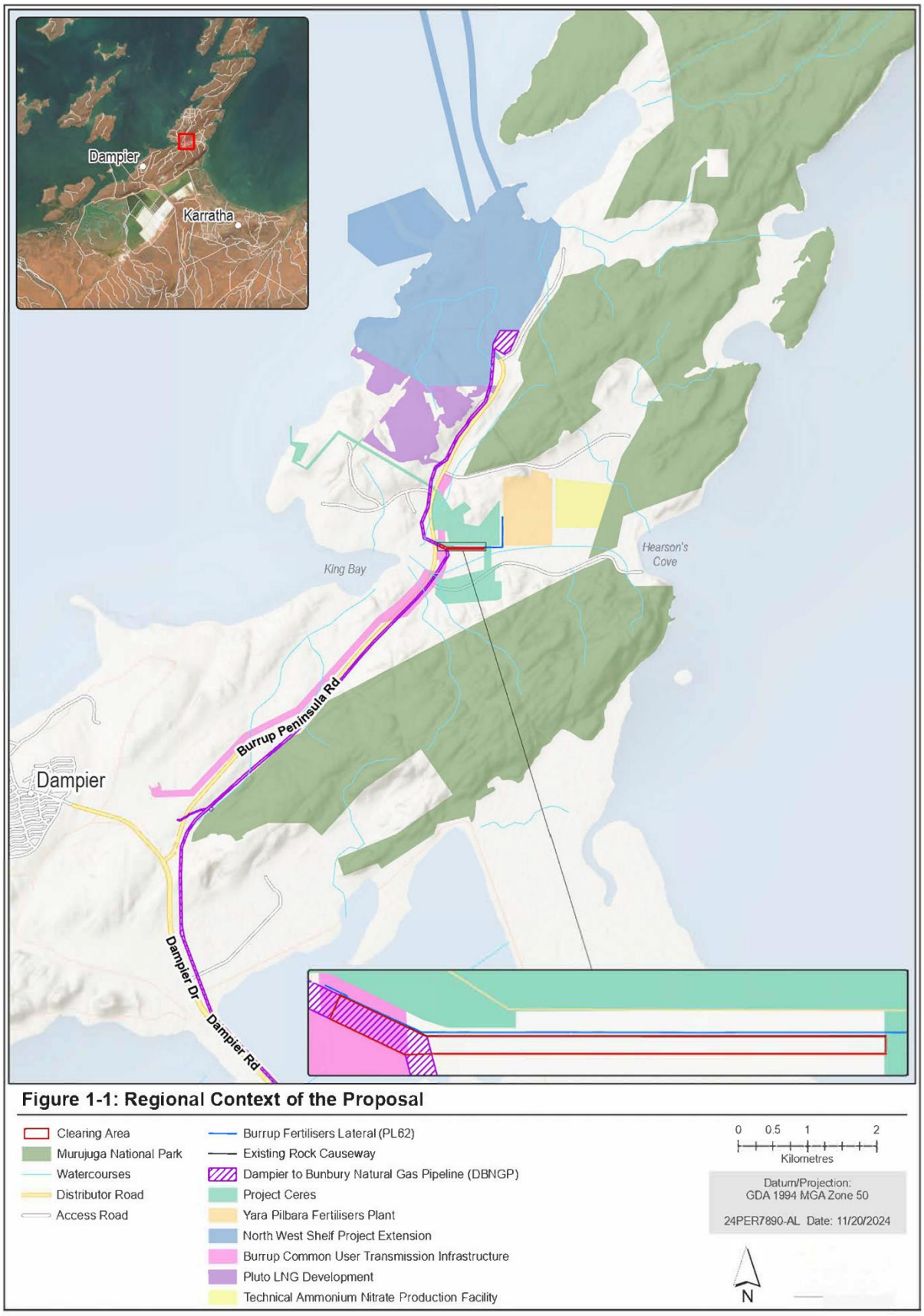


Figure 1-1: Regional Context of the Proposal

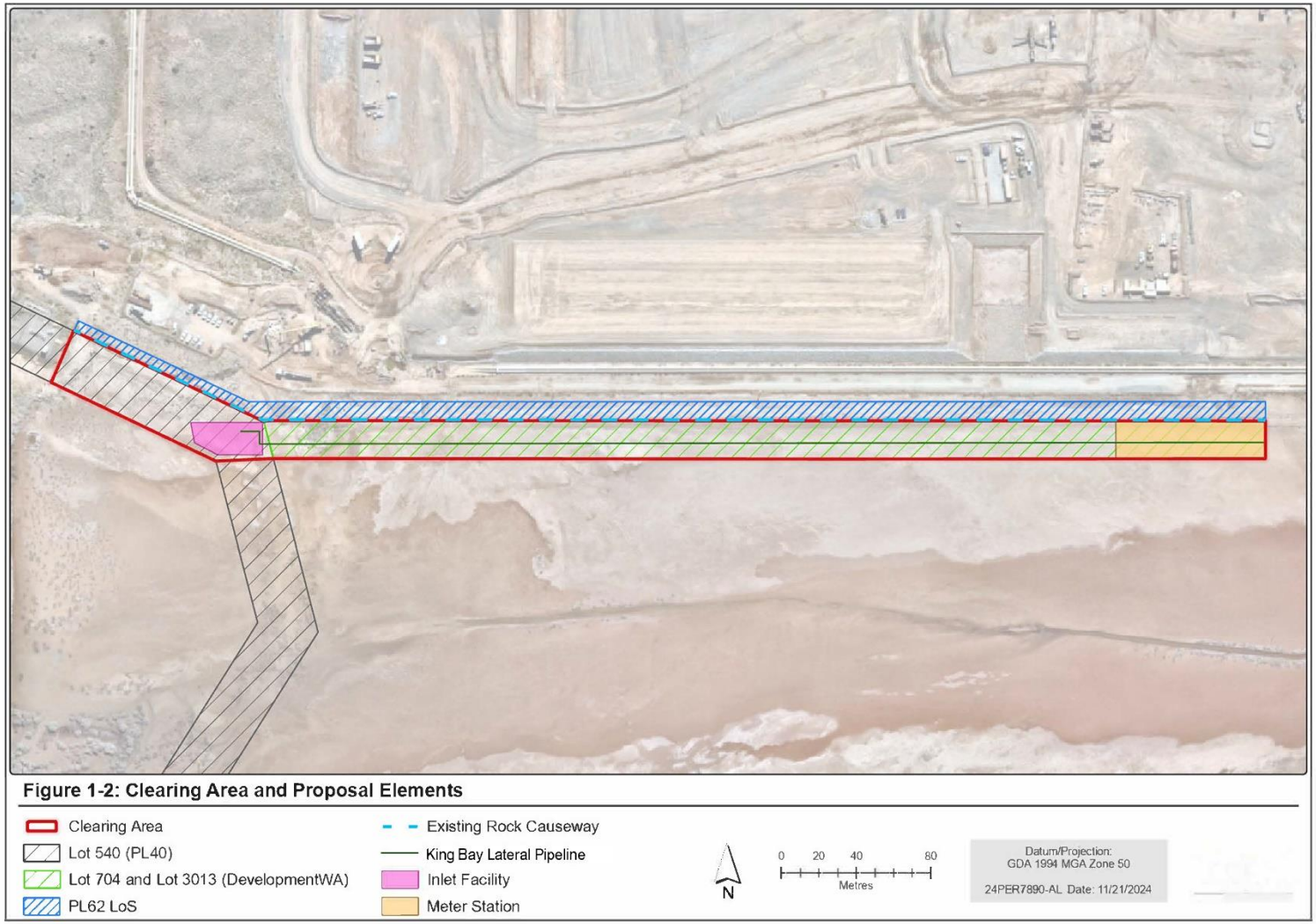


Figure 1-2: Clearing Area and Proposal Elements

1.1.2 Required Approvals

The Proposal was referred to the Environmental Protection Authority (EPA) on 3 September 2024, under s.38 of the EP Act. The referral received a 'not assessed' determination on 10 October 2024 with the potential impacts associated with the Proposal to be managed under other statutory decision-making processes. Other environmental approvals and regulations relevant to the Proposal are outlined in Table 1-1.

The Proposal will not be referred to under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) due to the absence of significant impacts on Matters of National Environmental Significance.

Table 1-1: Required Approvals for the Proposal

Approval Authority	Relevant Legislation	Process
Department of Energy, Mines, Industry Regulations and Safety (DEMIRS)	*Petroleum Pipelines Act 1969* (PP Act) and PP (Environment) Regulations 2012	Licence to construct and operate a petroleum pipeline
	Petroleum and Geothermal Energy Act 1967 (PGER Act) and PGER (Environment) Regulations 2012	Permits to undertake petroleum exploration Production Licences
	Dangerous Goods Safety Act 2004 (DGS Act)	License for the appropriate storage and handling of Dangerous Goods
Department of Biodiversity, Conservation and Attractions (DBCA)	*Biodiversity Conservation Act 2016* (BC Act)	Licensing associated with fauna and flora surveys and fauna relocation

1.2 Location, Ownership and Zoning

The Clearing Area intersects three land tenements, all occurring within the City of Karratha local government area and have been zoned for Strategic Industry in the City's Local Planning Scheme 8 (Figure 1-2). All three tenements are listed as Crownland, administered by the Department of Planning, Land and Heritage (DPLH). Additional information on these land tenements is provided in Table 1-2. Lot 704 and Lot 3013 are leased to the Western Australian Land Authority (DevelopmentWA). Lot 540 is contained within the DBNGP Corridor pursuant to the *Dampier to Bunbury Pipeline Act 1997* (DBP Act).

The Proponent will have legal access to the Clearing Area by means of an access right granted under the DBP Act (within Lot 540) and a sublease granted by the West Australian Land Authority (within Lot 704 and Lot 3013).

Table 1-2: Land Tenements within the Clearing Area

Lot Number	Volume/Folio	Land Type
Lot 704 on Deposit Plan 411759	LR 3174/529	Service Corridor
Lot 3013 on Deposit Plan 042282	LR 3139/36	Infrastructure Corridor
Lot 540 on Deposit Plan 221364	LR 3122/50	Service Corridor

1.3 Proposal Description

The Proponent is proposing to construct and operate a 550 m pipeline and supporting infrastructure to connect the proposed Project Ceres to the DBNGP network.

Perdaman Industries is currently constructing the Project Ceres urea plant on the Burrup Peninsula, located directly adjacent to the north, east and south of the Proposal. The plant will convert natural gas into ammonia and subsequently into urea using a single synthesis reactor to produce fertiliser. The DBNGP will be the primary natural gas source for Project Ceres, and this will be transported via the Proposal.

The Clearing Area intersects an existing pipeline licence for the DBNGP (Pipeline Licence 40 [PL40]) (Figure 1-1). The DBNGP was constructed and commissioned in 1984 to transport natural gas from Dampier to commercial, industrial and domestic markets in south-west WA, finishing near Bunbury. The Clearing Area is also adjacent to the Burrup Fertilisers Lateral (Pipeline Licence 62 [PL62]). PL62 is a 1.4 km pipeline that connects the Yara Pilbara Fertilisers plant to the DBNGP network. PL62 is maintained cleared to enable Line of Sight (LoS) (PL62 LoS; Figure 1-2).

1.3.1 DN400 Lateral Pipeline

A DN400 (16-inch), approximately 550 m pipeline from the King Bay Inlet Station to the King Bay Meter Station. The pipeline installation will involve the construction of a 550 m underground concrete-coated pipeline with pipeline pigging facilities at either end to tie into the DBNGP and the meter station. Construction of the pipeline will involve trenching, stringing, welding, lower-in, backfilling, hydrostatic pressure testings and final tie-ins. The trench will be open for a maximum of three weeks. Concrete-coated pipe will be utilised to eliminate the need for dewatering.

Trench spoil will be stored to the south of the trench and re-used for backfilling, and excess spoil will be spread over the pipeline centreline and battered against the rock causeway.

1.3.2 King Bay Inlet Station

The King Bay Inlet Station consists of the following components:

- Connection to DBNGP at new hot tap point
- Remote operable shutdown valve
- Pipework and valving provision for pig launcher
- Field Marshalling Box for control, power supply and communications cables run from the King Bay Meter Station.

The hot tap connection to the DBNGP involves making a connection to existing piping or pressure vessels without interrupting or emptying that section of the pipe or vessel. This method allows for modifications or expansions to the pipeline network without shutting down operations.

A remote operable isolating valve will be installed to isolate systems in case of a loss of primary containment. This valve helps prevent further leakage and ensures that the affected area can be safely addressed without compromising the entire system.

A pig launcher is used to facilitate intelligent pigging of the pipeline for maintenance, cleaning, and inspection purposes, allowing for the detection and mitigation of defects and corrosion within the pipeline infrastructure.

1.3.3 King Bay Meter Station

The King Bay Meter Station consists of the following components:

- Pipework and valving provision for pig receiver
- Remote operable shutdown valve skid
- Filtration skid
- Duty/standby custody transfer Ultrasonic flow skid
- Duty/standby pressure control skid
- 2 x Gas Chromatograph
- A Remote Terminal Unit Control shelter
- Solar panel and battery storage for power supply.

A pig receiver will be installed to retrieve the intelligent pig from pigging, ensuring that any pig sent through the system for cleaning or diagnostic purposes is safely and effectively recovered.

A custody transfer meter station will be installed to allow accurate measurement and accounting of the gas flow, facilitating proper management and billing between the DBNGP and Project Ceres.

1.3.4 Supporting Infrastructure

Supporting infrastructure to facilitate the construction of the Proposal will include material storage/laydown areas. There will be no storage of dangerous or hazardous goods within the site in quantities required to be licenced.

1.3.5 Rock Causeway

To facilitate construction access along the pipeline easement, the width of the existing rock causeway is to be expanded. The existing causeway runs parallel to the proposed pipeline. This causeway will be expanded from 3 m in width to 8 m and raised to provide 400 mm clearance from the natural surface level. The length of the causeway is approximately 550 m. Pipeline construction will proceed following the completion of the causeway expansion.

2. PHYSICAL ENVIRONMENT

2.1 Biogeographical Regions

The Interim Biogeographic Regionalisation for Australia (IBRA) currently classifies 89 bioregions across Australia, based on a range of biotic and abiotic factors such as climate, vegetation, fauna, geology and landform (Thackway and Cresswell 1995; DCCEEW 2024). These bioregions are further refined into 419 subregions representing more localised and homogenous geomorphological units in each bioregion (DCCEEW 2024). IBRA divides WA into 26 biogeographic regions and 53 subregions based on dominant landscape characteristics of climate, lithology, geology, landform and vegetation.

The Clearing Area is located in the Pilbara bioregion, and the Roebourne subregion. The Roebourne subregion is described as *Quaternary alluvial and older colluvial coastal and sub-coastal plains with vegetation described as grass savannah of mixed bunch and hummock grasses, and dwarf shrub steppe of Acacia species and ephemeral drainage lines support Eucalyptus victrix or Corymbia hamersleyana woodlands. Samphire, Sporobolus and mangal occur on marine alluvial flats and river deltas* (Kendrick and Stanley 2001).

2.2 Climate

The Clearing Area has a hot, semi-arid climate with hot wet summers and warm dry winters. Based on the data from the nearby Bureau of Meteorology (BoM) Karratha Aero weather station (Station Number 4083 - rainfall data from 1971 to present), which is located approximately 8.5 km to the south of the Clearing Area, the Clearing Area receives an annual average of 294.6 mm of precipitation per annum, with most rainfall occurring in January to March (BoM 2024).

The annual mean maximum temperature ranges from 36.2°C in March to 26.5°C in June and July, whilst the annual mean minimum temperature ranges from 26.9 in January to 13.9 in July (BoM 2024).

2.3 Land Use

The land surrounding the Clearing Area primarily consists of industrial developments related to the oil and gas sector. The Dampier township is located approximately 6 km to the southwest and is the closest urban centre. The Murujuga National Park is also located approximately 1 km to the north and south of the Clearing Area (Figure 1-1).

2.4 Land Systems and Soils

2.4.1 Land Systems

Land Systems mapping, prepared by the Department of Primary Industries and Regional Development (DPIRD), provides a comprehensive and standardised description of landscapes, soils and vegetation of the Pilbara region of WA at a regional scale (Payne and Schoknecht 2011; DPIRD 2024). These surveys describe the biophysical characteristics of each region and subsequently divide each region into land systems; land systems being defined as repeating patterns of topography, soils and vegetation.

Two Land Systems have been mapped across the Clearing Area: the Granitic Land System and the Littoral Land System (Table 2-1; Figure 2-1).

Table 2-1: Land Systems within the Clearing Area

Land System	Description	State Land Type	Extent in Roebourne Subregion (ha)	Extent within the Clearing Area (ha)	Proportion of Extent within the Clearing Area (%)
Granitic Land System	Rugged granitic hills supporting shrubby hard and soft spinifex grasslands.	Hills and ranges; Spinifex grasslands	7,794.7	<0.01	Negligible
Littoral Land System	Bare coastal mudflats (unvegetated), samphire flats, sandy islands, coastal dunes and beaches, supporting samphire low shrublands, sparse acacia shrublands and mangrove forests.	Coastal plains, beaches, dunes, mudflats and cliffs; Various coastal vegetation	212,304.9	1.43	Negligible

2.4.2 Soil Characteristics

The Clearing Area overlies the Karratha Coastal soil landscape zone, comprising coastal mudflats (with sandy coastal plains and some hills) on marine deposits over the Pilbara Craton with tidal soils, Calcareous loamy earth, Salt lake soils and Red/brown non-cracking clays.

During the baseline Environmental Site Assessment (ESA) undertaken for the Clearing Area (discussed further in Section 2.4.3), one soil profile with two distinct horizons was identified. Namely; a pale brown silty sand (SS) overlaying a mottled grey and brown silty, clayey sand (SS (C)) (Table 2-2).

Table 2-2: Generalised Lithologies and Particle Size Analysis Results

Depth (m bgl)	Soil Profile Code	Lithological Description/Observations
0.0-0.4	SS	**Pale brown silty sand** May include shell fragments and is typically dry to moist.
0.4-1.5	SS(C)	**Mottled grey and brown silty, clayey sands** May contain trace gravel or cobbles and is typically moist to wet.

2.4.3 Site Contamination

The three lots of the Clearing Area (Lots 540, 3013 and 704) have been classified by DWER as 'Possibly Contaminated – Investigation Required', with restrictions on groundwater abstraction requiring testing before its use (Section 2.5.2).

The classification is due to the results of contamination assessments carried out in 2017-2018 at the Technical Ammonium Nitrate (TAN) Yara Fertilisers Plant, which found ammonia, nitrates and nitrites at elevated concentrations in soil and groundwater, approximately 1.1 km northeast of the Clearing Area (Figure 1-1; Attachment C in Senversa 2024). The investigations found that nutrient seepage was occurring at the TAN plant embankment into the adjacent supratidal flats,

as a result of faulty infrastructure. The receiving sediments of the adjacent 'upper' supratidal flats were found to be acting as a nutrient sink, with the potential for migration to downstream areas in the 'lower' supratidal flats and King Bay during high rainfall events.

Following a significant rainfall event in May 2021, environmental monitoring data indicated unacceptably high nitrate concentrations in surface waters migrating from the TAN plant, with the potential to impact sensitive ecological receptors in the supratidal flats and King Bay (Attachment C in Senversa 2024)

Because of the above, the Proponent commissioned Senversa to undertake a baseline ESA of the Clearing Area to assess the potential contamination within the Clearing Area to inform management (Senversa 2024)

Based on the results of the survey, the soils within the Clearing Area were not found to contain evidence of anthropogenic contaminants, including hydrocarbons, Per- and polyfluoroalkyl substances (PFAS) or metals. However, the ESA did identify the potential for Acid Sulphate Soils to occur if soils became oxidised.

2.5 Hydrology

2.5.1 Surface Water

The Clearing Area occurs within the Port Hedland Coast basin and is located within a saline coastal flat (Figure 2-2; DWER 2018a). The Clearing Area does not intersect any significant surface water bodies or wetlands, nor any Public Drinking Water Source Areas (DWER 2024).

A minor (non-perennial) watercourse lies directly south of the Clearing Area draining into Kings Bay.

The Clearing Area occurs within a mudflat area that drains westward to King Bay (Cardno 2020). The mudflats are tidal and are subject to flooding during heavy rainfall periods and during extreme spring tides.

2.5.2 Groundwater

The Pilbara Fractured Rock Aquifer underlies the Clearing Area and forms part of the Pilbara Proclaimed Groundwater Area (DWER 2018b). Groundwater investigations were undertaken for Project Ceres which found that the local groundwater levels range between 0.7–2.8 m below ground surface and had a total dissolved salt concentrations that exceed that of the surrounding seawater (40,000–50,000 mS/cm) (SKM 2001). Groundwater levels within the Clearing Area range between 0.276 and 0.376 m below ground level (Senversa 2024).

The groundwater was also assessed during the baseline ESA which found it to contain low levels of PFAS; however, the concentrations were below adopted guidelines for human health and the environment. All hydrocarbons in the groundwater were below the Limit of Reporting (LoR) and subsequently below the adopted assessment criteria. The groundwater was found to have exceedances of Zinc; however, in the absence of a defined contaminant source, and in light of comparatively low concentrations of other reported metals, the zinc concentrations were considered to be reflective of ambient groundwater conditions.

The groundwater did have elevated nutrients (ammonia, total nitrogen and phosphorus). The elevated nutrients were considered consistent with the nutrient seepage from the TAN plant.

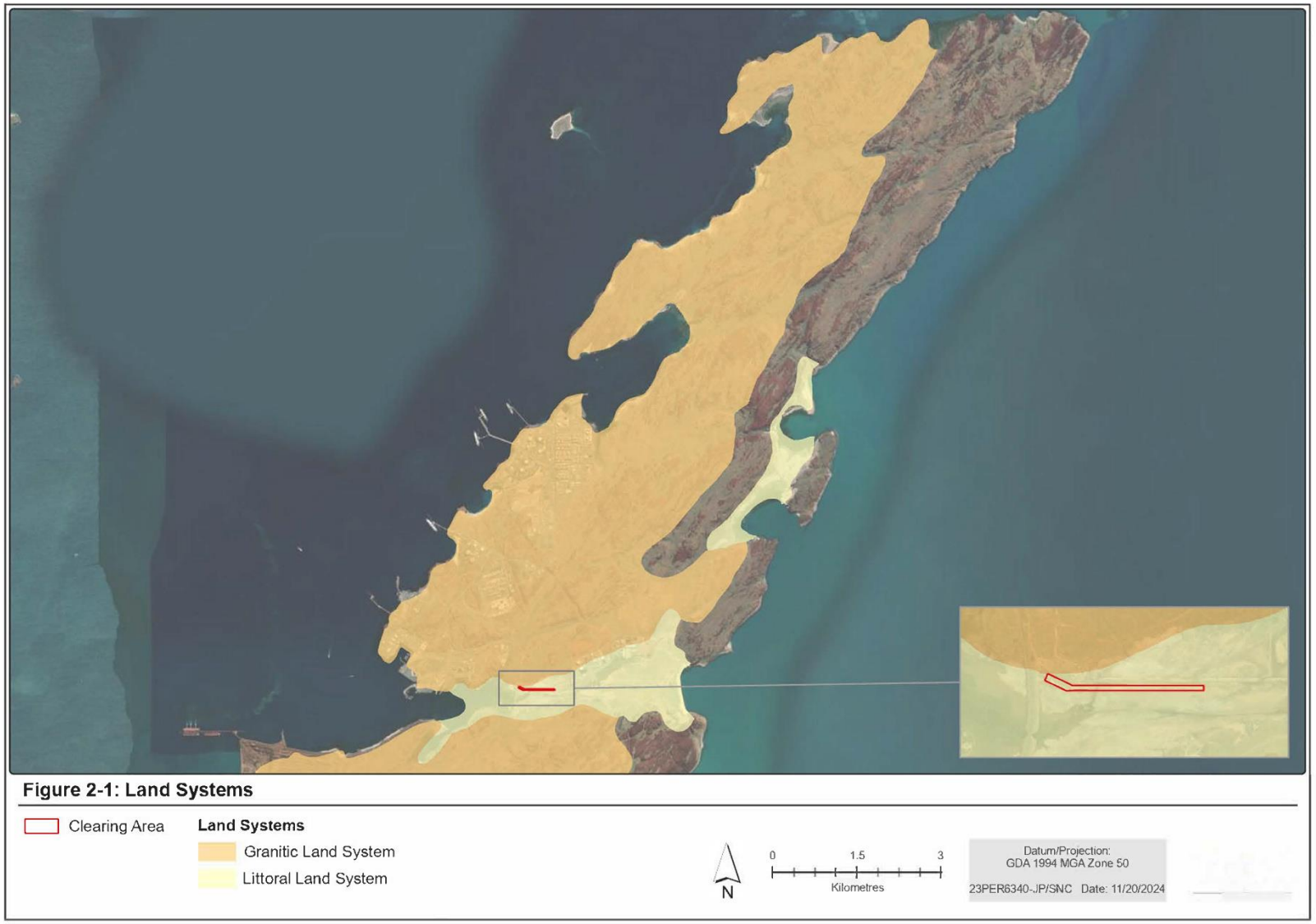


Figure 2-1: Land Systems

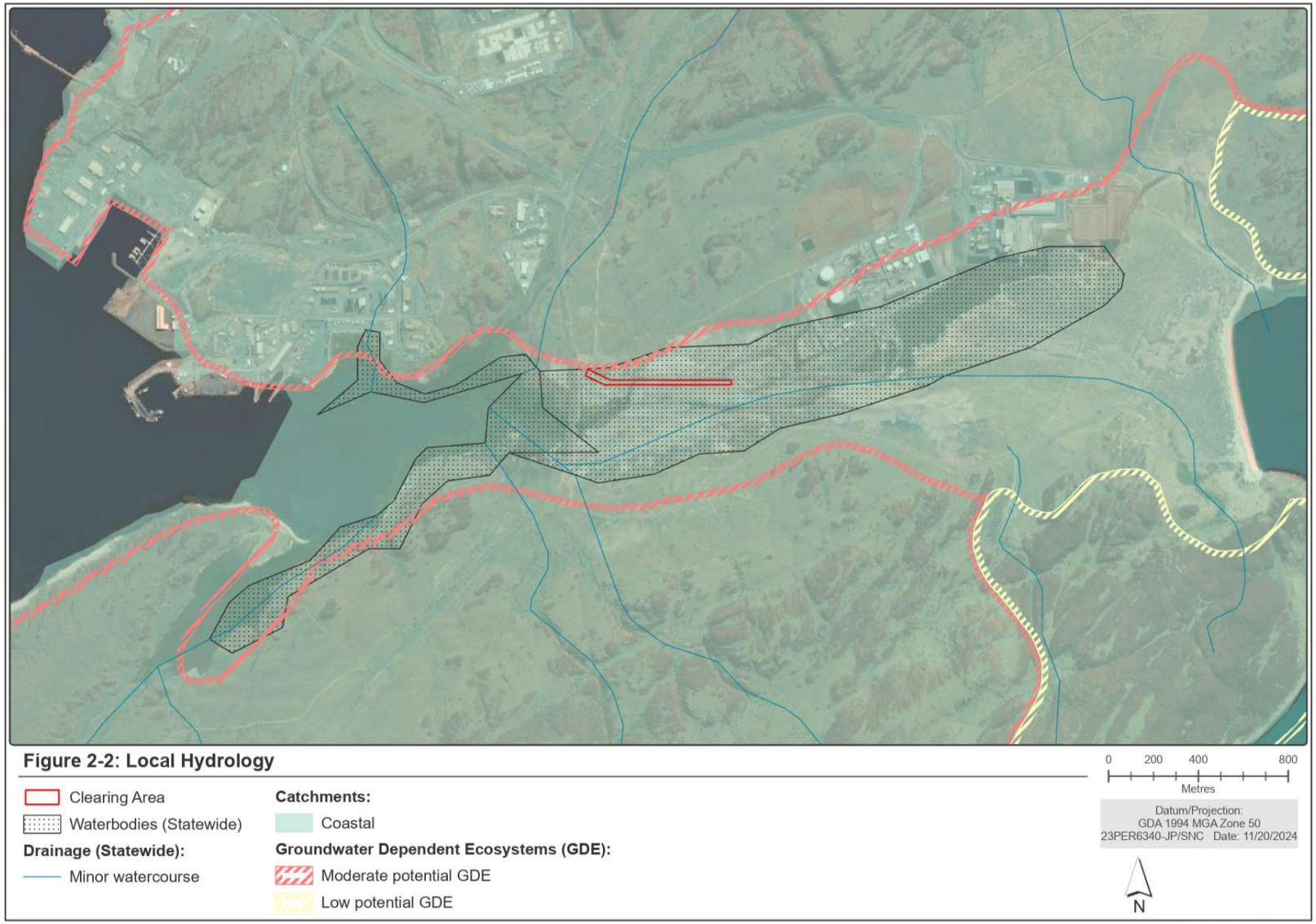


Figure 2-2: Local Hydrology

2.6 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are defined in the Environmental Protection (Environmentally Sensitive Areas) Notice 2005 under section 51B of the EP Act. ESAs include areas declared as World Heritage, included on the Register of the National Estate (now replaced by the National Heritage List under the EPBC Act), defined wetlands, and vegetation containing rare (Threatened) flora and Threatened Ecological Communities (TECs).

There are no ESAs within the Clearing Area. The closest is the Murujuga National Park which is located approximately 1 km to the north and south of the Clearing Area (DBCA 2020).

Priority Ecological Communities (PECs) are biological flora or fauna communities that are recognised to be of significance but do not meet the criteria for a TEC. There are five categories of PECs, none of which are currently protected under legislation. A DBCA Threatened and Priority Communities database search identified two known occurrences of a PEC within 5 km of the Project Area.

2.7 Heritage

The Proposal is located within the Ngarluma-Yindjibarndi Native Title Determination Area (WAD6017/1996), which is held jointly by the Ngarluma Aboriginal Corporation and the Yindjibarndi Aboriginal Corporation. The Prescribed Body Corporate for the Burrup and Maitland Industrial Estates Agreement (BMIEA) is the Murujuga Aboriginal Corporation (MAC).

The mapped boundaries of seven registered Aboriginal Heritage sites from the DPLH Aboriginal Cultural Heritage Register overlap the Clearing Area, including:

- Place ID 9069: Kissing Birds
- Place ID 9073: Rock Shot
- Place ID 9215: Haul Road South 06
- Place ID 9216: Haul Road South 07
- Place ID 9813: DRD Area A-07
- Place ID 19766: DN-09 Engravings
- Place ID 26008: Hearson Engravings.

An archaeological and ethnographic heritage survey was conducted concurrently on 17 November 2023, advised by Traditional Owners from MAC (ACHC 2023; Scarp Archaeology 2024). An endorsement of the findings of the survey reports was received from MAC on 28 March 2024 (MAC 2024).

Key outcomes and requirements of the site identification archaeological and ethnographic survey include, but are not limited to:

- Although the mapped boundaries of the seven registered Aboriginal Heritage sites from the DPLH Aboriginal Cultural Heritage Register intersect the Clearing Area, there is no significant heritage material or other aspects of significant Aboriginal heritage value specifically located within the Clearing Area
- No new isolated artefacts, new heritage sites or heritage features were recorded
- There are no Aboriginal heritage sites with ethnographic values that intersect with the proposed Clearing Area.
- Four monitors be present for all earthworks

- Employees and contractors carrying out the proposal must be informed of the contents of the final survey reports (ACHC 2023; Scarp Archaeology 2024) and their obligations to have zero harm to heritage
- The Proponent must inform MAC of any changes to the Proposal
- In the event that additional sites are located at any stage during the proposal, MAC Heritage procedures must be followed, and all works must halt immediately in the area to prevent any impacts
- In the event that human remains are located at any stage during the proposed works, DPLH procedures must be followed, and all works must halt immediately in the area to prevent any further impacts to the remains.

One previously recorded midden site (WC-2023-M001-01 and WC-2023-M001-02) was recorded during the survey (Scarp Archaeology 2024). The Clearing Area has been subsequently revised to avoid impact on this midden site.

3. BIOLOGICAL ENVIRONMENT

3.1 Ecological Surveys

A detailed and targeted flora and vegetation survey and a basic fauna survey have been undertaken for the 1.43 ha Clearing Area (ELA 2024). The details and spatial extent of the survey is presented in Table 3-1 and Figure 3-1.

In addition to the above, the Clearing Area is also within the larger area surveyed as part of Project Ceres. A Pre- and Post-Wet Season Biological Survey was conducted for this project in late 2018 and early 2019 and included flora and vegetation survey effort (APM 2019). The survey findings were reviewed by Eco Logical Australia (ELA) and are referenced where appropriate to provide greater local context of the flora and vegetation values present within the Clearing Area and wider locality (ELA 2024).

Table 3-1: Flora and Vegetation Studies

Survey	Area (ha)	Scope &Timing	Study/Survey Effort	Consistency with Guidance and Limitations
Perdaman Pipeline Flora and Fauna Survey (ELA 2024) Figure 3-1**Error! Reference source not found.**	1.43	The field survey was conducted on 26 March 2024. The scope of the survey included: • Desktop assessment of available literature and databases to identify potential values • Field survey to establish quadrats, map and describe vegetation types and compile a species inventory • Identification of conservation significant flora and vegetation communities. • Field survey to delineate and map fauna habitats and	The field survey included the establishment of one quadrat (20 x 125 m) and the systematic traversing of vegetation within the Clearing Area	This survey was conducted in accordance with appropriate technical guidance including: • Environmental Factor Guideline: Flora and Vegetation (EPA 2016a) • Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016b) • Environmental Factor Guideline: Terrestrial Fauna (EPA 2016c) • Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020) No limitations or constraints were identified for the survey

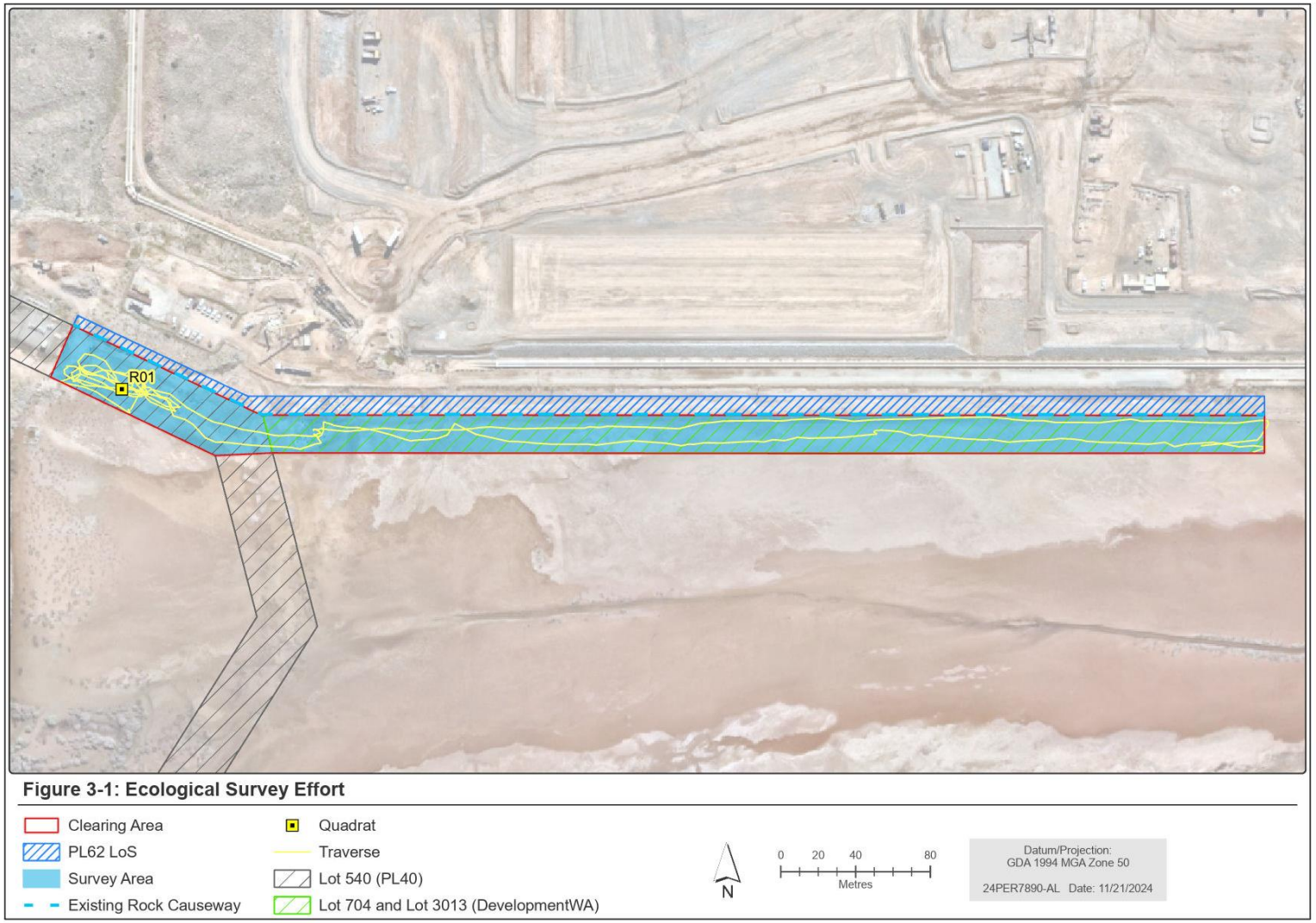


Figure 3-1: Ecological Survey Effort

3.2 Flora and Vegetation

3.2.1 Vegetation

3.2.1.1 Pre-European Vegetation

The Pre-European vegetation of Western Australia was mapped, at a 1:1,000,000,000 scale by Beard (1979) who categorised vegetation into broad vegetation associations. Based on this mapping, DPIRD (DAFWA) compiled a list of vegetation extent and types across WA (Shepherd et al. 2002).

One pre-European vegetation association has been mapped across the Clearing Area, namely Abydos Plain – Roebourne 117 (Figure 3-2). Table 3-2 summarises the current and pre-European extent of this vegetation association within the Roebourne subregion.

Table 3-2: Pre-European Vegetation Associations

Vegetation Association	Pre-European Extent (ha)*	Current Extent (ha)	Proportion (%) of pre-European extent remaining	Extent in Clearing Area (ha)	Proportion (%) of Current Extent within the Clearing Area
Abydos Plain – Roebourne 117 – Hummock grasslands, grass steppe, soft spinifex	50,962.9	46,901.6	92.0	1.43	<0.01%

3.2.1.2 Vegetation Types

One broad vegetation type (VT01) was identified within the Clearing Area, covering 0.21 ha and classified as being in 'Poor' condition (ELA 2024). The remaining 1.22 ha within the Clearing Area is Mudflats, devoid of vegetation (ELA 2024)). The description and spatial extent of VT01 is presented in Table 3-3 and Figure 3-3.

3.2.1.3 Conservation Significant Ecological Communities

No vegetation types within the Clearing Area were identified as representing any known or potential conservation significant ecological communities listed under the EPBC Act, the BC Act or by DBCA (ELA 2024).

The desktop assessment identified two PECs that occur within 5 km of the Clearing Area (ELA 2024). Both PECs are considered not to occur within the Clearing Area due to the lack of suitable species and habitats, as well as both PECs being restricted to rockpile formations.

3.2.1.4 Vegetation Condition

All vegetation within the Clearing Area (0.21 ha) was classified as being in Poor condition, based on the Trudgen (1988) vegetation scale (Figure 3-4) (ELA 2024). The areas identified as Mudflat (1.22 ha) were not assigned a vegetation condition. Disturbances recorded within the Clearing Area included previous clearing, infestation of weed species and deposition of dust.

Table 3-3: Vegetation Types

Vegetation Types	Description	Extent (ha) in Clearing Area			Proportion (%) of Clearing Area	Representative Photo
		Lot 540 (PL40)	Lot 704 and Lot 3013 (DevelopmentWA)	Total		
VT01	*Tecticornia halocnemoides*, *Tecticornia indica* subsp. *leiostachya*, *Trianthema turgidifolium* low sparse chenopod shrubland	0.14	0.07	0.21	14.7	
Mudflats	Naturally devoid of vegetation	0.21	1.01	1.22	85.3	
Total		**0.35**	**1.08**	**1.43**	**100.0**	

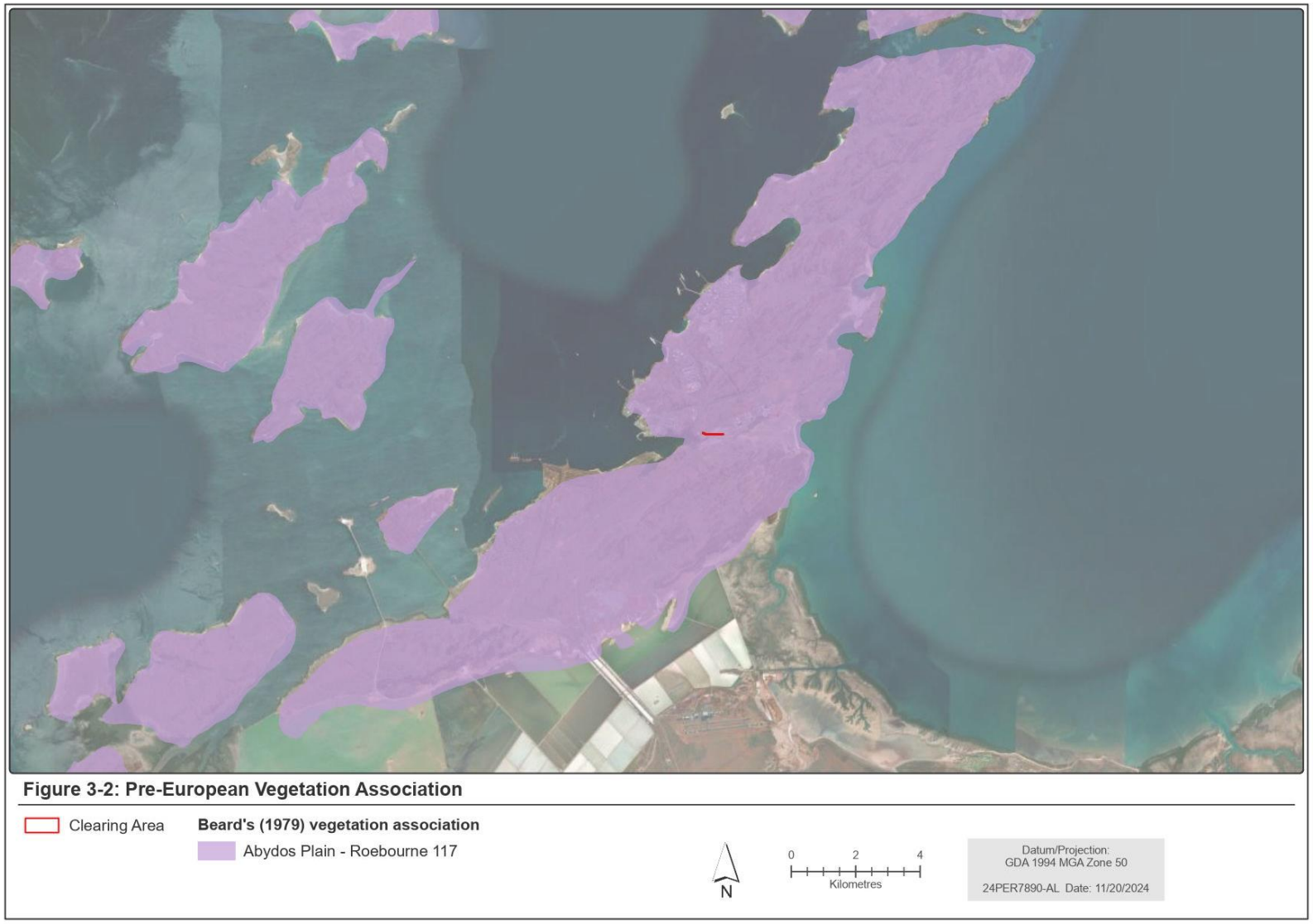


Figure 3-2: Pre-European Vegetation Association

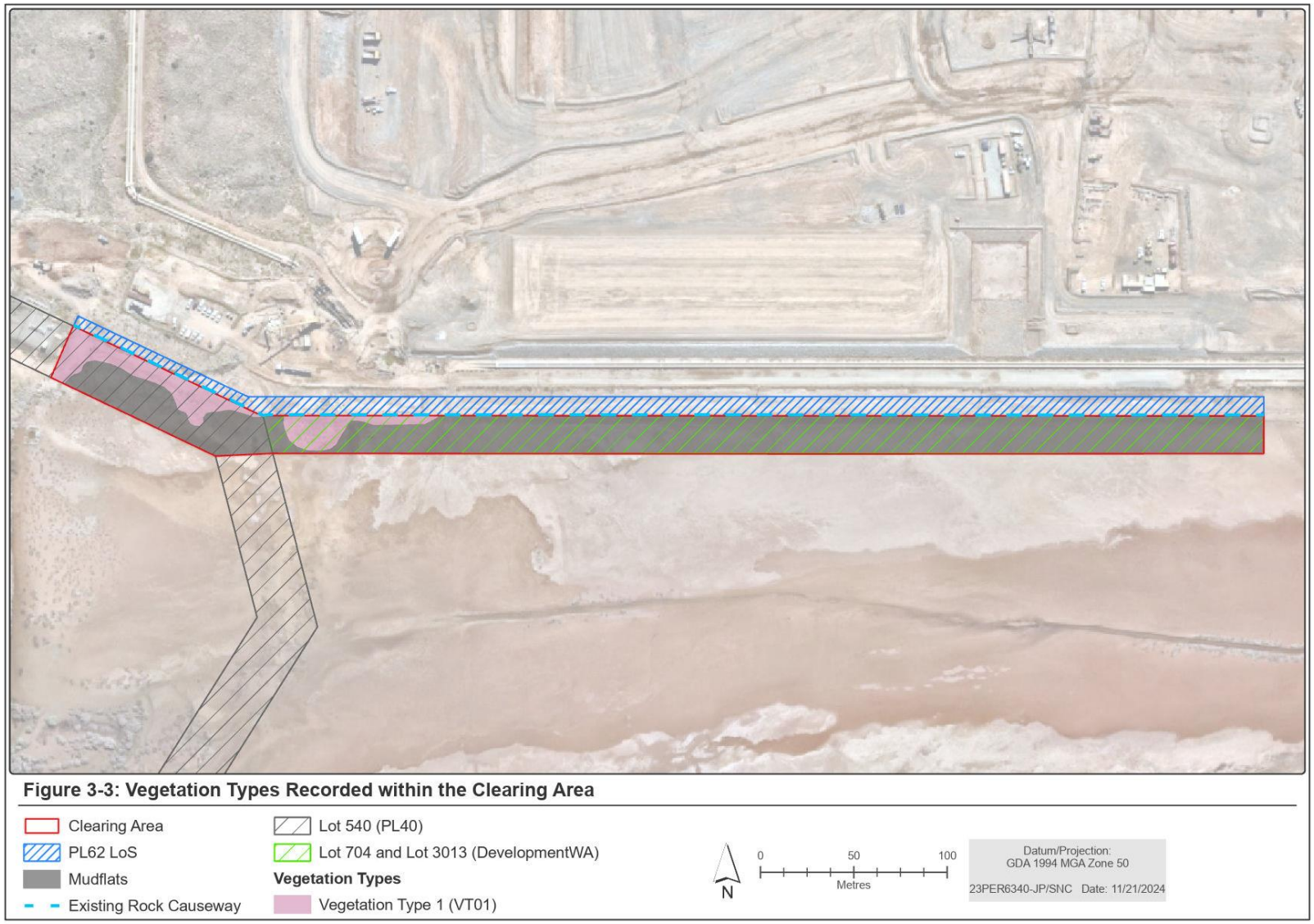


Figure 3-3: Vegetation Types Recorded within the Clearing Area

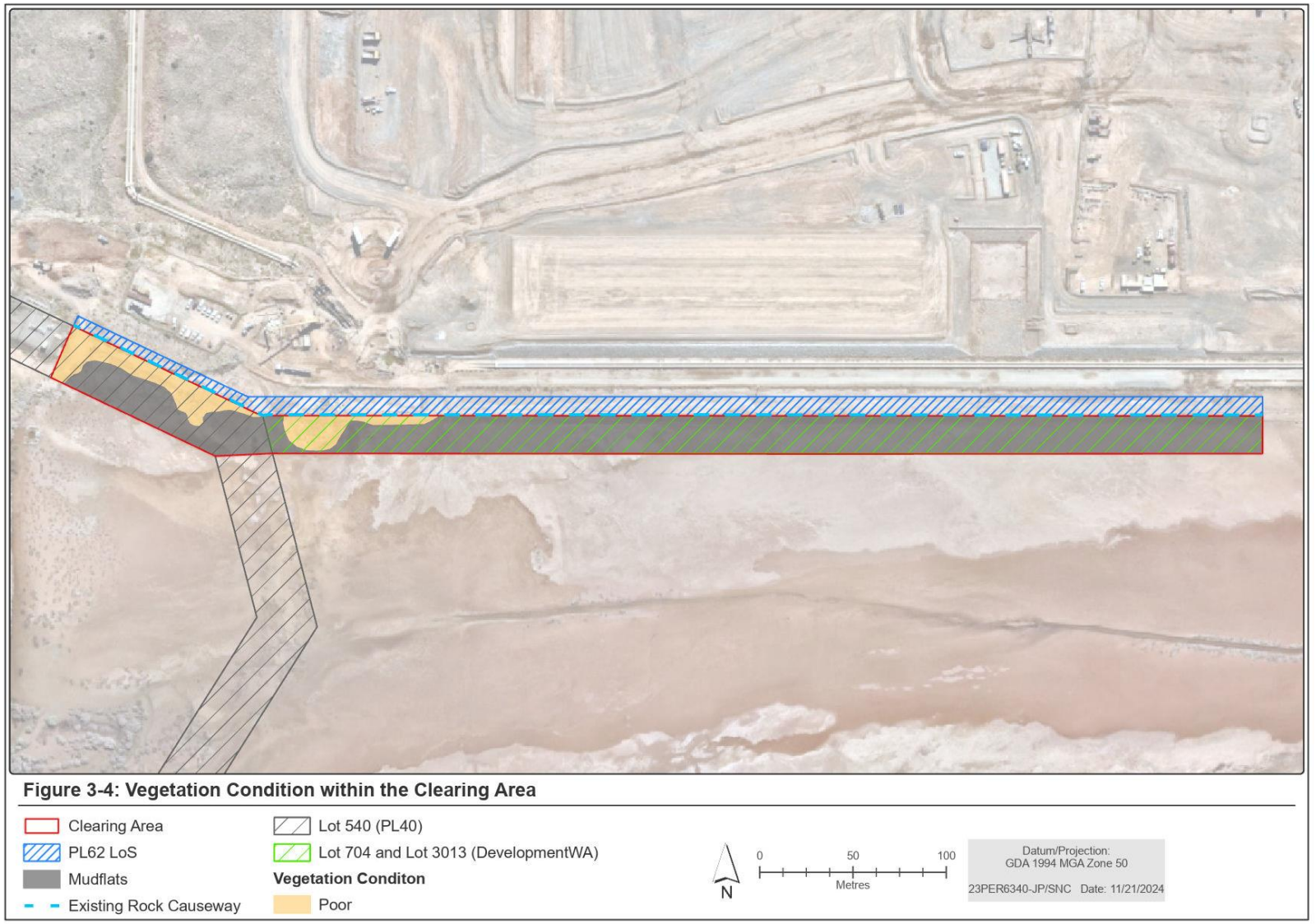


Figure 3-4: Vegetation Condition

3.2.2 Flora

A total of 10 flora species (nine native and one introduced) from eight genera and five families were recorded within the Clearing Area (ELA 2024). Most recorded taxa were representative of the Chenopodiaceae (four taxa) and Poaceae (three taxa) families. Tecticornia was the best-represented genera throughout the Clearing Area with three taxa recorded.

3.2.2.1 Conservation Significant Flora

No Threatened flora species listed under the EPBC Act or BC Act or Priority species listed by DBCA were recorded from within the Clearing Area (ELA 2024).

3.2.2.2 Introduced Flora

One introduced flora species was recorded within the Clearing Area, **Cenchrus ciliaris* (Buffel grass) (ELA 2024). The species is listed under the Biosecurity and Agricultural Management Act 2007 (BAM Act) as Permitted (s-11), with no specific conditions for control required. This species was recorded at a 0.1% cover within vegetated areas of the Clearing Area.

3.3 Terrestrial Fauna

3.3.1 Fauna Habitat

Two fauna habitat types were identified within the Clearing Area: 'Mudflats' (1.22 ha) and 'Low Chenopod Shrubland' (0.21 ha) (ELA 2024). The description and spatial extent of these fauna habitats is provided in Table 3-4 and Figure 3-5.

Only the Mudflats habitat within the Clearing Area is considered to potentially provide foraging habitat to conservation significant fauna, with a range of migratory waders having the potential to use the habitat when it is occasionally inundated (e.g. during king tides and heavy rainfall). The vegetation within the Low Chenopod Shrubland habitat was in Poor condition and therefore not considered to provide habitat for any conservation significant fauna species (ELA 2024).

Neither habitat is considered to be locally or regionally restricted with 38.74 ha of Samphire Shrubland/Supra-tidal Flat habitat (which is considered representative of these habitats) recorded by APM (2019; Figure 3-6) as well as 43.7 ha of the Samphire Shrubland within the Murujuga National Park and 803.02 ha within the broader Burrup Peninsula (Cardno 2020).

Table 3-4: Habitat Types

Habitat Types	Description	Extent (ha) in Clearing Area			Proportion (%) of Clearing Area	Representative Photo
		Lot 540 (PL40)	Lot 704 and Lot 3013 (DevelopmentWA)	Total		
Mudflats	Species poor mudflat	0.21	1.01	1.22	85.3	

Habitat Types	Description	Extent (ha) in Clearing Area			Proportion (%) of Clearing Area	Representative Photo
		Lot 540 (PL40)	Lot 704 and Lot 3013 (DevelopmentWA)	Total		
Low Chenopod Shrubland	Low sparse chenopods	0.14	0.07	0.21	14.7	
Total		**0.35**	**1.08**	**1.43**	**100.0**	

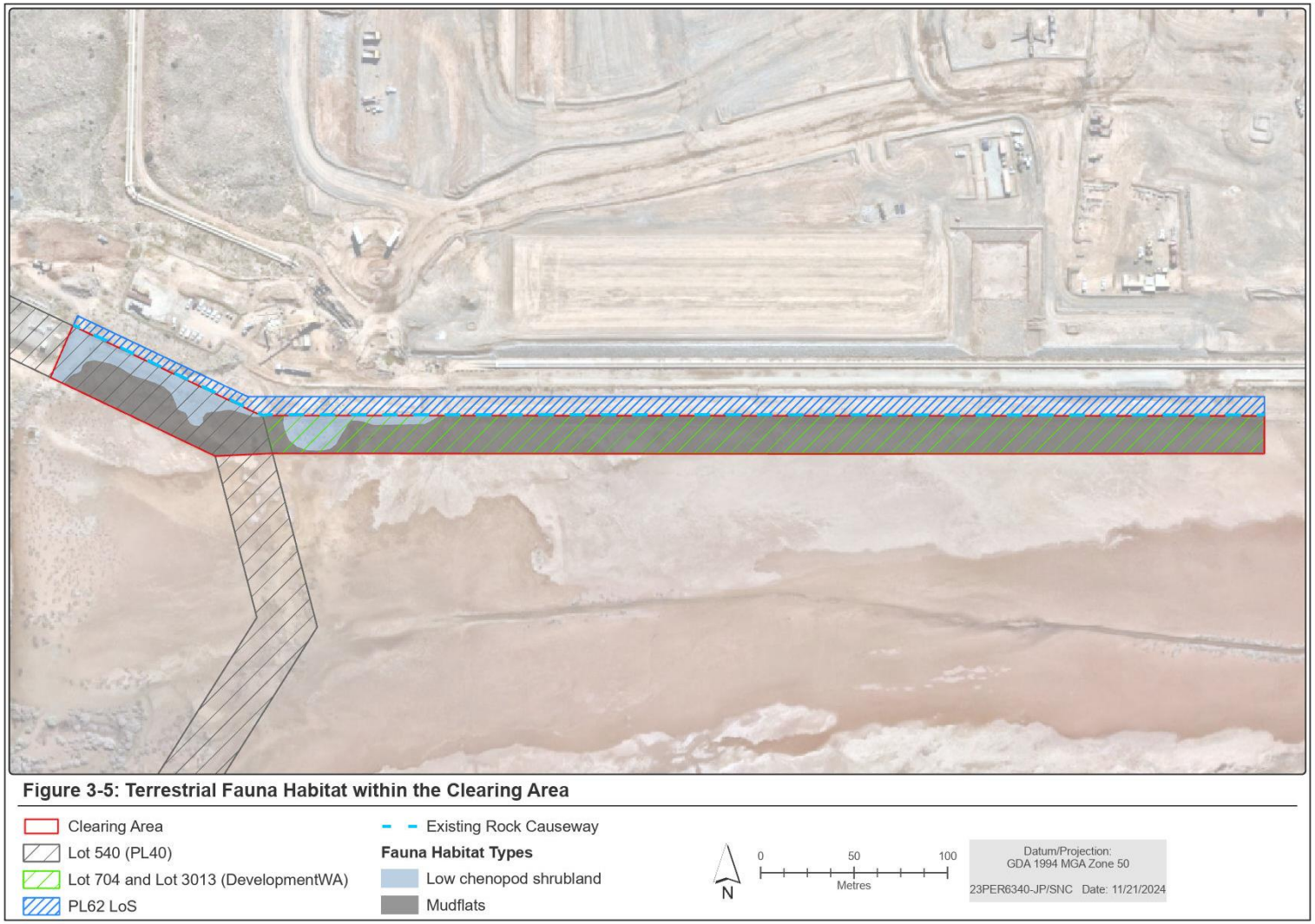


Figure 3-5: Terrestrial Fauna Habitat

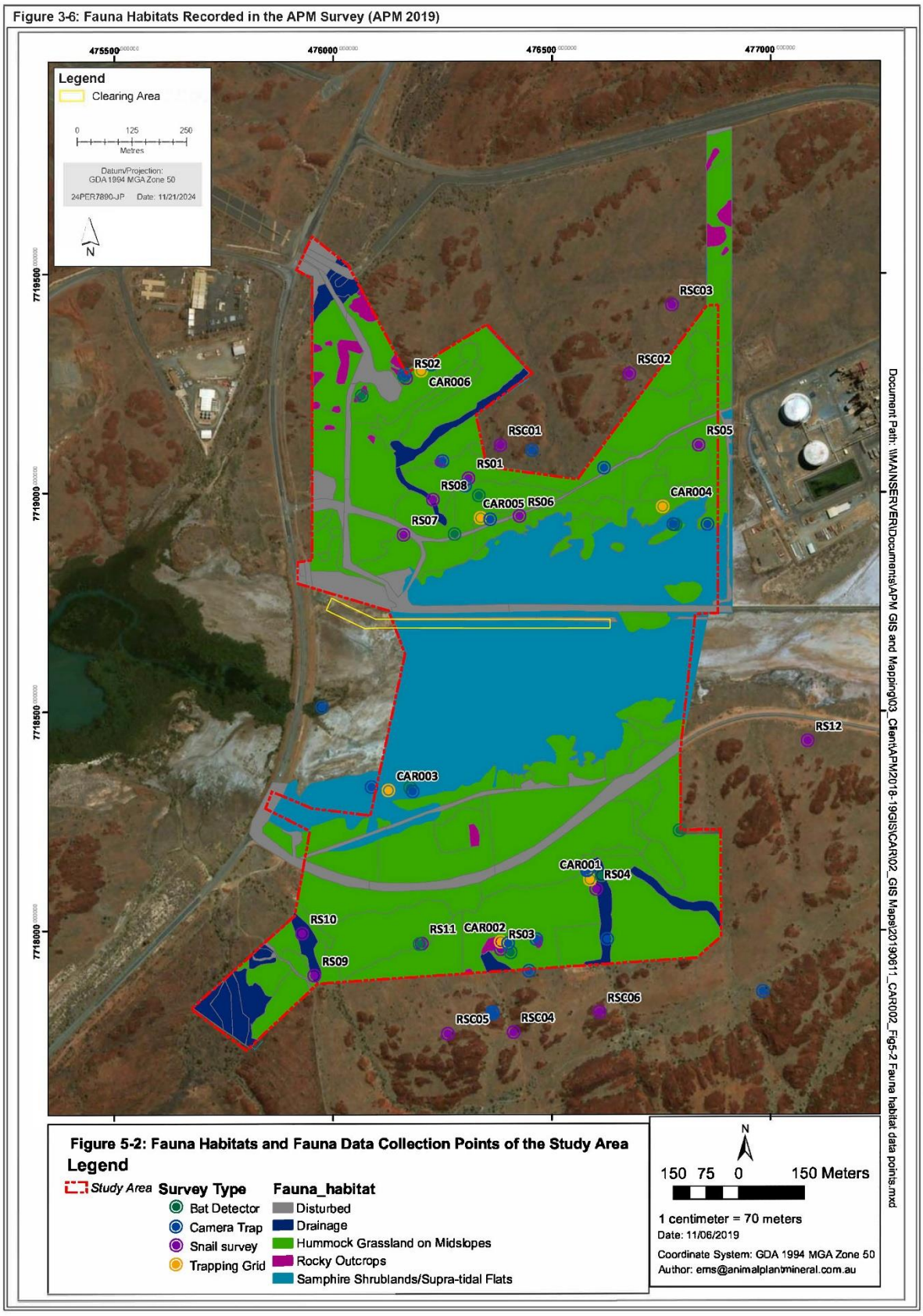


Figure 3-6: Terrestrial Fauna Habitats Recorded in the APM survey (APM 2019)

3.3.2 Fauna Species

Historical and recent surveys of the Burrup Peninsula have recorded 30 mammal species, 150 bird species, 49 reptiles and two amphibians near the Proposal (Cardno 2020). No fauna species were recorded within the Clearing Area during the recent survey (ELA 2024).

A desktop review identified 29 conservation significant fauna species as possible occurring within the Clearing Area, based on habitat preferences and proximity of records (ELA 2024). This included 28 species listed under the EPBC Act and BC Act, one of which is also listed as Priority 4 by DBCA, and one species is listed as an Other Specially Protected species under the BC Act only (ELA 2024).

No direct (observations) or indirect (scats, tracks, diggings) evidence of Threatened species listed under the EPBC Act or BC Act or Priority species listed by DBCA were recorded within the Clearing Area during the fauna survey (ELA 2024). Based on the results of the fauna survey, eight conservation significant fauna species were considered as having the potential to occur within the Clearing Area, based on the availability of suitable habitat and proximity of previous records (ELA 2024, Table 3-5).

The remaining 21 fauna species identified in the desktop assessment were considered unlikely to occur or do not occur within the Clearing Area, based on habitat requirements, lack of suitable habitat present, distance and age of previous records, and adequacy of the survey effort. Species considered unlikely to occur have not been included in this assessment; however, a comprehensive list (excluding pelagic marine fauna species) is provided in Appendix B.

Table 3-5: Conservation Significant Fauna Likelihood of Occurrence Assessment

Species	Conservation Status	Habitat Preferences	Suitable Habitat within the Clearing Area	Likelihood of Occurrence within the Clearing Area
Calidris ferruginea (Curlew Sandpiper)	Critically Endangered (EPBC Act and BC Act) Migratory (EPBC Act and BC Act)	Curlew Sandpiper occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand.	Mudflats	**Potential** Potentially suitable habitat may occur within the Clearing Area (seasonally when inundated). Records occur within 1 km of the Clearing Area.
Tringa nebularia (Common Greenshank)	Endangered (EPBC Act) Migratory (EPBC Act and BC Act)	Inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves, or seagrass.	Mudflats	**Potential** Potentially suitable habitat may occur within the Clearing Area (seasonally when inundated). Records occur within 1 km of the Clearing Area.
Xenus cinereus (Terek Sandpiper)	Vulnerable (EPBC Act) Migratory (EPBC Act and BC Act)	The Terek Sandpiper mostly forages in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayments, harbours or lagoons. The species has also been recorded on islets, mudbanks, sandbanks and spits, and near mangroves and occasionally in samphire (*Halosarcia* spp.).	Mudflats	**Potential** Potentially suitable habitat may occur within the Clearing Area (seasonally when inundated). Records occur within 1 km of the Clearing Area.
Gelochelidon nilotica (Gull-billed Tern)	Migratory (EPBC Act and BC Act)	Saltpans, coastal lagoons, mudflats, marshes and wet fields, overwintering on estuaries, saltpans, lagoons and saltmarshes, or in more inland sites such as large rivers, lakes, rice-fields, sewage ponds, reservoirs, saltpans and irrigation canals.	Mudflats	**Potential** Potentially suitable habitat may occur within the Clearing Area (seasonally when inundated). Records occur within 1 km of the Clearing Area.

Species	Conservation Status	Habitat Preferences	Suitable Habitat within the Clearing Area	Likelihood of Occurrence within the Clearing Area
Hydroprogne caspia (Caspian Tern)	Migratory (EPBC Act and BC Act)	The Caspian Tern is mostly found in sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries and river deltas) and those with sandy or muddy margins are preferred. It also occurs on near coastal or inland terrestrial wetlands that are either fresh or saline, especially lakes (including ephemeral lakes), waterholes, reservoirs, rivers and creeks.	Mudflats	**Potential** Potentially suitable habitat may occur within the Clearing Area (seasonally when inundated). Records occur within 1 km of the Clearing Area.
Limosa lapponica (Bar-tailed Godwit)	Migratory (EPBC Act and BC Act)	The Bar-tailed Godwit is found in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays.	Mudflats	**Potential** Potentially suitable habitat may occur within the Clearing Area (seasonally when inundated). Records occur within 1 km of the Clearing Area.
Pluvialis fulva (Pacific Golden Plover)	Migratory (EPBC Act and BC Act)	Beaches, mudflats and sandflats in sheltered areas including harbours, estuaries and lagoons.	Mudflats	**Potential** Marginal potentially suitable habitat is present (seasonally when inundated), however is highly degraded and adjacent to activity. Majority of records are coastal/intertidal mudflats.
Tringa stagnatilis (Marsh Sandpiper)	Migratory (EPBC Act and BC Act)	Permanent or ephemeral wetlands including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, inundated floodplains and intertidal mudflats.	Mudflats	**Potential** Marginal potentially suitable habitat is present (seasonally when inundated), however is highly degraded and adjacent to activity. Majority of records are coastal/intertidal mudflats.

4. AVOIDANCE AND MITIGATION MEASURES

The Proposal is designed to avoid environmental impacts, including clearing native vegetation, where possible or minimise impacts to As Low as Reasonably Practicable (ALARP) where unavoidable. Potential impacts have primarily been avoided or minimised through the design of the pipeline, wells, and associated infrastructure during the planning phase of the Proposal.

4.1 Environmental Mitigation Measures

The Proponent prepared and submitted a Construction Environmental Management Plan (CEMP) to support the Proposals Part IV referral to the EPA. The CEMP details the management and mitigation measures proposed to be implemented by the Proponent to minimise impacts to native vegetation, fauna, water and soil during the construction phase of the Proposal. These measures have been summarised in Table 4-1.

The Proponent is also currently revising the DBNGP Environmental Plan (EP), which is subject to approval by DEMIRS under the Petroleum Pipeline (Environmental) Regulation 2012 and the PGER (Environment) Regulations 2012. Unlike the CEMP the EP presents the management and the assessment of environmental risks associated with all phases of the Proposal.

Table 4-1: Summary of Proposed Environment Mitigation Measures

Impacts	Avoidance	Minimisation	Residual Impacts
Flora and Vegetation			
Clearing of native vegetation	• Native vegetation clearing has been avoided through the reduction of the Clearing Area during the design phase • The Proposal will utilise the existing rock causeway for the construction of the pipeline avoiding the clearing of vegetation.	• A Native Clearing Clearance Procedure will be implemented including: ○ Authorisation to Clear Vegetation (ACV) or equivalent process is implemented ○ Delineation of approved area prior to clear and grade (pegging) • The proposed pipeline will be underground. As such, the majority of surface disturbance will be temporary, with natural landforms to be reinstated post-construction • Reinstatement work will be carried out in accordance with the DBNGP EP to preserve and promote the regeneration of natural vegetation within the Clearing Area.	Loss of 0.21 ha of native vegetation in Poor condition.
Degradation of vegetation from increased dust deposition	• Avoid clearing native vegetation as far as practicable.	• Construction of the pipeline will occur over a maximum of three weeks, minimising the time over which dust emissions will occur • Minimisation of time between trenching and backfilling • Use of a water cart to stabilise stockpiles, when required • Reducing speed limits on the ROW • Safe work method statements (SWMS) / Job Hazard Analysis (JHA) to identify dust risk at time of activity and apply controls (i.e. water cart / truck) • Limit topsoil stockpile height to less than 2 m in height.	Localised short-term increase in fugitive dust during construction
Increased fragmentation of native vegetation	• The Clearing Area has been designed to avoid increased fragmentation as far as practicable including positioning the Proposal adjacent to existing infrastructure (i.e. the existing causeway).	• Vegetation clearing will be kept to the minimum required to ensure effective implementation of the Proposal • The proposed pipeline will be underground. As such, the majority of surface disturbance will be temporary, with natural landforms to be reinstated post-construction • Reinstatement work will be carried out in accordance with the DBNGP EP to preserve and promote the regeneration of natural vegetation within the Clearing Area.	Negligible increase in fragmentation of remnant vegetation

Impacts	Avoidance	Minimisation	Residual Impacts
Introduction or spread of weed species	N/A	• Weed hygiene controls will be implemented in accordance with the DBNGP EP, including: o Site personnel inductions o All vehicles and machinery will remain on existing tracks, as far as practicable o Clean on Entry Procedure will be implemented if Clean of Entry area is identified o Frequent visual inspections of vehicles and clean down as required o All fill to be certified as weed and seed free prior to use o Where possible restrict third-party access through physical barriers or discourage through signage o Targeted weed management practices if requires, during operations • Non-operational areas will be rehabilitated and reinstated back to previous landform, ensuring all weeds are removed.	Potential introduction and/or spread of weed species
Altered fire regimes as a result of construction activities	N/A	• Bushfire management measures will be implemented in accordance with the DBNGP EP, including: o All Bushfire Regulations will be abided by including total fire ban requirements o Fire-fighting equipment on all mobile plant and vehicles o Designated smoking areas o Daily checks on fire danger rating and fire bans included in daily prestart o All plant and equipment to comply with fire safety standards o Permit to Work and Hot Works Certificate including gas testing for hazardous areas as per the Hot Works Procedure, including: ▪ High gas risk areas are demarcated and signed ▪ Appropriate firefighting equipment is available at all times ▪ Selected personnel are trained in responding to fires ▪ Inductions include fire risks (hot works and smoking) ▪ All non-approved items are kept away from hazardous areas.	Potential short-term increased occurrence of bushfires

Impacts	Avoidance	Minimisation	Residual Impacts
Terrestrial Fauna			
Loss of fauna habitat	• Fauna habitat clearing has been avoided through the reduction of the Clearing Area during the design phase • The Proposal will utilise the existing causeway for the construction of the pipeline, avoiding the clearing of fauna habitat	• A Native Clearing Clearance Procedure will be implemented including: ○ ACV or equivalent process is implemented ○ Delineation of approved area prior to clear and grade (pegging) • The proposed pipeline will be underground. As such, the majority of surface disturbance will be temporary, with natural landforms to be reinstated post-construction • Reinstatement work will be carried out in accordance with the DBNGP EP.	Loss of 1.43 ha of fauna habitat.
Injury, mortality, or displacement of terrestrial fauna	• The construction of the Proposal will avoid the wet season and king tides when the area is most likely to be utilised by the conservation significant species.	• The construction of the Proposal will be short (4-6 months), with trenching to occur for a maximum of three weeks • A Fauna Interaction Procedure will be implemented which will include: ○ Reducing speed limits (40 km/h on the rock causeway during construction and 60 km/h during operations) ○ Minimising travel in dawn and dusk periods ○ Ensuring no clearing outside of authorised clearing areas ○ Ensuring vehicles stick to existing tracks as much as possible ○ Implementation of fauna interaction controls (minimise handling, release ASAP to safe location, report all handling events) ○ Utilising trained personnel in fauna handling • Trench Management Controls will be implemented, including: ○ Trenches will be battered at 1H:1V to enable fauna egress ○ Twice daily trench inspections within three hours of sunrise and the second inspection between the hours of 3:00 pm and 6:00 pm of that same day ○ Installation of fauna egress and/or refuges from excavations or trenches at intervals no less than 100 m ○ Completion of fauna inspection within 30 minutes prior to lowering in/backfill operations.	Potential injury, mortality, or displacement of terrestrial fauna.

Impacts	Avoidance	Minimisation	Residual Impacts
Increased fragmentation of fauna habitat	• The Clearing Area has been designed to avoid increased fragmentation as far as practicable including positioning the Proposal adjacent to existing infrastructure (i.e. the existing causeway and PL62).	• Fauna habitat clearing will be kept to the minimum required to ensure effective implementation of the Proposal • The proposed pipeline will be underground. As such, the majority of surface disturbance will be temporary, with natural landforms to be reinstated post-construction • Reinstatement work will be carried out in accordance with the DBNGP EP.	Negligible increase in fragmentation of fauna habitat.
Disturbance to native fauna from light, dust, noise and/or vibration	• The construction of the Proposal will avoid periods of inundation when the area is most likely to be utilised by the conservation significant species. • Night construction activities will be avoided to mitigate the disturbance to fauna from increased light	• Construction of the Proposal will occur over 4-6 months, minimising the time over which light, dust, noise and/or vibration will occur • Trenching for pipeline construction will be over a maximum of three weeks, reducing the time over which dust emissions will occur • Excessive dust will be minimised through: ○ Minimisation of time between trenching and backfilling ○ Use of a water cart to stabilise stockpiles, when required ○ Reducing speed limits on the ROW ○ Safe work method statements (SWMS) / Job Hazard Analysis (JHA) to identify dust risk at time of activity and apply controls (i.e. water cart / truck) ○ Limit topsoil stockpile height to less than 2 m in height. • Noise emissions will be controlled in accordance with a Guide to Noise Control on Construction, Maintenance and Demolition Sites (AS/NZS 2436-1981), and the following minimisation measures will be applied in accordance with the DBGNP EP ○ Standard design and operating procedures to minimise noise ○ Mechanical vibratory compaction will not be utilised during backfill and compaction of the trench.	Potential short-term, disturbance of native fauna due to dust, noise, light and/or vibrations.
Habitat degradation as a result of introduction or spread of weed species	N/A	• Weed hygiene controls will be implemented in accordance with the DBNGP EP, including: ○ Site personnel inductions ○ All vehicles and machinery will remain on existing tracks, as far as practicable ○ Clean on Entry Procedure will be implemented ○ Frequent visual inspections of vehicles and clean down as required ○ All imported fill to be certified as weed and seed free prior to use	Potential introduction and/or spread of weed species.

Impacts	Avoidance	Minimisation	Residual Impacts
		○ Targeted weed management practices as required ○ Earthmoving equipment and plant to be certified as weed and seed free prior to use • Non-operational areas will be rehabilitated and reinstated, ensuring all weeds are removed.	
Habitat degradation as a result of increased predation by feral fauna	N/A	• Recording of feral animal sightings during construction. If feral animal numbers increase, targeted control measures will be implemented such as waste management.	Potential for increased predation by feral fauna.
Habitat degradation as a result of altered fire regimes due to construction activities	N/A	• Bushfire management measures will be implemented in accordance with the DBNGP EP, including: ○ All Bushfire Regulations will be abided by including total fire ban requirements ○ Fire-fighting equipment on all mobile plant and vehicles ○ Designated smoking areas ○ Daily checks on fire danger rating and fire bans included in daily prestart ○ All plant and equipment to comply with fire safety standards • Permit to Work and Hot Works Certificate including gas testing for hazardous areas as per the Hot Works Procedure, including: ○ High gas risk areas are demarcated and signed ○ Appropriate firefighting equipment is available at all times ○ Selected personnel are trained in responding to fires ○ Inductions include fire risk (hot works and smoking) ○ All non-approved items are kept away from hazardous areas.	Potential short-term increased occurrence of bushfires.
Hydrology			
Alteration of surface water drainage and waterflow pathways	• The Clearing Area has been designed to avoid significant surface water bodies.	• The construction phase will be short (4-6 months), and activities will avoid the wet season and king tides. • The proposed pipeline will be underground. As such, the natural surface will be reconstituted throughout the majority of the Clearing Area to reinstate surface water drainage patterns.	Potential minor, short-term alteration of surface water drainage and waterflow pathways.

Impacts	Avoidance	Minimisation	Residual Impacts

Contamination of surface water from the excavation/exposure of contaminated groundwater or ASS	• No dewatering or discharge will be required as part of the Proposal.	• The entire pipeline will be trenched at the same time and the trench will remain open for a maximum of three weeks
		• Trenching will not occur during the wet season or king tides, to enable backfilling to occur prior to when the site is at most risk of inundation
		• Periods of inundation will be avoided by:
		  ○ Reviewing the Bureau of Meteorology (BoM) forecasts on daily basis and prior to mobilisation, to avoid commencing construction activities if extreme weather events (such as cyclones) are likely to occur and to enable backfilling to occur prior to periods of inundation
		  ○ Reviewing tide charts to avoid construction activities during periods of king tides
		• In accordance with DBNGP EP, an ASS Management Plan will be developed and implemented in accordance with the DWER Guideline *Treatment and Management of Soil and Water in ASS Landscapes* (2015)
		• Potential ASS spoil will be treated as per the ASS Management Plan prior to stockpiling
			Potential contamination of surface water or groundwater.

Contamination of surface water or groundwater from the accidental loss or spill of hazardous materials	• Vehicles and machinery will be refueled offsite avoiding the storage of large quantities of hazardous materials within the Clearing Area.	• DBNGP EP and OSCP will be implemented
		• Spill response equipment will be readily available and regularly maintained
		• All spills will be recorded and immediately cleaned up in accordance with the OSCP
		• In accordance with the DBNGP EP:
		  ○ Handle hazardous materials in accordance with the Hazardous Materials Handling and Storage Procedure (S-PRO-016)
		  ○ Avoid hazardous materials handling within 100 m of watercourses such as refuelling of machinery and vehicles
		• A Waste Management Procedure will be implemented which sets out the controls for waste onsite and the disposal process including the:
		  ○ Licensing of waste contractor
		  ○ Segregation of waste streams including hydrocarbon waste and batteries.
		  ○ Bunding or containment of liquid wastes
		  ○ Frequent removal of waste product to minimise waste hydrocarbon storage time onsite (vacuum truck)
			Potential contamination of surface water or groundwater.

Impacts	Avoidance	Minimisation	Residual Impacts
Increased erosion and/or sediment load and reduction of quality of surface water	• The Clearing Area has been designed to avoid significant surface water bodies.	• The construction phase will be short (4-6 months), and activities will avoid the wet season and king tides, which has the potential to mobilise sediments • Ensure all vehicles remain on existing tracks where possible • Implement erosion controls on stockpiles (where required) • Rock armoring will be placed strategically around the metering station and inlet facility to reduce the potential for erosion	No residual impact anticipated.
Heritage			
Reduced amenity to the surrounding landscape through the placement of infrastructure	• The Clearing Area has been reduced as far as practicable during the design phase.	• The proposed pipeline will be underground. As such, the majority of surface disturbance will be temporary, with natural landforms to be reinstated post-construction • Construction of the Proposal will occur over 4-6 months, minimising the time over which amenity will be reduced • The Proposal is located within an existing industrial area, subject to high levels of anthropogenic disturbance. The Proposal is surrounded by the Perdaman Urea Plant to the north, east and south, and Burrup Road to the west.	No residual impacts expected.
Impacts to Aboriginal heritage as a result of clearing	• A known midden site (WC-2023-M001-01 and WC-2023-M001-02; Scarp Archaeology 2024) has been avoided through the reduction of the Clearing Area during the design phase.	• Traditional Owner monitoring will be undertaken throughout construction of the Proposal • Employees and contractors carrying out the proposal must be informed of the contents of the final survey reports (ACHC 2023; Scarp Archaeology 2024) and their obligations to have zero harm on heritage • The Proponent must inform MAC of any changes to the Proposal • In the event that additional sites are located at any stage during the proposal, MAC Heritage procedures must be followed, and all works must halt immediately in the area to prevent any impacts • In the event that human remains are located at any stage during the proposed works, DPLH procedures must be followed, and all works must halt immediately in the area to prevent any further impacts to the remains.	No residual impacts expected.
Reduced amenity to the surrounding landscape during construction from dust, noise, vibration and light	• Avoid clearing native vegetation as far as practicable • Night construction activities will be avoided to mitigate the disturbance to amenity from increased light	• Construction of the Proposal will occur over 4-6 months, minimising the time over which light, dust, and/or noise will occur • Trenching for pipeline construction will be over a maximum of three weeks, reducing the time over which dust emissions will occur • Excessive dust will also be minimised through: ○ Minimisation of time between trenching and backfilling	Potential short-term impacts on the amenity of the surrounding landscape.

Impacts	Avoidance	Minimisation	Residual Impacts
		○ Use of a water cart to stabilise stockpiles, when required ○ Reducing speed limits on the ROW ○ Safe work method statements (SWMS) / Job Hazard Analysis (JHA) to identify dust risk at time of activity and apply controls (i.e. water cart / truck) ○ Limit topsoil stockpile height to less than 2 m in height. • Noise emissions will be controlled in accordance with a Guide to Noise Control on Construction, Maintenance and Demolition Sites (AS/NZS 2436-1981), and the following minimisation measures will be applied in accordance with the DBGNP EP: ○ Standard design and operating procedures to minimise noise ○ Mechanical vibratory compaction will not be utilised during backfill and compaction of the trench.	
Impacts to the integrity of Aboriginal rock art resulting from air emissions	• Complete avoidance of air emissions is not possible.	• Low sulfur diesel will be used for vehicles and machinery, as this produces less air emissions than conventional diesel • Construction of the Proposal will occur over 4-6 months, minimising the time over which air emissions will occur.	Air emissions potentially contributing to the degradation of Aboriginal rock art.
Marine Environment			
Elevated turbidity from fugitive dust emissions resulting in reduced marine environmental quality and impacts to the King Bay mangrove community	Avoid clearing vegetation as far as practicable, avoiding increased dust emissions.	• Construction of the Proposal will occur over four to six months, minimising the time over which dust emissions will occur • The entire pipeline will be trenched at the same time and the trench will remain open for a maximum of three weeks • Dust suppression techniques will be implemented in accordance with the DBNGP EP, including: ○ Minimisation of time between trenching and backfilling ○ Use of a water cart to stabilise stockpiles, when required ○ Ensure all vehicles transporting fill material are appropriately covered during transport • Reducing speed limits on the ROW.	Potential short-term elevated turbidity of adjacent marine waters.
Elevated turbidity resulting in reduced marine environmental quality and impacts to	The Clearing Area has been designed to avoid significant water bodies.	• The construction phase will be short (4-6 months), and activities will, where possible, avoid periods of inundation (such as the wet season or king tides), which has the potential to mobilise sediments	No residual impact anticipated.

Impacts	Avoidance	Minimisation	Residual Impacts

the King Bay mangrove community due to increased sediment load		• The entire pipeline will be trenched at the same time and the trench will remain open for a maximum of three weeks
		• Trenching will not occur during the wet season or during king tides, to enable backfilling to occur prior to when the site is at most risk of inundation
		• Periods of inundation will be avoided by:
		  ○ Reviewing the BoM forecasts on daily basis and prior to mobilisation, to avoid commencing construction activities if extreme weather events (such as cyclones) are likely to occur and to enable backfilling to occur prior to periods of inundation
		  ○ Reviewing tide charts to ensure the any open trenches will not be inundated by tides
		• Rock armoring will be placed strategically around the metering station and inlet facility to reduce the potential for erosion.	

Reduced marine environmental quality and associated impacts to the King Bay mangrove community from excavation/exposure of contaminated groundwater or ASS	The Proposal has been designed to avoid construction during periods of heavy rainfall and king tides, when risks associated with stormwater runoff are highest.	• The entire pipeline will be trenched at the same time and the trench will remain open for a maximum of three weeks
		• Trenching will not occur during the wet season or during king tides, to enable backfilling to occur prior to when the site is at most risk of inundation
		• Periods of inundation will be avoided by:
		  ○ Reviewing the BoM forecasts on daily basis and prior to mobilisation, to avoid commencing construction extreme weather events (such as cyclones) are likely to occur and to enable backfilling to occur prior to periods of inundation
		  ○ Reviewing tide charts to ensure the any open trenches will not be inundated by tides.
		• In accordance with the DBNGP EP, an ASS Management Plan will be developed and implemented in accordance with the DWER Guideline Treatment and Management of Soil and Water in ASS Landscapes (2015)
		• Potential ASS spoil will be treated as per the ASS Management Plan prior to stockpiling.
			Potential contamination of marine waters.

Reduced marine environmental quality and associated impacts to the King Bay mangrove community	The Proposal has been designed to avoid construction during periods of extreme weather events and king tides, when	• DBNGP EP and OSCP will be implemented • Spill response equipment will be readily available and regularly maintained • All spills will be recorded and immediately cleaned up in accordance with the OSCP • In accordance with the DBNGP EP:	No residual impact anticipated.

Impacts	Avoidance	Minimisation	Residual Impacts
from accidental spills of hazardous materials	risks associated with accidental spills are highest Vehicles and machinery will be refuelled offsite avoiding the storage of large quantities of hazardous materials within the Clearing Area.	○ Handle hazardous materials in accordance with the Hazardous Materials Handling and Storage Procedure (S-PRO-016) ○ Avoid hazardous materials handling within 100 m of watercourses such as refueling of machinery and vehicles.	

5. ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

A detailed assessment of the proposed clearing of up to 0.21 ha of native vegetation against the Ten Clearing Principles contained in Schedule 5 of the EP Act is provided in Sections 5.1 to 5.10. Table 5-1 provides a summary of the assessment.

The Proposal is not considered to be at variance with eight of the Ten Clearing Principles and not likely to be at variance with the remaining two.

Table 5-1: Summary of assessment against the ten clearing principles

Clearing Principle	Not at variance	Not likely to be at variance	May be at variance	At variance	Seriously at variance
a) Native vegetation should not be cleared if it comprises a high level of biological diversity	☒	☐	☐	☐	☐
b) Native vegetation should not be cleared if it comprises the whole, or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia	☒	☐	☐	☐	☐
c) Native vegetation should not be cleared if it includes or is necessary for the continued existence of Rare flora	☒	☐	☐	☐	☐
d) Native vegetation should not be cleared if it comprises the whole, or part of, or is necessary for the maintenance of a threatened ecological community (TEC)	☒	☐	☐	☐	☐
e) Native vegetation should not be cleared if it is significant as remnant vegetation in an area that has been extensively cleared	☒	☐	☐	☐	☐
f) Native vegetation should not be cleared if it is growing in or in association with an environment associated with a watercourse or wetland	☒	☐	☐	☐	☐
g) Native vegetation should not be cleared if the clearing of vegetation is likely to cause appreciable land degradation	☐	☒	☐	☐	☐
h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area	☒	☐	☐	☐	☐
i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water	☐	☒	☐	☐	☐

j) Native vegetation should not be cleared if the clearing of vegetation is likely to cause, or exacerbate, the incidence of flooding	☒	☐	☐	☐	☐

5.1 Comprises a high level of biological diversity

Principle (a): Native vegetation should not be cleared if it comprises a high level of biological diversity.

A total of 10 flora species (nine native and one introduced) from eight genera and five families were recorded within the Clearing Area (ELA 2024). One broad vegetation type (VT01) was identified, covering 0.21 ha and classified as being in 'Poor' condition (ELA 2024). Approximately, 1.22 ha of the Clearing Area was identified as Mudflats, which are naturally devoid of vegetation and thus not assigned a vegetation condition (ELA 2024). None of these ecological communities were identified as representing any known or potential conservation significant ecological communities listed under the EPBC Act, the BC Act or by DBCA (ELA 2024).

No fauna species were recorded within the Clearing Area during the recent survey (ELA 2024). Historical nearby fauna surveys have recorded 30 mammal species, 150 bird species, 49 reptiles and two amphibians (Cardno 2020).

Eight conservation significant fauna species are considered as having the potential to occasionally occur within the Clearing Area, when the 1.22 ha of Mudflats habitat is inundated. This is based on the availability of suitable habitat and proximity of previous records.

Overall, the absence of Threatened and/or Priority listed species within the Clearing Area indicates that the biological diversity is not high. In addition, the Clearing Area is small (0.21 ha of native vegetation), in 'Poor' condition and is within an already disturbed landscape given that it is bound by Burrup Road and the DBNGP to the west, the Burrup Desalinated Water and Seawater Supplies pipeline to the north and the Project Ceres causeway to the east. As such, the Proposal is **not considered to be at variance with this Principle.**

5.2 Potential impact on any significant habitat for fauna indigenous to Western Australia

Principle (b): Native vegetation should not be cleared if it comprises the whole, or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Two fauna habitat types were identified within the Clearing Area: 'Mudflats' (1.22 ha) and 'Low Chenopod Shrubland' (0.21 ha) (ELA 2024).

Only the Mudflats habitat is considered to potentially provide foraging habitat to conservation significant fauna, with a range of migratory waders having the potential to use the habitat when it is occasionally inundated (e.g. during king tides and heavy rainfall). The vegetation within the Low Chenopod Shrubland habitat was in 'Poor' condition and therefore not considered to provide habitat for any conservation significant fauna species (ELA 2024).

Neither habitat is considered to be locally or regionally restricted with 38.74 ha of Samphire Shrubland/Supra-tidal Flat habitat (which is considered representative of these habitats) recorded by APM (2019) surrounding the Clearing Area, as well as 43.7 ha of the Samphire Shrubland within the Murujuga National Park and 803.02 ha within the broader Burrup Peninsula (Cardno 2020).

Whilst the Mudflat habitat has the potential to provide foraging habitat for several migratory wader fauna species the habitat is well represented locally and within the broader Burrup Peninsula. Additionally, the pipeline will be buried underground, and any temporarily disturbed Mudflat areas will be reconstructed once the construction phase is completed. As such, the Proposal is **not considered to be at variance with this Principle.**

5.3 Potential impact on any rare flora

Principle (c): Native vegetation should not be cleared if it includes or is necessary for the continued existence of rare flora

No flora species listed under the EPBC Act, BC Act or Priority flora species listed by DBCA were recorded or considered likely to occur within the Clearing Area (ELA 2024). This is due to the lack of suitable habitat present, lack of species detection despite adequate survey effort and appropriate season, and the lack of nearby records (ELA 2024).

As no flora species listed under the EPBC Act, BC Act or Priority flora species listed by DBCA were recorded within the Clearing Area, the Proposal is **not considered to be at variance with this Principle.**

5.4 Potential of any threatened ecological communities

Principle (d): Native vegetation should not be cleared if it comprises the whole, or part of, or is necessary for the maintenance of a threatened ecological community (TEC).

None of the vegetation types within or immediately surrounding the Clearing Area meet the diagnostic criteria of any listed TEC under the EPBC Act or BC Act.

As no TECs were recorded or considered to have the potential to occur within the Clearing Area, the Proposal is **not considered to be at variance with this Principle.**

5.5 Significance as a remnant of native vegetation in the area that has been extensively cleared

Principle (e): Native vegetation should not be cleared if it is significant as remnant vegetation in an area that has been extensively cleared.

The Proposal occurs within the Abydos Plain – Roebourne 117 Vegetation Association, as mapped by Beard (1978) and refined by Shepard et al (2022). The proposal will result in clearing of approximately 0.21 ha of Abydos Plain – Roebourne 117. Approximately 92% (46,901.6 ha) of the pre-European extent of this vegetation remains in the Roebourne IBRA subregion (DWER 2014). The proposed clearing represents 0.004% of the remaining extent of Abydos Plain – Roebourne 117 within the Roebourne IBRA subregion, which is expected to be considered a negligible impact.

Given that the Vegetation Association retains 92% of its pre-European extent, and the Proposal implementation will represent the clearing of only 0.004% of its remaining extent within the Roebourne IBRA subregion, Abydos Plain – Roebourne 117 will not become extensively cleared, and therefore the Proposal is **not considered to be at variance with this Principle.**

5.6 Impact on any watercourses and/or wetlands

Principle (f): Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

The Clearing Area does not intersect with any significant surface watercourse/bodies or wetlands. The closest is a minor (non-perennial) watercourse that occurs immediately to the south and drains into Kings Bay.

Whilst the Proposal's construction will not directly impact this watercourse it may temporarily disrupt the natural drainage / preferential water flow of the surrounding landscape, which flows into this watercourse. However, the construction phase will be short (4-6 months) and will avoid the wet season and king tides, therefore the likelihood of significant water flows occurring across the Clearing Area during the construction phase is low.

In addition, the pipeline will be buried underground, and the area's natural surface will be reconstructed throughout most of the Clearing Area once the construction phase is completed.

Due to the short timeframe and seasonal timing of the construction of the Proposal, the likelihood of it significantly impacting water flows to surrounding watercourses is low. As such, the Proposal is **not considered to be at variance with this Principle**.

5.7 Potential to cause appreciable land degradation

Principle (g): Native vegetation should not be cleared if the clearing of vegetation is likely to cause appreciable land degradation.

The landscape in which the Proposal occurs is already subject to anthropogenic disturbance as a result of the multiple industrial industries. The Proposal is bound by Burrup Road and the DBNGP to the west, the Burrup Desalinated Water and Seawater Supplies pipeline to the north and the Project Ceres causeway to the east. As such only 'Poor' condition vegetation remains within the Clearing Area

The Clearing Area has been identified as having a 'Moderate to High risk of ASS occurring within 3 m of the natural soil surface' (Senversa 2024; Appendix A), therefore there is potential that ASS will be exposed to an oxygen-rich environment during ground disturbance activities, such as trenching and stockpiling. To minimise this risk no dewatering will be undertaken and the Proponent will develop and implement an ASS Management Plan following the DWER Guideline *Treatment and Management of Soil and Water in ASS Landscapes* (2015).

The Proposal could increase the severity of wind and water erosion, particularly on stockpiled material and trenches. However, the extent of the erosion is likely to be localised and limited to the construction phase (4-6 months). To further minimise the severity of the erosion all trenching will occur simultaneously and trenches will be open for a maximum of three weeks. Trenching will not occur during the wet season or during king tides, to enable backfilling before the site is at most risk of inundation. In addition, rock armouring will be placed strategically around the metering station and inlet facility to minimise potential for erosion. Through these measures, the amount of erosion will be minimal and unlikely to cause appreciable land degradation.

Due to the short timeframe and seasonal timing of the construction phase of the Proposal, and the implementation of the DBNGP EP, the Proposal is **not likely to be at variance with this Principle**.

5.8 Potential to impact on the environmental values of adjacent or nearby conservation areas

Principle (h): Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

The Clearing Area is not located within or adjacent to any conservation areas, with the nearest being Murujuga National Park located approximately 1 km north and south of the Clearing Area. Due to the Proposal's small scale and short timeframes, the 1 km separation distance is sufficient to ensure that any impacts to the National Park values will be negligible. As such, the Proposal is **not considered to be at variance with this Principle.**

5.9 Potential deterioration in the quality of surface or underground water

Principle (i): Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

The construction phase for the Proposal has the potential to increase erosion rates and the volume of sediment available for mobilisation into surrounding surface water bodies. To minimise the potential for sedimentation the pipeline trenching will occur simultaneously and be open for a maximum of three weeks. Trenching will not occur during the wet season or during king tides, to enable backfilling to occur before the site is at most risk of inundation. All stockpiled spoil will be either backfilled into the trench or respread over the pipeline centreline and battered against the rock causeway to minimise erosion. In addition, rock armouring will be placed strategically around the metering station and inlet facility to reduce the potential for erosion. Through these measures, the amount of sediment mobilised would not negatively impact surface water quality.

The construction phase of the Proposal may result in accidental spills of hazardous materials, particularly hydrocarbons. This risk is greatest for groundwater, given the proximity of local groundwater levels to the surface, as well as for King Bay, given its proximity. To minimise this risk all vehicles and machinery will be refuelled offsite and the quantity of hazardous materials that will be stored and handled within the Clearing Area will be less than that required to be regulated and managed under the Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007. Additionally, all hazardous materials (including chemicals and hydrocarbons) will be managed per standard operating procedures, with key mitigation commitments documented in the DBNGP EP. Given that only minor quantities of hazardous materials will be required over a short construction period (4-6 months), accidental spills are unlikely to significantly impact water quality.

The Clearing Areas have been identified as being at having a 'Moderate to High risk of ASS occurring within 3 m of the natural soil surface' (Senversa 2024; Appendix A), therefore there is potential that ASS will be exposed to an oxygen-rich environment during ground disturbance activities, such as trenching and stockpiling. To minimise this risk no dewatering will be undertaken in the implementation of the Proposal and the Proponent will develop and implement an ASS Management Plan following the DWER Guideline *Treatment and Management of Soil and Water in ASS Landscapes* (2015). Through the implementation of these measures, the exposure of ASS soils is unlikely to negatively impact water quality.

The groundwater in the Clearing Area was found to have elevated nutrients (ammonia, total nitrogen and phosphorus. The elevated nutrients were considered consistent with the nutrient seepage from the TAN plant (Senversa 2024; Appendix A). Ground disturbing activities such as trenching for the pipeline may expose contaminated groundwater. No dewatering is required for trenching and pipeline burials, hence, there is negligible risk of contaminated groundwater being discharged into the environment. The entire pipeline will be trenched at the same time and will

remain open for a maximum of three weeks. Trenching for the pipeline will not occur during the wet season or during king tides, to enable backfilling to occur prior to when the site is at most risk of inundation. As such, it is considered unlikely that contaminated groundwater will be mobilised at a volume that may result in a reduction in surface water quality. Due to the short timeframe and seasonal timing of the construction phase of the Proposal, and the implementation of the DBNGP EP, the Proposal is **not likely to be at variance with this Principle**.

5.10 Potential of clearing to cause, or exacerbate, the incidence of flooding

j) Native vegetation should not be cleared if the clearing of vegetation is likely to cause, or exacerbate, the incidence of flooding

Approximately 85% of the Clearing Area has been classified as mudflats, which drain westward to King Bay (Cardno 2020). The mudflats are tidal and are subject to flooding during heavy rainfall periods and during extreme spring tides.

The construction phase of the Proposal may temporarily disrupt the natural surface water flows within the Clearing Area, which may affect the occurrence and intensity of localised flooding (i.e. waterlogging). However, this is thought to be unlikely as the construction phase will be short (4-6 months) and will avoid the wet season and king tide when the mudflats generally become flooded.

An increase in waterlogging is unlikely to occur during the operational phase of the Proposal as the pipeline will be buried underground and the area's natural surface will be reconstructed throughout most of the Clearing Area once the construction phase is complete.

Due to the short timeframe and seasonal timing of the construction phase of the Proposal, the increased occurrence and intensity of localised flooding is unlikely. As such, the Proposal is **not considered to be at variance with this Principle**.

6. STAKEHOLDER CONSULTATION

6.1 Key Stakeholders

The key stakeholders identified in relation to the environmental aspects of the Proposal are listed in Table 6-1. A summary of consultation and engagement activities undertaken by the Proponent to date with the key stakeholders listed, along with the issues and topics raised and any Proponent response or related actions is provided in Table 6-2.

Table 6-1:Key stakeholders for the Proposal

Stakeholder Sector	Organisation
Regulatory Agencies	Department of Energy, Mines, Industry Regulation and Safety (DEMIRS)
	Department of Planning Lands and Heritage (DPLH)
	Department of Water and Environmental Regulation (DWER)
	Environmental Protection Authority (EPA)
Local Government	City of Karratha
Traditional Owners	Murujuga Aboriginal Corporation (MAC)
Landowners	DevelopmentWA
Other	Perdaman Chemicals and Fertilisers Pty Ltd
	Woodside Energy Ltd
Community Groups	Dampier Community Association
	Pilbara Wildlife Carers Association

6.2 Ongoing Engagement

The Proponent will continue to consult stakeholders throughout the Proposal's approval process, construction, operation and closure stages.

Table 6-2: Stakeholder Consultation

Stakeholder	Date	Issues / Topics Raised	Proponent Response / Outcome
DEMIRS	Ongoing engagement has occurred with DEMIRS in relation to the Proposal. Types of engagement have comprised of meetings and emails.	Discussion regarding the update of the DBNGP EP to include the Proposal.	DEMIRS agreed to the update of the DBNGP EP.

Stakeholder	Date	Issues / Topics Raised	Proponent Response / Outcome
DPLH	The Proponent engaged with DLPH in June 2024 in relation to the Proposal. This included one meeting and emails.	Discussion regarding site access rights and the submission of an Access Right application.	Draft Access Right provided for review. Final grant will be post-pipeline licence grant.
DWER	DWER were engaged in May 2024 in relation to the Proposal.	Licensing and permitting requirements under the *Rights in Water and Irrigation Act 1914* (RiWI Act) RiWI Act.	No concerns were raised.
DWER – EPA Services	The Proponent met with the EPA in June 2024 for a pre-referral meeting and had further correspondence with the EPA in relation to the referral process in July 2024.	Discussion of the assessment process including the appropriate approval pathway, key environmental factors, and referral documentation requirements. The Proponent informed the EPA that it proposed to refer the project under Part IV of the EP Act.	No concerns were raised.
MAC	Ongoing engagement has occurred between the Proponent and MAC since August 2023 in relation to the Proposal. Types of engagement have comprised of heritage surveys, meetings and regular emails.	Topics of consultation have included: • Heritage survey coordination and discussions • Heritage and project agreement discussion • Project support decision from MAC.	No concerns were raised. Heritage surveys have been completed and endorsed by MAC.
DevelopmentWA	Ongoing engagement has occurred between the Proponent and Development WA since November 2023 in relation to the Proposal. Types of engagement have comprised of meetings and regular emails.	DevelopmentWA were involved in initial project discussions. Additional topics of consultation have included: • Tenure discussions • Concerns regarding site contamination • Telstra cable discussions • Discussions regarding drainage issues.	The Proponent will discuss contamination and drainage concerns within the referral documentation.
Perdaman	The Proponent met with Perdaman in March 2024 in relation to the Proposal.	Discussion regarding the battery limits of the land tenure.	Project battery limits agreed.
Woodside	The Proponent met with Woodside on a weekly and fortnightly basis since December 2023 in relation to the Proposal.	Discussion regarding the project parameters	No concerns were raised.

7. REFERENCES

Acacia Cultural Heritage Consulting (ACHC) 2023. Ethnographic Cultural Heritage Assessment Report. Prepared for Murujuga Aboriginal Corporation and AGIG. December 2023.

Animal Plant Mineral (APM) Pty Ltd 2019. *Perdaman Urea Proposal Pre and Post-wet Season Biological Survey*. Prepared on behalf of Cardno, June 2019.

Beard, J. S. 1979. *Pilbara, 1:1 000,000 vegetation series: Explanatory notes to sheet 1, the vegetation of the Pilbara area*. Nedlands, W.A. University of Western Australia.

Bureau of Meteorology (BoM). 2024a. Climate Data Online: Available: http://www.bom.gov.au/climate/data

Australian Heritage Council (AHC) 2012. *The Potential Outstanding Universal Values of the Dampier Archipelago Site and Threats to that Site.* A report to the Minister for Sustainability, Environment, Water, Population and Communities. Available from: https://www.dcceew.gov.au/sites/default/files/env/pages/5b14f51b-b7e1-432f-8049-1e653713607d/files/outstanding-universal-values-may2012.pdf.

Cardno 2020. *Perdaman Urea Proposal Environmental Review Document*. Prepared for Perdaman Chemicals and Fertilisers by Cardno, March 2020.

Department of Biodiversity, Conservation and Attractions (DBCA) 2020. *Murujuga World Heritage listing one step closer*. Available from: https://www.dbca.wa.gov.au/news/2020/murujuga-world-heritage-listing-one-step-closer.

Department of Climate Change, Energy, the Environment and Water (DCCEEW). 2024. Australia's bioregions (IBRA). Available from: https://www.environment.gov.au/land/nrs/science/ibra.

Department of Primary Industries and Regional Development (DPIRD) 2024. *Rangelands Land-System Mapping for the Pastoral Area of Western Australia*.

Department of Water and Environmental Regulation (DWER) 2018a. *Hydrographic Catchments - Basins (DWER-027).* Available from: https://catalogue.data.wa.gov.au/dataset/hydrographic-catchments-basins.

Department of Water and Environmental Regulation (DWER) 2018b. *RiWI Act Groundwater Areas (DWER-034)*. Available from: RIWI Act, Groundwater Areas (DWER-034) - Datasets - data.wa.gov.au

Department of Water and Environmental Regulation (DWER). 2024. *Public Drinking Water Source Areas (DWER-033)*. Available from: Public Drinking Water Source Areas (DWER-033) - Datasets - data.wa.gov.au.

Eco Logical Australia (ELA) 2024. *Perdaman Pipeline Flora and Fauna Survey*. Report prepared for Australian Gas Infrastructure Group.

Environmental Protection Authority (EPA) 2016a. *Environmental Factor Guideline: Flora and Vegetation.* Perth, Western Australia. Published December 2016.

Environmental Protection Authority (EPA) 2016b. *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment*. Perth, Western Australia.

Environmental Protection Authority (EPA) 2016c. *Environmental Factor Guideline: Terrestrial Fauna.* Perth, Western Australia. Published December 2016.

Environmental Protection Authority (EPA) 2020. *Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment.* Perth, Western Australia. Published June 2020.

Kendrick, P and Stanley, F. 2001. *Pilbara 4 (PIL4 - Roebourne Subregion), (M. Cowan, chairman), A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002*. Department of Conservation and Land Management, Perth.

Payne, A. and Schoknecht, N. 2011. *Land Systems of the Kimberley Region, Western Australia.* Technical Bulletin No. 98, Department of Agriculture and Food.

Scarp Archaeology 2024. *Report of a Site Avoidance Level Archaeological Survey undertaken for Australian Gas Infrastructure Group by Murujuga Aboriginal Corporation representatives and Scarp Archaeology*. January 2024.

Senversa Pty Ltd (Senversa) 2024. *Baseline Environmental Site Assessment: Perdaman Lateral Pipeline, Burrup Peninsula.* Report prepared for AGIG.

SKM 2001. *Proposed 2,200 tpd Ammonia Plant, Burrup Peninsula Western Australia, Public Environment Review*. Prepared by SKM for Burrup Fertilisers Pty Ltd, August 2001.

Thackway, R. and Cresswell, I. D. (Eds). 1995. *An Interim Biogeographic Regionalisation for Australia: a framework for establishing the national system of reserves, Version 4.0*. Australian Nature Conservation Agency, Canberra, ACT.

Trudgen, M. E. 1988. *A Report on the Flora and Vegetation of the Port Kennedy Area*. Unpublished report prepared for Bowman Bishaw and Associates, West Perth.

APPENDICES

Appendix A: Baseline Environmental Site Assessment: Perdaman Lateral Pipeline, Burrup Peninsula (Senversa 2024)

Perdaman Lateral Pipeline, Burrup Peninsula

2 September 2024

Baseline Environmental Site Assessment

Document Information

Baseline Environmental Site Assessment

Perdaman Lateral Pipeline, Burrup Peninsula

Prepared by:

Senversa Pty Ltd
ABN: 89 132 231 380
Level 18, 140 St Georges Terrace, Perth, WA 6000
tel:+61 8 6324 0200
www.senversa.com.au

Prepared for:

Australian Gas Infrastructure Group
Level 22, 140 St Georges Terrace
PERTH WA 6000

Revision	Date	Author	Reviewed	Approved	Detail
0	7 August 2024	Ashton Betti Rebecca Duong Egan Churchill-Gray	Jeremy Hogben	Jeremy Hogben	Draft for client review
1	9 August 2024	Rebecca Duong	Jeremy Hogben	Jeremy Hogben	Final
2	2 September 2024	Ashton Betti	Jeremy Hogben	Jeremy Hogben	Final

Project Manager: Ashton Betti

Project Director: Jeremy Hogben

Disclaimer and Limitations:

This document is confidential and has been prepared by Senversa for use only by its client and for the specific purpose described in our proposal which is subject to limitations. No party other than Senversa's client may rely on this document without the prior written consent of Senversa, and no responsibility is accepted for any damages suffered by any third party arising from decisions or actions based on this document. Matters of possible interest to third parties may not have been specifically addressed for the purposes of preparing this document and the use of professional judgement for the purposes of Senversa's work means that matters may have existed that would have been assessed differently on behalf of third parties.

Senversa prepared this document in a manner consistent with the level of care and skill ordinarily exercised by members of Senversa's profession practising in the same locality under similar circumstances at the time the services were performed.

Permission should be sought before any reference (written or otherwise) is made public that identifies any people, person, address or location named within or involved in the preparation of this report. Senversa requires that this document be considered only in its entirety and reserves the right to amend this report if further information becomes available. This document is issued subject to the technical principles, limitations and assumptions provided herein in **Section 12**.

Senversa acknowledges the traditional custodians of the land on which this work was created and pay our respect to Elders past and present.

Executive Summary

Senversa was engaged by Australian Gas infrastructure Group to conduct a Baseline Environmental Site Assessment (ESA) at the proposed location of the Perdaman Lateral Pipeline in the Burrup Peninsula where a 500 m natural gas pipeline is proposed to be constructed to connect the site to the Dampier to Bunbury Natural Gas Pipeline.

Lots 540, 3013 and 704, which form the site, have been classified by the Department of Water and Environmental Regulation as "*possibly contaminated – investigation required*" with restrictions on groundwater abstraction requiring testing prior to its intended use based on the presence of ammonia, nitrate and nitrite in surface water and sediments which originates from a nearby ammonium nitrate production facility.

The soil and groundwater investigations undertaken as part of this ESA indicated that there are no current risks to human health or ecological receptors associated with anthropogenic sources at the site, including per- and polyfluoroalkyl substances, metals and hydrocarbons. Elevated nutrients (ammonia, total nitrogen and phosphorus) were present in groundwater above adopted human health and ecological assessment levels, as consistent with known off-site sources which have migrated onto the site (and formed the basis for the current site classification).

The acid sulfate soils (ASS) investigation found the presence of potential ASS (PASS) in soils within the proposed excavation footprint that will require management if disturbed. The ASS management measures are detailed in **Section 10.0** of this report and include soil neutralisation treatment. The ASS management requirements are considered appropriate to mitigate any potential risks associated with PASS at the site.

It is understood that no dewatering/effluent abstraction will be undertaken as part of the works and therefore no management of groundwater is proposed for the site. If dewatering is subsequently proposed, additional management measures will be required associated with this.

Contents

Executive Summary ii

List of Acronyms v

1.0 Introduction 1

1.1 Background 1

1.2 Objective 1

1.3 Scope of Work 1

1.4 Relevant Legislation / Guidelines 2

2.0 Site Identification 3

3.0 Environmental Setting 4

4.0 Site Inspection 8

5.0 Adopted Assessment Criteria 9

5.1 Assessment Guidelines 9

5.2 Adopted Assessment Criteria 9

5.3 Site-Specific Soil Ecological Investigation Levels 10

6.0 Site Investigation Methodology 12

6.1 Methodology 12

6.2 Quality Assurance / Quality Control 13

7.0 Soil Investigation Results 14

7.1 Field Observations 14

7.2 Soil Analytical Results 14

7.3 ASS Results 14

7.3.1 Field Observations and Soil Types 14

7.3.2 ASS Field Indicators 15

7.3.3 SPOCAS/ S_{CR} Results 15

8.0 Groundwater Investigation Results 17

8.1 Groundwater Elevation and Flow Direction 17

8.2 Groundwater Field Indicator Parameters 17

8.3 Groundwater Analytical Results 17

9.0 Discussion 19

9.1 Soil 19

9.2 Groundwater 19

10.0 ASS Management 20

10.1.1 Liming Rates 21

10.1.2 Validation Sampling 22
10.1.3 Groundwater and Effluent Management 22
11.0 Conclusions and Recommendations 23
12.0 Principles and Limitations 24
13.0 References 25

Tables in Text

Table 2-1: Site Identification Details 3
Table 3-1: Environmental Setting 4
Table 4-1: Site Inspection Summary 8
Table 5-1: Adopted Assessment Criteria for Soil 9
Table 5-2: Adopted Assessment Criteria for Groundwater 10
Table 5-3: Site Specific EILs 11
Table 6-1: Investigation Methodology 12
Table 7-1: Soil Field Observations – Contamination Indicators 14
Table 7-2: Generalised Lithology and PSA Results 15
Table 7-3: SPOCAS Results 16
Table 8-1: Groundwater Field Parameters 17
Table 8-2: Groundwater Criteria Exceedances (5 July 2024) 18
Table 10-1: Inputs for Liming Rate Calculation 21
Table 10-2: Calculating ENV Values 22

Appendices

Figures

Summary Tables

Appendix A: Certificates of Title

Appendix B: Tetra Tech Coffey (2022a) Groundwater Well Installation Logs

Appendix C: DWER Contaminted Sites Notice of Classification

Appendix D: Site Photographs

Appendix E: EIL Calculation Spreadsheets

Appendix F: Field Records

Appendix G: Quality Assurance / Quality Control Assessment

Appendix H: Laboratory Reports

List of Acronyms

Acronym	Definition
AGIG	Australian Gas infrastructure Group
ANZECC	Australian and New Zealand Environment and Conservation Council
ASS	Acid sulfate soils
BTEX	Benzene, toluene, ethylbenzene, xylenes
COC	Chain of custody
CoPC	Contaminant of potential concern
DBNGP	Dampier to Bunbury Natural Gas Pipeline
DER	Department of Environment Regulation (former)
DO	Dissolved oxygen
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
ESA	Environmental Site Assessment
EC	Electrical conductivity
EIL	Ecologically based investigation level
GME	Groundwater monitoring event
HIL	Health-based investigation level
HSL	Health screening level
LNAPL	Light non-aqueous phase liquid
LoR	Limit of reporting
MW	Monitoring well
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
PAH	Polycyclic aromatic hydrocarbons
PASS	Potential acid sulfate soils
PFAS	Per- and polyfluoroalkyl substances
QA	Quality assurance
QC	Quality control
RPD	Relative percentage difference
SWL	Standing water level
TDS	Total dissolved solids
TRH	Total recoverable hydrocarbons

1.0 Introduction

1.1 Background

Senversa Pty Ltd was engaged by Australian Gas infrastructure Group (AGIG) to conduct a Baseline Environmental Site Assessment (ESA) at the proposed location of the Perdaman Lateral Pipeline in the Burrup Peninsula, Western Australia (the site).

AGIG is proposing to construct a 500 m lateral natural gas pipeline from the Dampier to Bunbury Natural Gas Pipeline (DBNGP) to the Perdaman site on the Burrup Peninsula. The proposed pipeline location is shown on **Figure 1**. The project will require referral to the Western Australian Environmental Protection Authority (EPA).

Three lots (Lots 540, 3013 and 704) that the proposed lateral pipeline covers have been classified by the Department of Water and Environmental Regulation (DWER) as "*possibly contaminated – investigation required*" with restrictions on groundwater abstraction requiring testing prior to its intended use. The classification is due to the presence of ammonia, nitrate and nitrite in surface water and sediments which originates from a nearby ammonium nitrate production facility. Several other contamination issues may also be present which will require management during construction works, including the possible presence of per- and polyfluoroalkyl substances (PFAS) in groundwater and the potential for disturbance of acid sulfate soils (ASS).

AGIG commissioned an ESA to assess the potential contamination and environmental issues that will require management as part of the proposed construction works.

1.2 Objective

The objective of the ESA was to establish environmental conditions of the site prior to construction of the lateral pipeline. The information will be used as an input for the required management measures during construction works, including supporting the required EPA approvals.

1.3 Scope of Work

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

- Review of relevant existing environmental setting information available for the site.
- Soil investigation comprising 12 soil bores to a maximum depth of 0.5 m bgl via hand auger / hand excavation.
- Installation of five pre-packed temporary piezometers to a maximum depth of 1.5 m bgl using a hollow stem auger fitted to the back of an excavator.
- Completion of a groundwater monitoring event at the temporary piezometers.
- Submission of representative soil and groundwater samples to a National Association of Testing Authorities (NATA) accredited laboratory for analysis for Contaminants of Potential Concern (CoPC).
- Comparison of analytical results to Tier 1 assessment criteria.
- Provision of ASS management requirements.
- Preparation of this report.

1.4 Relevant Legislation / Guidelines

The scope of work was completed in general accordance with the following relevant legislation and guidelines:

- *National Environmental Protection (Assessment of Site Contamination) Measure (as amended 15 May 2013)* (ASC NEPM) (National Environment Protection Council [NEPC] 1999).
- *Assessment and management of contaminated sites – Contaminated sites guidelines* DWER (2021). November 2021.
- *Identification and investigation of acid sulfate soils and acidic landscapes* (Department of Environment Regulation [DER] 2015a).
- *Treatment and management of soil and water in acid sulfate soil landscapes* (DER 2015b).

2.0 Site Identification

Site identification details are provided in **Table 2-1**. The site location and boundary are shown on **Figure 1**. Certificates of title are provided in **Appendix A**.

Table 2-1: Site Identification Details

Item	Details
Site Address	Burrup Road, Burrup Peninsula,
Certificate of Title (CoT)	Lot 540 on Deposited Plan 221364 (LR3122 / 50) Lot 3013 on Deposited Plan 42282 (LR3139 / 36) Lot 704 on Deposited Plan 411759 (LR3174 / 529)
Site Boundary Coordinates	Site boundary coordinates are provided on **Figure 1**.
Site Area	10,816 m^2
Local Government Authority	City of Karratha
Site Owner	Crown Land, Responsible Agency: Department of Planning, Lands and Heritage Lot 540 – Status: Unallocated Crown Land, Primary Interest Holder: State of Western Australia Lot 3013 – Status: Reserve without Management Order, Primary Interest Holder: State of Western Australia Lot 704 – Status: Reserve without Management Order, Primary Interest Holder: Western Australian Land Authority
Current Zoning	Strategic Industry (City of Karratha Local Planning Scheme No. 8)
Current Site Use	Vacant
Proposed Site Use	Lateral natural gas pipeline
Surrounding Site Use	North: Construction associated with the Perdaman gas plant South: Tidal flats East: Vacant tidal flats West: Burrup Road, followed by tidal flats

3.0 Environmental Setting

The key environmental attributes of the site are provided in **Table 3-1**.

Table 3-1: Environmental Setting

Item	Details
Land-use Zoning and Surrounding Uses	The site is zoned 'Strategic Industry' under the City of Karratha Local Planning Scheme No. 8. The areas surrounding the site include "District Roads' zoning to the west (Burrup Road Reserve). \
Topography and Landforms	Topographic data from Landgate indicates that the site is predominately flat with an elevation of less than 10 m Australian Height Datum (AHD). Regional topographic mapping indicates that the site exists within a topographic low, with the elevation increasing up to 80 m AHD surrounding the site. A review of the *Elvis – Elevation and Depth – Foundation Spatial Data* database (Intergovernmental Committee on Surveying and Mapping [ICSM] 2022) identified that lower portion of the site (within the culvert) is situated at an elevation of approximately 5 m AHD, being lower than the adjacent portion of road at approximately 7 m AHD.
Geology	**Regional Geology:** 1:50,000 Western Australia Geological Survey mapping (Hickman, 1997; Sheet 2256, Dampier) indicates that the bedrock geology underlying the general site area comprises Archaean granophyre and gabbro (AyG and AyGo) underlain by metamorphosed Archaean granite to granodiorite (AgDm). The overlying superficial geology is mapped to comprise silt and mud in supratidal to intertidal flats and lagoons (Qhmu). The surrounding superficial soil to the north and south of the site consists of outwash fan/scree colluvium (Qc), followed by Gidley granophyre (AyG). **Site-Specific Geology:** Investigations completed in 2022 to the east and north of the site (Tetra Tech Coffey 2022a) indicated the presence of a layer of superficial deposits overlying granophyre bedrock. The maximum depth of investigation within the vicinity of the site was 2.8 m prior to refusal (MW02). Borehole records for nearby installations (MW02 - 100 m north, and MW07 and MW08 - 50 m east) are provided as **Appendix B** and the generalised lithologies summarised below: • **MW02**: Superficial deposits of brown to pale brown, medium grained sandy clay with cobbles (2.6 m), underlain by grey, staline and fresh granophyre bedrock (to 2.8 m). • **MW07**: Superficial deposits consisting of fine grained, brown and very soft sandy clay (to 0.75 m) underlain by grey-black clay with trace granophyre fragments (to 1.0 m termination depth). • **MW08**: Superficial deposits consisting of red brown poorly graded sandy gravel (to 0.5 m), underlain by brown clay with calcrete fragments (to 0.75 m termination depth).
Acid Sulfate Soils	**Regional ASS Mapping:** A search of the 'Acid Sulfate Soil Risk Map, Pilbara Coastline (DWER-053)' layer within the *SLIP Locate V5* database (Landgate 2024) identified that the site is located within an area designated as Level 1 ASS Risk, which is described as *"High to moderate risk of ASS occurring within 3 m of natural soil surface."* Comparatively smaller areas of land designated as Level 2 ASS Risk are located to the north, east and south-west of the site, and are at least 300 m from the site. Level 2 ASS Risk areas as described as "*Moderate to low risk of ASS occurring within 3 m of natural soil surface, but high to moderate risk of ASS beyond 3 m of natural soil surface."*

Item	Details
Acid Sulfate Soils (continued)	**Site-Specific ASS:** A series of soil investigations have been undertaken within the vicinity of the site. Previous environmental investigations have indicated the presence of ASS within shallow soils. The following information was noted in the Detailed Site Assessment for Acid Sulfate Soil (Tetra Tech Coffey 2022b) undertaken for the Perdaman Urea Project upgrade located to the north and east of the site: • Field pH screening undertaken during preliminary ASS investigation (Enveng Group 2020) indicates that soils within Level 1 areas are basic (pH >7), with a low to extreme reaction rate. This is expected for potential ASS (PASS) found within the Pilbara region. SPOCAS and S_{CR} analysis was undertaken on representative samples collected from shallow soils (surface to 1 metre below ground level [m BGL]) in the assessments by EnvEng (2020) and Tetra Tech Coffey (2022b). Reported net acidity for these samples indicated that PASS is present within shallow soils within the Level 1 area.
Climate and Rainfall	The climate in Karratha can be descibed as sub-tropical with a mixture of humid, wet weather conditions in the wet season and extended, hot dry spells in the dry season. The highest rainfall typically occurs in February, with an average of 74 mm. The wettest period of the year is from January to March. The lowest rainfall occurs in October, with an average of only 1 mm. The hottest month is January, with an average high of 35°C and low of 27°C. The coldest month of the year is July, with an average low of 17°C and high of 26°C.
Hydrology	The site is located within a local topographic low and is expected to receive surface runoff during watershed events. The primary drainage feature in the site locality is the ephemeral drainage feature approximately 50 m south of the site. The drainage feature discharges into King Bay approximately 400 m west of the site. Flow across this feature would be expected under wet season conditions or a falling king tide event. The lower reaches of the creek in the coastal discharge zone may be inundated for more prolonged periods throughout the year, where groundwater levels approach sea level in the locality of the flats.
Hydrogeology	**Regional Hydrogeology:** The site falls within the hydrogeological setting of the Pilbara – Fractured Rock aquifer, which is a non-target aquifer, according to the Pilbara groundwater allocation plan (DoW, 2013a). Available groundwater is hosted in fractures and voids within the bedrock and tends to be very localised. Groundwater recharge is episodic and affected by direct rainfall infiltration in areas where the rocks are fractured. The fractures fill during rainfall and then drain during periods of abstraction or negligible rainfall. Recharge of the fractured rock aquifer also occurs by leakage from surface water flows. Abstraction impacts from fractured rock aquifers are far more localised than from alluvial and sedimentary rock aquifers (DoW, 2013b). The fractured rock aquifers within the Pilbara region are acknowledged to be structurally complex and irregular, and the amount and quality of available water storage is highly variable and unreliable and, as a result, water supplies can be problematic both in terms of quantity (yield) and quality. Alluvial aquifers overly the fractured rock aquifers along coastal areas where groundwater is generally hosted under unconfined conditions in the Quaternary sediments. Groundwater is generally in hydraulic continuity with the underlying weathered fractured rock aquifers. Consequently, the most important areas for groundwater resources are where the major surface watercourses traverse the coastal plain. Groundwater salinity is also lowest in these zones. **Site-Specific Hydrogeology:** No on-site groundwater monitoring bores existed prior to the proposed investigation scope, however baseline hydrogeological investigations were undertaken to the north and east of the site by Tetra Tech Coffey (2022a). Based on groundwater monitoring (Tetra Tech Coffey 2022a) groundwater flow is expected to be in a westerly direction towards King Bay. The hydraulic gradient was shown to be relatively gradual with water levels very close to the surface, with surface waters in this area likely to be surface expression of groundwater during high rainfall events. Due to tidal influences in the area, it is likely that groundwater flow direction will change during periods of high tide. Drilling and gauging records for nearby wells MW07 and MW08 indicated that groundwater was hosted between approximately 0.915 m below top of collar (m BTOC) and 1.130 m BTOC respectively. Groundwater elevations at these locations (at the time of gauging) corresponded to 1.898 m AHD and 1.774 m AHD.
Public Drinking Water Source Areas (PDWSA)	A search of the DWER Public Drinking Water Source Area (PDWSA) Map identified that the site is not located within a PDWSA and there are no PDWSAs within a 5 km radius of the site.

Item	Details
Groundwater Abstraction	A search of the DWER Water Information Reporting Database (DWER 2024a) indicated that there were no registered groundwater bores located onsite or within 500 m of the site boundary. The closest registered groundwater bore is located approximately 5 km southwest of the site. A search of the DWER Water Register (DWER 2024b) produced no licensed abstraction licences within the site or within 500 m of the site boundary. The closest licenced groundwater abstraction area belongs to Yara Pilbara Nitrated Pty Ltd, located approximately 1 km northeast of the site.
Beneficial Uses of Groundwater	The Baseline Hydrogeological Assessment (Tetra Tech Coffey 2022a) assessed the likely beneficial uses of groundwater within the study area. The assessment indicated that the beneficial use of groundwater within the immediate vicinity of the site and surrounds would be limited to supporting marine water ecosystems, as immediate groundwater discharge is to the supratidal area and eventually discharges to King Bay. Industrial uses of groundwater were considered unlikely due to the low yielding nature of the aquifer and/or the saline nature of groundwater (Tetra Tech Coffey 2022a).
Flora / Vegetation	The following information has been provided by AGIG: *Ten flora species (nine native and one introduced) recorded in the 1.43 ha Survey Area.* *No ecological communities or flora species listed under the EPBC Act, BC Act or as Priority by DBCA have been recorded or are considered to potentially occur.* *One broad vegetation type consisting of low sparse chenopod shrubland has been identified. A total of 0.21 hectares has been mapped. This was considered to be in Poor condition.* *The remaining 1.22 ha of the survey area is described as 'Mudflat' and had no vegetation present. Areas of Mudflat were not assigned a vegetation condition.*
Fauna	A review of the Coastal Management Strategy prepared by Essential Environmental (2016) for the City of Karratha, recognised the high conservation status species such as the turtles, dugongs, migratory seabirds/ waders and whale sharks all inhabit Pilbara waters. Six species of sea turtle inhabit local waters and three nest on various beaches within the province, a change to the turtle nesting environment may pose a risk to the turtle incubation period and other factors. Marine water quality is likely to be impacted by storm water runoff and pollutants entering the marine environment. The following information has been provided by AGIG: *No fauna species of conservation significance have been recorded within the Survey Area.* *Six conservation significant fauna* [bird] *species are considered to potentially occur within the Development Envelope.* *Two fauna habitats have been identified, namely 'Mudflats' and 'Low Chenopod Shrubland'* *0.22 ha of low sparse chenopod shrubland that is unlikely to be utilised by conservation significant species.* *1.22 ha of Mudflats may provide potential foraging habitat for the species listed above when seasonally inundated (e.g. during king tides).*
Wetlands and Sensitive Ecosystems	There are no RAMSAR sites located on site or within a 500 m radius of the site. A search of the Bureau of Meteorology (BoM) Groundwater Dependent Ecosystem (GDE) atlas (BoM 2024) indicates that there are no aquatic or subterranean groundwater dependent ecosystems (GDEs) located on site or within a 500 m radius of the site. There are moderate potential terrestrial GDEs mapped approximately 200 m north and 500 m south of the site. This ecosystem consists of rugged granitic hills supporting shrubby hard and soft spinifex grasslands (hummock grasslands). No environmentally sensitive areas (ESAs) are recorded on-site, or down inferred hydraulic gradient of the site (Landgate 2024). Murujuga National Park located approximately 1 km north of the site, which may hold ecological significance despite not being listed as an ESA.
Aboriginal Heritage	The following information has been provided by AGIG: *The Traditional Owners were represented by Murujuga Aboriginal Corporation with whom AGIG is developing a Cultural Heritage Agreement for this and subsequent projects.* *Archeological and Ethnographic Heritage Survey was conducted 17 November 2024. The Traditional Owners preliminary advice indicated there were no sites of importance or significance along the chosen pipeline route although two midden sites were identified in the adjacent pipeline easement. A full report with a clearance was received on 28 March 2024.*

Item	Details
European Heritage	A search of the Heritage Council's InHerit database did not return any results for a registered heritage site on or within a 500 m radius of the site.
Contaminated Sites Database	Three lots (Lots 540, 3013 and 704) that the proposed lateral pipeline covers have been classified by DWER as '*possibly contaminated – investigation required*' with restrictions on groundwater abstraction for testing prior to its intended use. The classification is due to the presence of ammonia, nitrate and nitrite in surface water and sediments which originates from a nearby ammonium nitrate production facility. A copy of the notice of classification is provided as **Appendix C**. The nearest publicly registered contaminated site is located approximately 1 km to the north-east of the site. The nearby site (3017 Village Road, Burrup) has been classified as '*contaminated - remediation required*' due to the presence of ammonia, nitrate and nitrite in soils, groundwater, surface water and sediments at the site and off-site.

4.0 Site Inspection

A site inspection was undertaken on 27 June 2024 by Senversa Environmental Scientist, Egan Churchill-Gray, to assess the site for visual and/or olfactory evidence of potential contamination (including potential primary and secondary sources), and to ground truth general site conditions.

A summary of the site inspection is provided in **Table 4-1Error! Reference source not found.** and site photographs are provided in **Appendix D**. Site features are shown on **Figure 1** (attached).

Table 4-1: Site Inspection Summary

Item	Observations
Site Identification and Access	The site access was unrestricted from Burrup Road via an unsealed track along the Water Corporation easement. The site is rectangular/linear, undeveloped and unfenced.
Buildings, Structures and Key Areas	No infrastructure currently exists on the site. The proposed lateral pipeline easement is aligned parallel to the existing Water Corporation, Telstra and Burrup fertiliser easements, which are located north of the site. An underground optical fibre line runs parallel to and 10 m north of the northern site boundary. No dangerous goods or chemical storage was observed at the site. No underground storage tanks, above ground storage tanks, pits or traps were observed on site. No groundwater monitoring bores were located on the site or were observed in the vicinity of the site. The site area was visually free of any surficial possibly asbestos containing material (ACM).
Surface and Ground Conditions	The entire site was flat with surface conditions consisting of clayey sand. The site surface was saturated with up to 50 mm of standing water at the time of inspection. A minor access track is aligned directly north of the site, consisting of gravelly material mounded 150 mm above the natural surface.
Topography and Drainage	The site is flat and drains from east to west, ultimately flowing into King Bay and the Indian Ocean. No onsite surface water drainage infrastructure was observed during the site inspection. A series of culverts were present east of the site aligned north-south.
Vegetation	The site is free of vegetation.
Presence/ absence of stockpiles / Waste	No stockpiles or waste was observed at the time of inspection.
Surrounding Land Uses	The site was surrounded by vacant tidal flats to the east, south and west. Land use directly north of the site included utility easements and construction activity associated with the Perdaman gas plant, followed by native vegetation. An ammonium nitrate production facility is located approximately 500 m northeast of the site.
Interviews	No interviewees were identified at the site.

5.0 Adopted Assessment Criteria

5.1 Assessment Guidelines

The following documents form the primary basis of contaminated site investigations in Western Australia:

- *Contaminated Sites Act 2003* and *Contaminated Sites Regulations 2006*.
- *Assessment and management of contaminated sites* (DWER 2021).
- ASC NEPM (NEPC 1999).

In addition, the following documents have been included for adoption of assessment criteria:

- *Health screening levels for petroleum hydrocarbons in soil and groundwater. Part 1: Technical development document*, Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) Technical Report No. 10 (Friebel and Nadebaum 2011).
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Governments [ANZG] 2018).
- *PFAS National Environmental Management Plan (NEMP) Version 2.0* (National Chemicals Working Group of the Heads of EPAs Australia and New Zealand [HEPA] 2020).
- *Identification and investigation of acid sulfate soils and acidic landscapes* (DER 2015a).

Senversa has adopted assessment criteria in consideration of the current and potential future land use and potential receptors.

5.2 Adopted Assessment Criteria

A summary of the adopted assessment criteria is provided in **Table 5-1** and **Table 5-2**.

Table 5-1: Adopted Assessment Criteria for Soil

Exposure Scenario	Assessment Criteria	Guideline Source
Ecological	• Ecological Investigation Level (EIL) for commercial / industrial. Site-specific EILs have also been adopted in accordance with the ASC NEPM Toolbox and Section 2.5 of Schedule B1, as included in **Section 5.3**. • Ecological Screening Level (ESL) for coarse grained soils, applicable to commercial / industrial.	NEPC (1999)
	• Ecological direct exposure for PFAS. • Ecological indirect exposure for PFAS.	HEPA (2020)
Human Health	• Health-based Investigation Level (HIL) for commercial / industrial (HIL-D). • Health Screening Level (HSL) for vapour intrusion for sand, 0 m - <1 m for commercial / industrial (HSL-D). Use of these values for screening purposes is considered conservative for samples collected at greater depth.	NEPC (1999)
	• HSL for direct contact (for intrusive maintenance workers).	Friebel and Nadebaum (2011)
	• HIL for commercial / industrial (HIL-D).	HEPA (2020)

Exposure Scenario	Assessment Criteria	Guideline Source
ASS Action Criteria	• Field indicators for PASS and actual ASS (AASS). • Net action criteria for coarse to medium texture sands to loamy sands and peats, for >1,000 tonnes of material disturbed.	DER (2015a)

Table 5-2: Adopted Assessment Criteria for Groundwater

Exposure Scenario	Assessment Criteria	Guideline Source
Ecological	• Marine water - 95% species protection level (MWG)[1]	ANZG (2018)
	• Ecological water quality guideline values for interim marine - 99% species protection level (MWG-99).	HEPA (2020)
Human Health	• Domestic Non-Potable Use Guidelines (NPUG)	DWER (2021)
	• HSL for groundwater vapour intrusion for sand, 2 m - <4 m for commercial/ industrial (HSL-D). Use of these values for screening purposes is considered conservative for samples collected at greater depth.	NEPC (1999)
	• Drinking water quality guideline value (DWG) (PFAS only).[2]	HEPA (2020)
	• NPUG, equivalent to 10 times the drinking water quality guideline value for PFAS as per HEPA (2020)	DWER (2021)

5.3 Site-Specific Soil Ecological Investigation Levels

Site specific EILs were derived for metals (copper, chromium, nickel and zinc) using the Interactive (Excel) Calculation Spreadsheet provided in the ASC NEPM Toolbox assuming the contamination is "aged", no background concentrations, and using site specific clay content, pH, CEC and TOC values, as follows[3]:

- Clay content: 6%
- pH: 8.6
- CEC: 44.1 meq/100g
- TOC: 0.14%

Based on these results, the following site-specific EILs were calculated. A copy of the EIL calculation spreadsheets for the site are included in **Appendix E**.

[1] For TPH/TRH, no moderate or high reliability trigger values were derived by ANZECC/ARMCANZ (2000) and no default guideline values are available from ANZG (2018). Aquatic habitat screening levels recommended by the California Regional Water Quality Board have therefore been adopted. The CRWB (2016) screening levels are those derived for use at San Francisco Airport and the Presidio and are based on chronic aquatic toxicity tests of petrol and jet fuel mixtures. For each TPH/TRH fraction, the lowest value derived for petroleum mixtures within the fraction has been adopted. It is noted that these values are adopted by other US jurisdictions (e.g. Hawaii Department of Health) and are comparable to the current Dutch intervention value for mineral oil (600 µg/L).

[2] Consistent with DWER (2021) guidance, drinking water guideline values were adopted as Tier 1 PFAS screening levels for non-potable uses (such as watering gardens) in situations where consumption of home-grown produce is a viable/plausible exposure pathway. This is considered to be the case for semi- rural residential lots down-gradient of the site (but not on-site).

[3] Derived using the most conservative values from the two samples that were analysed for the relevant parameters (SB09_0-0.1 and SB09_0.4-0.5).

Table 5-3: Site Specific EILs

Analyte	Commercial / Industrial
Chromium III	580 mg/kg
Copper	250 mg/kg
Nickel	780 mg/kg
Zinc	2,100 mg/kg

6.0 Site Investigation Methodology

6.1 Methodology

Soil and groundwater sampling was undertaken to assess the contamination status of the proposed pipeline alignment. Soil and groundwater sampling locations are shown on **Figure 2** and **Figure 3**, respectively. The investigation methodology is provided in **Table 6-1**.

Table 6-1: Investigation Methodology

Task	Proposed Scope
Soil Investigation	The soil investigation comprised sampling at 12 shallow soil bores along the proposed pipeline alignment. The soil sampling locations were spaced at approximate 50 m intervals along the alignment to meet the minimum number of samples required based on ASS guidelines[4]. The coordinates of soil sample locations were defined using a hand-held GPS. The accuracy of such a method was ±3 to 5 m. Soil samples were collected via hand auger or manual excavation using a shovel to a maximum depth of 0.5 m bgl. This depth was considered practical given site conditions and timing and allowed for representative samples to be collected. Geological and environmental conditions encountered at each location were logged based on the Unified Soil Classification System (USCS). Soil logs are included in **Appendix F** and photographs of the soil profile for each sampling location are included in **Appendix D**. Soil samples were collected into laboratory supplied sample containers. Samples were stored in a cooler box containing ice prior to and during transit to the laboratory. Samples were transported to ALS Environmental with accompanying chain of custody (CoC) documents and laboratory supplied security seals. ALS Environmental operates under accreditation number 825, with the Perth laboratory being site number 15847. Samples were submitted for the following analysis: • Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn) • Total recoverable hydrocarbons (TRH) • Benzene, toluene, ethylbenzene, xylene, naphthalene (BTEXN) • PFAS • ASS field indicators (pH_F and pH_{FOX}) • Suspension peroxide oxidation combined acidity and sulfate (SPOCAS) suite • Chromium reducible sulfur (S_{CR}) suite • pH, total organic carbon, cation exchange capacity and clay content (two samples only). All soil cuttings were returned to the hole in the approximate order they were removed.

[4] DER (2015a) Identification and investigation of acid sulfate soils and acidic landscapes. June 2015.

Task	Proposed Scope
Groundwater Investigation	A groundwater monitoring event (GME) was undertaken comprising installation of five temporary piezometers to a depth of 1.5 m bgl using a mechanical auger fitted to an excavator. The coordinates of piezometer locations were defined using a hand-held GPS. The accuracy of such a method was ±3 to 5 m. Geological and environmental conditions encountered at each location were logged based on the USCS. Soil logs are included in **Appendix F** and photographs of the soil profile for each sampling location are included in **Appendix D**. Piezometers comprised a pre-packed well screen and were fitted with a capped PVC standpipe above ground level. After the installation, each piezometer was developed using a groundwater pump until water appeared to be free of sediment. Piezometers were left for 24 hours to stabilise after installation before sampling. The temporary piezometers were gauged using an interface probe and sampled using low-flow methodologies (peristaltic pump). Field water quality parameters were recorded during purging until stabilisation occurred. Groundwater sampling records are provided in **Appendix F**. Samples were placed into laboratory prepared containers, preserved for the relevant analyses. Groundwater samples analysed for dissolved metals (where required) were field filtered with a dedicated 0.45-micron disposable filter. Samples were stored in a cooler box containing ice prior to and during transit to the laboratory. Samples were transported to the laboratory with accompanying CoC documents and laboratory supplied security seals. Samples were submitted to ALS Environmental for the following analysis: • Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn) • TRH • BTEX • PFAS • Nutrients (including nitrate, nitrite and ammonia) • pH • Alkalinity and acidity • Major ions All purge water was disposed of back down the piezometer.

6.2 Quality Assurance / Quality Control

The QA/QC adopted by Senversa provide a consistent approach to evaluation of whether the data quality objectives required by the project have been achieved. The process focuses on assessment of the useability of the data in terms of accuracy and reliability in forming conclusions on the condition of the element of the environment being investigated. Based on the results of the review, the data was considered suitable for use in forming conclusions relating to the contamination status of the soil and groundwater at the site. The QA/QC and data validation review is detailed in **Appendix G**.

7.0 Soil Investigation Results

7.1 Field Observations

Soil bores for the soil investigation and for the installation of monitoring wells (as piezometers) were installed on 4 July 2024. The maximum investigation depth was 1.5 m bgl (for installation of monitoring wells). The shallow soil profile (to 1.5 m bgl) was found to be generally consistent across the site, and described as: silty sand, being pale brown in colour, poorly graded, fine to coarse grained, with the presence of trace shell fragments at some locations. All locations encountered a high clay component from 0.4 m bgl and below, with some mottling present. No evidence of anthropogenic materials or contamination was identified at any location, as summarised in **Table 7-1** below.

Table 7-1: Soil Field Observations – Contamination Indicators

Potential Contamination Indicator	Description
Fill Presence	There was no evidence of fill (including reworked natural soils) at any investigation location. All soils appeared natural.
Evidence of Contamination	No visual or olfactory evidence of hydrocarbon impacts, or other contaminants, was observed in soils during the investigation.

7.2 Soil Analytical Results

A total of 24 samples from 12 soil bores were submitted for analysis of CoPCs, including metals, hydrocarbons and PFAS. Soil analytical results were compared against the relevant adopted assessment criteria as per **Section 5.0**. The tabulated results are present in **Table 1** (attached) and laboratory reports are provided in **Appendix H**.

A review of the results indicated that:

- Hydrocarbons (TRH, BTEXN, PAHs) were below the laboratory limit of reporting (LoR) for all samples, and subsequently below all adopted assessment criteria.
- PFAS results were below the laboratory LoR for all samples, and subsequently below all adopted assessment criteria.
- Metals were variously detected in all samples, including arsenic, chromium, copper, lead, nickel and zinc. All results were below the adopted assessment criteria.

7.3 ASS Results

7.3.1 Field Observations and Soil Types

Soil lithologies encountered at the site were grouped on their physical characteristics and visual differentiation. Two distinct soil profiles were noted, being pale brown silty sand (SS), present as the uppermost horizon, underlain by mottled grey and brown silty, clayey sand (SS(C)). The soil profile descriptions and particle size analysis (PSA) results from soil bore location SB09 are provided in **Table 7-2** with bore logs included in **Appendix F**.

Table 7-2: Generalised Lithology and PSA Results

Depth (m bgl)	Soil Profile Code	Lithological Description/Observations	Particle Size Analysis Results (SB09)				
			Clay	Sand	Silt	Gravel	Cobbles
0.0 – 0.4 m	SS	**Pale brown silty sand** May include shell fragments. Typically dry to moist.	6%	67%	11%	16%	<1%
0.4 – 1.5 m	SS(C)	**Mottled grey and brown silty, clayey sand** May include trace gravel or cobbles. Typically moist to wet.	12%	60%	24%	4%	<1%

7.3.2 ASS Field Indicators

Consistent with DER (2015a), ASS field screening for field pH (pH_F) and oxidised field pH (pH_{FOX}) are used to determine indicators of potential ASS (PASS) and actual ASS (AASS):

- Indicators of AASS: pH_F <4 and pH_{FOX} <3.
- Indicators of PASS: pH_F >4 and pH_{FOX} <3.

Where the change in pH (Δ pH) between pH_F and pH_{FOX} is significant (nominally >3 pH units difference), the sample is also considered to indicate the presence of PASS (DER 2015a).

A total of 24 samples from 12 soil bores were screened for ASS indicators, field screening for field pH (pH_F) and oxidised field pH (pH_{FOX}) and are presented in **Table 2** (attached). Indicators of PASS or AASS were not present in any sample, noting the following:

- pH_F results were between pH 8.2 and pH 8.8.
- pH_{FOX} results were between pH 6.8 and pH 8.1.
- ΔpH ranged between 0.1 pH units (SB01_0-0.1) and 1.8 pH units (SB11_0-0.1).

pH_F and pH_{FOX} values were comparable between the SS and SS(C) profiles.

7.3.3 SPOCAS/ S_{CR} Results

All samples were submitted for SPOCAS and S_{CR} analysis. The SPOCAS analytical method is considered more accurate for the determination of a soil's potential to generate acidity particularly for soils with pH_{OX} >6.5, and therefore the SPOCAS results have been used as the primary indicator of PASS at the site.

The SPOCAS results are used to determine the net acidity of each sample, which is determined from the existing and potential acidity of the soil. DER (2015a) provides a calculation to determine net acidity of a soil:

Net acidity = potential acidity + existing acidity – acid neutralising capacity (ANC), where:

- Potential acidity is calculated from the sulfur trail of the SPOCAS analysis, which gives a measure of the maximum oxidisable sulfur. Potential acidity is reported as peroxide oxidisable sulfur (S_{POS}).
- Existing acidity is calculated from the Titratable Actual Acidity (TAA) of a soil, which measures the soluble and readily exchangeable acidity of a particular soil.
- ANC is a measure of a soil's ability to buffer against decreases in soil pH (i.e. increased acidity). DER (2015a) states that without confirmatory kinetic testing or modified laboratory methods, ANC cannot be used to reduce ASS management where potential and/ or existing acidity exist.

Therefore:

Net acidity = S_{POS} + *TAA*

The calculated net acidity results for each soil profile are provided in **Table 7-3** below. The DER Action Criteria of 0.03%S was adopted for assessment based on the soil type (medium textured sandy loams to light clays with a clay content of 5% – 40%), and an estimate disturbance of >1000 tonnes of material.

The tabulated analytical results are provided in **Table 2** (attached) and the laboratory reports are provided in **Appendix H**.

Table 7-3: SPOCAS Results

Soil Profile		SPOCAS		
		TAA	**SPOS**	**Net Acidity (excl. ANCE)**
SS	Min	<0.005	0.007	<0.02
	Max	<0.005	0.150	0.15
SS(C)	Min	<0.005	0.039	0.04
	Max	<0.005	0.255	0.26
Action Criteria (DER 2015)		-	-	0.03
Units	-	*%S*	*%S*	*%S*

The net acidity results indicate that both soil types exceeded the DER Action Criteria, which trigger the requirement for ASS management.

8.0 Groundwater Investigation Results

8.1 Groundwater Elevation and Flow Direction

Groundwater depth was measured to be very shallow, between 0.276 m bgl (well MW03) and 0.376 m bgl (MW01). Site-specific groundwater flow direction was not able to be calculated as wells were not surveyed. It is expected that groundwater flow would be in a westerly direction towards King Bay.

8.2 Groundwater Field Indicator Parameters

Following purging, a representative groundwater sample was collected from wells MW01 to MW05. Stabilised groundwater was typically colourless (except for well MW03 which was pale brown), slightly to moderately turbid and without sheen. A sulphurous odour was detected from groundwater collected at wells MW04 and MW05. Field parameters are provided in full in **Table 3** (attached) and summarised below in **Table 8-1**.

Table 8-1: Groundwater Field Parameters

Field Parameter	pH	EC	TDS	DO	Redox (Eh)	Temperature
Minimum	6.95 (MW05)	130,858 (MW01)	85,058 (MW01)	0.38 (MW02)	54.8 (MW05)	22.5 (MW05)
Maximum	7.56 (MW01)	192,348 (MW05)	125,026 (MW05)	2.59 (MW04)	144.4 (MW03)	25.3 (MW02)
Units	*pH units*	*µS/cm*	*mg/L*	*mg/L*	*mV*	*°C*

Notes:
TDS calculated based on a conversion factor of 0.65.

The field data indicates that groundwater at the site is near-neutral, hyper-saline, typically present aerobic and oxidising conditions.

8.3 Groundwater Analytical Results

The groundwater analytical results were compared to the adopted assessment criteria. Limited exceedances of the MWG (ANZG 2018) and NPUG (DWER 2021) assessment criteria were identified. No exceedances of the HSL-D for groundwater vapour intrusion (NEPC 1999) or the DWG - Health (HEPA 2020) were reported.

A review of the groundwater analytical results indicated that:

- All metal concentrations except for zinc were below the laboratory LoR. Concentrations of zinc were reported for wells MW01 and MW02, marginally above the LoR and above the MWG.
- Inorganic compounds and ions (ammonia, total nitrogen, phosphorus, chloride and sulfate) variously exceeded NPUG and/or MWG at all locations.
- Hydrocarbons (TRH and BTEXN) were below the laboratory LoR for all samples, and subsequently below all adopted assessment criteria.

- PFAS results were variably reported above the LoR in all samples, generally present as perfluoroalkane carboxylic acids. For those PFAS compounds for which an assessment criterion is available (PFOA, PFOS and PFHxS), only well MW01 reported concentrations above the LoR (albeit at a low concentration of 0.0006 µg/L). No exceedances of the adopted assessment criteria were reported for PFAS.

Groundwater exceedances of the adopted assessment criteria are summarised in Error! Reference source not found. below. The tabulated groundwater analytical results are presented in **Table 4** (attached) and laboratory reports are provided in **Appendix H**.

Table 8-2: Groundwater Criteria Exceedances (5 July 2024)

Analytes	Units	LoR	NPUG (DWER 2021)	MWG (ANZG 2018)	Well ID				
					MW01	MW02	MW03	MW04	MW05
Metals									
Zinc	mg/L	0.005	3	0.008	0.125	0.113	-	-	-
Inorganics and Major Ions									
Ammonia (as N)	mg/L	0.01	0.388	0.91	0.49	1.7*	-	0.68	0.44
Total Nitrogen (as N)	mg/L	0.1	-	0.1	1.4	1.3*	1.3	1.7	0.8
Phosphorus (as P)	mg/L	0.01	-	0.015	-	-	0.24	0.12	0.16
Chloride	mg/L	1	250	-	54,000	72,800	96,000	74,400	88,800
Sulfate (as SO4)	mg/L	1	1,000	-	6,920	13,000	9,750	8,760	9,840

Notes:
'*' indicates that the concentration is the adopted replicate result.

9.0 Discussion

9.1 Soil

Soils encountered at the site did not indicate the presence of anthropogenic contaminants, including hydrocarbons, PFAS and metals. No exceedances of the adopted human health and ecological assessment criteria were present, indicating that there is currently no plausible risk to receptors from these contaminants within soils likely to be disturbed during site works.

The outcomes of the ASS investigation indicated that soil at the site is slightly alkaline with no field indicators of PASS or ASS based on the pH_F and pH_{FOX} results. However, the majority of soils have a net acidity above the DER Action Criteria of 0.03%S, which indicates that there is the potential for acidification of soils if oxidised. These results are consistent with the regional ASS mapping, which indicates that there is a "*high to moderate risk of ASS occurring within 3 m of natural soil surface*".

Soils encountered during the investigation were classified into two primary soil types, based on their physiological properties, being pale grey silty sand (SS) and mottled grey and brown silty, clayey sand (SS(C)). The SS soil type reported a maximum net acidity of 0.15%S and the SS(C) soil type reported a maximum net acidity of 0.26%S, indicating that all disturbed soil of consistent with these geological profiles will require ASS management if disturbed. Further ASS management actions are discussed in **Section 10.0**.

9.2 Groundwater

The groundwater analytical results were assessed against the adopted assessment criteria for human health and ecological receptors. The results indicated that there are currently no risks to receptors in regards to PFAS, with low-level PFAS detected at all locations however the concentrations were below the adopted guidelines for human health and the environment. It is noted the assessment criteria currently only exist for a limited number of PFAS compounds and therefore the conclusion should be considered in this regard.

All hydrocarbon concentrations were below LoR and subsequently below the adopted assessment criteria, indicating that hydrocarbons in groundwater in the vicinity of the proposed works does not pose a risk to receptors, including from a vapour intrusion pathway.

Exceedances of zinc were reported above the MWG at wells MW01 and MW02. It is noted that the reported LoR for all samples was elevated, due to matrix interference during laboratory analysis, as is common with samples of elevated TDS. The increased LoR was above the MWG criterion of 0.008 mg/L and therefore it is likely that the remaining samples would also have reported zinc concentrations above the MWG. In the absence of a defined contaminant source, and in light of comparatively low concentration of other reported metals, the zinc concentrations are likely to be reflective of ambient groundwater conditions.

The location of the site (north-western Australia, in close proximity to the ocean) is consistent with the hypersaline conditions encountered. The elevated chloride and sulfate results are indicative of these ambient conditions and the NPUG exceedances are not considered to indicate contamination or a risk to receptors.

Nutrients including ammonia, total nitrogen and phosphorus variously exceeded NPUG and/or MWG which is consistent with known impacts from the nearby ammonium nitrate production facility. However, given the hypersaline conditions and limited beneficial use of groundwater, including potential for the presence of aquatic ecosystems, any risks from elevated nutrients are considered to be low.

Overall, the results of the groundwater investigation indicate that groundwater encountered at the site is shallow, hypersaline and has limited beneficial uses. The groundwater conditions are considered to be representative of ambient conditions that are consistent with the site's geographical location, with no indication of anthropogenic impacts.

10.0 ASS Management

The outcomes of the ASS investigation indicated that soils encountered at the site requirement treatment for the mitigation of PASS (where disturbed), in accordance with the *Treatment and management of soil and water in acid sulfate soil landscapes* (DER 2015b):

- Soil type SS:
  - Pale brown silty sand.
  - Encountered between the surface and nominally to 0.4 m bgl.
  - May include shell fragments.
  - Typically dry to moist.
- Soil type SS(C):
  - Mottled grey and brown silty, clayey sand
  - Encountered between nominally 0.4 m bgl to the lowest investigation depth (1.5 m bgl).
  - May include trace gravel or cobbles.
  - Typically moist to wet.

The following management measures should be implemented during intrusive works which result in the disturbance/ excavation of soils within the investigation area.

- Soil treatment should be undertaken on a treatment pad.
  - The treatment pad should consistent of a minimum 300 mm thickness compacted limestone base (or other neutralising material).
  - The treatment pad should have bunded edges to prevent leachate runoff.
- Soils should be segregated into SS and SS(C) soil types. Where soils are not separated, the soil should be treated at the higher treatment rate (i.e. applicable to the SS(C) soil type).
- Soils should be appropriately treated with a neutralising agent (see **Section 0** for dosing rate calculations).
  - An alkaline material, such as calcium carbonate ($CaCO_3$), in the form of finely crushed limestone or aglime, is commonly used as a neutralising agent. Sodium based compounds are not recommended for ASS treatment.
  - Treatment should be undertaken via mechanical mixing of the neutralising agent with the excavated soil so that the material is uniform.
  - Untreated soils should not be left exposed for long periods of time. Loamy sands should be treated within 2.5 days of stockpiling.
- Treated soils should be validated prior to backfilling. Where possible, validated soils should be placed above the water table.
- Following decommissioning of the treatment pad, validation of the soil beneath the treatment pad should be undertaken to ensure that leaching has not occurred.

Note: Where soils are encountered that do not correspond with either of the soil profiles described above, further investigations should be undertaken to determine whether soils present ASS risks, and is so, the treatment rate that should be applied.

10.1.1 Liming Rates

The neutralising agent is to be mixed through the excavated soil, at a rate that is calculated from the highest net acidity of each soil type. The calculation to determine the volume of lime to be applied is as follows:

Lime (kg $CaCO_3$/ tonne soil) = bulk density x (net acidity x 30.59) x 1.02 x safety factor x 100/ENV, where:

- Bulk density value is applied in tonne/m^3. The DWER default value for loamy sands (most applicable to the site) is a factor of 1.5.
- Net acidity value is applied %S units. The highest net acidity for each soil type should be used.
- A safety factor of 1.5 should be applied at a minimum to account for non-homogeneous mixing.
- The effective neutralising value (ENV) should be used for the specific ENV from the neutralising agent used. This information can be obtained from the supplier.

The site-specific inputs for the liming rate calculation are presented in **Table 10-1**.

Table 10-1: Inputs for Liming Rate Calculation

Soil Type	Bulk Density (loamy sands)	Maximum Net Acidity	Safety Factor
SS	1.5	0.15	1.5
SS(C)	1.5	0.26	1.5
Units	*tonne/m^3*	*%S*	-

Based on the above inputs, the calculation for the SS soil type is:

Lime (kg $CaCO_3$/ tonne soil) = *1.5 x (0.15 x 30.59) x 1.02 x 1.5 x 100/ENV*

= *10.53 x 100/ENV*

Based on the above inputs, the calculation for the SS(C) soil type is:

Lime (kg $CaCO_3$/ tonne soil) = *1.5 x (0.26 x 30.59) x 1.02 x 1.5 x 100/ENV*

= *18.25 x 100/ENV*

The ENV of a specific neutralising agent should be calculated for each particle size, based on the following calculation:

ENV = % Proportion/100 x Utilisation Factor x NV

The percentage proportion and neutralising value (NV) should be provided by the supplier of the neutralising agent. The utilisation factors for each particle size are included in **Table 10-2** below.

For **Table 10-2:**

- 'X' indicates factors provided by the supplier of the neutralising agent.
- 'A' to 'D' indicate the calculated ENV for each particle size.
- The total ENV to be used in the liming rate calculation is the sum of A, B, C and D.

Table 10-2: Calculating ENV Values

Particle size	Proportion (%)	Utilisation factor	NV (%)	ENV
1.00–2.00mm	X	0.01	X	A
0.85–1.00mm	X	0.10	X	B
0.300–0.850mm	X	0.60	X	C
<0.300mm	X	1.00	X	D
Total	100	-	-	Sum of A, B, C, D

10.1.2 Validation Sampling

Prior to the on-site reuse or backfilling of excavated material, validation sampling should be undertaken and the results verified to ensure effective neutralisation has been achieved. As per DER (2015b), sampling frequency should be undertaken in accordance with DWER's current *Landfill waste classification and waste definitions* (DWER 2019). The required sampling frequency is presented in **Plate 1**.

Volume (m^3)	Number of Samples
100 to 200	4
200 to 500	6
500 to 1,000	8
1,000 to 2,000	11
2,000 to 3,000	15
3,000 to 4,000	18
4,000 to 5,000	20
5,000 to 10,000	24
> 10,000	24 plus 4 for each additional 10,000 m^3

Plate 1: Validation sampling frequency (DWER 2019)

Noting that the field ASS results did not indicate PASS or AASS, all validation samples should be analysed for SPOCAS. Analysis should be undertaken on an unground sample. The following validation criteria should be met:

- Evidence that the neutralising material has been thoroughly mixed with the soil.
- pH_F >6.0 pH units.
- Net acidity <0.03%S.

Note: Where validation samples do not meet the validation criteria of <0.03%S, further neutralisation should be undertaken, and subsequent validation sampling, until the validation criteria is met.

10.1.3 Groundwater and Effluent Management

It is understood that no groundwater dewatering is proposed as part of this project and therefore no management of groundwater is proposed for the site (Pipecraft 2024).

Should dewatering be proposed, specific management measures will need to be implemented to ensure that groundwater acidification does not occur. The management measures will need to be documented in a separate management plan.

11.0 Conclusions and Recommendations

Senversa was engaged by AGIG to conduct a Baseline ESA at the proposed location of the Perdaman Lateral Pipeline in the Burrup Peninsula where a 500 m natural gas pipeline is proposed to be constructed to connect the site to the DBNGP.

Lots 540, 3013 and 704, which form the site, have been classified by the DWER as "*possibly contaminated – investigation required*" with restrictions on groundwater abstraction requiring testing prior to its intended use based on the presence of ammonia, nitrate and nitrite in surface water and sediments which originates from a nearby ammonium nitrate production facility.

The soil and groundwater investigations undertaken as part of this ESA indicated that there are no current risks to human health or ecological receptors associated with anthropogenic sources at the site, including PFAS, metals and hydrocarbons. Elevated nutrients (ammonia, total nitrogen and phosphorus) were present in groundwater above adopted human health and ecological assessment levels, as consistent with known off-site sources which have migrated onto the site (and formed the basis for the current site classification).

The ASS investigation found the presence of PASS in soils within the proposed excavation footprint that will require management if disturbed. The ASS management measures are detailed in **Section 10.0** of this report and include soil neutralisation treatment. The ASS management requirements are considered appropriate to mitigate any potential risks associated with PASS at the site.

It is understood that no dewatering/effluent abstraction will be undertaken as part of the works and therefore no management of groundwater is proposed for the site.

12.0 Principles and Limitations

The following principles are an integral part of site contamination assessment practices and are intended to be referred to when resolving any ambiguity or exercising such discretion as is accorded the user or site assessor.

Area	Principle and Limitation
Elimination of Uncertainty	Some uncertainty is inherent in all site investigations. Furthermore, any sample, either surface or subsurface, taken for chemical testing may or may not be representative of a larger population or area. Professional judgment and interpretation are inherent in the process, and even when exercised in accordance with objective scientific principles, uncertainty is inevitable. Additional assessment beyond that which was reasonably undertaken may reduce the uncertainty.
Limitations of Information	The effectiveness of any site investigation may be compromised by limitations or defects in the information used to define the objectives and scope of the investigation, including inability to obtain information concerning historic site uses or prior site assessment activities despite the efforts of the user and assessor to obtain such information.
Level of Assessment	The investigation herein should not be considered to be an exhaustive assessment of environmental conditions on a property. There is a point at which the effort required to obtain information is outweighed by the time required to obtain that information, and, in the context of private transactions and contractual responsibilities, may become a material detriment to the orderly conduct of business. If the presence of target analytes is confirmed on a property, the extent of further assessment is a function of the degree of confidence required and the degree of uncertainty acceptable in relation to the objectives of the assessment.
Comparison with Subsequent Inquiry	The justification and adequacy of the findings of this investigation in light of the findings of a subsequent inquiry should be evaluated based on the reasonableness of judgments made at the time and under the circumstances in which they were made.
Data Useability	Investigation data generally only represent the site conditions at the time the data were generated. Therefore, the usability of data collected as part of this investigation may have a finite lifetime depending on the application and use being made of the data. In all respects, a future reader of this report should evaluate whether previously generated data are appropriate for any subsequent use beyond the original purpose for which they were collected, or are otherwise subject to lifetime limits imposed by other laws, regulations or regulatory policies.
Nature of Advice	The investigation works herein are intended to develop and present sound, scientifically valid data concerning actual site conditions. Senversa does not seek or purport to provide legal or business advice.

13.0 References

Australian and New Zealand Governments (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

Bureau of Meteorology (2024) Groundwater Dependent Ecosystems Atlas, Bureau of Meteorology, viewed 2 July 2024, <http://www.bom.gov.au/water/groundwater/gde/map.shtml>.

Department of Environment Regulation (2015a) Identification and investigation of acid sulfate soils and acidic landscapes. June 2015.

Department of Environment Regulation (2015b) Treatment and management of soil and water in acid sulfate soil landscapes. June 2015.

Department of Water and Environmental Regulation (2021) Assessment and management of contaminated sites. November 2021.

Department of Water and Environmental Regulation (2024a) *Water Information Reporting*, viewed 2 July 2024, <http://wir.water.wa.gov.au/Pages/Water-Information-Reporting.aspx>.

Department of Water and Environmental Regulation (2024b) *Water Register*, viewed 2 July 2024, <https://maps.water.wa.gov.au/#/webmap/register>.

Enveng Group (2020) Perdaman Environmental Testing and Acid Sulfate Soils (ASS) Preliminary Assessment - Summary of Findings and Recommendations. 10 September 2020. (Enveng Group Project No. PR25).

Friebel, E and Nadebaum, P (2011) Health screening levels for petroleum hydrocarbons in soil and groundwater. Part 1: Technical development document, Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) Technical Report No. 10.

Hickman, AH (1997) Dampier, W.A. Sheet 2256: Western Australia Geological Survey, 1:100 000 Geological Series.

National Chemicals Working Group of the Heads of EPAs Australia and New Zealand (2020) PFAS National Environmental Management Plan. Version 2.0. January 2020.

National Environment Protection Council (1999) National Environmental Protection (Assessment of Site Contamination) Measure (as amended 15 May 2013).

Pipecraft (2024) Construction Execution Plan, AGIG – Perdaman Pipeline Lateral. Revision D, 13 August 2024 (Reference: CEP-T24001-001).

Tetra Tech Coffey (2022a) Perdaman Urea Project - Project Destiny. Baseline Hydrogeological Assessment. 10 March 2022. (Reference: 754-PEREN296568).

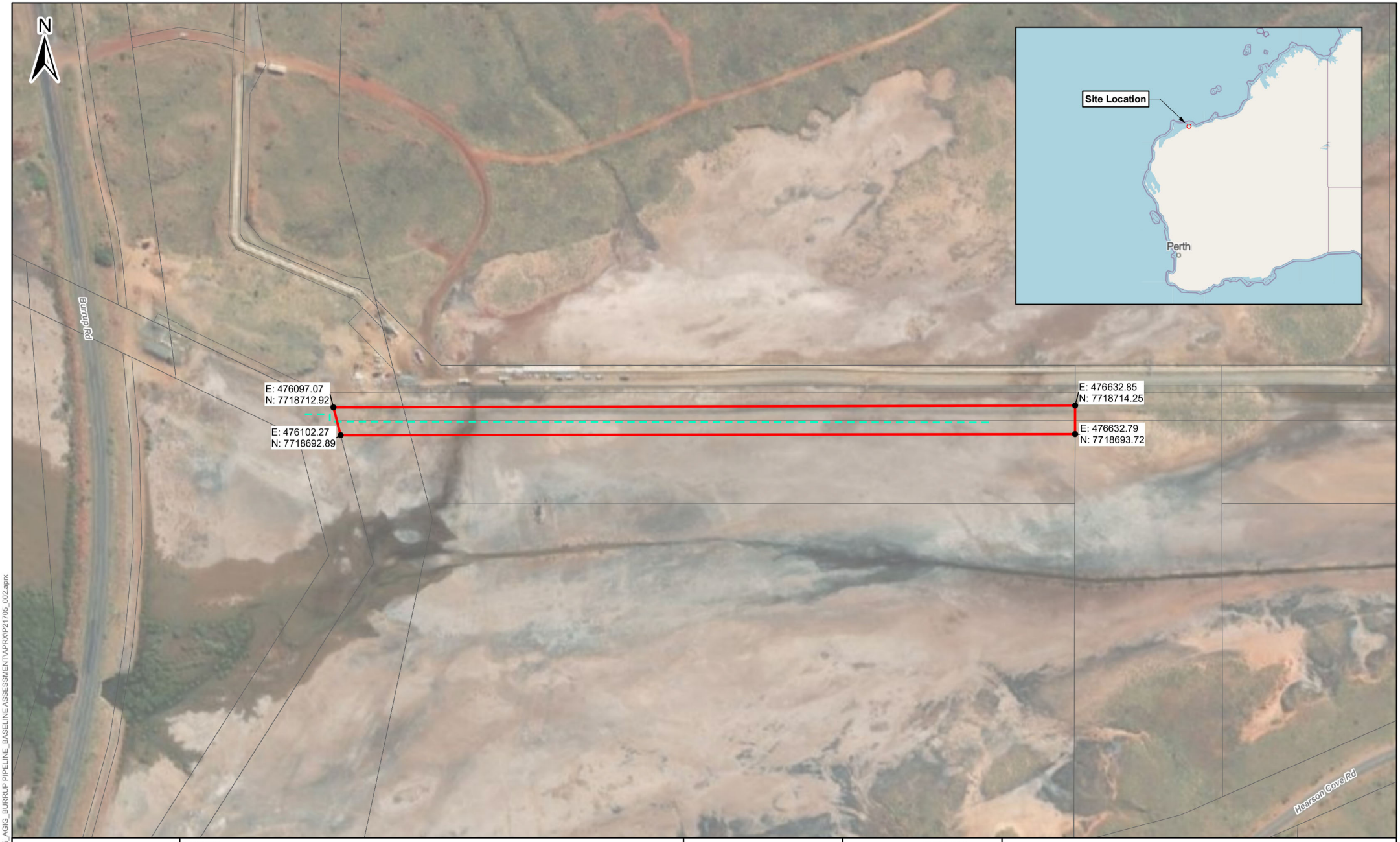
Tetra Tech Coffey (2022b) Perdaman Urea Project - Project Destiny. Detailed Site Assessment for Acid Sulfate Soil. 19 April 2022. (Reference: 754-PEREN297100).

Figures

Figure 1: Site Location Plan

Figure 2: Site Plan

Figure 3: Sample Location Plan



senversa

Legend

- Boundary
- Proposed Pipeline
- Cadastre (LGATE-001)

Aerial Imagery © ESRI World Imagery

Created:	A. Murray	Date:	6/08/2024
Reviewed:	E. Churchill-Gray	Revision:	0
Approved:	A. Betti	Scale:	1:2,500 (A3)
File:	P21705_002_F001 Site Location		

0 12.5 25 50 75 100 125 Metres

Coordinate System: GDA2020 MGA Zone 50

Figure No: 1

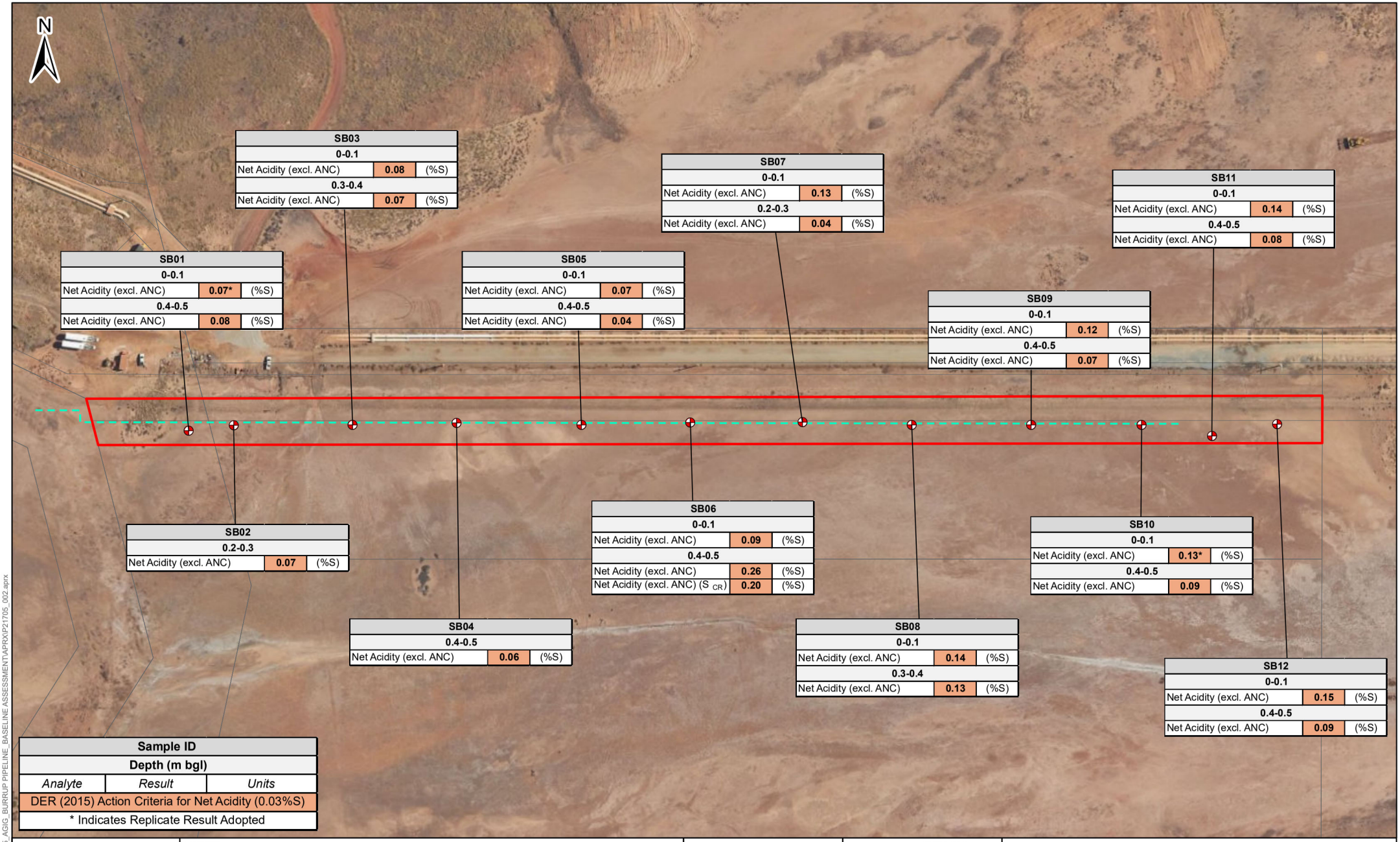
Title: Site Location

Project: Baseline Environmental Site Assessment

Location: Perdaman Lateral Pipeline, Burrup Peninsula

Client: Australian Gas Infrastructure Group

Path: S:\01_Jobs\6.WA_Jobs\P21705_AGIG_BURRUP PIPELINE_BASELINE ASSESSMENT\APRX\P21705_002.aprx



senversa

Legend

- Hand Auger
- Boundary
- Proposed Pipeline
- Cadastre (LGATE-001)

Aerial Imagery © Landgate

Created:	A. Murray	Date:	6/08/2024
Reviewed:	E. Churchill-Gray	Revision:	0
Approved:	A. Betti	Scale:	1:1,500 (A3)
File:	P21705_002_F002 Soil Locations		

0 5 10 20 30 40 50 Metres

Coordinate System: GDA2020 MGA Zone 50

Figure No: 2

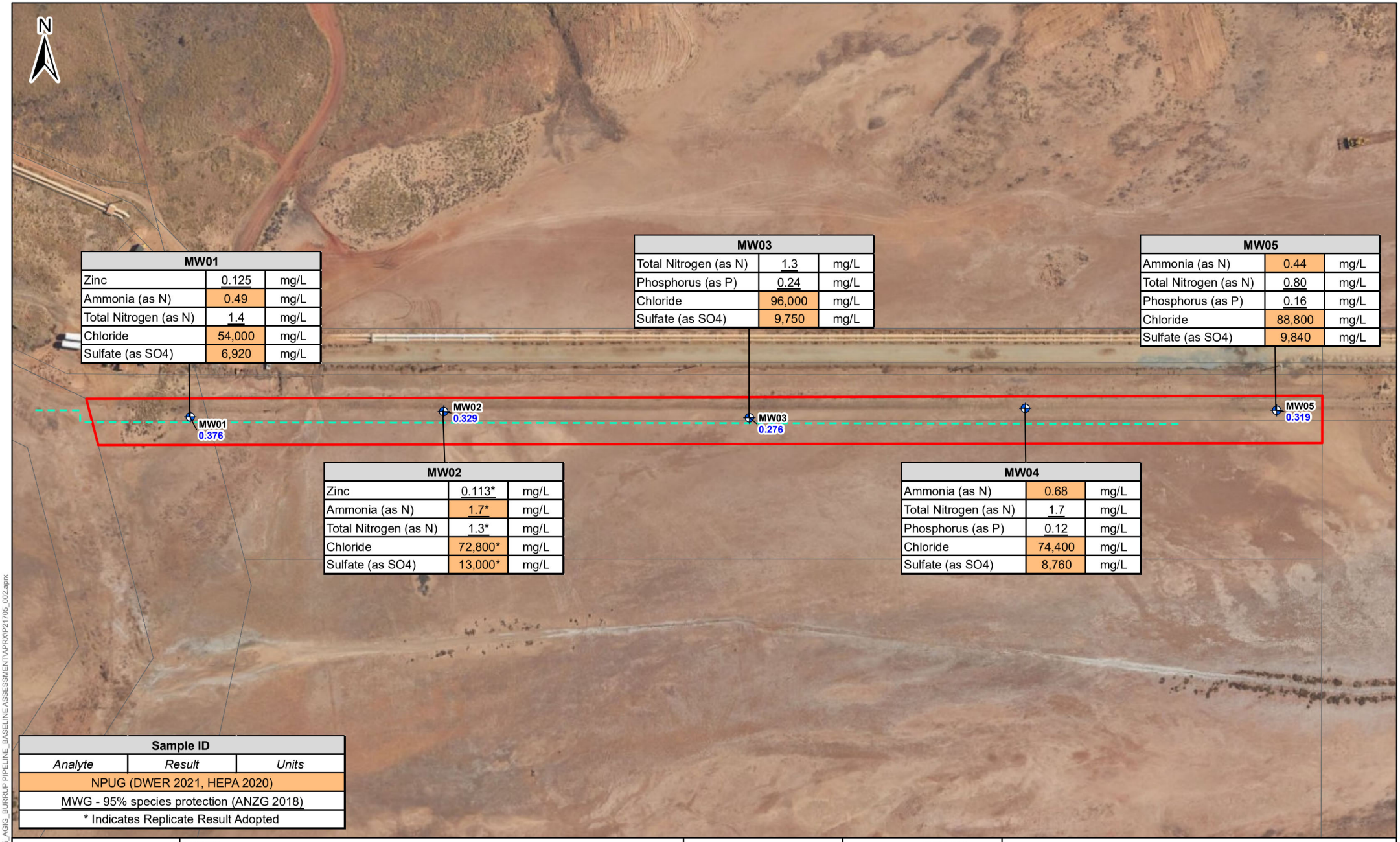
Title: Soil Sampling Locations

Project: Baseline Environmental Site Assessment

Location: Perdaman Lateral Pipeline, Burrup Peninsula

Client: Australian Gas Infrastructure Group

Path: S:\01_Jobs\6.WA_Jobs\P21705_AGIG_BURRUP PIPELINE_BASELINE ASSESSMENT\APRX\P21705_002.aprx



MW01		
Zinc	0.125	mg/L
Ammonia (as N)	0.49	mg/L
Total Nitrogen (as N)	1.4	mg/L
Chloride	54,000	mg/L
Sulfate (as SO4)	6,920	mg/L

MW03		
Total Nitrogen (as N)	1.3	mg/L
Phosphorus (as P)	0.24	mg/L
Chloride	96,000	mg/L
Sulfate (as SO4)	9,750	mg/L

MW05		
Ammonia (as N)	0.44	mg/L
Total Nitrogen (as N)	0.80	mg/L
Phosphorus (as P)	0.16	mg/L
Chloride	88,800	mg/L
Sulfate (as SO4)	9,840	mg/L

MW02		
Zinc	0.113*	mg/L
Ammonia (as N)	1.7*	mg/L
Total Nitrogen (as N)	1.3*	mg/L
Chloride	72,800*	mg/L
Sulfate (as SO4)	13,000*	mg/L

MW04		
Ammonia (as N)	0.68	mg/L
Total Nitrogen (as N)	1.7	mg/L
Phosphorus (as P)	0.12	mg/L
Chloride	74,400	mg/L
Sulfate (as SO4)	8,760	mg/L

Sample ID		
Analyte	*Result*	*Units*
NPUG (DWER 2021, HEPA 2020)		
MWG - 95% species protection (ANZG 2018)		
* Indicates Replicate Result Adopted		

senversa

Legend
- Piezometer
- Boundary
- Proposed Pipeline
- Cadastre (LGATE-001)

Well ID
Reduced Water Level (m bgl)

Aerial Imagery © Landgate

Created:	A. Murray	Date:	6/08/2024
Reviewed:	E. Churchill-Gray	Revision:	0
Approved:	A. Betti	Scale:	1:1,500 (A3)
File:	P21705_002_F003 GW Contours		

0 5 10 20 30 40 50 Metres

Coordinate System: GDA2020 MGA Zone 50

Figure No: 3

Title: Groundwater Sampling Locations

Project: Baseline Environmental Site Assessment

Location: Perdaman Lateral Pipeline, Burrup Peninsula

Client: Australian Gas Infrastructure Group

Path: S:\01_Jobs\6.WA_Jobs\P21705_AGIG_BURRUP PIPELINE_BASELINE ASSESSMENT\APRX\P21705_002.aprx

Summary Tables

Table 1: Soil Analytical Results
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

senversa

							Metals								BTEX							Total Petroleum Hydrocarbons				
						pH (Lab)	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Total Xylene	Total BTEX	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum)
HIL D - Commercial/ Industrial (NEPC 1999)						-	3,000	900	3,600[#1]	240,000	1,500[#2]	730	6,000	400,000	3[#3]	99,000[#3]	27,000[#3]	-	-	230[#3]	-	-	-	-	-	-
Maintenance of Ecosystems - Commercial / Industrial						-	160[#7]	-	580[#8,9]	250[#9]	1,830[#7]	-	780[#9]	2,100[#9]	75[#10]	135[#10]	165[#10]	-	-	95[#11]	-	-	-	-	-	-
Ecological, direct exposure (HEPA 2020)						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecological, indirect exposure (HEPA 2020)						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LoR						0.1	2	0.1	1	1	1	0.02	1	5	0.1	0.1	0.1	0.2	0.1	0.3	0.2	10	20	50	50	50
Units						*pH Units*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
Soil Bore ID	**Field ID**	**Date**	**Depth**	**Lab Report No.**																						
SB01	SB01_0-0.1	4/07/2024	0 - 0.1	EP2409636		8.6	7	<1	18	27	<5	<0.1	7	30	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
	SB01_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636		8.8	7	<1	19	<5	<5	<0.1	8	9	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
SB02	SB02_0-0.1	4/07/2024	0 - 0.1	EP2409636		8.7	9	<1	97	17	6	<0.1	10	16	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
	SB02_0.2-0.3	4/07/2024	0.2 - 0.3	EP2409636		8.7	10	<1	25	6	<5	<0.1	10	12	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
SB03	SB03_0-0.1	4/07/2024	0 - 0.1	EP2409636		8.7	8	<1	23	22	5	<0.1	10	40	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
	SB03_0.3-0.4	4/07/2024	0.3 - 0.4	EP2409636		8.6	8	<1	25	6	<5	<0.1	11	12	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
SB04	SB04_0-0.1	4/07/2024	0 - 0.1	EP2409636		8.6	8	<1	21	14	<5	<0.1	9	23	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
	SB04_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636		8.7	9	<1	29	6	<5	<0.1	13	14	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
SB05	SB05_0-0.1	4/07/2024	0 - 0.1	EP2409636		8.6	10	<1	27	17	<5	<0.1	12	27	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
	SB05_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636		8.4	12	<1	28	7	<5	<0.1	13	14	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
SB06	SB06_0-0.1	4/07/2024	0 - 0.1	EP2409636		8.6	10	<1	20	5	<5	<0.1	8	8	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
	SB06_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636		8.5	14	<1	33	6	<5	<0.1	13	14	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
SB07	SB07_0-0.1	4/07/2024	0 - 0.1	EP2409636		8.7	11	<1	23	10	<5	<0.1	10	16	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
	SB07_0.2-0.3	4/07/2024	0.2 - 0.3	EP2409636		8.6	9	<1	22	5	<5	<0.1	9	8	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
SB08	SB08_0-0.1	4/07/2024	0 - 0.1	EP2409636		8.7	10	<1	12	<5	<5	<0.1	5	6	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
	SB08_0.3-0.4	4/07/2024	0.3 - 0.4	EP2409636		8.7	10	<1	20	<5	<5	<0.1	8	7	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
SB09	SB09_0-0.1	4/07/2024	0 - 0.1	EP2409636		8.6	8	<1	20	10	<5	<0.1	8	16	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
	SB09_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636		8.6	9	<1	34	8	<5	<0.1	14	13	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
SB10	SB10_0-0.1	4/07/2024	0 - 0.1	EP2409636		8.7	10	<1	11	5	<5	<0.1	5	6	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
	SB10_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636		8.6	7	<1	32	6	<5	<0.1	12	11	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
SB11	SB11_0-0.1	4/07/2024	0 - 0.1	EP2409636		8.5	8	<1	15	<5	<5	<0.1	5	<5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
	SB11_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636		8.6	8	<1	35	7	<5	<0.1	13	11	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
SB12	SB12_0-0.1	4/07/2024	0 - 0.1	EP2409636		8.5	10	<1	17	6	<5	<0.1	7	10	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
	SB12_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636		8.6	7	<1	27	<5	<5	<0.1	9	7	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50

Comments
#1 Value is for Chromium (VI).
#2 Assumes 50% bioavailability.
#3 Value sources from Friebel & Nadebaum (2011)- HSL-D.
#4 HSL based on vapour intrusion pathway (sand <1 m depth)
#5 HSL based on direct contact pathways (Friebel and Nadebaum, 2011) as vapour intrusion HSL is not limiting.
#6 HSL based on direct contact pathways (Friebel and Nadebaum, 2011) as fraction is not volatile.
#7 Value applies to aged arsenic (contamination present in soil for at least two years).
#8 Value is for chromium III.
#9 Site-specific EIL.
#10 Coarse soil value adopted for initial screening.
#11 Fine soil value (most conservative) adopted for initial screening.
#12 Value applies to both coarse and fine soil.
#13 Value applies to both fresh and aged contamination.

Table 1: Soil Analytical Results
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

					Total Recoverable Hydrocarbons							PAHs																		
					C6-C10 Fraction	C6-C10 Fraction minus BTEX (F1)	>C10-C16 Fraction	>C10-C16 Fraction minus naphthalene (F2)	>C16-C34 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Sum)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Naphthalene (VOC)	Phenanthrene	Pyrene	Benzo(a)pyrene TEQ (Zero)	Sum of Polycyclic aromatic hydrocarbons (PAH)
HIL D - Commercial/ Industrial (NEPC 1999)					-	260[#4]	-	20,000[#5]	27,000[#6]	38,000[#6]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NL [#3]	-	-	-	40	4,000
Maintenance of Ecosystems - Commercial / Industrial					-	215	-	170	1,700[#10]	3,300[#10]	-	-	-	-	-	1.4[#12]	-	-	-	-	-	-	-	-	370[#13]	-	-	-	-	-
Ecological, direct exposure (HEPA 2020)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecological, indirect exposure (HEPA 2020)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LoR					10	10	50	50	100	100	50	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Units					*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
Soil Bore ID	**Field ID**	**Date**	**Depth**	**Lab Report No.**																										
SB01	SB01_0-0.1	4/07/2024	0 - 0.1	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
	SB01_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
SB02	SB02_0-0.1	4/07/2024	0 - 0.1	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
	SB02_0.2-0.3	4/07/2024	0.2 - 0.3	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
SB03	SB03_0-0.1	4/07/2024	0 - 0.1	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
	SB03_0.3-0.4	4/07/2024	0.3 - 0.4	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
SB04	SB04_0-0.1	4/07/2024	0 - 0.1	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
	SB04_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
SB05	SB05_0-0.1	4/07/2024	0 - 0.1	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
	SB05_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
SB06	SB06_0-0.1	4/07/2024	0 - 0.1	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
	SB06_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
SB07	SB07_0-0.1	4/07/2024	0 - 0.1	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
	SB07_0.2-0.3	4/07/2024	0.2 - 0.3	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
SB08	SB08_0-0.1	4/07/2024	0 - 0.1	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
	SB08_0.3-0.4	4/07/2024	0.3 - 0.4	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
SB09	SB09_0-0.1	4/07/2024	0 - 0.1	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
	SB09_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
SB10	SB10_0-0.1	4/07/2024	0 - 0.1	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
	SB10_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
SB11	SB11_0-0.1	4/07/2024	0 - 0.1	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
	SB11_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
SB12	SB12_0-0.1	4/07/2024	0 - 0.1	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
	SB12_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5

Comments
#1 Value is for Chromium (VI).
#2 Assumes 50% bioavailability.
#3 Value sources from Friebel & Nadebaum (2011)- HSL-D.
#4 HSL based on vapour intrusion pathway (sand <1 m depth)
#5 HSL based on direct contact pathways (Friebel and Nadebaum, 2011) as vapour intrusion HSL is not limiting.
#6 HSL based on direct contact pathways (Friebel and Nadebaum, 2011) as fraction is not volatile.
#7 Value applies to aged arsenic (contamination present in soil for at least two years).
#8 Value is for chromium III.
#9 Site-specific EIL.
#10 Coarse soil value adopted for initial screening.
#11 Fine soil value (most conservative) adopted for initial screening.
#12 Value applies to both coarse and fine soil.
#13 Value applies to both fresh and aged contamination.

Table 1: Soil Analytical Results
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

					(n:2) Fluorotelomer Sulfonic Acids				Perfluoroalkane Carboxylic Acids										
					4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Perfluorohexanoic acid (PFHxA)	Perfluorododecanoic acid (PFDoDA)	Perfluorononanoic acid (PFNA)	Perfluoropentanoic acid (PFPeA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluoroheptanoic acid (PFHpA)	Perfluorobutanoic acid (PFBA)	Perfluorodecanoic acid (PFDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorooctanoic acid (PFOA)
HIL D - Commercial/ Industrial (NEPC 1999)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	50[#10]
Maintenance of Ecosystems - Commercial / Industrial					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecological, direct exposure (HEPA 2020)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	**10**
Ecological, indirect exposure (HEPA 2020)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LoR					0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	0.0002	0.0002	0.0005	0.0002	0.001	0.0002	0.0002	0.0002	0.0002
Units					*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
Soil Bore ID	**Field ID**	**Date**	**Depth**	**Lab Report No.**															
SB01	SB01_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
	SB01_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB02	SB02_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
	SB02_0.2-0.3	4/07/2024	0.2 - 0.3	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB03	SB03_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
	SB03_0.3-0.4	4/07/2024	0.3 - 0.4	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB04	SB04_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
	SB04_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB05	SB05_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
	SB05_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB06	SB06_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
	SB06_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB07	SB07_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
	SB07_0.2-0.3	4/07/2024	0.2 - 0.3	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB08	SB08_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
	SB08_0.3-0.4	4/07/2024	0.3 - 0.4	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB09	SB09_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
	SB09_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB10	SB10_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
	SB10_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB11	SB11_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
	SB11_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB12	SB12_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
	SB12_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002

Comments
#1 Value is for Chromium (VI).
#2 Assumes 50% bioavailability.
#3 Value sources from Friebel & Nadebaum (2011)- HSL-D.
#4 HSL based on vapour intrusion pathway (sand <1 m depth)
#5 HSL based on direct contact pathways (Friebel and Nadebaum, 2011) as vapour intrusion HSL is not limiting.
#6 HSL based on direct contact pathways (Friebel and Nadebaum, 2011) as fraction is not volatile.
#7 Value applies to aged arsenic (contamination present in soil for at least two years).
#8 Value is for chromium III.
#9 Site-specific EIL.
#10 Coarse soil value adopted for initial screening.
#11 Fine soil value (most conservative) adopted for initial screening.
#12 Value applies to both coarse and fine soil.
#13 Value applies to both fresh and aged contamination.

Table 1: Soil Analytical Results
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

					Perfluoroalkane Sulfonic Acids									Perfluoroalkyl Sulfonamides								
					Perfluorononane sulfonate (PFNS)	Perfluorooctanesulfonic acid (PFOS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutane sulfonic acid (PFBS)	Perfluoropropanesulfonic acid (PFPrS)	Sum of PFHxS and PFOS	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	Perfluorooctane sulfonamide (FOSA)	Sum of PFAS
HIL D - Commercial/ Industrial (NEPC 1999)					-	20[#11]	-	20[#11]	-	-	-	-	20[#10]	-	-	-	-	-	-	-	-
Maintenance of Ecosystems - Commercial / Industrial					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecological, direct exposure (HEPA 2020)					-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecological, indirect exposure (HEPA 2020)					-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LoR					0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0002	0.0005	0.0002	0.0002	0.0005	0.0005	0.0005	0.0002	0.0002
Units					*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
Soil Bore ID	**Field ID**	**Date**	**Depth**	**Lab Report No.**																	
SB01	SB01_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
	SB01_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB02	SB02_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
	SB02_0.2-0.3	4/07/2024	0.2 - 0.3	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB03	SB03_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
	SB03_0.3-0.4	4/07/2024	0.3 - 0.4	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB04	SB04_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
	SB04_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB05	SB05_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
	SB05_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB06	SB06_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
	SB06_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB07	SB07_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
	SB07_0.2-0.3	4/07/2024	0.2 - 0.3	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB08	SB08_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
	SB08_0.3-0.4	4/07/2024	0.3 - 0.4	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB09	SB09_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
	SB09_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB10	SB10_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
	SB10_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB11	SB11_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
	SB11_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB12	SB12_0-0.1	4/07/2024	0 - 0.1	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
	SB12_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002

Comments
#1 Value is for Chromium (VI).
#2 Assumes 50% bioavailability.
#3 Value sources from Friebel & Nadebaum (2011)- HSL-D.
#4 HSL based on vapour intrusion pathway (sand <1 m depth)
#5 HSL based on direct contact pathways (Friebel and Nadebaum, 2011) as vapour intrusion HSL is not limiting.
#6 HSL based on direct contact pathways (Friebel and Nadebaum, 2011) as fraction is not volatile.
#7 Value applies to aged arsenic (contamination present in soil for at least two years).
#8 Value is for chromium III.
#9 Site-specific EIL.
#10 Coarse soil value adopted for initial screening.
#11 Fine soil value (most conservative) adopted for initial screening.
#12 Value applies to both coarse and fine soil.
#13 Value applies to both fresh and aged contamination.

Table 1: Soil Analytical Results
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

					Inorganics							Particle Size																	
					Total Organic Carbon	Exchangeable Calcium	Exchangeable Magnesium	Exchangeable Potassium	Exchangeable Sodium	Exchangeable Sodium Percent	Cation Exchange Capacity	Clay in soils <2um	Sand (0.06-2.00 mm)	Silt (2-60 µm)	Gravel (>2mm)	Cobbles (>6cm)	+75µm	+150µm	+300µm	+425µm	+600µm	+1180µm	+2.36mm	+4.75mm	+9.5mm	+19.0mm	+37.5mm	+75.0mm
HIL D - Commercial/ Industrial (NEPC 1999)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maintenance of Ecosystems - Commercial / Industrial					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecological, direct exposure (HEPA 2020)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecological, indirect exposure (HEPA 2020)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LoR					200	0.1	0.1	0.1	0.1	0.1	0.1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Units					*mg/kg*	*meq/100g*	*meq/100g*	*meq/100g*	*meq/100g*	*%*	*meq/100g*	*%*	*%*	*%*	*%*	*%*	*%*	*%*	*%*	*%*	*%*	*%*	*%*	*%*	*%*	*%*	*%*	*%*	*%*	*%*
Soil Bore ID	**Field ID**	**Date**	**Depth**	**Lab Report No.**																									
SB01	SB01_0-0.1	4/07/2024	0 - 0.1	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SB01_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB02	SB02_0-0.1	4/07/2024	0 - 0.1	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SB02_0.2-0.3	4/07/2024	0.2 - 0.3	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB03	SB03_0-0.1	4/07/2024	0 - 0.1	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SB03_0.3-0.4	4/07/2024	0.3 - 0.4	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB04	SB04_0-0.1	4/07/2024	0 - 0.1	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SB04_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB05	SB05_0-0.1	4/07/2024	0 - 0.1	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SB05_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB06	SB06_0-0.1	4/07/2024	0 - 0.1	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SB06_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB07	SB07_0-0.1	4/07/2024	0 - 0.1	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SB07_0.2-0.3	4/07/2024	0.2 - 0.3	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB08	SB08_0-0.1	4/07/2024	0 - 0.1	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SB08_0.3-0.4	4/07/2024	0.3 - 0.4	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB09	SB09_0-0.1	4/07/2024	0 - 0.1	EP2409636	1,400	33.8	9.2	0.4	0.6	1.4	44.1	6	67	11	16	<1	80	72	56	48	41	26	12	4	<1	<1	<1	<1	<1
	SB09_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	2,900	22.1	7.3	1	1	3.2	31.4	12	60	24	4	<1	58	28	16	12	9	6	3	<1	<1	<1	<1	<1	<1
SB10	SB10_0-0.1	4/07/2024	0 - 0.1	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SB10_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB11	SB11_0-0.1	4/07/2024	0 - 0.1	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SB11_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB12	SB12_0-0.1	4/07/2024	0 - 0.1	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SB12_0.4-0.5	4/07/2024	0.4 - 0.5	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comments
#1 Value is for Chromium (VI).
#2 Assumes 50% bioavailability.
#3 Value sources from Friebel & Nadebaum (2011)- HSL-D.
#4 HSL based on vapour intrusion pathway (sand <1 m depth)
#5 HSL based on direct contact pathways (Friebel and Nadebaum, 2011) as vapour intrusion HSL is not limiting.
#6 HSL based on direct contact pathways (Friebel and Nadebaum, 2011) as fraction is not volatile.
#7 Value applies to aged arsenic (contamination present in soil for at least two years).
#8 Value is for chromium III.
#9 Site-specific EIL.
#10 Coarse soil value adopted for initial screening.
#11 Fine soil value (most conservative) adopted for initial screening.
#12 Value applies to both coarse and fine soil.
#13 Value applies to both fresh and aged contamination.

Table 2: Acid Sulfate Soil Results
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

senversa

						Field Test					SPOCAS - pH		SPOCAS - sulfidic units										
						pH (Lab)	pH-F (Field pH test)	pH-FOX (Field pH Peroxide test)	ΔpH	Reaction Rate	pH (KCl)	pH (Ox)	Titratable Actual Acidity (TAA)	Titratable Sulfidic Acidity (TSA)	Titratable Peroxide Acidity (TPA)	KCl Extractable Sulfur (S KCL)	Sulfur in Peroxide (Sp)	Peroxide Oxidisable Sulfur (SPOS)	Acid Reacted Calcium	Acid Reacted Magnesium	Excess Acid Neutralising Capacity (ANCE)		Net Acidity	Net Acidity without ANCE
Indicators of PASS (DER 2015)						-	>4	<3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indicator of AASS (DER 2015)						-	<4	<3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Action Criteria for Net Acidity (DER 2015)						-	-	-	-	-	-	-	0.03	-	-	-	-	-	-	-	-	-	-	0.03
LoR						0.1	0.1	0.1	0.1	-	0.1	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.02	0.02	0.02	0.02
Units						*pH Units*	*pH Units*	*pH Units*	*pH Units*	-	*pH Units*	*pH Units*	*%S*	*%S*	*%S*	*%S*	*%S*	*%S*	*%S*	*%S*	*%CaCO3*	*%S*	*%S*	*%S*
Soil Bore ID	**Field ID**	**Date**	**Depth**	**Soil Type**	**Lab Report No.**																			
SB01	SB01_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	8.6	8.2	8.1	0.1	Slight	10	8.4	<0.005	<0.005	<0.005	0.085	0.143	0.059	9.06	0.951	29.5	9.45	<0.02	0.06
	SB01_0.4-0.5	4/07/2024	0.4 - 0.5	SS(C)	EP2409636	8.8	8.4	7.0	1.4	Slight	10	8.5	<0.005	<0.005	<0.005	0.147	0.23	0.083	12.3	1.65	41	13.1	<0.02	0.08
SB02	SB02_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	8.7	8.3	7.3	1.0	Slight	10.1	8.7	<0.005	<0.005	<0.005	0.098	0.105	0.007	4.86	0.553	17.5	5.6	<0.02	<0.02
	SB02_0.2-0.3	4/07/2024	0.2 - 0.3	SS	EP2409636	8.7	8.3	7.0	1.3	Moderate	9.9	8.5	<0.005	<0.005	<0.005	0.109	0.183	0.074	10.4	1.54	37.7	12.1	<0.02	0.07
SB03	SB03_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	8.7	8.2	7.1	1.1	Moderate	9.8	8.3	<0.005	<0.005	<0.005	0.189	0.27	0.08	8.33	1.96	31.2	9.98	<0.02	0.08
	SB03_0.3-0.4	4/07/2024	0.3 - 0.4	SS	EP2409636	8.6	8.4	7.0	1.4	Moderate	9.9	8.5	<0.005	<0.005	<0.005	0.094	0.165	0.071	10.2	1.19	34.5	11	<0.02	0.07
SB04	SB04_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	8.6	8.3	7.3	1.0	Slight	10	8.3	<0.005	<0.005	<0.005	0.751	0.758	0.007	6.4	1.71	23.9	7.65	<0.02	<0.02
	SB04_0.4-0.5	4/07/2024	0.4 - 0.5	SS(C)	EP2409636	8.7	8.4	7.3	1.1	Slight	9.8	8.6	<0.005	<0.005	<0.005	0.117	0.177	0.06	9.66	1.29	33.8	10.8	<0.02	0.06
SB05	SB05_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	8.6	8.3	7.3	1.0	Moderate	9.9	8.3	<0.005	<0.005	<0.005	0.51	0.58	0.07	6.98	2.21	26.2	8.38	<0.02	0.07
	SB05_0.4-0.5	4/07/2024	0.4 - 0.5	SS(C)	EP2409636	8.4	8.3	7.1	1.2	Slight	9.8	8.5	<0.005	<0.005	<0.005	0.213	0.252	0.039	6.23	1.77	24.5	7.85	<0.02	0.04
SB06	SB06_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	8.6	8.4	7.2	1.2	Slight	9.9	8.3	<0.005	<0.005	<0.005	0.276	0.37	0.094	8.69	1.94	32.1	10.3	<0.02	0.09
	SB06_0.4-0.5	4/07/2024	0.4 - 0.5	SS(C)	EP2409636	8.5	8.4	7.6	0.8	Moderate	9.7	8.4	<0.005	<0.005	<0.005	0.276	0.532	0.255	6.6	1.78	25.4	8.12	<0.02	0.26
SB07	SB07_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	8.7	8.4	7.0	1.4	Slight	9.8	8.3	<0.005	<0.005	<0.005	0.237	0.367	0.13	14	3.59	52.1	16.7	<0.02	0.13
	SB07_0.2-0.3	4/07/2024	0.2 - 0.3	SS	EP2409636	8.6	8.4	7.3	1.1	Moderate	9.9	8.4	<0.005	<0.005	<0.005	0.133	0.243	0.11	14	1.86	48.4	15.5	<0.02	0.11
SB08	SB08_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	8.7	8.4	7.0	1.4	Slight	10	8.4	<0.005	<0.005	<0.005	0.172	0.31	0.138	17	2.12	58.5	18.7	<0.02	0.14
	SB08_0.3-0.4	4/07/2024	0.3 - 0.4	SS	EP2409636	8.7	8.6	7.1	1.5	Slight	10	8.4	<0.005	<0.005	<0.005	0.104	0.232	0.128	16.5	2.26	59.7	19.1	<0.02	0.13
SB09	SB09_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	8.6	8.5	7.0	1.5	Slight	9.8	8.2	<0.005	<0.005	<0.005	0.385	0.508	0.123	14.6	2.38	49.1	15.7	<0.02	0.12
	SB09_0.4-0.5	4/07/2024	0.4 - 0.5	SS	EP2409636	8.6	8.4	6.9	1.5	Slight	9.8	8.3	<0.005	<0.005	<0.005	0.14	0.209	0.069	10.4	1.37	34.4	11	<0.02	0.07
SB10	SB10_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	8.7	8.5	6.9	1.6	Slight	10	8.3	<0.005	<0.005	<0.005	0.128	0.236	0.108	11.9	1.7	40.8	13	<0.02	0.11
	SB10_0.4-0.5	4/07/2024	0.4 - 0.5	SS(C)	EP2409636	8.6	8.5	6.8	1.7	Slight	9.8	8.2	<0.005	<0.005	<0.005	0.157	0.248	0.09	12	2.1	42	13.4	<0.02	0.09
SB11	SB11_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	8.5	8.8	7.0	1.8	Slight	9.9	8.1	<0.005	<0.005	<0.005	0.077	0.214	0.137	18.7	1.78	60.8	19.5	<0.02	0.14
	SB11_0.4-0.5	4/07/2024	0.4 - 0.5	SS(C)	EP2409636	8.6	8.4	6.8	1.6	Slight	9.7	8.2	<0.005	<0.005	<0.005	0.154	0.236	0.082	11.5	1.23	38.5	12.3	<0.02	0.08
SB12	SB12_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	8.5	8.5	6.9	1.6	Slight	9.8	8.2	<0.005	<0.005	<0.005	0.278	0.428	0.15	17.9	1.85	57.2	18.3	<0.02	0.15
	SB12_0.4-0.5	4/07/2024	0.4 - 0.5	SS(C)	EP2409636	8.6	8.5	6.8	1.7	Slight	9.9	8.2	<0.005	<0.005	<0.005	0.165	0.253	0.088	14.4	1.32	48.4	15.5	<0.02	0.09

Table 2: Acid Sulfate Soil Results
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

senversa

						SPOCAS - acidity units									Liming rate		S_{CR} - pH	S_{CR} Suite - acidity units					S_{CR} Suite - sulfidic units					
						Titratable Actual Acidity (TAA)	Titratable Sulfidic Acidity (TSA)	Titratable Peroxide Acidity (TPA)	Peroxide Oxidisable Sulfur (POS)	Acid Reacted Calcium	Acid Reacted Magnesium	Excess Acid Neutralising Capacity (EANC)	Net Acidity	Net Acidity without ANCE	Liming rate without ANCE	Liming Rate	pH (KCl)	Titratable Actual Acidity (TAA)	Acid Neutralising Capacity (ANCBT)	Net Acidity (acidity units)	a-Net Acidity without ANCE	a-Chromium Reducible Sulfur (Scr)	Titratable Actual Acidity (TAA)	Chromium Reducible Sulfur (Scr)	Acid Neutralising Capacity	Acid Neutralising Capacity	Net Acidity	Net Acidity without ANCE
Indicators of PASS (DER 2015)						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indicator of AASS (DER 2015)						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Action Criteria for Net Acidity (DER 2015)						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03
LoR						2	2	2	5	5	5	10	10	10	1	1	0.1	2	10	10	10	10	0.02	0.005	0.01	0.01	0.02	0.02
Units						*mole H+/t*									*kg CaCO3/t*		*pH Units*	*mole H+/t*					*%S*	*%S*	*%CaCO3*	*%S*	*%S*	*%S*
Soil Bore ID	**Field ID**	**Date**	**Depth**	**Soil Type**	**Lab Report No.**																							
SB01	SB01_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	<2	<2	<2	37	5,650	593	5,900	<10	37	3	<1	10	<2	7,180	<10	<10	<10	<0.02	<0.005	36	11.5	<0.02	<0.02
	SB01_0.4-0.5	4/07/2024	0.4 - 0.5	SS(C)	EP2409636	<2	<2	<2	52	7,660	1,030	8,190	<10	52	4	<1	10	<2	9,250	<10	<10	<10	<0.02	0.006	46.3	14.8	<0.02	<0.02
SB02	SB02_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	<2	<2	<2	<5	3,030	345	3,500	<10	<10	<1	<1	10.1	<2	4,540	<10	<10	<10	<0.02	<0.005	22.7	7.27	<0.02	<0.02
	SB02_0.2-0.3	4/07/2024	0.2 - 0.3	SS	EP2409636	<2	<2	<2	46	6,520	958	7,530	<10	46	3	<1	9.9	<2	9,170	<10	<10	<10	<0.02	<0.005	45.9	14.7	<0.02	<0.02
SB03	SB03_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	<2	<2	<2	50	5,200	1,220	6,230	<10	50	4	<1	9.8	<2	9,550	<10	<10	<10	<0.02	<0.005	47.8	15.3	<0.02	<0.02
	SB03_0.3-0.4	4/07/2024	0.3 - 0.4	SS	EP2409636	<2	<2	<2	44	6,340	743	6,900	<10	44	3	<1	9.9	<2	8,150	<10	<10	<10	<0.02	<0.005	40.8	13.1	<0.02	<0.02
SB04	SB04_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	<2	<2	<2	<5	3,990	1,070	4,780	<10	<10	<1	<1	10	<2	7,210	<10	<10	<10	<0.02	0.007	36.1	11.6	<0.02	<0.02
	SB04_0.4-0.5	4/07/2024	0.4 - 0.5	SS(C)	EP2409636	<2	<2	<2	38	6,020	805	6,760	<10	38	3	<1	9.8	<2	6,890	<10	<10	<10	<0.02	<0.005	34.5	11	<0.02	<0.02
SB05	SB05_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	<2	<2	<2	44	4,360	1,380	5,230	<10	44	3	<1	9.9	<2	9,280	<10	<10	<10	<0.02	<0.005	46.4	14.9	<0.02	<0.02
	SB05_0.4-0.5	4/07/2024	0.4 - 0.5	SS(C)	EP2409636	<2	<2	<2	24	3,880	1,100	4,900	<10	25	2	<1	9.8	<2	8,770	<10	<10	<10	<0.02	<0.005	43.9	14	<0.02	<0.02
SB06	SB06_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	<2	<2	<2	58	5,420	1,210	6,410	<10	59	4	<1	9.9	<2	9,340	<10	<10	<10	<0.02	<0.005	46.8	15	<0.02	<0.02
	SB06_0.4-0.5	4/07/2024	0.4 - 0.5	SS(C)	EP2409636	<2	<2	<2	159	4,120	1,110	5,070	<10	159	12	<1	9.7	<2	5,610	<10	122	122	<0.02	0.195	28.1	9	<0.02	0.20
SB07	SB07_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	<2	<2	<2	81	8,740	2,240	10,400	<10	81	6	<1	9.8	<2	12,300	<10	<10	<10	<0.02	<0.005	61.6	19.7	<0.02	<0.02
	SB07_0.2-0.3	4/07/2024	0.2 - 0.3	SS	EP2409636	<2	<2	<2	68	8,750	1,160	9,670	<10	68	5	<1	9.9	<2	11,400	<10	<10	<10	<0.02	<0.005	57.1	18.3	<0.02	<0.02
SB08	SB08_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	<2	<2	<2	86	10,600	1,320	11,700	<10	86	6	<1	10	<2	13,600	<10	<10	<10	<0.02	<0.005	68.3	21.9	<0.02	<0.02
	SB08_0.3-0.4	4/07/2024	0.3 - 0.4	SS	EP2409636	<2	<2	<2	80	10,300	1,410	11,900	<10	80	6	<1	10	<2	12,900	<10	<10	<10	<0.02	<0.005	64.6	20.7	<0.02	<0.02
SB09	SB09_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	<2	<2	<2	76	9,130	1,480	9,810	<10	77	6	<1	9.8	<2	12,000	<10	<10	<10	<0.02	<0.005	59.8	19.2	<0.02	<0.02
	SB09_0.4-0.5	4/07/2024	0.4 - 0.5	SS	EP2409636	<2	<2	<2	43	6,520	854	6,880	<10	43	3	<1	9.8	<2	7,730	<10	<10	<10	<0.02	<0.005	38.7	12.4	<0.02	<0.02
SB10	SB10_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	<2	<2	<2	67	7,440	1,060	8,140	<10	67	5	<1	10	<2	12,000	<10	<10	<10	<0.02	<0.005	59.8	19.2	<0.02	<0.02
	SB10_0.4-0.5	4/07/2024	0.4 - 0.5	SS(C)	EP2409636	<2	<2	<2	56	7,470	1,310	8,400	<10	56	4	<1	9.8	<2	8,830	<10	<10	<10	<0.02	<0.005	44.2	14.2	<0.02	<0.02
SB11	SB11_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	<2	<2	<2	85	11,600	1,110	12,200	<10	85	6	<1	9.9	<2	14,800	<10	<10	<10	<0.02	<0.005	74	23.7	<0.02	<0.02
	SB11_0.4-0.5	4/07/2024	0.4 - 0.5	SS(C)	EP2409636	<2	<2	<2	51	7,160	767	7,690	<10	51	4	<1	9.7	<2	8,360	<10	<10	<10	<0.02	<0.005	41.9	13.4	<0.02	<0.02
SB12	SB12_0-0.1	4/07/2024	0 - 0.1	SS	EP2409636	<2	<2	<2	94	11,200	1,160	11,400	<10	94	7	<1	9.8	<2	13,400	<10	<10	<10	<0.02	0.005	67	21.5	<0.02	<0.02
	SB12_0.4-0.5	4/07/2024	0.4 - 0.5	SS(C)	EP2409636	<2	<2	<2	55	9,000	820	9,660	<10	55	4	<1	9.9	<2	9,340	<10	<10	<10	<0.02	<0.005	46.7	15	<0.02	<0.02

Table 3: RPDs (Soil)
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

							Metals								BTEX							Total Petroleum Hydrocarbons				
						pH (Lab)	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Total Xylene	Total BTEX	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum)
Units						*pH Units*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
LoR						0.1	2	0.1	1	1	1	0.02	1	5	0.1	0.1	0.1	0.2	0.1	0.3	0.2	10	20	50	50	50
Location ID	**Field ID**	**Date**	**Sample Type**	**Lab Report No.**																						
SB01	SB01_0-0.1	4/07/2024	Primary	EP2409636		8.6	7	<1	**18**	27	<5	<0.1	**7**	**30**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
SB01	QC101	4/07/2024	Duplicate	EP2409636		8.9	6	<1	**10**	29	<5	<0.1	**5**	**20**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
RPD						3	15	0	**57**	7	0	0	**33**	**40**	0	0	0	0	0	0	0	0	0	0	0	0
SB01	SB01_0-0.1	4/07/2024	Primary	EP2409636		8.6	7	<1	18	27	<5	<0.1	7	30	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	-	<10	<50	<100	<100	<50
SB01	QC201	5/07/2024	Triplicate	1115574		9	7.4	<0.1	15	29	4.5	0.04	6.6	25	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	-	<20	<20	<50	<50	<50
RPD						5	6	0	18	7	0	0	6	18	0	0	0	0	0	0	-	0	0	0	0	0
SB10	SB10_0-0.1	4/07/2024	Primary	EP2409636		8.7	10	<1	11	5	<5	<0.1	5	6	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
SB10	QC102	4/07/2024	Duplicate	EP2409636		8.7	9	<1	11	<5	<5	<0.1	4	<5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50
RPD						0	11	0	0	0	0	0	22	18	0	0	0	0	0	0	0	0	0	0	0	0
SB10	SB10_0-0.1	4/07/2024	Primary	EP2409636		8.7	10	<1	**11**	**5**	<5	<0.1	**5**	**6**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	-	<10	<50	<100	<100	<50
SB10	QC202	5/07/2024	Triplicate	1115574		8.9	7.7	<0.1	**6.8**	**1.5**	2.3	0.04	**2.9**	**17**	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	-	<20	<20	<50	<50	<50
RPD						2	26	0	**47**	**108**	0	0	**53**	**96**	0	0	0	0	0	0	-	0	0	0	0	0
SB12	SB12_0-0.1	4/07/2024	Primary	EP2409636		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB12	QC103	4/07/2024	Duplicate	EP2409636		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB12	SB12_0-0.1	4/07/2024	Primary	EP2409636		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB12	QC203	5/07/2024	Triplicate	1115574		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RPD acceptance criteria is as follows:

- Not limiting, where the maximum concentration of the two results is less than 10 times the LoR.
- 50%, where the maximum concentration of the two results is between 10 and 20 times the LoR.
- 30%, where the maximum concentration of the two results is greater than 20 times the LoR.

Table 3: RPDs (Soil)
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

					Total Recoverable Hydrocarbons							PAHs																		
					C6-C10 Fraction	C6-C10 Fraction minus BTEX (F1)	>C10-C16 Fraction	>C10-C16 Fraction minus naphthalene (F2)	>C16-C34 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Sum)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Naphthalene (VOC)	Phenanthrene	Pyrene	Benzo(a)pyrene TEQ (Zero)	Sum of Polycyclic aromatic hydrocarbons (PAH)
Units					*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
LoR					10	10	50	50	100	100	50	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Location ID	**Field ID**	**Date**	**Sample Type**	**Lab Report No.**																										
SB01	SB01_0-0.1	4/07/2024	Primary	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
SB01	QC101	4/07/2024	Duplicate	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
RPD					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB01	SB01_0-0.1	4/07/2024	Primary	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
SB01	QC201	5/07/2024	Triplicate	1115574	<20	<20	<50	<50	<100	<100	<100	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
RPD					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB10	SB10_0-0.1	4/07/2024	Primary	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
SB10	QC102	4/07/2024	Duplicate	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
RPD					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB10	SB10_0-0.1	4/07/2024	Primary	EP2409636	<10	<10	<50	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
SB10	QC202	5/07/2024	Triplicate	1115574	<20	<20	<50	<50	<100	<100	<100	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
RPD					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB12	SB12_0-0.1	4/07/2024	Primary	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB12	QC103	4/07/2024	Duplicate	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB12	SB12_0-0.1	4/07/2024	Primary	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB12	QC203	5/07/2024	Triplicate	1115574	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RPD acceptance criteria is as follows:

- Not limiting, where the maximum concentration of the two results is less than 10 times the LoR.
- 50%, where the maximum concentration of the two results is between 10 and 20 times the LoR.
- 30%, where the maximum concentration of the two results is greater than 20 times the LoR.

Table 3: RPDs (Soil)
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

senversa

					Acid Sulfate Soils - Field			Acid Sulfate Soils								Acid Sulfate Soils- Accounting						
					pH-F (Field pH test)	pH-FOX (Field pH Peroxide test)	Reaction Ratings	pH (KCl)	pH (Ox)	Titratable Actual Acidity	Titratable Sulfidic Acidity	acidity - Peroxide Oxidisable Sulfur	a-Chromium Reducible Sulfur (Scr)	TPA as moles H+/tonne	acidity - Acid Reacted Calcium	acidity - Acid Reacted Magnesium	ANC Fineness Factor	Acid Neutralising Capacity (ANCBT)	acidity - Excess Acid Neutralising Capacity	Net Acidity (acidity units)	a-Net Acidity without ANCE	Liming rate without ANCE	Liming Rate
Units					*pH Units*	*pH Units*	-	*pH Units*	*pH Units*	*mole H+/t*	*mole H+/t*	*mole H+/t*	*mole H+/t*	*moles H+/*	*mole H+/t*	*mole H+/t*	-	*mole H+/t*	*mole H+/t*	*mole H+/t*	*mole H+/t*	*kg CaCO3*	*kg CaCO3*
LoR					0.1	0.1	1	0.1	0.1	2	2	2	3	2	0.005	0.005	0.5	2	10	10	10	1	1
Location ID	**Field ID**	**Date**	**Sample Type**	**Lab Report No.**																			
SB01	SB01_0-0.1	4/07/2024	Primary	EP2409636	8.2	8.1	1	10	8.4	<2	<2	37	<10	<2	5,650	**593**	1.5	7,180	**5,900**	<10	37	3	<1
SB01	QC101	4/07/2024	Duplicate	EP2409636	8.7	7	1	9.9	8.4	<2	<2	45	<10	<2	7,120	**906**	1.5	8,690	**8,160**	<10	45	3	<1
RPD					6	15	0	1	0	0	0	20	0	0	23	**42**	0	19	**32**	0	20	0	0
SB01	SB01_0-0.1	4/07/2024	Primary	EP2409636	8.2	8.1	-	10	8.4	<2	<2	37	<10	<2	**5,650**	**593**	1.5	7,180	-	<10	-	-	<1
SB01	QC201	5/07/2024	Triplicate	1115574	8.7	8.4	-	9.5	7.8	<2	<2	49	3.7	-	**7,900**	**930**	1.5	8,600	-	<10	-	-	<1
RPD					6	4	-	5	7	0	0	28	0	-	**33**	**44**	0	18	-	0	-	-	0
SB10	SB10_0-0.1	4/07/2024	Primary	EP2409636	8.5	6.9	1	10	8.3	<2	<2	67	<10	<2	7,440	**1,060**	1.5	12,000	8,140	<10	67	5	<1
SB10	QC102	4/07/2024	Duplicate	EP2409636	8.6	6.9	1	9.9	8.3	<2	<2	84	<10	<2	8,300	**1,530**	1.5	11,000	9,280	<10	84	6	<1
RPD					1	0	0	1	0	0	0	23	0	0	11	**36**	0	9	13	0	23	18	0
SB10	SB10_0-0.1	4/07/2024	Primary	EP2409636	8.5	6.9	-	10	8.3	<2	<2	67	<10	<2	**7,440**	**1,060**	1.5	12,000	-	<10	-	-	<1
SB10	QC202	5/07/2024	Triplicate	1115574	8.7	8.3	-	9.6	7.9	<2	<2	79	<3	-	**11,000**	**2,900**	1.5	12,000	-	<10	-	-	<1
RPD					2	18	-	4	5	0	0	16	0	-	**39**	**93**	0	0	-	0	-	-	0
SB12	SB12_0-0.1	4/07/2024	Primary	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB12	QC103	4/07/2024	Duplicate	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB12	SB12_0-0.1	4/07/2024	Primary	EP2409636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB12	QC203	5/07/2024	Triplicate	1115574	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RPD					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RPD acceptance criteria is as follows:

- Not limiting, where the maximum concentration of the two results is less than 10 times the LoR.
- 50%, where the maximum concentration of the two results is between 10 and 20 times the LoR.
- 30%, where the maximum concentration of the two results is greater than 20 times the LoR.

Table 3: RPDs (Soil)
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

					(n:2) Fluorotelomer Sulfonic Acids				Perfluoroalkane Carboxylic Acids										
					4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Perfluorohexanoic acid (PFHxA)	Perfluorododecanoic acid (PFDoDA)	Perfluorononanoic acid (PFNA)	Perfluoropentanoic acid (PFPeA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluoroheptanoic acid (PFHpA)	Perfluorobutanoic acid (PFBA)	Perfluorodecanoic acid (PFDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorooctanoic acid (PFOA)
Units					*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
LoR					0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	0.0002	0.0002	0.0005	0.0002	0.001	0.0002	0.0002	0.0002	0.0002
Location ID	**Field ID**	**Date**	**Sample Type**	**Lab Report No.**															
SB01	SB01_0-0.1	4/07/2024	Primary	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB01	QC101	4/07/2024	Duplicate	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
RPD					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB01	SB01_0-0.1	4/07/2024	Primary	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB01	QC201	5/07/2024	Triplicate	1115574	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
RPD					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB10	SB10_0-0.1	4/07/2024	Primary	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB10	QC102	4/07/2024	Duplicate	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
RPD					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB10	SB10_0-0.1	4/07/2024	Primary	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB10	QC202	5/07/2024	Triplicate	1115574	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
RPD					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB12	SB12_0-0.1	4/07/2024	Primary	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB12	QC103	4/07/2024	Duplicate	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
RPD					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB12	SB12_0-0.1	4/07/2024	Primary	EP2409636	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB12	QC203	5/07/2024	Triplicate	1115574	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
RPD					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

RPD acceptance criteria is as follows:

- Not limiting, where the maximum concentration of the two results is less than 10 times the LoR.
- 50%, where the maximum concentration of the two results is between 10 and 20 times the LoR.
- 30%, where the maximum concentration of the two results is greater than 20 times the LoR.

Table 3: RPDs (Soil)
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

					Perfluoroalkane Sulfonic Acids									Perfluoroalkyl Sulfonamides							PFAS
					Perfluorononane sulfonate (PFNS)	Perfluorooctanesulfonic acid (PFOS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutane sulfonic acid (PFBS)	Perfluoropropanesulfonic acid (PFPrS)	Sum of PFHxS and PFOS	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	Perfluorooctane sulfonamide (FOSA)	Sum of PFAS
Units					*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
LoR					0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0002	0.0005	0.0002	0.0002	0.0005	0.0005	0.0005	0.0002	0.0002
Location ID	**Field ID**	**Date**	**Sample Type**	**Lab Report No.**																	
SB01	SB01_0-0.1	4/07/2024	Primary	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB01	QC101	4/07/2024	Duplicate	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
RPD					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB01	SB01_0-0.1	4/07/2024	Primary	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB01	QC201	5/07/2024	Triplicate	1115574	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.05
RPD					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB10	SB10_0-0.1	4/07/2024	Primary	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB10	QC102	4/07/2024	Duplicate	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
RPD					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB10	SB10_0-0.1	4/07/2024	Primary	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB10	QC202	5/07/2024	Triplicate	1115574	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.05
RPD					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB12	SB12_0-0.1	4/07/2024	Primary	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB12	QC103	4/07/2024	Duplicate	EP2409636	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
RPD					-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0
SB12	SB12_0-0.1	4/07/2024	Primary	EP2409636	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
SB12	QC203	5/07/2024	Triplicate	1115574	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.005	<0.005	<0.005	<0.05
RPD					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

RPD acceptance criteria is as follows:

- Not limiting, where the maximum concentration of the two results is less than 10 times the LoR.
- 50%, where the maximum concentration of the two results is between 10 and 20 times the LoR.
- 30%, where the maximum concentration of the two results is greater than 20 times the LoR.

Table 4: QAQC Results - Soil Blanks
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

				Metals								BTEX							Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons						
				Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Total Xylene	Total BTEX	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum)	C6-C10 Fraction	C6-C10 Fraction minus BTEX (F1)	>C10-C16 Fraction	>C10-C16 Fraction minus naphthalene (F2)	>C16-C34 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Sum)
Units				*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
LoR				5	1	2	5	5	0.1	2	5	0.2	0.5	0.5	0.5	0.5	0.5	0.2	10	50	100	100	50	10	10	50	50	100	100	50
Field ID	**Date**	**Sample Type**	**Lab Report No.**																											
QC401	4/07/2024	Trip Blank (soil)	EP2409636	<5	<1	<2	<5	<5	<0.1	<2	<5	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50

				PAHs																			
				Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Naphthalene (VOC)	Phenanthrene	Pyrene	Benzo(a)pyrene TEQ (Zero)	Sum of Polycyclic aromatic hydrocarbons (PAH)
Units				*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*
LoR				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5
Field ID	**Date**	**Sample Type**	**Lab Report No.**																				
QC401	4/07/2024	Trip Blank (Soil)	EP2409636	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5

Table 5 - Groundwater Gauging and Field Parameters
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

Well ID	Survey Data		Gauging Results				
	Easting (MGA)	Northing (MGA)	Casing height (mAGL)	Date Gauged	Groundwater Depth (mBTOC)	Total Well Depth (mBTOC)	GW mBGL
MW01	476144	7718707	0.592	5/07/2024	0.968	2.16	0.376
MW02	476256	7718708	0.627	5/07/2024	0.956	2.13	0.329
MW03	476387	7718705	0.775	5/07/2024	1.051	2.03	0.276
MW04	476503	7718711	0.637	5/07/2024	0.925	2.11	0.288
MW05	476615	7718717	0.825	5/07/2024	1.144	2.36	0.319

Well ID	Stabilised Groundwater Field Parameters							Comments/Observations
	Date Sampled	DO (mg/L)	EC (µS/cm)	TDS # (mg/L)	pH (pH units)	Redox (mV)	Temperature (°C)	
MW01	5/07/2024	0.96	130858	85058	7.56	143	24.8	Colourless, no sheen, no odour, Moderately turbid
MW02	5/07/2024	0.38	146987	95542	7.24	139.4	25.3	Colourless, no sheen, no odour, Slightly turbid
MW03	5/07/2024	2.08	192065	124842	7.43	144.4	23	Light brown, no sheen, no odour, Slightly turbid
MW04	5/07/2024	2.59	173491	112769	7.4	119.9	23.6	Colourless, no sheen, sulphurous odour, Slightly turbid
MW05	5/07/2024	0.53	192348	125026	6.95	54.8	22.5	Colourless, no sheen, sulphurous odour, Slightly turbid

Notes:

TDS calculated based on a conversion factor of 0.65 i.e. TDS (ppm) = 0.65 x EC (µS/cm)

mg/L: miligram per litre

µS/cm: microsiemens per centimetre

mV: millivolts

°C: celsius

Table 6: Groundwater Analytical Results
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

senversa

								Metals (dissolved)								Inorganics									Major Ions								
						pH (Lab)	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Ammonia (as N)	Nitrate (as N)	Nitrite (as N)	Total Oxidised Nitrogen (as N)	Total Kjeldahl Nitrogen	Total Nitrogen (as N)	Phosphorus (as P)	Ortho-phosphate (as P)	Calcium (filtered)	Chloride	Magnesium (filtered)	Potassium (filtered)	Sulfate (as SO4) (filtered)	Sodium (filtered)	Anions Total	Cations Total	Ionic Balance
NPUG (DWER 2021, HEPA 2020)						-	-	0.02	-	20	0.1	0.01	0.2	3	0.388	113	9.12	-	-	-	-	-	-	250	-	-	1,000	-	-	-	-
MWG - 95% species protection (ANZG 2018) (99% for PFAS)						-	-	0.0007[#6]	0.0044[#7]	0.0013[#8]	0.0044[#8]	0.0001[#6]	0.007[#6]	0.008[#8]	0.91[#8]	2.4[#9]	-	-	-	0.1*	0.015*	-	-	-	-	-	-	-	-	-	-
HSL D - Vapour intrusion, sand (2m - 4m) (NEPC 1999)						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DWG - Health (HEPA 2020)						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LoR						0.01	0.001	0.0001	0.001	0.001	0.001	0.0001	0.001	0.005	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01	0.5	1	0.5	0.5	1	0.5	0.01	0.01	1
Units						*pH Units*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*meq/L*	*meq/L*	%
Well ID	**Field ID**	**Date**	**Sample Type**	**Lab Report No.**																											
MW01	MW01	05/07/2024	Primary	EP2409638		7.56	<0.020	<0.0020	<0.020	<0.020	<0.020	<0.0005	<0.020	0.125	0.49	0.23	0.04	0.27	1.1	1.4	<0.05	0.02	1,320	54,000	3,600	1,100	6,920	32,400	1,670	1,800	3.74
MW02	MW02	05/07/2024	Primary	EP2409638		7.33	<0.020	<0.0020	<0.020	<0.020	<0.020	<0.0005	<0.020	<0.100	1.7*	0.02	<0.01	0.02	1.3*	1.3*	<0.05	0.04	1,510	71,800	4,070	1,310	13,000*	37,000	2,180	2,050	3.1
MW03	MW03	05/07/2024	Primary	EP2409638		7.3	<0.050	<0.0050	<0.050	<0.050	<0.050	<0.0005	<0.050	<0.250	0.32	0.31	0.01	0.32	1	1.3	0.24	0.02	1,410	96,000	6,270	1,960	9,750	55,400	2,910	3,050	2.25
MW04	MW04	05/07/2024	Primary	EP2409638		7.47	<0.020	<0.0020	<0.020	<0.020	<0.020	<0.0005	<0.020	<0.100	0.68	0.64	<0.01	0.64	1.1	1.7	0.12	0.05	1,280	74,400	5,310	1,610	8,760	48,100	2,280	2,630	7.12
MW05	MW05	05/07/2024	Primary	EP2409638		7.17	<0.050	<0.0050	<0.050	<0.050	<0.050	<0.0005	<0.050	<0.250	0.44	0.05	<0.01	0.05	0.8	0.8	0.16	0.04	1,230	88,800	6,120	2,010	9,840	55,700	2,710	3,040	5.69

Comments

#1 NHMRC (2011) - Health. Multiplied by a factor of x10

by a factor of x10

#3 To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.

#4 To obtain F2 subtract napthalene from the >C10 - C16 fraction.

#5 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020.

#6 ANZG (2018). Higher species protection level adopted as recommended

#7 ANZG (2018). The more conservative value (Chromium CrVI) out of the available chromium species was adopted for initial screening purposes.

#8 ANZG (2018)

value was withdrawn due to calculation errors. Value is for freshwater but is used in recommended.

hydrocarbons.

#12 CRWB (2019). Value for diesel (C8-C21) mixture.

#13 CRWB (2019). Value for diesel (C8-C21) mixture. No value derived for TPH >C21 as not considered soluble; diesel value used for screening.

#14 PFAS National Environmental Management Plan (HEPA 2020). Higher species protection level adopted as recommended

* Denotes physical and chemical stressor Environmental Assessment Level - Inshore Marine Ecosystem.

* indicates replicate value adopted.

Table 6: Groundwater Analytical Results
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

					Alkalinity					BTEX							Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons							PAHs
					Bicarbonate Alkalinity (as CaCO3)	Carbonate Alkalinity (as CaCO3)	Hydroxide Alkalinity (as CaCO3)	Total Alkalinity (as CaCO3)	Acidity (as CaCO3)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Total Xylene	Total BTEX	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum)	C6-C10 Fraction	C6-C10 Fraction minus BTEX (F1)	>C10-C16 Fraction	>C10-C16 Fraction minus naphthalene (F2)	>C16-C34 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Sum)	Naphthalene
NPUG (DWER 2021, HEPA 2020)					-	-	-	-	-	10	25	3	-	-	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MWG - 95% species protection (ANZG 2018) (99% for PFAS)					-	-	-	-	-	500[#6]	180[#8]	80[#8]	-	350[#10]	-	-	-	-	-	-	-	-	640[#11]	-	640[#11]	640[#12]	640[#13]	-	50[#6]
HSL D - Vapour intrusion, sand (2m - 4m) (NEPC 1999)					-	-	-	-	-	*5,000*	*NL*	*NL*	-	-	*NL*	-	-	-	-	-	-	-	*6,000 #3*	-	*NL #4*	-	-	-	*NL*
DWG - Health (HEPA 2020)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LoR					1	1	1	1	1	1	1	1	2	1	2	1	20	20	40	40	40	20	20	20	20	50	50	50	5
Units					*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*
Well ID	**Field ID**	**Date**	**Sample Type**	**Lab Report No.**																									
MW01	MW01	05/07/2024	Primary	EP2409638	117	<1	<1	117	39	<1	<2	<2	<2	<2	<2	<1	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100	<5
MW02	MW02	05/07/2024	Primary	EP2409638	79	<1	<1	79	38	<1	<2	<2	<2	<2	<2	<1	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100	<5
MW03	MW03	05/07/2024	Primary	EP2409638	62	<1	<1	62	41	<1	<2	<2	<2	<2	<2	<1	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100	<5
MW04	MW04	05/07/2024	Primary	EP2409638	136	<1	<1	136	60	<1	<2	<2	<2	<2	<2	<1	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100	<5
MW05	MW05	05/07/2024	Primary	EP2409638	104	<1	<1	104	68	<1	<2	<2	<2	<2	<2	<1	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100	<5

Comments

#1 NHMRC (2011) - Health. Multiplied by a factor of x10
by a factor of x10

#3 To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.

#4 To obtain F2 subtract napthalene from the >C10 - C16 fraction.

#5 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020.

#6 ANZG (2018). Higher species protection level adopted as recommended

#7 ANZG (2018). The more conservative value (Chromium CrVI) out of the available chromium species was adopted for initial screening purposes.

#8 ANZG (2018)
value was withdrawn due to calculation errors. Value is for freshwater but is used in recommended.
hydrocarbons.

#12 CRWB (2019). Value for diesel (C8-C21) mixture.

#13 CRWB (2019). Value for diesel (C8-C21) mixture. No value derived for TPH >C21 as not considered soluble; diesel value used for screening.

#14 PFAS National Environmental Management Plan (HEPA 2020). Higher species protection level adopted as recommended

* Denotes physical and chemical stressor Environmental Assessment Level - Inshore Marine Ecosystem.

* indicates replicate value adopted.

Table 6: Groundwater Analytical Results
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

					(n:2) Fluorotelomer Sulfonic Acids				Perfluoroalkane Carboxylic Acids										
					4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Perfluorohexanoic acid (PFHxA)	Perfluorododecanoic acid (PFDoDA)	Perfluorononanoic acid (PFNA)	Perfluoropentanoic acid (PFPeA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluoroheptanoic acid (PFHpA)	Perfluorobutanoic acid (PFBA)	Perfluorodecanoic acid (PFDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorooctanoic acid (PFOA)
NPUG (DWER 2021, HEPA 2020)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.6[#1]
MWG - 95% species protection (ANZG 2018) (99% for PFAS)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	19[#14]
HSL D - Vapour intrusion, sand (2m - 4m) (NEPC 1999)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DWG - Health (HEPA 2020)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.56[#5]**
LoR					0.001	0.001	0.001	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.002	0.0005	0.0005	0.0005	0.0005
Units					*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*
Well ID	**Field ID**	**Date**	**Sample Type**	**Lab Report No.**															
MW01	MW01	05/07/2024	Primary	EP2409638	<0.001	<0.001	<0.001	<0.001	0.0193	<0.0005	<0.0005	0.0414	<0.0005	0.0071	0.036	<0.0005	<0.0005	<0.0005	0.0008
MW02	MW02	05/07/2024	Primary	EP2409638	<0.001	<0.001	<0.001	<0.001	0.023	<0.0005	<0.0005	0.0515	<0.0005	0.005	0.031	<0.0005	<0.0005	<0.0005	<0.0005
MW03	MW03	05/07/2024	Primary	EP2409638	<0.001	<0.001	<0.001	<0.001	0.018	<0.0005	<0.0005	0.0523	<0.0005	0.0016	0.04	<0.0005	<0.0005	<0.0005	<0.0005
MW04	MW04	05/07/2024	Primary	EP2409638	<0.001	<0.001	<0.001	<0.001	0.0603	<0.0005	<0.0005	0.0984	<0.0005	0.0186	0.051	<0.0005	<0.0005	<0.0005	<0.0005
MW05	MW05	05/07/2024	Primary	EP2409638	<0.001	<0.001	<0.001	<0.001	0.0144	<0.0005	<0.0005	0.0954	<0.0005	<0.0005	0.058	<0.0005	<0.0005	<0.0005	<0.0005

Comments

#1 NHMRC (2011) - Health. Multiplied by a factor of x10
by a factor of x10

#3 To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.

#4 To obtain F2 subtract napthalene from the >C10 - C16 fraction.

#5 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020.

#6 ANZG (2018). Higher species protection level adopted as recommended

#7 ANZG (2018). The more conservative value (Chromium CrVI) out of the available chromium species was adopted for initial screening purposes.

#8 ANZG (2018)
value was withdrawn due to calculation errors. Value is for freshwater but is used in recommended.
hydrocarbons.

#12 CRWB (2019). Value for diesel (C8-C21) mixture.

#13 CRWB (2019). Value for diesel (C8-C21) mixture. No value derived for TPH >C21 as not considered soluble; diesel value used for screening.

#14 PFAS National Environmental Management Plan (HEPA 2020). Higher species protection level adopted as recommended

* Denotes physical and chemical stressor Environmental Assessment Level - Inshore Marine Ecosystem.

* indicates replicate value adopted.

Table 6: Groundwater Analytical Results
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

					Perfluoroalkane Sulfonic Acids							Perfluoroalkyl Sulfonamides							
					Perfluorooctanesulfonic acid (PFOS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutane sulfonic acid (PFBS)	Sum of PFHxS and PFOS	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	Perfluorooctane sulfonamide (FOSA)	Sum of PFAS
NPUG (DWER 2021, HEPA 2020)					0.7[#2]	-	0.7[#2]	-	-	-	0.7[#1]	-	-	-	-	-	-	-	-
MWG - 95% species protection (ANZG 2018) (99% for PFAS)					0.00023[#14]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HSL D - Vapour intrusion, sand (2m - 4m) (NEPC 1999)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DWG - Health (HEPA 2020)					-	-	-	-	-	-	**0.07[#5]**	-	-	-	-	-	-	-	-
LoR					0.0002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0003	0.001	0.0005	0.0005	0.001	0.001	0.001	0.0005	0.0003
Units					*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*
Well ID	**Field ID**	**Date**	**Sample Type**	**Lab Report No.**															
MW01	MW01	05/07/2024	Primary	EP2409638	<0.0002	<0.0005	0.0006	<0.0005	<0.0005	0.001	0.0006	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	0.106
MW02	MW02	05/07/2024	Primary	EP2409638	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0003	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	0.111
MW03	MW03	05/07/2024	Primary	EP2409638	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0003	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	0.112
MW04	MW04	05/07/2024	Primary	EP2409638	<0.0002	<0.0010	<0.0010	<0.0005	<0.0005	0.0013	<0.0003	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	0.23
MW05	MW05	05/07/2024	Primary	EP2409638	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0003	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	0.168

Comments

#1 NHMRC (2011) - Health. Multiplied by a factor of x10
by a factor of x10

#3 To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.

#4 To obtain F2 subtract napthalene from the >C10 - C16 fraction.

#5 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020.

#6 ANZG (2018). Higher species protection level adopted as recommended

#7 ANZG (2018). The more conservative value (Chromium CrVI) out of the available chromium species was adopted for initial screening purposes.

#8 ANZG (2018)
value was withdrawn due to calculation errors. Value is for freshwater but is used in recommended.
hydrocarbons.

#12 CRWB (2019). Value for diesel (C8-C21) mixture.

#13 CRWB (2019). Value for diesel (C8-C21) mixture. No value derived for TPH >C21 as not considered soluble; diesel value used for screening.

#14 PFAS National Environmental Management Plan (HEPA 2020). Higher species protection level adopted as recommended

* Denotes physical and chemical stressor Environmental Assessment Level - Inshore Marine Ecosystem.

* indicates replicate value adopted.

Table 7: RPDs (Groundwater)
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

						Metals								Inorganics								Major Ions									(n:2) Fluorotelomer Sulfonic Acids			
					pH (Lab)	Arsenic (filtered)	Cadmium (filtered)	Chromium (filtered)	Copper (filtered)	Lead (filtered)	Mercury (filtered)	Nickel (filtered)	Zinc (filtered)	Ammonia (as N)	Nitrate (as N)	Nitrite (as N)	Total Oxidised Nitrogen (as N)	Total Kjeldahl Nitrogen	Total Nitrogen (as N)	Phosphorus (as P)	Ortho-phosphate (as P)	Calcium (filtered)	Chloride	Magnesium (filtered)	Potassium (filtered)	Sulfate (as SO4) (filtered)	Sodium (filtered)	Anions Total	Cations Total	Ionic Balance	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)
Units					*pH Units*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*meq/L*	*meq/L*	%	*µg/L*	*µg/L*	*µg/L*	*µg/L*
LoR					0.01	0.001	0.0001	0.001	0.001	0.001	0.0001	0.001	0.005	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01	0.5	1	0.5	0.5	1	0.5	0.01	0.01	0	0.001	0.001	0.001	0.001
Well ID	**Field ID**	**Date**	**Sample Type**	**Lab Report No.**																														
MW02	MW02	05/07/2024	Primary	EP2409638	7.33	<0.020	<0.0020	<0.020	<0.020	<0.020	<0.0005	<0.020	<0.100	0.11	**0.02**	<0.01	**0.02**	**0.3**	**0.3**	<0.05	0.04	1,510	71,800	4,070	1,310	7,570	37,000	2,180	2,050	**3.1**	<0.001	<0.001	<0.001	<0.001
MW02	QC104	05/07/2024	Duplicate	EP2409638	7.34	<0.020	<0.0020	<0.020	<0.020	<0.020	<0.0005	<0.020	0.113	0.1	**0.03**	<0.01	**0.03**	**0.5**	**0.5**	<0.05	0.03	1,480	72,800	4,140	1,310	7,420	39,100	2,210	2,150	**1.39**	<0.001	<0.001	<0.001	<0.001
RPD					0	0	0	0	0	0	0	0	12	10	**40**	0	**40**	**50**	**50**	0	29	2	1	2	0	2	6	1	5	**76**	0	0	0	0
MW02	MW02	05/07/2024	Primary	EP2409638	-	<0.020	<0.0020	<0.020	<0.020	<0.020	<0.0005	<0.020	<0.100	**0.11**	0.02	<0.01	0.02	**0.3**	**0.3**	<0.05	**0.04**	1,510	71,800	4,070	1,310	**7,570**	37,000	-	-	**3.1**	<0.001	<0.001	<0.001	<0.001
MW02	QC204	05/07/2024	Duplicate	1115822	-	0.011	<0.002	<0.01	<0.01	<0.01	<0.001	<0.01	<0.05	**1.7**	0.02	<0.01	0.02	**1.3**	**1.3**	<0.01	**0.02^**	1,200	65,000	3,800	1,200	**13,000**	35,000	-	-	**-4.5**	<0.001	<0.005	<0.001	<0.001
RPD					-	0	0	0	0	0	0	0	0	**176**	0	0	0	**125**	**125**	0	**67**	23	10	7	9	**53**	6	-	-	**200**	0	0	0	0

					Alkalinity					BTEX							Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons							PAHs
					Bicarbonate Alkalinity (as CaCO3)	Carbonate Alkalinity (as CaCO3)	Hydroxide Alkalinity (as CaCO3)	Total Alkalinity (as CaCO3)	Acidity (as CaCO3)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Total Xylene	Total BTEX	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum)	C6-C10 Fraction	C6-C10 Fraction minus BTEX (F1)	>C10-C16 Fraction	>C10-C16 Fraction minus naphthalene (F2)	>C16-C34 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Sum)	Naphthalene
Units					*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*
LoR					1	1	1	1	1	1	1	1	2	1	2	1	20	20	40	40	40	20	20	20	20	50	50	50	5
Location Cod	**Field ID**	**Date**	**Sample Type**	**Lab Report No.**																									
MW02	MW02	05/07/2024	Primary	EP2409638	79	<1	<1	79	38	<1	<2	<2	<2	<2	<2	<1	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100	<5
MW02	QC104	05/07/2024	Duplciate	EP2409638	77	<1	<1	77	37	<1	<2	<2	<2	<2	<2	<1	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100	<5
RPD					3	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW02	MW02	05/07/2024	Primary	EP2409638	79	<1	<1	79	38	<1	<2	<2	<2	<2	<2	<1	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100	<5
MW02	QC204	05/07/2024	Duplicate	1115822	100	<5	<5	100	43	<1	<1	<1	<2	<1	<3	-	<20	<20	<40	<40	<40	<20	<20	<20	<20	<50	<50	<50	<1
RPD					23	0	0	23	12	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 7: RPDs (Groundwater)
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

					Perfluoroalkane Carboxylic Acids											Perfluoroalkane Sulfonic Acids							Perfluoroalkyl Sulfonamides							
					Perfluorohexanoic acid (PFHxA)	Perfluorododecanoic acid (PFDoDA)	Perfluorononanoic acid (PFNA)	Perfluoropentanoic acid (PFPeA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluoroheptanoic acid (PFHpA)	Perfluorobutanoic acid (PFBA)	Perfluorodecanoic acid (PFDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorooctanoic acid (PFOA)	Perfluorooctanesulfonic acid (PFOS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutane sulfonic acid (PFBS)	Sum of PFHxS and PFOS	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	Perfluorooctane sulfonamide (FOSA)	Sum of PFAS
Units					*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*
LoR					0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.002	0.0005	0.0005	0.0005	0.0005	0.0002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0003	0.001	0.0005	0.0005	0.001	0.001	0.001	0.0005	0.0003
Location Cod	**Field ID**	**Date**	**Sample Type**	**Lab Report No.**																										
MW02	MW02	05/07/2024	Primary	EP2409638	0.023	<0.0005	<0.0005	0.0515	<0.0005	0.005	0.031	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0003	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	0.111
MW02	QC104	05/07/2024	Duplciate	EP2409638	0.0221	<0.0005	<0.0005	0.0553	<0.0005	0.005	0.032	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0003	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	0.115
RPD					4	0	0	7	0	0	3	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	4
MW02	MW02	05/07/2024	Primary	EP2409638	0.023	<0.0005	<0.0005	0.0515	<0.0005	0.005	0.031	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0003	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	0.111
MW02	QC204	05/07/2024	Duplicate	1115822	0.022	<0.001	<0.001	0.054	<0.001	0.004	0.035	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.007	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.122
RPD					4	0	0	5	0	22	12	0	0	0	0	0	0	0	0	0	173	0	0	0	0	0	0	0	0	9

RPD acceptance criteria is as follows:

- Not limiting, where the maximum concentration of the two results is less than 10 times the LoR.
- 50%, where the maximum concentration of the two results is between 10 and 20 times the LoR.
- 30%, where the maximum concentration of the two results is greater than 20 times the LoR.

^ conversion factor of 0.3261 applied to orthophosphate as PO4 value.

Table 8: QAQC Results - Water Blanks
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

				Metals (Dissolved)								Inorganics								BTEX						
				Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Ammonia (as N)	Nitrate (as N)	Nitrite (as N)	Total Oxidised Nitrogen (as N)	Total Kjeldahl Nitrogen	Total Nitrogen (as N)	Phosphorus (as P)	Ortho-phosphate (as P)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Total Xylene	Total BTEX
Units				*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*
LoR				0.001	0.0001	0.001	0.001	0.001	0.0001	0.001	0.005	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01	1	2	2	2	2	2	1
Field ID	**Date**	**Sample Type**	**Lab Report No.**																							
QC301	4/07/2024	Rinsate	EP2409636	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.005	-	-	-	-	-	-	-	-	<1	<2	<2	<2	<2	<2	<1
QC302	5/07/2024	Rinsate	EP2409638	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.005	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.01	<0.01	<1	<2	<2	<2	<2	<2	<1
QC402	5/07/2024	Trip Blank (W)	EP2409638	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<2	<2	<2	<2	<2	<1
QC403	5/07/2024	Trip Blank(W)	EP2409638	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

				Total Petroleum Hydrocarbons					Total Recoverable Hydrocarbons							PAHs	
				C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum)	C6-C10 Fraction	C6-C10 Fraction minus BTEX (F1)	>C10-C16 Fraction	>C10-C16 Fraction minus naphthalene (F2)	>C16-C34 Fraction	>C34-C40 Fraction	>C10-C40 Fraction (Sum)	Naphthalene	Naphthalene (VOC)
Units				*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*
LoR				20	50	100	50	50	20	20	100	100	100	100	100	5	5
Field ID	**Date**	**Sample Type**	**Lab Report No.**														
QC301	4/07/2024	Rinsate	EP2409636	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100	-	<5
QC302	5/07/2024	Rinsate	EP2409638	<20	<50	<100	<50	<50	<20	<20	<100	<100	<100	<100	<100	<5	-
QC402	5/07/2024	Trip Blank (W)	EP2409638	<20	-	-	-	-	<20	<20	-	-	-	-	-	<5	-
QC403	5/07/2024	Trip Blank(W)	EP2409638	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 8: QAQC Results - Water Blanks
Baseline Assessment - Perdaman Burrup Lateral Pipeline,
Australian Gas Infrastructure Group

				(n:2) Fluorotelomer Sulfonic Acids				Perfluoroalkane Carboxylic Acids										Perfluoroalkane Sulfonic Acids						
				4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Perfluorohexanoic acid (PFHxA)	Perfluorododecanoic acid (PFDoDA)	Perfluorononanoic acid (PFNA)	Perfluoropentanoic acid (PFPeA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluoroheptanoic acid (PFHpA)	Perfluorobutanoic acid (PFBA)	Perfluorodecanoic acid (PFDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorooctanoic acid (PFOA)	Perfluorooctanesulfonic acid (PFOS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutane sulfonic acid (PFBS)	Sum of PFHxS and PFOS
Units				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LoR				0.001	0.001	0.001	0.001	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.002	0.0005	0.0005	0.0005	0.0005	0.0002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0002
Field ID	**Date**	**Sample Type**	**Lab Report No.**																						
QC301	4/07/2024	Rinsate	EP2409636	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
QC302	5/07/2024	Rinsate	EP2409638	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0003
QC402	5/07/2024	Trip Blank (W)	EP2409638	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC403	5/07/2024	Trip Blank (W)	EP2409638	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0003

				Perfluoroalkyl Sulfonamides							PFAS
				N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	Perfluorooctane sulfonamide (FOSA)	Sum of PFAS
Units				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LoR				0.001	0.0005	0.0005	0.001	0.001	0.001	0.0005	0.0002
Field ID	**Date**	**Sample Type**	**Lab Report No.**								
QC301	4/07/2024	Rinsate	EP2409636	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0002
QC302	5/07/2024	Rinsate	EP2409638	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0003
QC402	5/07/2024	Trip Blank (W)	EP2409638	-	-	-	-	-	-	-	-
QC403	5/07/2024	Trip Blank (W)	EP2409638	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0003

Appendix A: Certificates of Title

WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
LR3122	**50**

RECORD OF CERTIFICATE OF CROWN LAND TITLE

UNDER THE TRANSFER OF LAND ACT 1893
AND THE LAND ADMINISTRATION ACT 1997

The undermentioned land is Crown land in the name of the STATE OF WESTERN AUSTRALIA, subject to the interests and Status Orders shown in the first schedule which are in turn subject to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts
REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 540 ON DEPOSITED PLAN 221364

STATUS ORDER AND PRIMARY INTEREST HOLDER:
(FIRST SCHEDULE)

STATUS ORDER/INTEREST: UNALLOCATED CROWN LAND

PRIMARY INTEREST HOLDER: STATE OF WESTERN AUSTRALIA

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. H635745 SUNDRY. THE LAND HEREIN IS WITHIN THE DBNGP CORRIDOR PURSUANT TO THE DAMPIER TO BUNBURY PIPELINE ACT 1997. SEE LAND ADMINISTRATION PLAN 21364. REGISTERED 3/1/2001.
2. P474391 MEMORIAL. CONTAMINATED SITES ACT 2003 REGISTERED 9/3/2023.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF CROWN LAND TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	DP221364
PREVIOUS TITLE:	LR3121-860
PROPERTY STREET ADDRESS:	NO STREET ADDRESS INFORMATION AVAILABLE.
LOCAL GOVERNMENT AUTHORITY:	CITY OF KARRATHA
RESPONSIBLE AGENCY:	DEPARTMENT OF PLANNING, LANDS AND HERITAGE (SLSD)

NOTE 1: A000001A CORRESPONDENCE FILE 00564-2000-01RO.

END OF PAGE 1 - CONTINUED OVER

NOTE 2: LAND PARCEL IDENTIFIER OF DE WITT LOCATION 540 ON SUPERSEDED PAPER CERTIFICATE OF CROWN LAND TITLE CHANGED TO LOT 540 ON DEPOSITED PLAN 221364 ON 18-SEP-02 TO ENABLE ISSUE OF A DIGITAL CERTIFICATE OF TITLE.

NOTE 3: THE ABOVE NOTE MAY NOT BE SHOWN ON THE SUPERSEDED PAPER CERTIFICATE OF TITLE.

WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
LR3139	**36**

RECORD OF CERTIFICATE OF CROWN LAND TITLE

UNDER THE TRANSFER OF LAND ACT 1893
AND THE LAND ADMINISTRATION ACT 1997

The undermentioned land is Crown land in the name of the STATE OF WESTERN AUSTRALIA, subject to the interests and Status Orders shown in the first schedule which are in turn subject to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts
REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 3013 ON DEPOSITED PLAN 42282

STATUS ORDER AND PRIMARY INTEREST HOLDER:
(FIRST SCHEDULE)

STATUS ORDER/INTEREST: RESERVE WITHOUT MANAGEMENT ORDER

PRIMARY INTEREST HOLDER: STATE OF WESTERN AUSTRALIA

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. H376396 AUTHORISATION ORDER FOR THE TAKING OF INTERESTS. AS TO PORTION ONLY. SEE DP220773. REGISTERED 29/2/2000.
2. K148618 RESERVE 49121 FOR THE PURPOSE OF INFRASTRUCTURE CORRIDOR REGISTERED 5/4/2007.
3. L596014 EASEMENT TO WATER CORPORATION FOR WATER PIPES WATER MAINS PURPOSES. SEE DEPOSITED PLAN 51731 REGISTERED 6/4/2011.
4. N441861 EASEMENT TO WATER CORPORATION FOR ACCESS PURPOSES. SEE DEPOSITED PLAN 409052. REGISTERED 23/9/2016.
5. N657873 LEASE TO WESTERN AUSTRALIAN LAND AUTHORITY OF LEVEL 6 40 THE ESPLANADE PERTH WA 6000 EXPIRES: SEE LEASE. AS TO PORTION ONLY - SEE DEPOSITED PLAN 410659. REGISTERED 27/6/2017.
   - N657896 SUB-LEASE OF LEASE N657873 TO YARA PILBARA FERTILISERS PTY LTD OF LEVEL 5 182-184 ST GEORGES TERRACE PERTH WA 6000 EXPIRES: SEE SUB LEASE. AS TO PORTION ONLY - SEE DEPOSITED PLAN 410663. REGISTERED 27/6/2017.
6. O604891 NOTIFICATION OF EASEMENT FOR PIPELINE PURPOSES PURSUANT TO SECTION 19(4) OF THE PETROLEUM PIPELINES ACT 1969 TO SANTOS WA NORTHWEST PTY LTD OF LEVEL 7 100 ST GEORGES TERRACE PERTH WA 6000, HARRIET (ONYX) PTY LTD OF LEVEL 9 191 ST GEORGES TERRACE PERTH WA 6000. AS TO PORTION ONLY - SEE DEPOSITED PLAN 51732 RECORDED 7/1/2021.
7. P167156 LEASE TO WESTERN AUSTRALIAN LAND AUTHORITY OF LEVEL 2 40 THE ESPLANADE PERTH WA 6000 EXPIRES: SEE LEASE. AS TO PORTION ONLY - SEE DEPOSITED PLAN 411761 REGISTERED 2/6/2022.

END OF PAGE 1 - CONTINUED OVER

8. P474391 MEMORIAL. CONTAMINATED SITES ACT 2003 REGISTERED 9/3/2023.
9. P517088 CAVEAT BY PERDAMAN CHEMICALS AND FERTILISERS PTY LTD AS TO PORTION ONLY LODGED 17/4/2023.
10. P517173 CAVEAT BY NATIONAL AUSTRALIA BANK LIMITED AS TO PORTION ONLY LODGED 17/4/2023.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF CROWN LAND TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	DP42282
PREVIOUS TITLE:	LR3125-423
PROPERTY STREET ADDRESS:	NO STREET ADDRESS INFORMATION AVAILABLE.
LOCAL GOVERNMENT AUTHORITY:	CITY OF KARRATHA
RESPONSIBLE AGENCY:	DEPARTMENT OF PLANNING, LANDS AND HERITAGE (SLSD)

NOTE 1:	J522939	DEPOSITED PLAN 49168 LODGED FOR INTEREST PURPOSES ONLY.
NOTE 2:	K148616	CORRESPONDENCE FILE 02024-1998-15RO
NOTE 3:	P725548	DEPOSITED PLAN 426199 LODGED
NOTE 4:	P741787	INTEREST ONLY DEPOSITED PLAN 422673 LODGED

WESTERN AUSTRALIA

TITLE NUMBER	
Volume	Folio
LR3174	**529**

RECORD OF CERTIFICATE OF CROWN LAND TITLE

UNDER THE TRANSFER OF LAND ACT 1893
AND THE LAND ADMINISTRATION ACT 1997

The undermentioned land is Crown land in the name of the STATE OF WESTERN AUSTRALIA, subject to the interests and Status Orders shown in the first schedule which are in turn subject to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts
REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 704 ON DEPOSITED PLAN 411759

STATUS ORDER AND PRIMARY INTEREST HOLDER:
(FIRST SCHEDULE)

STATUS ORDER/INTEREST: RESERVE WITHOUT MANAGEMENT ORDER

PRIMARY INTEREST HOLDER: WESTERN AUSTRALIAN LAND AUTHORITY OF LEVEL 2 40 THE ESPLANADE PERTH WA 6000

(L P167156) REGISTERED 2/6/2022

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. P081158 RESERVE 48609 FOR THE PURPOSE OF SERVICE CORRIDOR REGISTERED 18/3/2022.
2. L596014 EASEMENT TO WATER CORPORATION FOR WATER PIPES WATER MAINS PURPOSES. SEE DEPOSITED PLAN 411759. REGISTERED 6/4/2011.
3. O604891 NOTIFICATION OF EASEMENT FOR PIPELINE PURPOSES PURSUANT TO SECTION 19(4) OF THE PETROLEUM PIPELINES ACT 1969 TO SANTOS WA NORTHWEST PTY LTD OF LEVEL 7 100 ST GEORGES TERRACE PERTH WA 6000, HARRIET (ONYX) PTY LTD OF LEVEL 9 191 ST GEORGES TERRACE PERTH WA 6000. AS TO PORTION ONLY - SEE DEPOSITED PLAN 411759. RECORDED 7/1/2021.
4. P167156 LEASE. SUBJECT TO THE TERMS AND CONDITIONS AS SET OUT IN THE LEASE. REGISTERED 2/6/2022.
5. P474391 MEMORIAL. CONTAMINATED SITES ACT 2003 REGISTERED 9/3/2023.
6. P517088 CAVEAT BY PERDAMAN CHEMICALS AND FERTILISERS PTY LTD AS TO PORTION ONLY LODGED 17/4/2023.
7. P517173 CAVEAT BY NATIONAL AUSTRALIA BANK LIMITED AS TO PORTION ONLY LODGED 17/4/2023.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.

END OF PAGE 1 - CONTINUED OVER

----------END OF CERTIFICATE OF CROWN LAND TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	DP411759
PREVIOUS TITLE:	LR3139-38
PROPERTY STREET ADDRESS:	NO STREET ADDRESS INFORMATION AVAILABLE.
LOCAL GOVERNMENT AUTHORITY:	CITY OF KARRATHA
RESPONSIBLE AGENCY:	DEPARTMENT OF PLANNING, LANDS AND HERITAGE (SLSD)

NOTE 1:	M399633	CORRESPONDENCE FILE 00750-2003-01RO
NOTE 2:	N059155	DEPOSITED PLAN 406079 LODGED (INTEREST ONLY)
NOTE 3:	P741787	INTEREST ONLY DEPOSITED PLAN 422673 LODGED

Appendix B: Tetra Tech Coffey (2022a) Groundwater Well Installation Logs

TETRA TECH COFFEY

Environmental Log - Monitoring Well

Hole ID.	***MW02***
sheet:	1 of 1
project no.	***754-PEREN296568***
client: ***Clough***	date started: ***25 Jan 2022***
principal: ***Cameron Baldock***	date completed: ***25 Jan 2022***
project: ***Perdaman Hydrological Drilling***	logged by: ***NT***
location: ***The Perdaman site, Burrup Road, Burrup WA***	checked by: ***BW***

position: Not Specified | surface elevation: Not Specified | angle from horizontal: 90°

equipment type: | drilling fluid: | hole diameter : 150 mm

drilling information | **well details** | **material substance**

method & support	water	samples & field tests	photoionization detector (ppmv)	MW02	depth (m)	graphic log	classification symbol	material description **SOIL TYPE** plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
HS	25-01-22 ▽	E			0.5			**SAND CLAY**: medium grained, brown to pale brown, moderately sorted with cobbles of granophyre in places.			No visual or olfactory evidence of contamination
					1.0						
					1.5						
					2.0						
					2.5	+ +		**GRANOPHYRE** grey, staline and fresh in nature.			
					3.0			Monitoring Well MW02 terminated at 2.80 m			**backfill details:** 0.0-0.2m: Bentonite 0.2-2.8m: Sand **standpipe piezo. MW02 details:** 0.4-2.8m: screen
					3.5						
					4.0						
					4.5						

CDF_0_9_06_LIBRARY.GLB rev:AU Log COF PIEZOMETER: ENVIRONMENTAL PERDAMAN HYDRO LOGS 22 FEB 22.GPJ DWG31116.GDW 24-02-2022 13:58

method

AD	auger drilling*
AS	auger screwing*
HA	hand auger
MR	mud rotary
W	washbore
AH	air hammer
HS	hand auger hollow stem flight auger
*	bit shown by suffix
e.g.	AD/T
B	blank bit
T	TC bit
V	V bit

support

M	mud
C	casing
N	nill

water

10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests

ALT	air lift test
B	bulk disturbed sample
D	disturbed sample
E	environmental sample
SS	split spoon sample
U##	undisturbed sample ##mm diameter
WS	water sample
HB	hammer bouncing
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
PID	photoionization detector
R	refusal

classification symbol & soil description
based on Unified Classification System

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
Wl	liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

TETRA TECH COFFEY

Environmental Log - Hand Auger

Hole ID.	***MW07***
sheet:	1 of 1
project no.	***754-PEREN296568***
client: ***Clough***	date started: ***26 Jan 2022***
principal: ***Cameron Baldock***	date completed: ***26 Jan 2022***
project: ***Perdaman Hydrological Drilling***	logged by: ***NT***
location: ***The Perdaman site, Burrup Road, Burrup WA***	checked by: ***BW***

position: Not Specified | surface elevation: Not Specified | angle from horizontal: 90°

equipment type: Hand Auger | drilling fluid: | hole diameter : 150 mm

drilling information				well details	material substance					
method & support	water	samples & field tests	photoionization detector (ppmv)	MW07	depth (m)	graphic log	classification symbol	material description **SOIL TYPE** plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
HA N	26-01-22	E: SS12_0			0.0			**SAND CLAY**: fine grained, brown, very soft and saturated.			monitoring well slots surrounded by permeable sock, no gravel
		E: SS12_0.5			0.5			**CLAY**: grey black, granophyre fragments present.			monitoring well slots surrounded by permeable sock, no gravel
		E: SS12_1.0			1.0			Hand Auger MW07 terminated at 1.00 m			**backfill details:** 0.0-1.0m: Sand **standpipe piezo. MW07 details:** 0.0-1.0m: screen
					1.5						
					2.0						
					2.5						
					3.0						
					3.5						
					4.0						
					4.5						

CDF_0_9_06_LIBRARY.GLB rev:AU Log COF PIEZOMETER: ENVIRONMENTAL PERDAMAN HYDRO LOGS 22 FEB 22.GPJ DWG31116.GDW 24-02-2022 13:58

method

AD	auger drilling*
AS	auger screwing*
HA	hand auger
MR	mud rotary
W	washbore
AH	air hammer
HS	hand auger hollow stem flight auger
*	bit shown by suffix
e.g.	AD/T
B	blank bit
T	TC bit
V	V bit

support

M	mud
C	casing
N	nill

water

10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests

ALT	air lift test
B	bulk disturbed sample
D	disturbed sample
E	environmental sample
SS	split spoon sample
U##	undisturbed sample ##mm diameter
WS	water sample
HB	hammer bouncing
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
PID	photoionization detector
R	refusal

classification symbol & soil description
based on Unified Classification System

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
Wl	liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

TETRA TECH COFFEY

Environmental Log - Hand Auger

Hole ID.	***MW08***
sheet:	1 of 1
project no.	***754-PEREN296568***
client:	***Clough***
date started:	***26 Jan 2022***
principal:	***Cameron Baldock***
date completed:	***26 Jan 2022***
project:	***Perdaman Hydrological Drilling***
logged by:	***NT***
location:	***The Perdaman site, Burrup Road, Burrup WA***
checked by:	***BW***

position: Not Specified | surface elevation: Not Specified | angle from horizontal: 90°

equipment type: Hand Auger | drilling fluid: | hole diameter : 150 mm

drilling information				well details	material substance						
method & support	water	samples & field tests	photoionization detector (ppmv)	MW08	depth (m)	graphic log	classification symbol	material description **SOIL TYPE** plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
HA N	26-01-22	E: SS13_0			0			**SAND GRAVEL**: sub-rounded to sub-angular, red brown, poorly graded, grains of granophyre, QTE and shell fragments.			no visual or olfactory evidence of contamination
		E: SS13_0.5			0.5			**CLAY**: brown, contains fragments of calcrete.			monitoring well slots surrounded by permeable sock, no gravel
		E: SS13_0.75						Hand Auger MW08 terminated at 0.75 m			**backfill details:** 0.0-0.75m: Sand **standpipe piezo. MW08 details:** 0.0-0.75m: screen
					1.0						
					1.5						
					2.0						
					2.5						
					3.0						
					3.5						
					4.0						
					4.5						

CDF_0_9_06_LIBRARY.GLB rev:AU Log COF PIEZOMETER: ENVIRONMENTAL PERDAMAN HYDRO LOGS 22 FEB 22.GPJ DWG31116.GDW 24-02-2022 13:58

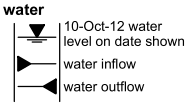
method

AD	auger drilling*
AS	auger screwing*
HA	hand auger
MR	mud rotary
W	washbore
AH	air hammer
HS	hand auger hollow stem flight auger
*	bit shown by suffix
e.g.	AD/T
B	blank bit
T	TC bit
V	V bit

support

M	mud
C	casing
N	nill

water



samples & field tests

ALT	air lift test
B	bulk disturbed sample
D	disturbed sample
E	environmental sample
SS	split spoon sample
U##	undisturbed sample ##mm diameter
WS	water sample
HB	hammer bouncing
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
PID	photoionization detector
R	refusal

classification symbol & soil description
based on Unified Classification System

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
Wl	liquid limit

consistency / relative density

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Appendix C: DWER Contaminted Sites Notice of Classification

Government of Western Australia
Department of Water and Environmental Regulation

Your ref:
Our ref: DMO 11605
Enquiries: Sharon Gray
Phone: 1300 762 982
Fax: (08) 6364 7001
Email: info@dwer.wa.gov.au

State Land Services
Department of Planning, Lands and Heritage
Locked Bag 2506
Perth WA 6001

Dear Sir/Madam

This letter is the formal notice of classification of a known or suspected contaminated site in which you have an interest. This constitutes the notice the Department of Water and Environmental Regulation (the department) is legally obliged to give under the *Contaminated Sites Act 2003* (the Act), which came into effect on 1 December 2006.

The Act was set up to record and manage contaminated sites in Western Australia, in order to protect people's health and the environment. Please note that contamination does not necessarily mean that an area is unsafe to live or work in – for example, it may be limited to groundwater, and only becomes an issue to be managed if a groundwater bore was being considered.

This notice explains why the site has been classified, what restrictions, if any, have been placed on the use of the site and how you can appeal the classification. In some cases, this notice may include other lots which also form part of the classified site, in addition to the lot in which you have an interest.

If, after reading this letter, you have any further queries, please contact the department on 1300 762 982 (Contaminated Sites Information Line).

NOTICE OF A CLASSIFICATION OF A KNOWN OR SUSPECTED CONTAMINATED SITE GIVEN UNDER SECTION 15 OF THE *CONTAMINATED SITES ACT 2003*

The site detailed below **(the site),** consisting of 8 parcel(s) of land, was reported to the CEO of the department as a known or suspected contaminated site and has been classified under the Act:

- LOT 3013 ON DEPOSITED PLAN 42282 as shown on certificate of title LR3139/36 known as Burrup WA 6714
- LOT 540 ON DEPOSITED PLAN 221364 as shown on certificate of title LR3122/50 known as Burrup WA 6714
- LOT 640 ON DEPOSITED PLAN 29300 as shown on certificate of title LR3003/200 known as Burrup WA 6714
- LOT 704 ON DEPOSITED PLAN 411759 as shown on certificate of title LR3174/529 known as Barrup WA 6714
- LOT 703 ON DEPOSITED PLAN 411759 as shown on certificate of title LR3174/528 known as Barrup WA 6714
- LOT 707 ON DEPOSITED PLAN 411759 as shown on certificate of title LR3174/531 known as Barrup WA 6714
- LOT 705 ON DEPOSITED PLAN 411759 as shown on certificate of title LR3174/530 known as Barrup WA 6714
- Approximate spatial representation of section of LOT 700 ON DEPOSITED PLAN 411759 (Landgate PIN 12574931) as shown on certificate of title 4017/305, Burrup WA 6714

This notification is being sent to you in accordance with section 15(1) of the Act on the grounds that you, as the recipient, are one or more of the following:

(a) owner of the site (contact details sourced from the current certificate of title);
(b) occupier of the site;
(c) relevant public authority;
(d) person who, in the CEO's opinion, there is particular reason to notify;
(e) person who made the report under section 11 or 12; and
(f) person who, in the CEO's opinion, may be responsible for remediation of a site classified as *contaminated – remediation required.*

Site Classification

Category of site classification: Possibly contaminated - investigation required

Date of site classification: 06/02/2023

Reasons for classification: This site was reported to the Department of Water and Environmental Regulation (the department) as per reporting obligations under section 11 of the 'Contaminated Sites Act 2003' (the Act), which commenced on 1 December 2006.

The site has been classified under section 13 of the Act based on information submitted to the department by November 2022.

A nearby site at Lot 3017 Village Road, Burrup has been used as an ammonium nitrate production facility (known as the TAN plant) since 2017. Contamination assessments carried out in 2017-2018 found ammonia, nitrates and nitrites at elevated concentrations in soil and groundwater at the TAN plant. The contamination assessments were undertaken following unauthorised releases in 2017 to 2018 of ammonium nitrate solution, cooling water containing corrosion inhibitor and process effluent containing ammonium and nitrate, into soils and groundwater at the TAN plant due to faulty infrastructure.

A series of groundwater investigations between 2017 and 2021 found that concentrations of nitrate and ammonia in groundwater at the TAN plant exceeded Water Quality Australia's default guideline values for the protection of aquatic ecosystems, and site-specific assessment criteria developed in accordance with ANZECC & ARMCANZ 2000 for aquatic ecosystems (for 90% and 99% species protection level i.e. moderate and high level of ecological protection [LEP]). Aquatic ecosystems criteria are relevant due to the location of the TAN plant upstream of marine and ephemeral supratidal flats and King Bay.

The investigations found that groundwater nutrient seepage was occurring via the toe of the TAN plant embankment into the adjacent supratidal flats at the site.

The receiving sediments of the adjacent 'upper' supratidal flats (moderate LEP) were found to be acting as a nutrient sink, with potential for migration to downstream areas in the 'lower' supratidal flats and King Bay (high LEP) during high rainfall events.

A Detailed Ecological Risk Assessment (DERA) was undertaken in 2020 to assess the level of environmental risk posed by substances present in surface waters and sediments. Site-specific risk assessment criteria were developed for the upper and lower supratidal flats, King Bay and Hearson Cove in accordance with ANZECC & ARMCANZ 2000.

Following a significant rainfall event 16-24 May 2021, environmental monitoring data indicated unacceptably high concentrations of nitrate in surface waters migrating from the TAN plant, with the potential to impact sensitive ecological receptors in the supratidal flats and King Bay. Nitrates were found to be present in surface waters and sediments of the supratidal flats exceeding Water Quality Australia's default guideline values for the protection of aquatic ecosystems and the developed site-specific assessment criteria developed for aquatic ecosystems (moderate and high LEP).

Chlorophyll-a in surface waters of the supratidal flats exceeded Water Quality Australia's default guideline values for the protection of aquatic ecosystems. Algal growth was detected within the mangrove intertidal zone of King Bay in July 2021, exceeding the developed site-specific environmental quality guidelines. Further environmental investigations are being undertaken to further determine the level of environmental impact and risk posed to off-site sensitive receptors.

A Remediation Action Plan has been in development for the TAN plant since mid-2021, including provision for active remediation comprising groundwater extraction/storage/treatment and in-situ enhanced bioremediation of groundwater beneath the plant. The active remediation works are aimed at reducing the nutrient loading in groundwater and surface water migrating from the site. Implementation of RAP drainage management provisions commenced in 2021, and groundwater remediation infrastructure works in 2022, with completion of all works expected by end of 2023.

An accredited contaminated sites auditor (the auditor) has reviewed the investigations and risk assessment to date. The auditor's findings are documented in mandatory auditor's report dated 3 December 2020. The department accepts the auditor's recommendation that active remediation is required at the TAN plant and that environmental investigations are progressing in accordance with the department's contaminated sites guidelines and the 'National Environment Protection (Assessment of Site Contamination) Measure 1999' (the NEPM) guidelines, to address data gaps and further assess the level of environmental risk posed to sensitive ecological receptors.

There are grounds to indicate possible contamination of the site and investigations and a risk assessment to determine the risk to human health, the environment, and environmental values has not been fully carried out. Therefore, the site is classified as 'possibly contaminated - investigation required'.

A memorial stating the site's classification will be placed on the certificate of title, and will notify any prospective owners of the contamination status of the site.

The department, in consultation with the Department of Health, has classified this site based on the information available to the department at the time of classification. It is acknowledged that the contamination status of the site may have changed since the information was collated and/or submitted to the department, and as such, the usefulness of this information may be limited.

In accordance with Department of Health advice, if groundwater is being, or is proposed to be abstracted, the department recommends that analytical testing should be carried out to determine whether the groundwater is suitable for its intended use.

Other Relevant Information:

Additional information included herein is relevant to the contamination status of the site and includes the department's expectations for action that should be taken to address potential or actual contamination described in the Reasons for Classification.

Based on the available information, contamination present on this site has originated from nearby land at Lot 3017, which has been classified separately under the Act. Therefore, this site is consistent with the definition of an "affected site" as specified in Part 1, Section 3 of the Act. Under the Act, the person responsible for the remediation of a source site is also responsible for remediation of any related affected sites.

Action Required:

Further soil, groundwater, sediment and surface water investigations, are required to determine the contamination status of the site. Investigations are to be carried out in accordance with the department's contaminated sites guidelines and the 'National Environment Protection (Assessment of Site Contamination) Measure 1999' (the NEPM).

General Information

The nature and extent of contamination and any restrictions on the use of the land, if applicable, are listed in Attachment A.

Information relating to the classification of the site is also available by submitting a request for a summary of records (using Form 2) to: Department of Water and Environmental Regulation, Locked Bag 10, Joondalup DC, WA 6919. A fee of $30 currently applies for a Basic Summary of Records. Forms are available from www.der.wa.gov.au/contaminatedsites.

In some instances the department has had to classify sites based on historical information. A site may be re-classified at any stage when additional information becomes available, for example where a new investigation or remediation report completed in accordance with the department's 'Contaminated Sites Guidelines' and the *National Environment Protection (Assessment of Site Contamination) Measure 1999*, is submitted to the department. The current site classification is the classification most recently conferred on the site.

Memorials

In accordance with section 58(1) of the Act, the department will lodge a memorial with the Registrar of Landgate, recording the classification against the site's Certificate(s) of Title. Parcel(s) without a registration number or certificate of title will not have a memorial lodged against them until a certificate of title has been created. Once complete, confirmation of the lodgement of the memorial(s) will be forwarded to the following people:

(a) each owner,
(b) Western Australian Planning Commission;
(c) CEO of the Department of Health;
(d) Local Government Authority;
(e) relevant scheme authority.

Given that memorial(s) will be lodged against the site, the Western Australian Planning Commission (WAPC) may not approve the subdivision of the land under Section 135 of the *Planning and Development Act 2005*, or the amalgamation of that land with any other land without seeking, and taking into account, the advice of the department as to the suitability of the land for subdivision or amalgamation. Furthermore, a responsible authority (e.g. Local Government Authorities) may not grant approval under a scheme for any proposed development of the land without seeking, and taking into account, advice from the department as to the suitability of the proposed development.

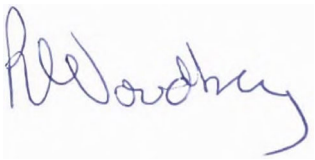
Appealing the Site Classification

All site classifications given by the department are appealable. However, only certain people can lodge a valid appeal. The people who can lodge a valid appeal varies, depending on the classification category, as detailed in Fact Sheet 4: *Site classifications and appeals*. Appeals need to be lodged in writing with the Contaminated Sites Committee at Forrest Centre, Level 22, 221 St Georges Terrace, Perth WA 6000, within **45 days** of being given this notification. The appeal should set out the appellant's relationship to the site, and must include the grounds and facts upon which it is based. An appeal fee (currently $45) applies.

To find out more about the appeal process, see the Contaminated Sites Committee website at www.csc.wa.gov.au or contact the office of the Committee on (08) 6364 7264.

For further information on all aspects of site classification, please refer to Fact Sheet 4 and the 'Contaminated Sites Guidelines', which are available from the department's website at www.der.wa.gov.au/contaminatedsites or by contacting the Contaminated Sites Information Line on 1300 762 982.

Yours sincerely



Penny Woodberry, Manager

CONTAMINATED SITES REGULATION
Delegated Officer under section 91
of the *Contaminated Sites Act 2003*

09/02/2023

Enc. Attachment A – Nature and Extent and Restrictions on Use.

Fact Sheet 4: *Site classifications and appeals*
Fact Sheet 5: *Buyer beware – buying and selling contaminated land*

ATTACHMENT A – Nature and Extent and Restrictions on Use

- LOT 3013 ON DEPOSITED PLAN 42282
- LOT 540 ON DEPOSITED PLAN 221364
- LOT 640 ON DEPOSITED PLAN 29300
- LOT 704 ON DEPOSITED PLAN 411759
- LOT 703 ON DEPOSITED PLAN 411759
- LOT 707 ON DEPOSITED PLAN 411759
- LOT 705 ON DEPOSITED PLAN 411759
- Approximate spatial representation of section of LOT 700 ON DEPOSITED PLAN 411759

Nature and Extent: Site investigations have found ammonia, nitrate and nitrite to be present in surface water and sediments at the site which originate from a nearby ammonium nitrate production facility.

Restriction on Use: Please refer to Reasons for Classification for further information on the potential contamination present at the site.

Appendix D: Site Photographs

Photograph 1.

[04 Jul 2024] – Soil bore location SB01

Photograph 2.

[04 Jul 2024] – Soil bore location SB02

Photograph 3.

[04 Jul 2024] – Soil bore location SB03

Photograph 4.

[04 Jul 2024] – Soil bore location SB04

Photograph 5.

[04 Jul 2024] – Soil bore location SB05

Photograph 6.

[04 Jul 2024] – Soil bore location SB06

Photograph 7.

[04 Jul 2024] – Soil bore location SB07

Photograph 8.

[04 Jul 2024] – Soil bore location SB08

Photograph 9.

[04 Jul 2024] – Soil bore location SB09

Photograph 10.

[04 Jul 2024] – Soil bore location SB10

Photograph 11.

[04 Jul 2024] – Soil bore location SB11

Photograph 12.

[04 Jul 2024] – Soil bore location SB12

Photograph 13.

[05 Jul 2024] – Monitoring location MW01

Photograph 14.

[05 Jul 2024] – Monitoring location MW02

Photograph 15.

[05 Jul 2024] – Monitoring location MW03

Photograph 16.

[05 Jul 2024] – Monitoring location MW04

Photograph 17.

[05 Jul 2024] – Monitoring location MW05

Photograph 18.

[05 Jul 2024] – Causeway construction, east of site

Photograph 19.

[04 Jul 2024] – Monitoring well installation (MW02)

Photograph 20.

[04 Jul 2024] – Site conditions, looking east.

Photograph 21.

[04 Jul 2024] – Site conditions, looking north

Photograph 22.

[04 Jul 2024] – Site conditions, looking west

Photograph 23.

[04 Jul 2024] – Water pipeline north of the site

Photograph 24.

[04 Jul 2024] – Drainage line discharging north of the site.

Photograph 25.

[04 Jul 2024] – North-west of the site

Photograph 26.

[04 Jul 2024] – Active works area northwest of the site.

Photograph 27.

[04 Jul 2024] – Looking south across the central portion of the site.

Appendix E: EIL Calculation Spreadsheets

NEPC
National Environment Protection Council

Ecological Investigation Level Calculation Spreadsheet

Developed by CSIRO for the National Environment Protection Council

DISCLAIMER

This work has been prepared in good faith exercising due care and attention. However, no representation or warranty, express or implied, is made as to the relevance, accuracy, completeness or fitness for purpose of this work in respect to any particular user's circumstances. Users of this work should satisfy themselves concerning its application to, and where necessary seek expert advice about, their situation. The Environment Protection and Heritage Council, the National Environment Protection Council and the NEPC Service Corporation shall not be liable to any persons or entity with respect to liability, loss or damage caused or alleged to have been caused directly or indirectly by this work.

Background information on the EIL Calculation Spreadsheet

This spreadsheet is to be used to calculate the Ecological Investigation Levels (EILs) that are to be used in the National Environment Protection (Assessment of Site Contamination) Measure when assessing a contaminated site. The EILs are numerical limits that are designed to protect soil and terrestrial flora and fauna (including pets and wildlife) and soil microbial processes from experiencing substantial deleterious effects caused by contaminants. Ecological Investigation Levels are the ecological equivalents of the investigation levels that aim to protect human health (HILs) and groundwater (GILs). Measured concentrations of contaminants in the soil at a site are compared to the appropriate EILs and if they exceed the EILs then further investigation in the form of an ecological risk assessment that conforms to Schedule B5a (NEPC, 2011) should be conducted.

This spreadsheet uses the methodology set out in Heemsbergen et al. (2008) and Schedule B(5)b (NEPC, 2011) to calculate EILs for contaminated sites that have three land-uses: (1) national parks and areas of high conservation value; (2) urban residential and open public space; and (3) commercial and industrial land.

The toxicity data used and the actual calculations of the EILs for arsenic, chromium III, copper, DDT, lead, naphthalene, nickel and zinc are presented in Warne et al (2009) and Schedule B(5)c (NEPC, 2010). However, it should be noted that the example EIL values presented in Warne et al. (2009) have been rounded off during their calculation and therefore the values presented in that report will not match exactly with those derived by the EIL calculation spreadsheet. The EIL values calculated by the spreadsheet ALWAYS take precedence over those presented in Warne et al. (2009).

The method for deriving the EILs was developed in order to overcome all of the major limitations of the previous EILs (NEPM, 1999). The exact method used to calculate each EIL varied according to

(1) the physicochemical properties of the contaminant – which modified the key exposure pathways that were considered;

(2) whether the toxicity data could be expressed in terms of added contaminant concentrations (obtained by subtracting the background concentration from the total contaminant concentration). When such data were available a limit of how much contaminant could be added to soil before ecotoxicological effects commenced was determined – termed the Added Contaminant Level (ACL). Either a measured or predicted ambient background concentration (ABC) was then added to the ACL to obtain the EIL (see below)

EIL = ACL + ABC

The advantage of this 'added risk' method is that the EILs can never be less than the ambient background concentration.

When the toxicity data could not be expressed in terms of added concentration then the EIL was expressed as a total concentration, and it does not consider the ambient background concentration at the site.

(3) whether high quality empirical relationships were available that could predict the toxicity of contaminants using soil physicochemical properties. When these were available soil-specific EILs could be derived (where soils with different properties will have their own unique EIL). When these relationships were not available generic EILs (where a single numerical EIL applies to all Australian soils of a particular land-use) were derived.

(4) whether an ageing leaching factor (ALF) was available. The vast majority of toxicity data is derived from laboratory-based experiments that use freshly spiked contaminants. The two characteristics that differ between such laboratory experiments and field-based experiments are ageing and leaching of contaminants. Toxicity data from laboratory-based experiments were used to derive EILs for fresh contamination (i.e. when the contaminant has been present in the soil for less than 2 years). When ALFs were available they were used to adjust laboratory-based toxicity data to field-based data that was combined with actual field data to derive EILs for aged contamination (i.e. where the contaminant has been present in the soil for 2 or more years).

References

Heemsbergen D, Warne MStJ, McLaughlin MJ, Kookana R. 2008. A Proposed Australian Methodology to Derive Ecological Investigation Levels in Contaminated Soils. CLW Science Report. Prepared for the NEPM Review Team. 76p.

NEPC (National Environment Protection Council). 1999. National Environment Protection (Assessment of Site Contamination) Measure 1999. Schedule B(1) Guideline on the Investigation Levels for Soil and Groundwater. NEPC, Adelaide, Australia.16p.

NEPC (National Environment Protection Council). 2011. National Environment Protection (Assessment of Site Contamination) Measure. Schedule B(5)a. Guideline on Risk Assessment. National Environment Protection Council, Adelaide, South Australia. 42p.

NEPC (National Environment Protection Council). 2011. National Environment Protection (Assessment of Site Contamination) Measure. Schedule B(5)b. Guidelines on the Australian methodology to derive Ecological Investigation Levels in contaminated soils. National Environment Protection Council, Adelaide, South Australia. 85p.

NEPC (National Environment Protection Council). 2011. National Environment Protection (Assessment of Site Contamination) Measure. Schedule B(5)c. Soil quality guidelines for arsenic, chromium III, copper, DDT, lead, naphthalene, nickel and zinc. National Environment Protection Council, Adelaide, South Australia. 185p.

Warne MStJ, Heemsbergen DA, McLaughlin MJ, Kookana RS. 2009. Proposed soil quality guidelines for arsenic, chromium (III), copper, DDT, lead, naphthalene, nickel and zinc. CSIRO Land and Water Science Report 44/09. 195p.

Inputs
Select contaminant from list below
Cr_III
Below needed to calculate fresh and aged ACLs
Enter % clay (values from 0 to 100%)
6
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method)
or for aged ABCs only
Enter State (or closest State)
SA
Enter traffic volume (high or low)
low

Outputs		
Land use	Cr III soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	#NUM!	120
Urban residential and open public spaces	#NUM!	350
Commercial and industrial	#NUM!	580

Inputs
Select contaminant from list below
Cu
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
44.1
Enter soil pH (calcium chloride method) (values from 1 to 14)
8.6
Enter organic carbon content (%OC) (values from 0 to 50%)
0.14
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method)
or for aged ABCs only
Enter State (or closest State)
SA
Enter traffic volume (high or low)
low

Outputs		
Land use	Cu soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	#NUM!	70
Urban residential and open public spaces	#NUM!	170
Commercial and industrial	#NUM!	250

Inputs
Select contaminant from list below
Ni
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
44.1
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method)
or for aged ABCs only
Enter State (or closest State)
SA
Enter traffic volume (high or low)
low

Outputs		
Land use	Ni soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	#NUM!	85
Urban residential and open public spaces	#NUM!	460
Commercial and industrial	#NUM!	780

Inputs
Select contaminant from list below
Zn
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
44.1
Enter soil pH (calcium chloride method) (values from 1 to 14)
8.6
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method)
or for aged ABCs only
Enter State (or closest State)
SA
Enter traffic volume (high or low)
low

Outputs		
Land use	Zn soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	#NUM!	340
Urban residential and open public spaces	#NUM!	1400
Commercial and industrial	#NUM!	2100

Appendix F: Field Records

BOREHOLE LOG

MW01

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 1.50 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION: E476144.000 N7718707.000 (GDA2020 / MGA zone 50)
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Solid Flight Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 150 mm
DIMENSIONS: N/A
GENERAL NOTES: Piezometre - constructed with gravel sleeve, backfilled with cuttings.
LOGGED BY: ECG
CHECKED BY: AD

METHOD	WELL INSTALLATION	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
SFA		0.0		SM	Silty SAND, poorly graded, fine to coarse, sub-rounded to sub-angular, non plastic silt, pale brown, inferred medium dense, moist (Quaternary muds).			
		0.5		SM	With clay, trace gravel, grey mottled brown.			
		1.0						
		1.5			Terminated at 1.50 m. Target Depth Achieved.			
		2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

BOREHOLE LOG

MW02

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 1.50 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION: E476256.000 N7718707.844 (GDA2020 / MGA zone 50)
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Solid Flight Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 150 mm
DIMENSIONS: N/A
GENERAL NOTES: Piezometre - constructed with gravel sleeve, backfilled with cuttings.
LOGGED BY: ECG
CHECKED BY: AD

METHOD	WELL INSTALLATION	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
SFA		0.0		SM	Silty SAND, poorly graded, fine to coarse, sub-rounded to sub-angular, non plastic silt, pale brown, inferred medium dense, moist (Quaternary muds).			
		0.5		SM	With clay, trace gravel, grey mottled brown.			
		1.0						
		1.5			Terminated at 1.50 m. Target Depth Achieved.			
		2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

BOREHOLE LOG

MW03

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 1.30 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION: E476387.360 N7718705.461 (GDA2020 / MGA zone 50)
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Solid Flight Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 150 mm
DIMENSIONS: N/A
GENERAL NOTES: Piezometre - constructed with gravel sleeve, backfilled with cuttings.
LOGGED BY: ECG
CHECKED BY: AD

METHOD	WELL INSTALLATION	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
SFA		0.0		SM	Silty SAND, poorly graded, fine to coarse, sub-rounded to sub-angular, non plastic silt, pale brown, inferred medium dense, moist (Quaternary muds).			
		0.5		SM	With clay, trace gravel, grey mottled brown.			
		1.0						
		1.5			Terminated at 1.30 m. Refusal on rock.			
		2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

BOREHOLE LOG

MW04

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 1.50 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION: E476502.943 N7718711.243 (GDA2020 / MGA zone 50)
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Solid Flight Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 150 mm
DIMENSIONS: N/A
GENERAL NOTES: Piezometre - constructed with gravel sleeve, backfilled with cuttings.
LOGGED BY: ECG
CHECKED BY: AD

METHOD	WELL INSTALLATION	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
SFA		0.0		SM	Silty SAND, poorly graded, fine to coarse, sub-rounded to sub-angular, non plastic silt, pale brown, inferred medium dense, moist (Quaternary muds).			
		0.5		SM	With clay, trace gravel, grey mottled brown.			
		1.0						
		1.5			Terminated at 1.50 m. Target Depth Achieved.			
		2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

BOREHOLE LOG

MW05

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 1.50 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION: E476615.234 N7718717.054 (GDA2020 / MGA zone 50)
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Solid Flight Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 150 mm
DIMENSIONS: N/A
GENERAL NOTES: Piezometre - constructed with gravel sleeve, backfilled with cuttings.
LOGGED BY: ECG
CHECKED BY: AD

METHOD	WELL INSTALLATION	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
SFA		0.0		SM	Silty SAND, poorly graded, fine to coarse, sub-rounded to sub-angular, non plastic silt, pale brown, inferred medium dense, moist (Quaternary muds).			
		0.5		SM	With clay, trace gravel, grey mottled brown.			
		1.0						
		1.5			Terminated at 1.50 m. Target Depth Achieved.			
		2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

BOREHOLE LOG

SB01

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 0.50 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION:
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Hand Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 100 mm
DIMENSIONS: N/A
GENERAL NOTES: N/A
LOGGED BY: ECG
CHECKED BY: AD

METHOD	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
HA	0.0		SM	Silty SAND, poorly graded, fine to coarse, sub-rounded to sub-angular, non plastic silt, pale brown, inferred medium dense, moist (Quaternary muds).	EU	SB01_0-0.1 QC101, QC201	
					EU	SB01_0.4-0.5	
			SM	With clay, trace cobbles, grey mottled brown, wet.			
	0.5			Terminated at 0.50 m. Target Depth Achieved.			
	1.0						
	1.5						
	2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

BOREHOLE LOG

SB02

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 0.30 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION:
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Hand Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 100 mm
DIMENSIONS: N/A
GENERAL NOTES: N/A
LOGGED BY: ECG
CHECKED BY: AD

METHOD	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
HA	0.0		SM	Silty SAND, poorly graded, fine to coarse, sub-rounded to sub-angular, non plastic silt, pale brown, inferred medium dense, moist (Quaternary muds).	EU	SB02_0-0.1	
					EU	SB02_0.2-0.3	
				Terminated at 0.30 m. Refusal on rock.			
	0.5						
	1.0						
	1.5						
	2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

BOREHOLE LOG

SB03

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 0.40 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION:
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Hand Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 100 mm
DIMENSIONS: N/A
GENERAL NOTES: N/A
LOGGED BY: ECG
CHECKED BY: AD

METHOD	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
HA	0.0		SM	Silty SAND, poorly graded, fine to coarse, sub-rounded to sub-angular, non plastic silt, pale brown, inferred medium dense, moist (Quaternary muds).	EU	SB03_0-0.1	
					EU	SB03_0.3-0.4	
				Terminated at 0.40 m. Refusal on rock.			
	0.5						
	1.0						
	1.5						
	2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

BOREHOLE LOG

SB04

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 0.50 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION:
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Hand Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 100 mm
DIMENSIONS: N/A
GENERAL NOTES: N/A
LOGGED BY: ECG
WATER NOTE: Water observed at 0.40 m
CHECKED BY: AD

METHOD	GROUND WATER LEVELS	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
HA		0.0		SM	Silty SAND, poorly graded, fine to coarse, sub-rounded to sub-angular, non plastic silt, pale brown, inferred medium dense, moist (Quaternary muds).	EU	SB04_0-0.1	
	▶			SM	With clay, wet.	EU	SB04_0.4-0.5	
		0.5			Terminated at 0.50 m. Target Depth Achieved.			
		1.0						
		1.5						
		2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

BOREHOLE LOG

SB05

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 0.50 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION:
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Hand Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 100 mm
DIMENSIONS: N/A
GENERAL NOTES: N/A
LOGGED BY: ECG
WATER NOTE: Water observed at 0.30 m
CHECKED BY: AD

METHOD	GROUND WATER LEVELS	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
HA		0.0		SM	Silty SAND, poorly graded, fine to coarse, sub-rounded to sub-angular, non plastic silt, pale brown, inferred medium dense, moist (Quaternary muds).	EU	SB05_0-0.1	
	▶				Wet.			
				SM		EU	SB05_0.4-0.5	
		0.5			Terminated at 0.50 m. Target Depth Achieved.			
		1.0						
		1.5						
		2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

BOREHOLE LOG

SB06

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 0.50 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION:
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Hand Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 100 mm
DIMENSIONS: N/A
GENERAL NOTES: N/A
LOGGED BY: ECG
CHECKED BY: AD

METHOD	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
HA	0.0		SM	Silty SAND, poorly graded, fine to coarse, sub-rounded to sub-angular, non plastic silt, pale brown, inferred medium dense, moist (Quaternary muds).	EU	SB06_0-0.1	
			SM	With clay, mottled grey and brown.	EU	SB06_0.4-0.5	
	0.5			Terminated at 0.50 m. Target Depth Achieved.			
	1.0						
	1.5						
	2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

BOREHOLE LOG

SB07

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 0.30 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION:
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Hand Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 100 mm
DIMENSIONS: N/A
GENERAL NOTES: N/A
LOGGED BY: ECG
CHECKED BY: AD

METHOD	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
HA	0.0		SM	Silty SAND, poorly graded, fine to coarse, sub-rounded to sub-angular, non plastic silt, pale brown, inferred medium dense, moist (Quaternary muds).	EU	SB07_0-0.1	
					EU	SB07_0.2-0.3	
				Terminated at 0.30 m. Refusal on rock.			
	0.5						
	1.0						
	1.5						
	2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

BOREHOLE LOG

SB08

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 0.40 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION:
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Hand Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 100 mm
DIMENSIONS: N/A
GENERAL NOTES: N/A
LOGGED BY: ECG
CHECKED BY: AD

METHOD	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
HA	0.0		SM	Silty SAND, poorly graded, fine to coarse, sub-rounded to sub-angular, non plastic silt, trace gravel shell fragments, pale brown, inferred medium dense, moist (Quaternary muds).	EU	SB08_0-0.1	
			SM	Without shell fragments.	EU	SB08_0.4-0.5	
				Terminated at 0.40 m. Refusal on rock.			
	0.5						
	1.0						
	1.5						
	2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

BOREHOLE LOG

SB09

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 0.50 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION:
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Hand Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 100 mm
DIMENSIONS: N/A
GENERAL NOTES: N/A
LOGGED BY: ECG
WATER NOTE: Water observed at 0.20 m
CHECKED BY: AD

METHOD	GROUND WATER LEVELS	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
HA	▶	0.0		SM	Silty SAND, poorly graded, fine to coarse, sub-rounded to sub-angular, non plastic silt, trace shell fragments, pale brown, inferred medium dense, moist (Quaternary muds).	EU	SB09_0-0.1	
				SM	Without shell fragments, wet.	EU	SB09_0.4-0.5	
		0.5			Terminated at 0.50 m. Target Depth Achieved.			
		1.0						
		1.5						
		2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

BOREHOLE LOG

SB10

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 0.50 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION:
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Hand Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 100 mm
DIMENSIONS: N/A
GENERAL NOTES: N/A
LOGGED BY: ECG
WATER NOTE: Water observed at 0.40 m
CHECKED BY: AD

METHOD	GROUND WATER LEVELS	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
HA		0.0		SM	Silty SAND, poorly graded, medium to coarse, sub-rounded to sub-angular, non plastic silt, pale brown, inferred medium dense, moist (Quaternary muds).	EU	SB10_0-0.1 QC102, QC202	
				SM	Fine to coarse.			
	▶			SM	With clay, grey mottled brown, wet.	EU	SB10_0.4-0.5	
		0.5			Terminated at 0.50 m. Target Depth Achieved.			
		1.0						
		1.5						
		2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

BOREHOLE LOG

SB11

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 0.50 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION:
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Hand Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 100 mm
DIMENSIONS: N/A
GENERAL NOTES: N/A
LOGGED BY: ECG
WATER NOTE: Water observed at 0.40 m
CHECKED BY: AD

METHOD	GROUND WATER LEVELS	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
HA		0.0		SM	Silty SAND, poorly graded, medium to coarse, sub-rounded to sub-angular, non plastic silt, pale brown, inferred medium dense, moist (Quaternary muds).	EU	SB11_0-0.1	
				SM	Fine to coarse.			
	▶			SM	With clay, grey mottled brown, wet.	EU	SB11-0.4-0.5	
		0.5			Terminated at 0.50 m. Target Depth Achieved.			
		1.0						
		1.5						
		2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

BOREHOLE LOG

SB12

PROJECT: P21705: Pipeline Baseline Assessment
FINAL DEPTH: 0.50 m
LOCATION: Burrup Road, Burrup, WA 6714
CLIENT: AGIG
INCLINATION: Vertical
POSITION:
SURFACE ELEVATION: Not measured
ORIENTATION: N/A
RIG TYPE: Hand Auger
CONTRACTOR: Karratha Building Company
CASING: Not cased
DATE: 04 Jul 2024
DIAMETER: 100 mm
DIMENSIONS: N/A
GENERAL NOTES: N/A
LOGGED BY: ECG
WATER NOTE: Water observed at 0.40 m
CHECKED BY: AD

METHOD	GROUND WATER LEVELS	DEPTH (m)	GRAPHIC LOG	MODIFIED GROUP SYMBOL	MATERIAL DESCRIPTION	SAMPLE TYPE	SAMPLE ID	FIELD TESTS
HA		0.0		SM	Silty SAND, poorly graded, medium to coarse, sub-rounded to sub-angular, non plastic silt, pale brown, inferred medium dense, moist (Quaternary muds).	EU	SB12_0-0.1	
				SM	Fine to coarse.			
	▶			SM	With clay, grey mottled brown, wet.	EU	SB12_0.4-0.5	
		0.5			Terminated at 0.50 m. Target Depth Achieved.			
		1.0						
		1.5						
		2.0						

These logs have been prepared for environmental and geotechnical purposes
For explanation and abbreviations and symbols, refer to Soil Description Notes & Abbreviations (SEN-TECH-051).

Monitoring Round: P21705_05 Jul 2024

Location Visit

Site ID	P21705	**Monitoring Zone**	
Location Code	MW05		
Arrival Date/Time	05/07/2024 08:41AM	**Departure Date/Time**	05/07/2024 09:10AM
Executed By	Egan Churchill-Gray		
Weather	Sunny		
Comments			

Well Information

Gatic Type	Stick up
Key Type	None
Well Condition	Good

Authorisation

Checked By	
Date Checked	

Groundwater Data

Well	-	**Date/Time**	05/07/2024 08:42AM
Measurement Method	Dip	**Dry**	No
Water Depth (mbTOC)	1.144	**Well Depth (mbTOC)**	2.36
Product Depth (mbTOC)			
Comments & Product Description	Stickup height: 0.825 magl		
Equipment ID			
Sediment Thickness (m)			
Depth to Water with Pump (m)	1.144		

gauging

Well Head PID (PPM)	
Product Confirmed by Bailer	No

Sample Data

Sampled Date/Time	05/07/2024 09:06AM
Well	
Matrix Type	Water
Equipment ID	
Sample Comments	
Field ID (Primary)	MW05

Purge Method	Low flow (peri)
Sample Method	Low flow (peri)
Waste Disposal	Surface

Purge Observations (purge start)

Purge Colour (Description)	colourless
Purge Odour (Description)	sulphurous odour
Purge Sheen (Description)	no sheen
Purge Turbidity (Description)	Slightly turbid

Sample Observations (purge end)

Sample Colour (Description)	colourless
Sample Odour (Description)	sulphurous odour
Sample Sheen (Description)	no sheen
Sample Turbidity (Description)	Slightly turbid

QA Samples

QA Sample ID (1)	
QA Sample ID (2)	
QA Sample ID (3)	
QA Sample ID (4)	

Purge/Sampling Comments

Air Bubbles in Vials	No
Headspace PID Reading(s)	
Reaction with Preservatives	No
Recharge-ability	Avg 0.1-0.4L/min
Water Depth at end of Sampling (m)	1.18

Field Chemistry

Time	Pump Inlet Depth	Standing Water Level	Purge rate (Field)	EC (Field)	pH (Field)	Redox (Field)	Dissolved Oxygen (Field)	Temp (Field)	Purge Volume
	m bTOC	m bTOC	L/min	uS/cm	pH Units	mV	mg/L	° C	L
08:43AM	1.6	1.22	0.1	192208	6.87	-46.6	1.04	24.1	0.1
08:52AM	1.6	1.215	0.1	192900	6.95	-142.2	0.51	23.9	0.6
08:58AM	1.6	1.215	0.1	187560	6.98	-149.9	0.53	24.2	1.1
09:03AM	1.6	1.225	0.1	192348	6.95	-150.2	0.53	22.5	1.6
Stabilisation *				±3% (3)	±0.05pH (3)	±10mV (3)	±10% (3)	±10% (3)	

Green indicates readings have stabilised according to the criteria shown, red indicates they haven't. The number in brackets indicates the number of readings that need to meet the criteria for the readings to be considered stable.

Monitoring Round: P21705_05 Jul 2024

Location Visit

Site ID	P21705	**Monitoring Zone**	
Location Code	MW04		
Arrival Date/Time	05/07/2024 09:22AM	**Departure Date/Time**	05/07/2024 09:53AM
Executed By	Egan Churchill-Gray		
Weather	Sunny		
Comments			

Well Information

Gatic Type	Stick up
Key Type	None
Well Condition	Good

Authorisation

Checked By	
Date Checked	

Groundwater Data

Well	-	**Date/Time**	05/07/2024 09:22AM
Measurement Method	Dip	**Dry**	No
Water Depth (mbTOC)	0.925	**Well Depth (mbTOC)**	2.11
Product Depth (mbTOC)			
Comments & Product Description	Stickup height: 0.637 magl		
Equipment ID			
Sediment Thickness (m)			
Depth to Water with Pump (m)	0.925		

gauging

Well Head PID (PPM)	
Product Confirmed by Bailer	No

Sample Data

Sampled Date/Time	05/07/2024 09:42AM
Well	
Matrix Type	Water
Equipment ID	
Sample Comments	
Field ID (Primary)	MW04

Purge Method	Low flow (peri)
Sample Method	Low flow (peri)
Waste Disposal	Surface

Purge Observations (purge start)

Purge Colour (Description)	colourless
Purge Odour (Description)	sulphurous odour
Purge Sheen (Description)	no sheen
Purge Turbidity (Description)	Slightly turbid

Sample Observations (purge end)

Sample Colour (Description)	colourless
Sample Odour (Description)	sulphurous odour
Sample Sheen (Description)	no sheen
Sample Turbidity (Description)	Slightly turbid

QA Samples

QA Sample ID (1)

QA Sample ID (2)

QA Sample ID (3)

QA Sample ID (4)

Purge/Sampling Comments

Air Bubbles in Vials	No
Headspace PID Reading(s)	
Reaction with Preservatives	No
Recharge-ability	Avg 0.1-0.4L/min
Water Depth at end of Sampling (m)	1.63

Field Chemistry

Time	Pump Inlet Depth	Standing Water Level	Purge rate (Field)	EC (Field)	pH (Field)	Redox (Field)	Dissolved Oxygen (Field)	Temp (Field)	Purge Volume
	m bTOC	m bTOC	L/min	uS/cm	pH Units	mV	mg/L	° C	L
09:26AM	1.5	1.05	0.1	172682	7.37	-92.6	2.58	23.4	0.1
09:36AM	1.5	1.23	0.1	173310	7.4	-86.4	2.55	23.7	0.6
09:40AM	1.5	1.35	0.1	173491	7.4	-85.1	2.59	23.6	1.1
Stabilisation *				±3% (3)	±0.05pH (3)	±10mV (3)	±10% (3)	±10% (3)	

Green indicates readings have stabilised according to the criteria shown, red indicates they haven't. The number in brackets indicates the number of readings that need to meet the criteria for the readings to be considered stable.

Monitoring Round: P21705_05 Jul 2024

Location Visit

Site ID	P21705	**Monitoring Zone**	
Location Code	MW03		
Arrival Date/Time	05/07/2024 10:20AM	**Departure Date/Time**	05/07/2024 10:48AM
Executed By	Egan Churchill-Gray		
Weather	Sunny		
Comments			

Well Information

Gatic Type	Stick up
Key Type	None
Well Condition	Good

Authorisation

Checked By	
Date Checked	

Groundwater Data

Well	-	**Date/Time**	05/07/2024 10:20AM
Measurement Method	Dip	**Dry**	No
Water Depth (mbTOC)	1.051	**Well Depth (mbTOC)**	2.03
Product Depth (mbTOC)			
Comments & Product Description	Stickup height: 0.775 magl		
Equipment ID			
Sediment Thickness (m)			
Depth to Water with Pump (m)	1.051		

gauging

Well Head PID (PPM)	
Product Confirmed by Bailer	No

Sample Data

Sampled Date/Time	05/07/2024 10:35AM
Well	
Matrix Type	Water
Equipment ID	
Sample Comments	
Field ID (Primary)	MW03

Purge Method	Low flow (peri)
Sample Method	Low flow (peri)
Waste Disposal	Surface

Purge Observations (purge start)

Purge Colour (Description)	light brown
Purge Odour (Description)	no odour
Purge Sheen (Description)	no sheen
Purge Turbidity (Description)	Slightly turbid

Sample Observations (purge end)

Sample Colour (Description)	light brown
Sample Odour (Description)	no odour
Sample Sheen (Description)	no sheen
Sample Turbidity (Description)	Slightly turbid

QA Samples

QA Sample ID (1)	
QA Sample ID (2)	
QA Sample ID (3)	
QA Sample ID (4)	

Purge/Sampling Comments

Air Bubbles in Vials	No
Headspace PID Reading(s)	
Reaction with Preservatives	No
Recharge-ability	Poor <0.1L/min
Water Depth at end of Sampling (m)	1.85

Field Chemistry

Time	Pump Inlet Depth	Standing Water Level	Purge rate (Field)	EC (Field)	pH (Field)	Redox (Field)	Dissolved Oxygen (Field)	Temp (Field)	Purge Volume
	m bTOC	m bTOC	L/min	uS/cm	pH Units	mV	mg/L	° C	L
10:22AM	1.5	1.304	0.1	190630	7.45	-61.5	2.95	23.4	0.2
10:31AM	1.7	1.59	0.1	193313	7.4	-60.8	2.17	22.7	0.8
10:34AM	1.7	1.69	0.1	192065	7.43	-60.6	2.08	23	1.1
Stabilisation *				±3% (3)	±0.05pH (3)	±10mV (3)	±10% (3)	±10% (3)	

Green indicates readings have stabilised according to the criteria shown, red indicates they haven't. The number in brackets indicates the number of readings that need to meet the criteria for the readings to be considered stable.

Monitoring Round: P21705_05 Jul 2024

Location Visit

Site ID	P21705	**Monitoring Zone**	
Location Code	MW02		
Arrival Date/Time	05/07/2024 11:17AM	**Departure Date/Time**	05/07/2024 11:52AM
Executed By	Egan Churchill-Gray		
Weather	Sunny		
Comments			

Well Information

Gatic Type	Stick up
Key Type	None
Well Condition	Good

Authorisation

Checked By	
Date Checked	

Groundwater Data

Well	-	**Date/Time**	05/07/2024 11:17AM
Measurement Method	Dip	**Dry**	No
Water Depth (mbTOC)	0.912	**Well Depth (mbTOC)**	2.13
Product Depth (mbTOC)			
Comments & Product Description	Stickup height: 0.583 magl 0.627m after collar install post gauging		
Equipment ID			
Sediment Thickness (m)			
Depth to Water with Pump (m)	0.912		

gauging

Well Head PID (PPM)	
Product Confirmed by Bailer	No

Sample Data

Sampled Date/Time	05/07/2024 11:38AM
Well	
Matrix Type	Water
Equipment ID	
Sample Comments	Extra amber botles for lab qc
Field ID (Primary)	MW02

Purge Method	Low flow (peri)
Sample Method	Low flow (peri)
Waste Disposal	Surface

Purge Observations (purge start)

Purge Colour (Description)	colourless
Purge Odour (Description)	no odour
Purge Sheen (Description)	no sheen
Purge Turbidity (Description)	Slightly turbid

Sample Observations (purge end)

Sample Colour (Description)	colourless
Sample Odour (Description)	no odour
Sample Sheen (Description)	no sheen
Sample Turbidity (Description)	Slightly turbid

QA Samples

QA Sample ID (1)	QC104
QA Sample ID (2)	QC204
QA Sample ID (3)	
QA Sample ID (4)	

Purge/Sampling Comments

Air Bubbles in Vials	No
Headspace PID Reading(s)	
Reaction with Preservatives	No
Recharge-ability	Avg 0.1-0.4L/min
Water Depth at end of Sampling (m)	0.96

Field Chemistry

Time	Pump Inlet Depth	Standing Water Level	Purge rate (Field)	EC (Field)	pH (Field)	Redox (Field)	Dissolved Oxygen (Field)	Temp (Field)	Purge Volume
	m bTOC	m bTOC	L/min	uS/cm	pH Units	mV	mg/L	° C	L
11:20AM	1.5	0.98	0.1	147639	7.33	-56.9	0.7	24.7	0.2
11:28AM	1.5	0.99	0.1	147226	7.29	-60.6	0.41	25.1	0.8
11:32AM	1.5	0.99	0.1	146825	7.27	-63.2	0.39	25.3	1.2
11:37AM	1.5	0.95	0.1	146987	7.24	-65.6	0.38	25.3	1.7
Stabilisation *				±3% (3)	±0.05pH (3)	±10mV (3)	±10% (3)	±10% (3)	

Green indicates readings have stabilised according to the criteria shown, red indicates they haven't. The number in brackets indicates the number of readings that need to meet the criteria for the readings to be considered stable.

Monitoring Round: P21705_05 Jul 2024

Location Visit

Site ID	P21705	**Monitoring Zone**	
Location Code	MW01		
Arrival Date/Time	05/07/2024 12:18PM	**Departure Date/Time**	05/07/2024 12:38PM
Executed By	Egan Churchill-Gray		
Weather	Sunny		
Comments			

Well Information

Gatic Type	Stick up
Key Type	None
Well Condition	Good

Authorisation

Checked By	
Date Checked	

Groundwater Data

Well	-	**Date/Time**	05/07/2024 12:18PM
Measurement Method	Dip	**Dry**	No
Water Depth (mbTOC)	0.968	**Well Depth (mbTOC)**	2.16
Product Depth (mbTOC)			
Comments & Product Description	Stickup height: 0.592 magl		
Equipment ID			
Sediment Thickness (m)			
Depth to Water with Pump (m)	0.968		

gauging

Well Head PID (PPM)	
Product Confirmed by Bailer	No

Sample Data

Sampled Date/Time	05/07/2024 12:30PM
Well	
Matrix Type	Water
Equipment ID	
Sample Comments	Extra pfas bottles for lab qc
Field ID (Primary)	MW01

Purge Method	Low flow (peri)
Sample Method	Low flow (peri)
Waste Disposal	Surface

Purge Observations (purge start)

Purge Colour (Description)	colourless
Purge Odour (Description)	no odour
Purge Sheen (Description)	no sheen
Purge Turbidity (Description)	Moderately turbid

Sample Observations (purge end)

Sample Colour (Description)	colourless
Sample Odour (Description)	no odour
Sample Sheen (Description)	no sheen
Sample Turbidity (Description)	Moderately turbid

QA Samples

QA Sample ID (1)	
QA Sample ID (2)	
QA Sample ID (3)	
QA Sample ID (4)	

Purge/Sampling Comments

Air Bubbles in Vials	No
Headspace PID Reading(s)	
Reaction with Preservatives	No
Recharge-ability	Avg 0.1-0.4L/min
Water Depth at end of Sampling (m)	1.2

Field Chemistry

Time	Pump Inlet Depth	Standing Water Level	Purge rate (Field)	EC (Field)	pH (Field)	Redox (Field)	Dissolved Oxygen (Field)	Temp (Field)	Purge Volume
	m bTOC	m bTOC	L/min	uS/cm	pH Units	mV	mg/L	° C	L
12:19PM	1.5	1.11	0.1	131422	7.56	-56.5	1.1	25	0.2
12:25PM	1.5	1.17	0.1	130733	7.56	-59.6	0.98	24.7	0.7
12:28PM	1.5	1.2	0.1	130858	7.56	-62	0.96	24.8	1
Stabilisation *				±3% (3)	±0.05pH (3)	±10mV (3)	±10% (3)	±10% (3)	

Green indicates readings have stabilised according to the criteria shown, red indicates they haven't. The number in brackets indicates the number of readings that need to meet the criteria for the readings to be considered stable.

Appendix G: Quality Assurance / Quality Control Assessment

Appendix G – Quality Assurance / Quality Control Assessment

1. Background

The data quality assurance (QA) and quality control (QC) procedures adopted by Senversa provide a consistent approach to evaluation of whether the data quality objectives (DQOs) required by the project have been achieved. The process focuses on assessment of the useability of the data in terms of accuracy and reliability in forming conclusions on the condition of the element of the environment being investigated. The approach is generally based on guidance from the following sources:

- National Environment Protection Council (NEPC) – *National Environment Protection (Assessment of Site Contamination) Amendment Measure No. 1 2013 (NEPM), Schedule B2: Guideline on Site Characterisation.*
- NEPC – *National Environment Protection (Assessment of Site Contamination) Amendment Measure No. 1 2013 (NEPM), Schedule B3: Guideline on Laboratory Analysis of Potentially Contaminated Soils.*
- United States Environmental Protection Agency (US EPA) – *Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4).*
- US EPA – *Guidance on Environmental Data Verification and Data Validation (EPA QA/G-8).*

2. Quality Assurance Procedure

The following data quality objectives, measures and acceptance criteria were adopted to verify compliance with the planned QA procedures:

Quality Assurance Process	Data Quality Element	Objectives and Measure	Acceptance Criteria
Standard Procedures	Comparability, Reproducibility, Representativeness	Standard field sampling procedures and forms used	No deviation from standard procedure and forms used
Equipment Calibration	Accuracy	All equipment calibrated in accordance with manufacturers specifications	All equipment calibrated in accordance with manufacturers specifications
Testing Method Accreditation	Accuracy and Comparability	National Association of Testing Authorities (NATA) accredited methods used for all analyses determined	Primary and secondary laboratories to use NATA accredited methods for all analytes determined
Quality Control Sampling Frequency	Precision and Repeatability	Field QC sampling frequency in accordance with AS4482.1-2005	Duplicates: ≥ 1 in 20 primary samples Triplicates: ≥ 1 in 20 primary samples Rinsate Blanks: ≥ 1 per day, per matrix per equipment Trip Blanks: ≥ 1 per esky containing samples for volatile analyses

Quality Assurance Process	Data Quality Element	Objectives and Measure	Acceptance Criteria
Quality Control Sampling Frequency	Accuracy, Precision and Comparability	Laboratory QC analysis frequency in accordance with NEPC (2013), Schedule B3	Laboratory Duplicates – at least 1 in 10 analyses or one per process batch Method Blanks – at least 1 per process batch Surrogate Recoveries – all samples spiked where appropriate (e.g. chromatographic analysis of organics) Laboratory Control Samples – at least 1 per process batch Matrix Spikes – at least 1 per matrix type per process batch
Sample Preservation, Handling and Holding Times	Accuracy	Samples appropriately preserved upon collection , stored and transported, and analysed within holding times	Sample containers, holding times and preservation in accordance laboratory specific method requirements.
Data Management	Accuracy	No errors in data transcription	Entry of field data verified by peer.
Data Useability	Completeness	Limits of reporting (LOR) less than adopted beneficial use investigation levels. Sample volumes and analytical methods selected to enable required LOR to be achieved	LOR less than investigation levels.

3. Quality Control Sampling and Analysis

The following data quality objectives, measures and acceptance criteria were adopted to evaluate the validity of the analytical data produced.

Quality Control Process	Data Quality Element	Objectives and Measure	Acceptance Criteria
Field Duplicate Sampling and Analysis	Precision and Field Repeatability	Field duplicate samples used assess the variability in analyte concentration between samples collected from the sample location and the reproducibility of the laboratory analysis. Where required, resubmission of previously analysed samples for chemicals within their holding times may be undertaken to further assess level of precision.	Analysed for same chemicals as primary sample RPD[1] <30% of mean concentration where both concentrations >20 x LOR RPD <50% of mean concentration where higher concentration 10 – 20 x LOR RPD - No limit where both concentrations < 10 x LOR

[1] Relative Percent Difference (%): Calculated as: ([Result No.1 – Result No. 2] ÷ Mean Result) × 100

Quality Control Process	Data Quality Element	Objectives and Measure	Acceptance Criteria
Triplicate Sampling and Analysis	Accuracy	Results are accurate and free from laboratory error. Triplicate samples sent to a secondary laboratory to assess the accuracy of the analyte concentrations reported by the primary laboratory	Analysed for same chemicals as primary sample RPD <30% of mean concentration where both concentrations >20 x LOR RPD <50% of mean concentration where higher concentration 10 – 20 x LOR RPD - No limit where both concentrations < 10 x LOR
Field Rinsate Blank Preparation and Analysis	Accuracy and Representativeness	Cross contamination of samples does not occur between sampling locations due to carry-over from sampling equipment. Rinsate blank samples prepared for each sampling procedure. Where possible the rinsate blanks are prepared immediately after sampling locations known to contain concentrations of the chemicals of concern above the LOR and / or before sampling locations where the chemicals being targeted in the laboratory analysis are to be compared to investigation levels near the LOR of the chemical.	Analyte concentrations below LOR
Trip Blank Sampling and Analysis	Accuracy and Representativeness	Cross contamination between samples does not occur in transit or as an artefact of the sample handling procedure. Trip blank samples prepared by the laboratory which accompany the empty sampling containers from the laboratory to the sampling site, and return with the samples to the laboratory to assess whether cross contamination occurs between samples or as an artefact of the sampling procedure.	Analyte concentrations below LOR
Laboratory QC Analysis	Laboratory Precision and Accuracy	Laboratory duplicates	As specified by the laboratory.
		Laboratory control spike	Dynamic recovery limits as specified by the laboratory.
		Certified reference material	As specified by the laboratory (generally dynamic recovery limits).
		Surrogate recovery	Dynamic recovery limits as specified by the laboratory.

Quality Control Process	Data Quality Element	Objectives and Measure	Acceptance Criteria
Laboratory QC Analysis		Matrix spike recovery	Recovery 70% – 130% or dynamic recovery limits specified by laboratory. However, note that recovery of phenols is generally significantly lower and a recovery in the range 20% to 130% is considered acceptable by most laboratories.
		Matrix spike recovery duplicate	RPD < 30%, or as specified by the laboratory.

4. Data Verification and Validation

The data validation process involved the checking of analytical procedure compliance with acceptance criteria and an assessment of the accuracy and precision of analytical data from the range of quality control indicators generated from both the sampling and analytical programmes.

RPDs results are provided in **Table 3** and **Table 7**, and blank results are provided in **Table 4** and **Table 8**.

4.1 Holding Times

Samples were generally analysed within recommended holding times, except for the following instances:

- EP2409638:
  - Analysis holding time overdue for: pH (8 days) in MW01 - MW05, and QC104.
  - Nitrite as N (1 day) in MW01 - MW05, QC104, QC302.
  - Reactive Phosphorus as P (1 day) in MW01 - MW05, QC104, QC302.

4.2 QC Frequencies

Laboratory duplicates were analysed at the required frequencies, except for the following instances:

- EP2409636:
  - Per- and Polyfluoroalkyl Substances (PFAS) (5.56 Actual/10.00 Expected)
  - TRH - Semivolatile Fraction (5.88 Actual/10.00 Expected)
- EP2409638:
  - TRH - Semivolatile Fraction (5.88 Actual/10.00 Expected)

Matrix spikes were analysed at the required frequencies, except for the following instances:

- EP2409638:
  - PFAS (0.00 Actual/10.00 Expected)

The above non-conformances are not considered to impact the quality of the data or data interpretation as additional laboratory tests (e.g. method blanks, surrogate recoveries, and laboratory control samples) were analysed over the entire sampling program at an acceptable frequency for these contaminants of potential concern (COPCs).

4.3 Matrix Spike Recoveries

Matrix spike recoveries were generally within the acceptable limits, except for the following instances:

- EP2409636 - Anonymous QC sample: Perfluorooctane sulfonic acid (PFOS) recovery not determined, background level greater than or equal to 4x spike level

- 1115574 - Low recovery for chromium (67%) below acceptance limit (75 - 125%)

There may be a low bias in reported results where matrix spike recoveries were below acceptable range. This was considered during data assessment. Laboratory report 1115574 present analysis of triplicates, and primary samples were used for final data assessment. Non-conformances did not affect the data interpretation as the results were generally consistent across all sampling events.

4.4 Laboratory Control Spike Recovery

Laboratory Control Spike Recoveries were generally within the acceptable limits, except for:

- EP2409636: recovery was greater than upper control limit in PAH: Acenaphthylene, Anthracene, and Pyrene.

Non-conformances in EP2409636 did not affect the data interpretation as all soil analytical results were below analyte LOR for PAHs.

4.5 Surrogate Recovery

Surrogate recoveries were generally within the acceptable limits, except for the following instances in EP2409636 (recovery greater than upper data quality objective):

- PAH: Anthracene-d10 in three samples,
- PAH: 4-Terphenyl-d14 in 14 samples,

Recoveries that are greater than the upper quality limit may have data biased to a greater concentration for associated primary sample. Non-conformances in Batch EP2409636 did not affect the data interpretation as all soil analytical results were below analyte LOR for PAHs.

4.6 Field RPDs and Blank Samples

Replicate and blank samples were collected during the investigation to confirm the repeatability and validity of the sample collection methods and resultant data. RPDs results are provided in **Table 5a**, and **Table 5b**, and blank results are provided in **Table 5c**.

All field blank results were below LOR

All RPDs were within the relevant acceptance criteria with exception of:

- Duplicate pair SB01_0-0.1 and QC101 for acidity - Acid Reacted Magnesium and acidity - Excess Acid Neutralising Capacity; between SB10_0-0.1 and QC102 for acidity - Acid Reacted Magnesium,
- Duplicate pair MW02 and QC104 for Ionic Balance,
- Triplicate pair SB01_0-0.1 and QC201 for acidity - Acid Reacted Calcium and acidity - Acid Reacted Magnesium; between SB10_0-0.1 and QC202 for acidity - Acid Reacted Calcium (39%) and acidity - Acid Reacted Magnesium,
- Triplicate pair MW02 and QC204 for Ammonia (as N), Sulfate (as SO4) (filtered), and Ionic Balance.

RPD exceedances may be associated with the heterogeneity of the soil. The other QC samples collected were all within quality limits and the soil analytical results are considered to be broadly reliable.

5. Data Suitability

While some laboratory QC non-conformances were reported, these were not considered to significantly impact on the quality or representativeness of the data, and the remainder of the QAQC results indicated that data quality was within acceptable limits. The overall results are therefore considered representative of the environmental condition of the site at the time of investigation and are suitable for their intended purpose.

Appendix H: Laboratory Reports

CERTIFICATE OF ANALYSIS

Work Order	: **EP2409636**	Page	: 1 of 57
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: MS ASHTON BETTI	Contact	: Ashvini Wickramasinghe
Address	: LEVEL 18, 140 ST GEORGES TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: +61 08 6557 8881	Telephone	: +61-8-9406 1301
Project	: P21705 Burrup - Baseline Assessment	Date Samples Received	: 08-Jul-2024 12:40
Order number	: PO023451	Date Analysis Commenced	: 09-Jul-2024
C-O-C number	: ----	Issue Date	: 23-Jul-2024 19:38
Sampler	: Egan Churchill-Gray		
Site	: ----		
Quote number	: EN/000		
No. of samples received	: 29		
No. of samples analysed	: 29		

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*
Aleksandar Vujkovic	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Daniel Fisher	Inorganics Analyst	Perth ASS, Wangara, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Wangara, WA
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Thomas Donovan	Senior Organic Chemist	Perth Organics, Wangara, WA

General Comments

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

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

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

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

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

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

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

- EP075(SIM): High surrogate recovery deemed acceptable as all associated analyte results are less than LOR.
- 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.
- 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.
- ASS: EA029 (SPOCAS): Analysis is performed as per the Acid Sulfate Soils Laboratory Methods Guidelines (2004) and the updated National Acid Sulfate Soils Guidance: National acid sulfate soils identification and laboratory methods manual, Department of Agriculture and Water Resources, Canberra, ACT (2018)
- ASS: EA033 (CRS Suite): Analysis is performed as per the Acid Sulfate Soils Laboratory Methods Guidelines (2004) and the updated National Acid Sulfate Soils Guidance: National acid sulfate soils identification and laboratory methods manual, Department of Agriculture and Water Resources, Canberra, ACT (2018)
- EP075(SIM): High LCS recovery deemed acceptable as all associated analyte results are less than LOR.
- ASS: EA029 (SPOCAS): Retained Acidity not required because pH KCl greater than or equal to 4.5
- ASS: EA033 (CRS Suite): Retained Acidity not required because pH KCl greater than or equal to 4.5
- ASS: EA029 (SPOCAS): Laboratory determinations of ANC needs to be corroborated by effectiveness of the measured ANC in relation to incubation ANC. Unless corroborated, the results of ANC testing should be discounted when determining Net Acidity for comparison with action criteria, or for the determination of the acidity hazard and required liming amounts.
- ASS: EA033 (CRS Suite): Laboratory determinations of ANC needs to be corroborated by effectiveness of the measured ANC in relation to incubation ANC. Unless corroborated, the results of ANC testing should be discounted when determining Net Acidity for comparison with action criteria, or for the determination of the acidity hazard and required liming amounts.
- ASS: EA033 (CRS Suite): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m3'.
- ASS: EA029 (SPOCAS): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from kg/t dry weight to kg/m3 in-situ soil, multiply reported results x wet bulk density of soil in t/m3.
- ASS: EA003 (NATA Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).

- 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.
- 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 or as per USEPA 1633 limits where LISTED. 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 and also conform to QSM 5.4 (US DoD) requirements.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB01_0-0.1	SB01_0.4-0.5	SB02_0-0.1	SB02_0.2-0.3	SB03_0-0.1
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-001	EP2409636-002	EP2409636-003	EP2409636-004	EP2409636-005
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	8.6	8.8	8.7	8.7	8.7
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	8.2	8.4	8.3	8.3	8.2
pH (Fox)	----	0.1	pH Unit	8.1	7.0	7.3	7.0	7.1
Reaction Rate	----	1	Reaction Unit	1	1	1	2	2
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	10.0	10.0	10.1	9.9	9.8
pH OX (23B)	----	0.1	pH Unit	8.4	8.5	8.7	8.5	8.3
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.005	% S	0.085	0.147	0.098	0.109	0.189
Peroxide Sulfur (23De)	----	0.005	% S	0.143	0.230	0.105	0.183	0.270
Peroxide Oxidisable Sulfur (23E)	----	0.005	% S	0.059	0.083	0.007	0.074	0.080
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	5	mole H+ / t	37	52	<5	46	50
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.005	% Ca	0.244	0.300	0.240	0.286	0.304
Peroxide Calcium (23Wh)	----	0.005	% Ca	11.6	15.6	6.31	13.3	10.7
Acid Reacted Calcium (23X)	----	0.005	% Ca	11.3	15.3	6.07	13.0	10.4
acidity - Acid Reacted Calcium (a-23X)	----	5	mole H+ / t	5650	7660	3030	6520	5200
sulfidic - Acid Reacted Calcium (s-23X)	----	0.005	% S	9.06	12.3	4.86	10.4	8.33

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB01_0-0.1	SB01_0.4-0.5	SB02_0-0.1	SB02_0.2-0.3	SB03_0-0.1
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-001	EP2409636-002	EP2409636-003	EP2409636-004	EP2409636-005
				Result	Result	Result	Result	Result
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.005	% Mg	**0.098**	**0.108**	**0.097**	**0.139**	**0.149**
Peroxide Magnesium (23Tm)	----	0.005	% Mg	**0.818**	**1.36**	**0.516**	**1.30**	**1.64**
Acid Reacted Magnesium (23U)	----	0.005	% Mg	**0.721**	**1.25**	**0.419**	**1.16**	**1.49**
Acidity - Acid Reacted Magnesium (a-23U)	----	5	mole H+ / t	**593**	**1030**	**345**	**958**	**1220**
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.005	% S	**0.951**	**1.65**	**0.553**	**1.54**	**1.96**
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% CaCO3	**29.5**	**41.0**	**17.5**	**37.7**	**31.2**
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	**5900**	**8190**	**3500**	**7530**	**6230**
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	**9.45**	**13.1**	**5.60**	**12.1**	**9.98**
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	**0.06**	**0.08**	<0.02	**0.07**	**0.08**
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	**37**	**52**	<10	**46**	**50**
Liming Rate excluding ANC	----	1	kg CaCO3/t	**3**	**4**	<1	**3**	**4**
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	**10.0**	**10.0**	**10.1**	**9.9**	**9.8**
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	**0.006**	<0.005	<0.005	<0.005
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	<10	<10	<10
EA033-C: Acid Neutralising Capacity								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB01_0-0.1	SB01_0.4-0.5	SB02_0-0.1	SB02_0.2-0.3	SB03_0-0.1
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-001	EP2409636-002	EP2409636-003	EP2409636-004	EP2409636-005
				Result	Result	Result	Result	Result
EA033-C: Acid Neutralising Capacity - Continued								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	36.0	46.3	22.7	45.9	47.8
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	7180	9250	4540	9170	9550
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	11.5	14.8	7.27	14.7	15.3
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	<1	<1	<1
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	9.6	16.5	13.8	18.6	23.4
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	7	7	9	10	8
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	18	19	97	25	23
Copper	7440-50-8	5	mg/kg	27	<5	17	6	22
Lead	7439-92-1	5	mg/kg	<5	<5	6	<5	5
Nickel	7440-02-0	2	mg/kg	7	8	10	10	10
Zinc	7440-66-6	5	mg/kg	30	9	16	12	40
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SB01_0-0.1	SB01_0.4-0.5	SB02_0-0.1	SB02_0.2-0.3	SB03_0-0.1
				Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit		EP2409636-001	EP2409636-002	EP2409636-003	EP2409636-004	EP2409636-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<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	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB01_0-0.1	SB01_0.4-0.5	SB02_0-0.1	SB02_0.2-0.3	SB03_0-0.1
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-001	EP2409636-002	EP2409636-003	EP2409636-004	EP2409636-005
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg	<50	<50	<50	<50	<50
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg	<50	<50	<50	<50	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<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	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
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
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	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
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	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
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB01_0-0.1	SB01_0.4-0.5	SB02_0-0.1	SB02_0.2-0.3	SB03_0-0.1
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-001	EP2409636-002	EP2409636-003	EP2409636-004	EP2409636-005
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
Perfluorononane sulfonic acid (PFNS)	68259-12-1	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
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB01_0-0.1	SB01_0.4-0.5	SB02_0-0.1	SB02_0.2-0.3	SB03_0-0.1
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-001	EP2409636-002	EP2409636-003	EP2409636-004	EP2409636-005
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	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 PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
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
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	67.8	64.8	58.8	61.1	73.8
2-Chlorophenol-D4	93951-73-6	0.5	%	82.4	82.2	76.6	82.7	95.0
2.4.6-Tribromophenol	118-79-6	0.5	%	67.5	61.3	62.8	60.2	94.2
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	94.3	94.4	89.7	96.3	119
Anthracene-d10	1719-06-8	0.5	%	121	119	110	122	144
4-Terphenyl-d14	1718-51-0	0.5	%	143	139	134	144	197
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	91.2	86.4	77.2	82.3	77.2
Toluene-D8	2037-26-5	0.2	%	93.0	86.9	77.2	84.4	77.2
4-Bromofluorobenzene	460-00-4	0.2	%	90.0	87.3	77.9	84.6	77.8
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	112	110	113	111	112

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB01_0-0.1	SB01_0.4-0.5	SB02_0-0.1	SB02_0.2-0.3	SB03_0-0.1
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-001	EP2409636-002	EP2409636-003	EP2409636-004	EP2409636-005
				Result	Result	Result	Result	Result
EP231S: PFAS Surrogate - Continued								
13C8-PFOA	----	0.0002	%	**110**	**113**	**116**	**108**	**108**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB03_0.3-0.4	SB04_0-0.1	SB04_0.4-0.5	SB05_0-0.1	SB05_0.4-0.5
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-006	EP2409636-007	EP2409636-008	EP2409636-009	EP2409636-010
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**8.6**	**8.6**	**8.7**	**8.6**	**8.4**
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	**8.4**	**8.3**	**8.4**	**8.3**	**8.3**
pH (Fox)	----	0.1	pH Unit	**7.0**	**7.3**	**7.3**	**7.3**	**7.1**
Reaction Rate	----	1	Reaction Unit	**2**	**1**	**1**	**2**	**1**
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**9.9**	**10.0**	**9.8**	**9.9**	**9.8**
pH OX (23B)	----	0.1	pH Unit	**8.5**	**8.3**	**8.6**	**8.3**	**8.5**
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.005	% S	**0.094**	**0.751**	**0.117**	**0.510**	**0.213**
Peroxide Sulfur (23De)	----	0.005	% S	**0.165**	**0.758**	**0.177**	**0.580**	**0.252**
Peroxide Oxidisable Sulfur (23E)	----	0.005	% S	**0.071**	**0.007**	**0.060**	**0.070**	**0.039**
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	5	mole H+ / t	**44**	<5	**38**	**44**	**24**
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.005	% Ca	**0.284**	**0.804**	**0.356**	**0.588**	**0.373**
Peroxide Calcium (23Wh)	----	0.005	% Ca	**13.0**	**8.80**	**12.4**	**9.32**	**8.16**
Acid Reacted Calcium (23X)	----	0.005	% Ca	**12.7**	**8.00**	**12.1**	**8.73**	**7.78**
acidity - Acid Reacted Calcium (a-23X)	----	5	mole H+ / t	**6340**	**3990**	**6020**	**4360**	**3880**
sulfidic - Acid Reacted Calcium (s-23X)	----	0.005	% S	**10.2**	**6.40**	**9.66**	**6.98**	**6.23**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB03_0.3-0.4	SB04_0-0.1	SB04_0.4-0.5	SB05_0-0.1	SB05_0.4-0.5
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-006	EP2409636-007	EP2409636-008	EP2409636-009	EP2409636-010
				Result	Result	Result	Result	Result
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.005	% Mg	**0.110**	**0.257**	**0.143**	**0.246**	**0.148**
Peroxide Magnesium (23Tm)	----	0.005	% Mg	**1.01**	**1.55**	**1.12**	**1.92**	**1.49**
Acid Reacted Magnesium (23U)	----	0.005	% Mg	**0.904**	**1.30**	**0.978**	**1.68**	**1.34**
Acidity - Acid Reacted Magnesium (a-23U)	----	5	mole H+ / t	**743**	**1070**	**805**	**1380**	**1100**
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.005	% S	**1.19**	**1.71**	**1.29**	**2.21**	**1.77**
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% CaCO3	**34.5**	**23.9**	**33.8**	**26.2**	**24.5**
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	**6900**	**4780**	**6760**	**5230**	**4900**
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	**11.0**	**7.65**	**10.8**	**8.38**	**7.85**
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	**0.07**	<0.02	**0.06**	**0.07**	**0.04**
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	**44**	<10	**38**	**44**	**25**
Liming Rate excluding ANC	----	1	kg CaCO3/t	**3**	<1	**3**	**3**	**2**
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	**9.9**	**10.0**	**9.8**	**9.9**	**9.8**
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	**0.007**	<0.005	<0.005	<0.005
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	<10	<10	<10
EA033-C: Acid Neutralising Capacity								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB03_0.3-0.4	SB04_0-0.1	SB04_0.4-0.5	SB05_0-0.1	SB05_0.4-0.5
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-006	EP2409636-007	EP2409636-008	EP2409636-009	EP2409636-010
				Result	Result	Result	Result	Result
EA033-C: Acid Neutralising Capacity - Continued								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	**40.8**	**36.1**	**34.5**	**46.4**	**43.9**
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	**8150**	**7210**	**6890**	**9280**	**8770**
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	**13.1**	**11.6**	**11.0**	**14.9**	**14.0**
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	<1	<1	<1
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**20.4**	**17.1**	**21.8**	**23.9**	**20.0**
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**8**	**8**	**9**	**10**	**12**
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	**25**	**21**	**29**	**27**	**28**
Copper	7440-50-8	5	mg/kg	**6**	**14**	**6**	**17**	**7**
Lead	7439-92-1	5	mg/kg	<5	<5	<5	<5	<5
Nickel	7440-02-0	2	mg/kg	**11**	**9**	**13**	**12**	**13**
Zinc	7440-66-6	5	mg/kg	**12**	**23**	**14**	**27**	**14**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SB03_0.3-0.4	SB04_0-0.1	SB04_0.4-0.5	SB05_0-0.1	SB05_0.4-0.5
				Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit		EP2409636-006	EP2409636-007	EP2409636-008	EP2409636-009	EP2409636-010
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<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	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SB03_0.3-0.4	SB04_0-0.1	SB04_0.4-0.5	SB05_0-0.1	SB05_0.4-0.5
				Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit		EP2409636-006	EP2409636-007	EP2409636-008	EP2409636-009	EP2409636-010
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<50	<50	<50	<50
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		----	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<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	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
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
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	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
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	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
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB03_0.3-0.4	SB04_0-0.1	SB04_0.4-0.5	SB05_0-0.1	SB05_0.4-0.5
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-006	EP2409636-007	EP2409636-008	EP2409636-009	EP2409636-010
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorononane sulfonic acid (PFNS)	68259-12-1	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
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB03_0.3-0.4	SB04_0-0.1	SB04_0.4-0.5	SB05_0-0.1	SB05_0.4-0.5
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-006	EP2409636-007	EP2409636-008	EP2409636-009	EP2409636-010
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	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 PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
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
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**60.9**	**60.2**	**89.4**	**82.3**	**89.6**
2-Chlorophenol-D4	93951-73-6	0.5	%	**83.2**	**85.7**	**81.3**	**73.3**	**80.0**
2.4.6-Tribromophenol	118-79-6	0.5	%	**62.4**	**62.0**	**57.8**	**55.2**	**52.0**
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**95.9**	**101**	**97.6**	**89.6**	**96.8**
Anthracene-d10	1719-06-8	0.5	%	**120**	**125**	**120**	**113**	**123**
4-Terphenyl-d14	1718-51-0	0.5	%	**147**	**152**	**147**	**135**	**148**
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**90.1**	**89.1**	**94.0**	**97.0**	**97.4**
Toluene-D8	2037-26-5	0.2	%	**90.6**	**90.3**	**95.4**	**97.2**	**97.0**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SB03_0.3-0.4	SB04_0-0.1	SB04_0.4-0.5	SB05_0-0.1	SB05_0.4-0.5
				Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit		EP2409636-006	EP2409636-007	EP2409636-008	EP2409636-009	EP2409636-010
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**91.5**	**90.1**	**93.6**	**95.6**	**94.4**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**110**	**112**	**120**	**108**	**129**
13C8-PFOA	----	0.0002	%		**102**	**112**	**93.5**	**114**	**118**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB06_0-0.1	SB06_0.4-0.5	SB07_0-0.1	SB07_0.2-0.3	SB08_0-0.1
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-011	EP2409636-012	EP2409636-013	EP2409636-014	EP2409636-015
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	8.6	8.5	8.7	8.6	8.7
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	8.4	8.4	8.4	8.4	8.4
pH (Fox)	----	0.1	pH Unit	7.2	7.6	7.0	7.3	7.0
Reaction Rate	----	1	Reaction Unit	1	2	1	2	1
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	9.9	9.7	9.8	9.9	10.0
pH OX (23B)	----	0.1	pH Unit	8.3	8.4	8.3	8.4	8.4
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.005	% S	0.276	0.276	0.237	0.133	0.172
Peroxide Sulfur (23De)	----	0.005	% S	0.370	0.532	0.367	0.243	0.310
Peroxide Oxidisable Sulfur (23E)	----	0.005	% S	0.094	0.255	0.130	0.110	0.138
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	5	mole H+ / t	58	159	81	68	86
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.005	% Ca	0.389	0.370	0.348	0.289	0.302
Peroxide Calcium (23Wh)	----	0.005	% Ca	11.2	8.62	17.8	17.8	21.6
Acid Reacted Calcium (23X)	----	0.005	% Ca	10.8	8.25	17.5	17.5	21.3
acidity - Acid Reacted Calcium (a-23X)	----	5	mole H+ / t	5420	4120	8740	8750	10600
sulfidic - Acid Reacted Calcium (s-23X)	----	0.005	% S	8.69	6.60	14.0	14.0	17.0

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB06_0-0.1	SB06_0.4-0.5	SB07_0-0.1	SB07_0.2-0.3	SB08_0-0.1
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-011	EP2409636-012	EP2409636-013	EP2409636-014	EP2409636-015
				Result	Result	Result	Result	Result
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.005	% Mg	**0.174**	**0.180**	**0.233**	**0.171**	**0.152**
Peroxide Magnesium (23Tm)	----	0.005	% Mg	**1.64**	**1.53**	**2.96**	**1.58**	**1.76**
Acid Reacted Magnesium (23U)	----	0.005	% Mg	**1.47**	**1.35**	**2.72**	**1.41**	**1.61**
Acidity - Acid Reacted Magnesium (a-23U)	----	5	mole H+ / t	**1210**	**1110**	**2240**	**1160**	**1320**
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.005	% S	**1.94**	**1.78**	**3.59**	**1.86**	**2.12**
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% CaCO3	**32.1**	**25.4**	**52.1**	**48.4**	**58.5**
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	**6410**	**5070**	**10400**	**9670**	**11700**
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	**10.3**	**8.12**	**16.7**	**15.5**	**18.7**
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	**0.09**	**0.26**	**0.13**	**0.11**	**0.14**
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	**59**	**159**	**81**	**68**	**86**
Liming Rate excluding ANC	----	1	kg CaCO3/t	**4**	**12**	**6**	**5**	**6**
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	**9.9**	**9.7**	**9.8**	**9.9**	**10.0**
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	**0.195**	<0.005	<0.005	<0.005
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	**122**	<10	<10	<10
EA033-C: Acid Neutralising Capacity								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB06_0-0.1	SB06_0.4-0.5	SB07_0-0.1	SB07_0.2-0.3	SB08_0-0.1
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-011	EP2409636-012	EP2409636-013	EP2409636-014	EP2409636-015
				Result	Result	Result	Result	Result
EA033-C: Acid Neutralising Capacity - Continued								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	46.8	28.1	61.6	57.1	68.3
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	9340	5610	12300	11400	13600
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	15.0	9.00	19.7	18.3	21.9
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	0.20	<0.02	<0.02	<0.02
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	122	<10	<10	<10
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	9	<1	<1	<1
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	19.3	21.3	17.4	19.6	14.6
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	10	14	11	9	10
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	20	33	23	22	12
Copper	7440-50-8	5	mg/kg	5	6	10	5	<5
Lead	7439-92-1	5	mg/kg	<5	<5	<5	<5	<5
Nickel	7440-02-0	2	mg/kg	8	13	10	9	5
Zinc	7440-66-6	5	mg/kg	8	14	16	8	6
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SB06_0-0.1	SB06_0.4-0.5	SB07_0-0.1	SB07_0.2-0.3	SB08_0-0.1
				Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit		EP2409636-011	EP2409636-012	EP2409636-013	EP2409636-014	EP2409636-015
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<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	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SB06_0-0.1	SB06_0.4-0.5	SB07_0-0.1	SB07_0.2-0.3	SB08_0-0.1
				Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit		EP2409636-011	EP2409636-012	EP2409636-013	EP2409636-014	EP2409636-015
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<50	<50	<50	<50
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<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	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
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
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	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
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	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
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB06_0-0.1	SB06_0.4-0.5	SB07_0-0.1	SB07_0.2-0.3	SB08_0-0.1
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-011	EP2409636-012	EP2409636-013	EP2409636-014	EP2409636-015
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
Perfluorononane sulfonic acid (PFNS)	68259-12-1	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
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB06_0-0.1	SB06_0.4-0.5	SB07_0-0.1	SB07_0.2-0.3	SB08_0-0.1
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-011	EP2409636-012	EP2409636-013	EP2409636-014	EP2409636-015
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	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 PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
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
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	89.8	88.2	87.0	86.3	104
2-Chlorophenol-D4	93951-73-6	0.5	%	80.9	81.4	78.7	78.3	110
2.4.6-Tribromophenol	118-79-6	0.5	%	54.6	53.0	53.3	52.3	85.6
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	97.5	97.9	94.9	94.4	111
Anthracene-d10	1719-06-8	0.5	%	125	123	123	120	98.6
4-Terphenyl-d14	1718-51-0	0.5	%	150	149	147	142	126
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	89.6	98.2	93.0	91.5	81.7
Toluene-D8	2037-26-5	0.2	%	92.9	101	95.3	90.7	73.4
4-Bromofluorobenzene	460-00-4	0.2	%	93.1	99.2	95.9	88.8	81.8
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	112	114	110	101	118

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB06_0-0.1	SB06_0.4-0.5	SB07_0-0.1	SB07_0.2-0.3	SB08_0-0.1
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-011	EP2409636-012	EP2409636-013	EP2409636-014	EP2409636-015
				Result	Result	Result	Result	Result
EP231S: PFAS Surrogate - Continued								
13C8-PFOA	----	0.0002	%	**95.0**	**95.0**	**120**	**122**	**122**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB08_0.3-0.4	SB09_0-0.1	SB09_0.4-0.5	SB10_0-0.1	SB10_0.4-0.5
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-016	EP2409636-017	EP2409636-018	EP2409636-019	EP2409636-020
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**8.7**	**8.6**	**8.6**	**8.7**	**8.6**
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	**8.6**	**8.5**	**8.4**	**8.5**	**8.5**
pH (Fox)	----	0.1	pH Unit	**7.1**	**7.0**	**6.9**	**6.9**	**6.8**
Reaction Rate	----	1	Reaction Unit	**1**	**1**	**1**	**1**	**1**
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**10.0**	**9.8**	**9.8**	**10.0**	**9.8**
pH OX (23B)	----	0.1	pH Unit	**8.4**	**8.2**	**8.3**	**8.3**	**8.2**
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.005	% S	**0.104**	**0.385**	**0.140**	**0.128**	**0.157**
Peroxide Sulfur (23De)	----	0.005	% S	**0.232**	**0.508**	**0.209**	**0.236**	**0.248**
Peroxide Oxidisable Sulfur (23E)	----	0.005	% S	**0.128**	**0.123**	**0.069**	**0.108**	**0.090**
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	5	mole H+ / t	**80**	**76**	**43**	**67**	**56**
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.005	% Ca	**0.259**	**0.468**	**0.341**	**0.274**	**0.341**
Peroxide Calcium (23Wh)	----	0.005	% Ca	**20.9**	**18.8**	**13.4**	**15.2**	**15.3**
Acid Reacted Calcium (23X)	----	0.005	% Ca	**20.6**	**18.3**	**13.1**	**14.9**	**15.0**
acidity - Acid Reacted Calcium (a-23X)	----	5	mole H+ / t	**10300**	**9130**	**6520**	**7440**	**7470**
sulfidic - Acid Reacted Calcium (s-23X)	----	0.005	% S	**16.5**	**14.6**	**10.4**	**11.9**	**12.0**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB08_0.3-0.4	SB09_0-0.1	SB09_0.4-0.5	SB10_0-0.1	SB10_0.4-0.5
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-016	EP2409636-017	EP2409636-018	EP2409636-019	EP2409636-020
				Result	Result	Result	Result	Result
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.005	% Mg	0.125	0.188	0.170	0.140	0.186
Peroxide Magnesium (23Tm)	----	0.005	% Mg	1.84	1.99	1.21	1.43	1.78
Acid Reacted Magnesium (23U)	----	0.005	% Mg	1.71	1.80	1.04	1.29	1.59
Acidity - Acid Reacted Magnesium (a-23U)	----	5	mole H+ / t	1410	1480	854	1060	1310
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.005	% S	2.26	2.38	1.37	1.70	2.10
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% CaCO3	59.7	49.1	34.4	40.8	42.0
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	11900	9810	6880	8140	8400
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	19.1	15.7	11.0	13.0	13.4
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	0.13	0.12	0.07	0.11	0.09
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	80	77	43	67	56
Liming Rate excluding ANC	----	1	kg CaCO3/t	6	6	3	5	4
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	10.0	9.8	9.8	10.0	9.8
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	<0.005	<0.005	<0.005	<0.005
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	<10	<10	<10
EA033-C: Acid Neutralising Capacity								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB08_0.3-0.4	SB09_0-0.1	SB09_0.4-0.5	SB10_0-0.1	SB10_0.4-0.5
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-016	EP2409636-017	EP2409636-018	EP2409636-019	EP2409636-020
				Result	Result	Result	Result	Result
EA033-C: Acid Neutralising Capacity - Continued								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	**64.6**	**59.8**	**38.7**	**59.8**	**44.2**
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	**12900**	**12000**	**7730**	**12000**	**8830**
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	**20.7**	**19.2**	**12.4**	**19.2**	**14.2**
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	<1	<1	<1
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**20.8**	**15.9**	**23.4**	**9.6**	**26.6**
EA150: Particle Sizing								
+75µm	----	1	%	**----**	**80**	**58**	**----**	**----**
+150µm	----	1	%	**----**	**72**	**28**	**----**	**----**
+300µm	----	1	%	**----**	**56**	**16**	**----**	**----**
+425µm	----	1	%	**----**	**48**	**12**	**----**	**----**
+600µm	----	1	%	**----**	**41**	**9**	**----**	**----**
+1180µm	----	1	%	**----**	**26**	**6**	**----**	**----**
+2.36mm	----	1	%	**----**	**12**	**3**	**----**	**----**
+4.75mm	----	1	%	**----**	**4**	<1	**----**	**----**
+9.5mm	----	1	%	**----**	<1	<1	**----**	**----**
+19.0mm	----	1	%	**----**	<1	<1	**----**	**----**
+37.5mm	----	1	%	**----**	<1	<1	**----**	**----**
+75.0mm	----	1	%	**----**	<1	<1	**----**	**----**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB08_0.3-0.4	SB09_0-0.1	SB09_0.4-0.5	SB10_0-0.1	SB10_0.4-0.5
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-016	EP2409636-017	EP2409636-018	EP2409636-019	EP2409636-020
				Result	Result	Result	Result	Result
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	----	6	12	----	----
Silt (2-60 µm)	----	1	%	----	11	24	----	----
Sand (0.06-2.00 mm)	----	1	%	----	67	60	----	----
Gravel (>2mm)	----	1	%	----	16	4	----	----
Cobbles (>6cm)	----	1	%	----	<1	<1	----	----
EA152: Soil Particle Density								
Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	----	2.66	2.52	----	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	33.8	22.1	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	9.2	7.3	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	0.4	1.0	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	0.6	1.0	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	44.1	31.4	----	----
Exchangeable Sodium Percent	----	0.1	%	----	1.4	3.2	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	10	8	9	10	7
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	20	20	34	11	32
Copper	7440-50-8	5	mg/kg	<5	10	8	5	6
Lead	7439-92-1	5	mg/kg	<5	<5	<5	<5	<5
Nickel	7440-02-0	2	mg/kg	8	8	14	5	12
Zinc	7440-66-6	5	mg/kg	7	16	13	6	11
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	----	0.14	0.29	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SB08_0.3-0.4	SB09_0-0.1	SB09_0.4-0.5	SB10_0-0.1	SB10_0.4-0.5
				Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit		EP2409636-016	EP2409636-017	EP2409636-018	EP2409636-019	EP2409636-020
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<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	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SB08_0.3-0.4	SB09_0-0.1	SB09_0.4-0.5	SB10_0-0.1	SB10_0.4-0.5
				Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit		EP2409636-016	EP2409636-017	EP2409636-018	EP2409636-019	EP2409636-020
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<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	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
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
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	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
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	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
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB08_0.3-0.4	SB09_0-0.1	SB09_0.4-0.5	SB10_0-0.1	SB10_0.4-0.5
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-016	EP2409636-017	EP2409636-018	EP2409636-019	EP2409636-020
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorononane sulfonic acid (PFNS)	68259-12-1	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
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB08_0.3-0.4	SB09_0-0.1	SB09_0.4-0.5	SB10_0-0.1	SB10_0.4-0.5
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-016	EP2409636-017	EP2409636-018	EP2409636-019	EP2409636-020
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	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 PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
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
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**101**	**92.2**	**81.0**	**93.9**	**92.7**
2-Chlorophenol-D4	93951-73-6	0.5	%	**102**	**96.0**	**81.4**	**101**	**96.8**
2.4.6-Tribromophenol	118-79-6	0.5	%	**85.7**	**82.9**	**68.4**	**75.3**	**71.1**
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**103**	**118**	**99.2**	**112**	**110**
Anthracene-d10	1719-06-8	0.5	%	**113**	**115**	**98.0**	**110**	**95.7**
4-Terphenyl-d14	1718-51-0	0.5	%	**131**	**121**	**110**	**116**	**118**
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**82.6**	**85.6**	**85.4**	**87.8**	**83.1**
Toluene-D8	2037-26-5	0.2	%	**75.7**	**80.0**	**76.4**	**80.9**	**75.0**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB08_0.3-0.4	SB09_0-0.1	SB09_0.4-0.5	SB10_0-0.1	SB10_0.4-0.5
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-016	EP2409636-017	EP2409636-018	EP2409636-019	EP2409636-020
				Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued								
4-Bromofluorobenzene	460-00-4	0.2	%	83.6	87.1	87.5	88.4	85.7
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	97.5	118	106	104	106
13C8-PFOA	----	0.0002	%	129	114	117	114	118

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB11_0-0.1	SB11_0.4-0.5	SB12_0-0.1	SB12_0.4-0.5	QC101
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-021	EP2409636-022	EP2409636-023	EP2409636-024	EP2409636-025
				Result	Result	Result	Result	Result
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**8.5**	**8.6**	**8.5**	**8.6**	**8.9**
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	**8.8**	**8.4**	**8.5**	**8.5**	**8.7**
pH (Fox)	----	0.1	pH Unit	**7.0**	**6.8**	**6.9**	**6.8**	**7.0**
Reaction Rate	----	1	Reaction Unit	**1**	**1**	**1**	**1**	**1**
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**9.9**	**9.7**	**9.8**	**9.9**	**9.9**
pH OX (23B)	----	0.1	pH Unit	**8.1**	**8.2**	**8.2**	**8.2**	**8.4**
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.005	% S	**0.077**	**0.154**	**0.278**	**0.165**	**0.103**
Peroxide Sulfur (23De)	----	0.005	% S	**0.214**	**0.236**	**0.428**	**0.253**	**0.176**
Peroxide Oxidisable Sulfur (23E)	----	0.005	% S	**0.137**	**0.082**	**0.150**	**0.088**	**0.072**
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	5	mole H+ / t	**85**	**51**	**94**	**55**	**45**
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.005	% Ca	**0.250**	**0.336**	**0.380**	**0.330**	**0.251**
Peroxide Calcium (23Wh)	----	0.005	% Ca	**23.6**	**14.7**	**22.7**	**18.4**	**14.5**
Acid Reacted Calcium (23X)	----	0.005	% Ca	**23.4**	**14.4**	**22.4**	**18.0**	**14.3**
acidity - Acid Reacted Calcium (a-23X)	----	5	mole H+ / t	**11600**	**7160**	**11200**	**9000**	**7120**
sulfidic - Acid Reacted Calcium (s-23X)	----	0.005	% S	**18.7**	**11.5**	**17.9**	**14.4**	**11.4**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB11_0-0.1	SB11_0.4-0.5	SB12_0-0.1	SB12_0.4-0.5	QC101
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-021	EP2409636-022	EP2409636-023	EP2409636-024	EP2409636-025
				Result	Result	Result	Result	Result
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.005	% Mg	**0.126**	**0.199**	**0.159**	**0.188**	**0.108**
Peroxide Magnesium (23Tm)	----	0.005	% Mg	**1.47**	**1.13**	**1.56**	**1.18**	**1.21**
Acid Reacted Magnesium (23U)	----	0.005	% Mg	**1.35**	**0.932**	**1.40**	**0.997**	**1.10**
Acidity - Acid Reacted Magnesium (a-23U)	----	5	mole H+ / t	**1110**	**767**	**1160**	**820**	**906**
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.005	% S	**1.78**	**1.23**	**1.85**	**1.32**	**1.45**
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% CaCO3	**60.8**	**38.5**	**57.2**	**48.4**	**40.9**
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	**12200**	**7690**	**11400**	**9660**	**8160**
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	**19.5**	**12.3**	**18.3**	**15.5**	**13.1**
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	**0.14**	**0.08**	**0.15**	**0.09**	**0.07**
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	**85**	**51**	**94**	**55**	**45**
Liming Rate excluding ANC	----	1	kg CaCO3/t	**6**	**4**	**7**	**4**	**3**
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	**9.9**	**9.7**	**9.8**	**9.9**	**9.9**
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	<0.005	**0.005**	<0.005	<0.005
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	<10	<10	<10
EA033-C: Acid Neutralising Capacity								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB11_0-0.1	SB11_0.4-0.5	SB12_0-0.1	SB12_0.4-0.5	QC101
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-021	EP2409636-022	EP2409636-023	EP2409636-024	EP2409636-025
				Result	Result	Result	Result	Result
EA033-C: Acid Neutralising Capacity - Continued								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	**74.0**	**41.9**	**67.0**	**46.7**	**43.5**
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	**14800**	**8360**	**13400**	**9340**	**8690**
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	**23.7**	**13.4**	**21.5**	**15.0**	**13.9**
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	<1	<1	<1
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**10.7**	**27.4**	**13.9**	**25.9**	**11.9**
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**8**	**8**	**10**	**7**	**6**
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	**15**	**35**	**17**	**27**	**10**
Copper	7440-50-8	5	mg/kg	<5	**7**	**6**	<5	**29**
Lead	7439-92-1	5	mg/kg	<5	<5	<5	<5	<5
Nickel	7440-02-0	2	mg/kg	**5**	**13**	**7**	**9**	**5**
Zinc	7440-66-6	5	mg/kg	<5	**11**	**10**	**7**	**20**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SB11_0-0.1	SB11_0.4-0.5	SB12_0-0.1	SB12_0.4-0.5	QC101
				Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit		EP2409636-021	EP2409636-022	EP2409636-023	EP2409636-024	EP2409636-025
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<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	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB11_0-0.1	SB11_0.4-0.5	SB12_0-0.1	SB12_0.4-0.5	QC101
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-021	EP2409636-022	EP2409636-023	EP2409636-024	EP2409636-025
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg	<50	<50	<50	<50	<50
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg	<50	<50	<50	<50	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<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	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
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
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	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
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	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
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB11_0-0.1	SB11_0.4-0.5	SB12_0-0.1	SB12_0.4-0.5	QC101
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-021	EP2409636-022	EP2409636-023	EP2409636-024	EP2409636-025
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
Perfluorononane sulfonic acid (PFNS)	68259-12-1	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
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB11_0-0.1	SB11_0.4-0.5	SB12_0-0.1	SB12_0.4-0.5	QC101
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-021	EP2409636-022	EP2409636-023	EP2409636-024	EP2409636-025
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	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 PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
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
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	87.5	91.3	84.6	77.6	81.9
2-Chlorophenol-D4	93951-73-6	0.5	%	97.3	93.7	93.8	92.8	93.9
2.4.6-Tribromophenol	118-79-6	0.5	%	64.0	62.1	59.9	60.8	60.6
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	108	101	107	113	96.1
Anthracene-d10	1719-06-8	0.5	%	99.1	103	105	104	100
4-Terphenyl-d14	1718-51-0	0.5	%	118	118	115	113	115
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	80.4	83.1	80.8	80.5	86.8
Toluene-D8	2037-26-5	0.2	%	71.7	76.6	72.5	71.9	76.8
4-Bromofluorobenzene	460-00-4	0.2	%	83.4	85.8	81.2	84.0	85.3
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	120	112	106	105	110

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	SB11_0-0.1	SB11_0.4-0.5	SB12_0-0.1	SB12_0.4-0.5	QC101
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409636-021	EP2409636-022	EP2409636-023	EP2409636-024	EP2409636-025
				Result	Result	Result	Result	Result
EP231S: PFAS Surrogate - Continued								
13C8-PFOA	----	0.0002	%	**118**	**107**	**118**	**124**	**103**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QC102	QC103	QC401	----	----
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	EP2409636-026	EP2409636-027	EP2409636-029	--------	--------
				Result	Result	Result	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**8.7**	----	----	----	----
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	**8.6**	----	----	----	----
pH (Fox)	----	0.1	pH Unit	**6.9**	----	----	----	----
Reaction Rate	----	1	Reaction Unit	**1**	----	----	----	----
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**9.9**	----	----	----	----
pH OX (23B)	----	0.1	pH Unit	**8.3**	----	----	----	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	----	----	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.005	% pyrite S	<0.005	----	----	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.005	% pyrite S	<0.005	----	----	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.005	% pyrite S	<0.005	----	----	----	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.005	% S	**0.162**	----	----	----	----
Peroxide Sulfur (23De)	----	0.005	% S	**0.296**	----	----	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.005	% S	**0.134**	----	----	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	5	mole H+ / t	**84**	----	----	----	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.005	% Ca	**0.275**	----	----	----	----
Peroxide Calcium (23Wh)	----	0.005	% Ca	**16.9**	----	----	----	----
Acid Reacted Calcium (23X)	----	0.005	% Ca	**16.6**	----	----	----	----
acidity - Acid Reacted Calcium (a-23X)	----	5	mole H+ / t	**8300**	----	----	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.005	% S	**13.3**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QC102	QC103	QC401	----	----
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	EP2409636-026	EP2409636-027	EP2409636-029	--------	--------
				Result	Result	Result	----	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.005	% Mg	**0.135**	----	----	----	----
Peroxide Magnesium (23Tm)	----	0.005	% Mg	**2.00**	----	----	----	----
Acid Reacted Magnesium (23U)	----	0.005	% Mg	**1.86**	----	----	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	5	mole H+ / t	**1530**	----	----	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.005	% S	**2.46**	----	----	----	----
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% CaCO3	**46.4**	----	----	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	**9280**	----	----	----	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	**14.8**	----	----	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	----	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	<0.02	----	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	<10	----	----	----	----
Liming Rate	----	1	kg CaCO3/t	<1	----	----	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	**0.13**	----	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	**84**	----	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	**6**	----	----	----	----
EA033-A: Actual Acidity								
pH KCl (23A)	----	0.1	pH Unit	**9.9**	----	----	----	----
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033-B: Potential Acidity								
Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	----	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----
EA033-C: Acid Neutralising Capacity								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QC102	QC103	QC401	----	----
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	EP2409636-026	EP2409636-027	EP2409636-029	--------	--------
				Result	Result	Result	----	----
EA033-C: Acid Neutralising Capacity - Continued								
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	**55.3**	----	----	----	----
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	**11000**	----	----	----	----
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	**17.7**	----	----	----	----
EA033-E: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	----	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	<0.02	----	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	<10	----	----	----	----
Liming Rate	----	1	kg CaCO3/t	<1	----	----	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	----	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	----	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	----	**12.6**	----	----	----
Moisture Content	----	1.0	%	**11.0**	----	<1.0	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**9**	----	<5	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	<1	----	----
Chromium	7440-47-3	2	mg/kg	**11**	----	<2	----	----
Copper	7440-50-8	5	mg/kg	<5	----	<5	----	----
Lead	7439-92-1	5	mg/kg	<5	----	<5	----	----
Nickel	7440-02-0	2	mg/kg	**4**	----	<2	----	----
Zinc	7440-66-6	5	mg/kg	<5	----	<5	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	<0.1	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	<0.5	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QC102	QC103	QC401	----	----
				Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	----	----
Compound	CAS Number	LOR	Unit		EP2409636-026	EP2409636-027	EP2409636-029	--------	--------
					Result	Result	Result	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
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	----	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	<0.5	----	----
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	----	----
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	----	<0.5	----	----
^ **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	----	<50	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	<100	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	<100	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	----	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	<10	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QC102	QC103	QC401	----	----
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	EP2409636-026	EP2409636-027	EP2409636-029	--------	--------
				Result	Result	Result	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg	<10	----	<10	----	----
>C10 - C16 Fraction	----	50	mg/kg	<50	----	<50	----	----
>C16 - C34 Fraction	----	100	mg/kg	<100	----	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	----	<100	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg	<50	----	<50	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg	<50	----	<50	----	----
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	----	----
Naphthalene	91-20-3	1	mg/kg	<1	----	<1	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.0005	mg/kg	<0.0005	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QC102	QC103	QC401	----	----
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	EP2409636-026	EP2409636-027	EP2409636-029	--------	--------
				Result	Result	Result	----	----
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.0002	mg/kg	<0.0002	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QC102	QC103	QC401	----	----
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	EP2409636-026	EP2409636-027	EP2409636-029	--------	--------
				Result	Result	Result	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<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	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**85.7**	----	**76.5**	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	**97.1**	----	**90.4**	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	**66.4**	----	**50.4**	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**102**	----	**91.5**	----	----
Anthracene-d10	1719-06-8	0.5	%	**107**	----	**97.1**	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	**118**	----	**112**	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**86.2**	----	**92.3**	----	----
Toluene-D8	2037-26-5	0.2	%	**76.2**	----	**86.5**	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	**87.3**	----	**94.1**	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	**110**	**112**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QC102	QC103	QC401	----	----
			Sampling date / time	04-Jul-2024 00:00	04-Jul-2024 00:00	04-Jul-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	EP2409636-026	EP2409636-027	EP2409636-029	--------	--------
				Result	Result	Result	----	----
EP231S: PFAS Surrogate - Continued								
13C8-PFOA	----	0.0002	%	**112**	**106**	**----**	**----**	**----**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	QC301	----	----	----	----
				Sampling date / time	04-Jul-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EP2409636-028	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	QC301	----	----	----	----
				Sampling date / time	04-Jul-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EP2409636-028	--------	--------	--------	--------
					Result	----	----	----	----
EP080: BTEXN - Continued									
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ **Total Xylenes**	----	2	µg/L		<2	----	----	----	----
^ **Sum of BTEX**	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		<0.0005	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		<0.0005	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		<0.0005	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0005	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	µg/L		<0.0002	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0005	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.0020	µg/L		<0.0020	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		<0.0005	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		<0.0005	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		<0.0005	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		<0.0005	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0005	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0005	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0005	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0005	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	QC301	----	----	----	----
				Sampling date / time	04-Jul-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EP2409636-028	--------	--------	--------	--------
					Result	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0005	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0005	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.001	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.001	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.001	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.001	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0005	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0005	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.001	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.001	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.001	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.001	----	----	----	----
EP231P: PFAS Sums									
^ **Sum of PFHxS and PFOS**	355-46-4/1763-23-1	0.0002	µg/L		<0.0002	----	----	----	----
^ **Sum of PFAS (WA DER List)**	----	0.0002	µg/L		<0.0002	----	----	----	----
^ **Sum of PFAS**	----	0.0002	µg/L		<0.0002	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	QC301	----	----	----	----
				Sampling date / time	04-Jul-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EP2409636-028	--------	--------	--------	--------
					Result	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**116**	**----**	**----**	**----**	**----**
Toluene-D8	2037-26-5	2	%		**104**	**----**	**----**	**----**	**----**
4-Bromofluorobenzene	460-00-4	2	%		**117**	**----**	**----**	**----**	**----**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**121**	**----**	**----**	**----**	**----**
13C8-PFOA	----	0.0005	%		**119**	**----**	**----**	**----**	**----**

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	57	119
2-Chlorophenol-D4	93951-73-6	52	130
2.4.6-Tribromophenol	118-79-6	40	132
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	53	139
Anthracene-d10	1719-06-8	68	124
4-Terphenyl-d14	1718-51-0	66	132
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	63	132
Toluene-D8	2037-26-5	66	125
4-Bromofluorobenzene	460-00-4	60	124
EP231S: PFAS Surrogate			
13C4-PFOS	----	76	136
13C8-PFOA	----	78	131

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125
EP231S: PFAS Surrogate			
13C4-PFOS	----	65	140
13C8-PFOA	----	71	133

Inter-Laboratory Testing

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry / Biology).

(SOIL) EP003: Total Organic Carbon (TOC) in Soil

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry / Biology).

(SOIL) EA150: Soil Classification based on Particle Size

(SOIL) EA150: Particle Sizing

(SOIL) EA152: Soil Particle Density

QUALITY CONTROL REPORT

Work Order	: **EP2409636**	Page	: 1 of 38
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: MS ASHTON BETTI	Contact	: Ashvini Wickramasinghe
Address	: LEVEL 18, 140 ST GEORGES TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: +61 08 6557 8881	Telephone	: +61-8-9406 1301
Project	: P21705 Burrup - Baseline Assessment	Date Samples Received	: 08-Jul-2024
Order number	: PO023451	Date Analysis Commenced	: 09-Jul-2024
C-O-C number	: ----	Issue Date	: 23-Jul-2024
Sampler	: Egan Churchill-Gray		
Site	: ----		
Quote number	: EN/000		
No. of samples received	: 29		
No. of samples analysed	: 29		

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*
Aleksandar Vujkovic	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Daniel Fisher	Inorganics Analyst	Perth ASS, Wangara, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Wangara, WA
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Thomas Donovan	Senior Organic Chemist	Perth Organics, Wangara, WA

General Comments

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

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

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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC
* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

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: 5924942)									
EP2409600-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	8	9	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	3	4	35.8	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	22	43	67.1	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	39	27	34.9	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	31	31	0.0	No Limit
EP2409600-011	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
		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
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 5926544)									
EP2409636-005	SB03_0-0.1	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	23	24	6.2	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	10	11	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	8	10	13.9	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	22	25	15.9	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	5	<5	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: 5926544) - continued									
EP2409636-005	SB03_0-0.1	EG005T: Zinc	7440-66-6	5	mg/kg	40	40	0.0	No Limit
EP2409636-015	SB08_0-0.1	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	12	13	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	5	5	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	10	9	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	6	6	0.0	No Limit
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 5926558)									
EP2409647-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	62	58	6.4	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	17	16	8.2	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	15	13	10.6	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	16	14	9.4	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	7	7	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	10	8	12.7	No Limit
EP2409647-013	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	49	46	5.6	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	13	12	8.1	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	13	12	10.3	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	11	10	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	7	6	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	6	6	0.0	No Limit
EA002: pH 1:5 (Soils) (QC Lot: 5916582)									
EP2409636-001	SB01_0-0.1	EA002: pH Value	----	0.1	pH Unit	8.6	8.6	0.0	0% - 20%
EP2409636-010	SB05_0.4-0.5	EA002: pH Value	----	0.1	pH Unit	8.4	8.5	0.0	0% - 20%
EA002: pH 1:5 (Soils) (QC Lot: 5916583)									
EP2409636-021	SB11_0-0.1	EA002: pH Value	----	0.1	pH Unit	8.5	8.6	1.4	0% - 20%
EA003 :pH (field/fox) (QC Lot: 5921591)									
EP2409636-001	SB01_0-0.1	EA003: pH (F)	----	0.1	pH Unit	8.2	8.3	0.0	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	8.1	8.1	0.0	0% - 20%
		EA003: Reaction Rate	----	1	Reaction Unit	1	1	0.0	No Limit
EP2409636-010	SB05_0.4-0.5	EA003: pH (F)	----	0.1	pH Unit	8.3	8.4	0.0	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	7.1	7.2	0.0	0% - 20%
		EA003: Reaction Rate	----	1	Reaction Unit	1	1	0.0	No Limit
EA003 :pH (field/fox) (QC Lot: 5921592)									
EP2409636-021	SB11_0-0.1	EA003: pH (F)	----	0.1	pH Unit	8.8	8.8	0.0	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 (%)*
EA003 :pH (field/fox) (QC Lot: 5921592) - continued									
EP2409636-021	SB11_0-0.1	EA003: pH (Fox)	----	0.1	pH Unit	7.0	7.0	0.0	0% - 20%
		EA003: Reaction Rate	----	1	Reaction Unit	1	1	0.0	No Limit
EA029-A: pH Measurements (QC Lot: 5939796)									
EP2409636-001	SB01_0-0.1	EA029: pH KCl (23A)	----	0.1	pH Unit	10.0	10.0	0.0	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	8.4	8.5	0.0	0% - 20%
EP2409636-011	SB06_0-0.1	EA029: pH KCl (23A)	----	0.1	pH Unit	9.9	9.9	0.0	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	8.3	8.3	0.0	0% - 20%
EA029-A: pH Measurements (QC Lot: 5939798)									
EP2409636-021	SB11_0-0.1	EA029: pH KCl (23A)	----	0.1	pH Unit	9.9	9.9	0.0	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	8.1	8.2	1.5	0% - 20%
EA029-B: Acidity Trail (QC Lot: 5939796)									
EP2409636-001	SB01_0-0.1	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02 (0.005)*	% pyrite S	<0.005	<0.005	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02 (0.005)*	% pyrite S	<0.005	<0.005	0.0	No Limit
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02 (0.005)*	% pyrite S	<0.005	<0.005	0.0	No Limit
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	No Limit
EP2409636-011	SB06_0-0.1	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02 (0.005)*	% pyrite S	<0.005	<0.005	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02 (0.005)*	% pyrite S	<0.005	<0.005	0.0	No Limit
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02 (0.005)*	% pyrite S	<0.005	<0.005	0.0	No Limit
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	No Limit
EA029-B: Acidity Trail (QC Lot: 5939798)									
EP2409636-021	SB11_0-0.1	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02 (0.005)*	% pyrite S	<0.005	<0.005	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02 (0.005)*	% pyrite S	<0.005	<0.005	0.0	No Limit
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02 (0.005)*	% pyrite S	<0.005	<0.005	0.0	No Limit
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	No Limit
EA029-C: Sulfur Trail (QC Lot: 5939796)									
EP2409636-001	SB01_0-0.1	EA029: KCl Extractable Sulfur (23Ce)	----	0.02 (0.005)*	% S	0.085	0.090	5.5	0% - 50%

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 (%)*
EA029-C: Sulfur Trail (QC Lot: 5939796) - continued									
EP2409636-001	SB01_0-0.1	EA029: Peroxide Sulfur (23De)	----	0.02 (0.005)*	% S	0.143	0.143	0.0	0% - 20%
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02 (0.005)*	% S	0.059	0.054	8.5	0% - 50%
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10 (5)*	mole H+ / t	37	34	8.5	No Limit
EP2409636-011	SB06_0-0.1	EA029: KCl Extractable Sulfur (23Ce)	----	0.02 (0.005)*	% S	0.276	0.299	8.1	0% - 20%
		EA029: Peroxide Sulfur (23De)	----	0.02 (0.005)*	% S	0.370	0.373	0.9	0% - 20%
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02 (0.005)*	% S	0.094	0.074	23.9	0% - 50%
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10 (5)*	mole H+ / t	58	46	23.9	0% - 50%
EA029-C: Sulfur Trail (QC Lot: 5939798)									
EP2409636-021	SB11_0-0.1	EA029: KCl Extractable Sulfur (23Ce)	----	0.02 (0.005)*	% S	0.077	0.074	4.1	0% - 50%
		EA029: Peroxide Sulfur (23De)	----	0.02 (0.005)*	% S	0.214	0.211	1.1	0% - 20%
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02 (0.005)*	% S	0.137	0.137	0.0	0% - 20%
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10 (5)*	mole H+ / t	85	86	0.0	0% - 50%
EA029-D: Calcium Values (QC Lot: 5939796)									
EP2409636-001	SB01_0-0.1	EA029: KCl Extractable Calcium (23Vh)	----	0.02 (0.005)*	% Ca	0.244	0.260	6.6	0% - 20%
		EA029: Peroxide Calcium (23Wh)	----	0.02 (0.005)*	% Ca	11.6	11.6	0.5	0% - 20%
		EA029: Acid Reacted Calcium (23X)	----	0.02 (0.005)*	% Ca	11.3	11.4	0.4	0% - 20%
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02 (0.005)*	% S	9.06	9.10	0.4	0% - 20%
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10 (5)*	mole H+ / t	5650	5680	0.4	0% - 20%
EP2409636-011	SB06_0-0.1	EA029: KCl Extractable Calcium (23Vh)	----	0.02 (0.005)*	% Ca	0.389	0.395	1.6	0% - 20%
		EA029: Peroxide Calcium (23Wh)	----	0.02 (0.005)*	% Ca	11.2	11.5	2.5	0% - 20%
		EA029: Acid Reacted Calcium (23X)	----	0.02 (0.005)*	% Ca	10.8	11.1	2.5	0% - 20%
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02 (0.005)*	% S	8.69	8.91	2.5	0% - 20%
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10 (5)*	mole H+ / t	5420	5560	2.5	0% - 20%
EA029-D: Calcium Values (QC Lot: 5939798)									
EP2409636-021	SB11_0-0.1	EA029: KCl Extractable Calcium (23Vh)	----	0.02 (0.005)*	% Ca	0.250	0.244	2.1	0% - 20%
		EA029: Peroxide Calcium (23Wh)	----	0.02 (0.005)*	% Ca	23.6	23.5	0.4	0% - 20%
		EA029: Acid Reacted Calcium (23X)	----	0.02 (0.005)*	% Ca	23.4	23.2	0.4	0% - 20%
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02 (0.005)*	% S	18.7	18.6	0.4	0% - 20%
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10 (5)*	mole H+ / t	11600	11600	0.4	0% - 20%
EA029-E: Magnesium Values (QC Lot: 5939796)									
EP2409636-001	SB01_0-0.1	EA029: KCl Extractable Magnesium (23Sm)	----	0.02 (0.005)*	% Mg	0.098	0.105	7.2	0% - 20%
		EA029: Peroxide Magnesium (23Tm)	----	0.02 (0.005)*	% Mg	0.818	0.806	1.5	0% - 20%
		EA029: Acid Reacted Magnesium (23U)	----	0.02 (0.005)*	% Mg	0.721	0.701	2.8	0% - 20%
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02 (0.005)*	% S	0.951	0.925	2.8	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 (%)*
EA029-E: Magnesium Values (QC Lot: 5939796) - continued									
EP2409636-001	SB01_0-0.1	EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10 (5)*	mole H+ / t	593	577	2.8	0% - 20%
EP2409636-011	SB06_0-0.1	EA029: KCl Extractable Magnesium (23Sm)	----	0.02 (0.005)*	% Mg	0.174	0.180	3.2	0% - 20%
		EA029: Peroxide Magnesium (23Tm)	----	0.02 (0.005)*	% Mg	1.64	1.60	2.8	0% - 20%
		EA029: Acid Reacted Magnesium (23U)	----	0.02 (0.005)*	% Mg	1.47	1.42	3.5	0% - 20%
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02 (0.005)*	% S	1.94	1.87	3.5	0% - 20%
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10 (5)*	mole H+ / t	1210	1160	3.5	0% - 20%
EA029-E: Magnesium Values (QC Lot: 5939798)									
EP2409636-021	SB11_0-0.1	EA029: KCl Extractable Magnesium (23Sm)	----	0.02 (0.005)*	% Mg	0.126	0.125	0.8	0% - 20%
		EA029: Peroxide Magnesium (23Tm)	----	0.02 (0.005)*	% Mg	1.47	1.41	4.4	0% - 20%
		EA029: Acid Reacted Magnesium (23U)	----	0.02 (0.005)*	% Mg	1.35	1.28	4.8	0% - 20%
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02 (0.005)*	% S	1.78	1.69	4.8	0% - 20%
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10 (5)*	mole H+ / t	1110	1060	4.8	0% - 20%
EA029-F: Excess Acid Neutralising Capacity (QC Lot: 5939796)									
EP2409636-001	SB01_0-0.1	EA029: Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	29.5	29.5	0.1	0% - 20%
		EA029: sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	9.45	9.46	0.1	0% - 20%
		EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	5900	5900	0.1	0% - 20%
EP2409636-011	SB06_0-0.1	EA029: Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	32.1	31.9	0.4	0% - 20%
		EA029: sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	10.3	10.2	0.4	0% - 20%
		EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	6410	6380	0.4	0% - 20%
EA029-F: Excess Acid Neutralising Capacity (QC Lot: 5939798)									
EP2409636-021	SB11_0-0.1	EA029: Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	60.8	60.9	0.1	0% - 20%
		EA029: sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	19.5	19.5	0.1	0% - 20%
		EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	12200	12200	0.1	0% - 20%
EA029-H: Acid Base Accounting (QC Lot: 5939796)									
EP2409636-001	SB01_0-0.1	EA029: Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Net Acidity excluding ANC (sulfur units)	----	0.02	% S	0.06	0.05	18.2	No Limit
		EA029: Liming Rate	----	1	kg CaCO3/t	<1	<1	0.0	No Limit
		EA029: Liming Rate excluding ANC	----	1	kg CaCO3/t	3	3	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 (%)*
EA029-H: Acid Base Accounting (QC Lot: 5939796) - continued									
EP2409636-001	SB01_0-0.1	EA029: Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	0.0	No Limit
		EA029: Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	37	34	8.5	No Limit
EP2409636-011	SB06_0-0.1	EA029: Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Net Acidity excluding ANC (sulfur units)	----	0.02	% S	0.09	0.07	25.0	No Limit
		EA029: Liming Rate	----	1	kg CaCO3/t	<1	<1	0.0	No Limit
		EA029: Liming Rate excluding ANC	----	1	kg CaCO3/t	4	3	28.6	No Limit
		EA029: Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	0.0	No Limit
		EA029: Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	59	46	24.8	No Limit
EA029-H: Acid Base Accounting (QC Lot: 5939798)									
EP2409636-021	SB11_0-0.1	EA029: Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Net Acidity excluding ANC (sulfur units)	----	0.02	% S	0.14	0.14	0.0	No Limit
		EA029: Liming Rate	----	1	kg CaCO3/t	<1	<1	0.0	No Limit
		EA029: Liming Rate excluding ANC	----	1	kg CaCO3/t	6	6	0.0	No Limit
		EA029: Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	0.0	No Limit
		EA029: Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	85	86	1.2	No Limit
EA033-A: Actual Acidity (QC Lot: 5939797)									
EP2409636-001	SB01_0-0.1	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	10.0	10.0	0.0	0% - 20%
EP2409636-011	SB06_0-0.1	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	9.9	9.9	0.0	0% - 20%
EA033-A: Actual Acidity (QC Lot: 5939799)									
EP2409636-021	SB11_0-0.1	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	9.9	9.9	0.0	0% - 20%
EA033-B: Potential Acidity (QC Lot: 5939797)									
EP2409636-001	SB01_0-0.1	EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	<0.005	0.0	No Limit
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EP2409636-011	SB06_0-0.1	EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	<0.005	0.0	No Limit
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA033-B: Potential Acidity (QC Lot: 5939799)									
EP2409636-021	SB11_0-0.1	EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	<0.005	0.0	No Limit
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	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 (%)*
EA033-C: Acid Neutralising Capacity (QC Lot: 5939797)									
EP2409636-001	SB01_0-0.1	EA033: Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	36.0	36.3	1.0	0% - 20%
		EA033: sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	11.5	11.6	1.0	0% - 20%
		EA033: acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	7180	7250	1.0	0% - 20%
EP2409636-011	SB06_0-0.1	EA033: Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	46.8	47.0	0.4	0% - 20%
		EA033: sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	15.0	15.0	0.4	0% - 20%
		EA033: acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	9340	9380	0.4	0% - 20%
EA033-C: Acid Neutralising Capacity (QC Lot: 5939799)									
EP2409636-021	SB11_0-0.1	EA033: Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	74.0	74.1	0.1	0% - 20%
		EA033: sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	23.7	23.7	0.1	0% - 20%
		EA033: acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	14800	14800	0.1	0% - 20%
EA033-E: Acid Base Accounting (QC Lot: 5939797)									
EP2409636-001	SB01_0-0.1	EA033: Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA033: Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA033: Liming Rate	----	1	kg CaCO3/t	<1	<1	0.0	No Limit
		EA033: Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	0.0	No Limit
		EA033: Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	0.0	No Limit
		EA033: Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EP2409636-011	SB06_0-0.1	EA033: Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA033: Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA033: Liming Rate	----	1	kg CaCO3/t	<1	<1	0.0	No Limit
		EA033: Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	0.0	No Limit
		EA033: Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	0.0	No Limit
		EA033: Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA033-E: Acid Base Accounting (QC Lot: 5939799)									
EP2409636-021	SB11_0-0.1	EA033: Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA033: Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA033: Liming Rate	----	1	kg CaCO3/t	<1	<1	0.0	No Limit
		EA033: Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	0.0	No Limit
		EA033: Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	0.0	No Limit
		EA033: Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 5924944)									
EP2409600-001	Anonymous	EA055: Moisture Content	----	0.1 (1.0)*	%	6.9	6.6	4.1	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 (%)*
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 5924944) - continued									
EP2409600-011	Anonymous	EA055: Moisture Content	----	0.1 (1.0)*	%	1.5	1.6	7.8	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 5926547)									
EP2409636-005	SB03_0-0.1	EA055: Moisture Content	----	0.1 (1.0)*	%	23.4	22.9	2.5	0% - 20%
EP2409636-015	SB08_0-0.1	EA055: Moisture Content	----	0.1 (1.0)*	%	14.6	14.2	2.7	0% - 50%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 5926551)									
EP2409636-025	QC101	EA055: Moisture Content	----	0.1 (1.0)*	%	11.9	11.9	0.0	0% - 50%
ED008: Exchangeable Cations (QC Lot: 5929285)									
EP2409580-009	Anonymous	ED008: Exchangeable Sodium Percent	----	0.1	%	1.0	1.0	0.0	0% - 50%
		ED008: Exchangeable Calcium	----	0.1	meq/100g	11.3	11.6	2.0	0% - 20%
		ED008: Exchangeable Magnesium	----	0.1	meq/100g	2.9	3.0	0.0	0% - 20%
		ED008: Exchangeable Potassium	----	0.1	meq/100g	0.6	0.7	0.0	No Limit
		ED008: Exchangeable Sodium	----	0.1	meq/100g	0.2	0.2	0.0	No Limit
		ED008: Cation Exchange Capacity	----	0.1	meq/100g	15.0	15.3	1.9	0% - 20%
EP2409636-018	SB09_0.4-0.5	ED008: Exchangeable Sodium Percent	----	0.1	%	3.2	3.2	0.0	0% - 20%
		ED008: Exchangeable Calcium	----	0.1	meq/100g	22.1	22.0	0.6	0% - 20%
		ED008: Exchangeable Magnesium	----	0.1	meq/100g	7.3	7.2	0.0	0% - 20%
		ED008: Exchangeable Potassium	----	0.1	meq/100g	1.0	1.0	0.0	No Limit
		ED008: Exchangeable Sodium	----	0.1	meq/100g	1.0	1.0	0.0	0% - 50%
		ED008: Cation Exchange Capacity	----	0.1	meq/100g	31.4	31.2	0.7	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 5924943)									
EP2409600-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP2409600-011	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 5926545)									
EP2409636-005	SB03_0-0.1	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP2409636-015	SB08_0-0.1	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 5926559)									
EP2409647-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP2409647-013	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 5922626)									
EB2423495-004	Anonymous	EP003: Total Organic Carbon	----	0.02	%	1.53	1.54	0.0	0% - 20%
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 5911444)									
EP2409604-002	Anonymous	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

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 (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 5911444) - continued									
EP2409604-002	Anonymous	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
EP2409636-006	SB03_0.3-0.4	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)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 5916379)									
EP2409636-015	SB08_0-0.1	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

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 (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 5916379) - continued									
EP2409636-015	SB08_0-0.1	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
EP2409636-025	QC101	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
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5911442)									
EP2409604-002	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP2409604-013	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5911443)									
EP2409604-002	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	130	150	12.4	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	100	110	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP2409636-006	SB03_0.3-0.4	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5916377)									
EP2409636-015	SB08_0-0.1	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	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 (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5916377) - continued									
EP2409636-025	QC101	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5916378)									
EP2409636-015	SB08_0-0.1	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP2409636-025	QC101	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	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: 5911442)									
EP2409604-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP2409604-013	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: 5911443)									
EP2409604-002	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	210	240	10.8	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
EP2409636-006	SB03_0.3-0.4	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5916377)									
EP2409636-015	SB08_0-0.1	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP2409636-025	QC101	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: 5916378)									
EP2409636-015	SB08_0-0.1	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	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
EP2409636-025	QC101	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	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: 5911442)									
EP2409604-002	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
EP2409604-013	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	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 (%)*
EP080: BTEXN (QC Lot: 5911442) - continued									
EP2409604-013	Anonymous	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
EP080: BTEXN (QC Lot: 5916377)									
EP2409636-015	SB08_0-0.1	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
EP2409636-025	QC101	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
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5911733)									
EP2409487-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	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: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	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
		EP231X: Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP2409511-006	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	0.0009	0.0008	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	0.0006	0.0006	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0070	0.0061	13.3	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0015	0.0014	10.3	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002 (0.0004)*	mg/kg	0.126	0.118	6.2	0% - 20%
		EP231X: Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.0002	mg/kg	0.0004	0.0004	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	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 (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5911733) - continued									
EP2409511-006	Anonymous	EP231X: Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.0005	mg/kg	0.0006	0.0006	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5911737)									
EP2409636-008	SB04_0.4-0.5	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	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: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	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
		EP231X: Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP2409636-018	SB09_0.4-0.5	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	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: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	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
		EP231X: Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5911733)									
EP2409487-001	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: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EP2409511-006	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	0.0022	0.0022	0.0	0% - 50%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0081	0.0075	7.4	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	0.0009	0.0008	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0069	0.0060	12.9	0% - 20%
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	0.0029	0.0026	8.8	0% - 50%
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	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 (%)*
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5911733) - continued									
EP2409511-006	Anonymous	EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	0.001	0.001	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5911737)									
EP2409636-008	SB04_0.4-0.5	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: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EP2409636-018	SB09_0.4-0.5	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: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5911733)									
EP2409487-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	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 (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5911733) - continued									
EP2409487-001	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP2409511-006	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	0.0005	0.0004	21.5	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5911737)									
EP2409636-008	SB04_0.4-0.5	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP2409636-018	SB09_0.4-0.5	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	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 (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5911737) - continued									
EP2409636-018	SB09_0.4-0.5	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5911733)									
EP2409487-001	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
		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
EP2409511-006	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
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	0.0557	0.0529	5.1	0% - 20%
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	0.0566	0.0528	7.1	0% - 20%
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5911737)									
EP2409636-008	SB04_0.4-0.5	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
EP2409636-018	SB09_0.4-0.5	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
EP231P: PFAS Sums (QC Lot: 5911733)									
EP2409487-001	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0002	0.0002	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 (%)
EP231P: PFAS Sums (QC Lot: 5911733) - continued									
EP2409487-001	Anonymous	EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0002	0.0002	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0002	0.0002	0.0	No Limit
EP2409511-006	Anonymous	EP231X: Sum of PFAS	----	0.0002 (0.0004)*	mg/kg	0.271	0.253	6.8	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002 (0.0004)*	mg/kg	0.133	0.124	6.9	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002 (0.0004)*	mg/kg	0.265	0.248	6.7	0% - 20%
EP231P: PFAS Sums (QC Lot: 5911737)									
EP2409636-008	SB04_0.4-0.5	EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP2409636-018	SB09_0.4-0.5	EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5923029)									
EP2409806-009	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0006	0.0006	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.048	0.048	0.0	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.028	0.027	0.0	No Limit
EP2409747-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.078	0.079	1.8	0% - 50%
EG035F: Dissolved Mercury by FIMS (QC Lot: 5923030)									
EP2409747-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5910331)									

Sub-Matrix: **WATER**

				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: 5910331) - continued									
EP2409636-028	QC301	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5913465)									
EP2408309-008	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP2409651-004	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5910331)									
EP2409636-028	QC301	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5913465)									
EP2408309-008	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP2409651-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 5913465)									
EP2408309-008	Anonymous	EP080: Benzene	71-43-2	1	µg/L	3	3	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP2409651-004	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5913583)									
EP2409501-003	Anonymous	EP231X-SUT: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	µg/L	0.0032	0.0032	0.0	0% - 50%
		EP231X-SUT: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	0.0005	<0.0005	0.0	No Limit
		EP231X-SUT: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-SUT: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5913583) - continued									
EP2409501-003	Anonymous	EP231X-SUT: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-SUT: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5913583)									
EP2409501-003	Anonymous	EP231X-SUT: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-SUT: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-SUT: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-SUT: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	0.0013	0.0011	10.9	No Limit
		EP231X-SUT: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	0.0015	0.0014	0.0	No Limit
		EP231X-SUT: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	0.0024	0.0023	4.9	No Limit
		EP231X-SUT: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-SUT: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	0.0006	<0.0005	0.0	No Limit
		EP231X-SUT: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-SUT: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-SUT: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	0.0053	0.0058	8.7	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5913583)									
EP2409501-003	Anonymous	EP231X-SUT: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-SUT: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-SUT: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-SUT: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	<0.001	0.0	No Limit
		EP231X-SUT: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	<0.001	0.0	No Limit
		EP231X-SUT: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	<0.001	0.0	No Limit
		EP231X-SUT: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	<0.001	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5913583)									
EP2409501-003	Anonymous	EP231X-SUT: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	<0.001	0.0	No Limit
		EP231X-SUT: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	0.010	0.009	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5913583) - continued									
EP2409501-003	Anonymous	EP231X-SUT: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	0.028	0.027	0.0	0% - 20%
		EP231X-SUT: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	<0.001	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5913583)									
EP2409501-003	Anonymous	EP231X-SUT: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	µg/L	0.0032	0.0032	0.0	0% - 50%
		EP231X-SUT: Sum of PFAS (WA DER List)	----	0.0002	µg/L	0.0483	0.0461	4.7	0% - 20%
		EP231X-SUT: Sum of PFAS	----	0.0002	µg/L	0.0528	0.0498	5.8	0% - 20%

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) 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: 5924942)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	77.39 mg/kg	111	70.0	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	1.93 mg/kg	72.5	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	18.67 mg/kg	99.9	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	46.13 mg/kg	103	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	58.42 mg/kg	97.6	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	14.48 mg/kg	98.4	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	190.4 mg/kg	93.9	70.0	130
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 5926544)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	77.39 mg/kg	102	70.0	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	1.93 mg/kg	72.5	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	18.67 mg/kg	95.6	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	46.13 mg/kg	98.3	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	58.42 mg/kg	97.6	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	14.48 mg/kg	96.3	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	190.4 mg/kg	95.4	70.0	130
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 5926558)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	77.39 mg/kg	104	70.0	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	1.93 mg/kg	72.5	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	18.67 mg/kg	101	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	46.13 mg/kg	99.4	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	58.42 mg/kg	92.2	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	14.48 mg/kg	98.4	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	190.4 mg/kg	91.8	70.0	130
EA002: pH 1:5 (Soils) (QCLot: 5916582)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	101	98.6	102
				----	7 pH Unit	100	98.6	102
EA002: pH 1:5 (Soils) (QCLot: 5916583)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	101	98.6	102
				----	7 pH Unit	100	98.6	102
EA029-A: pH Measurements (QCLot: 5939796)								

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
EA029-A: pH Measurements (QCLot: 5939796) - continued								
EA029: pH KCl (23A)	----	----	pH Unit	----	5.4 pH Unit	96.7	94.6	100
EA029: pH OX (23B)	----	----	pH Unit	----	4.3 pH Unit	103	93.0	112
EA029-A: pH Measurements (QCLot: 5939798)								
EA029: pH KCl (23A)	----	----	pH Unit	----	5.4 pH Unit	97.0	94.6	100
EA029: pH OX (23B)	----	----	pH Unit	----	4.3 pH Unit	105	93.0	112
EA029-B: Acidity Trail (QCLot: 5939796)								
EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	18 mole H+ / t	102	83.4	112
EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	29.2 mole H+ / t	100	89.0	123
EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.020	----	----	----	----
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.020	----	----	----	----
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.020	----	----	----	----
EA029-B: Acidity Trail (QCLot: 5939798)								
EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	18 mole H+ / t	102	83.4	112
EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	29.2 mole H+ / t	113	89.0	123
EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.020	----	----	----	----
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.020	----	----	----	----
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.020	----	----	----	----
EA029-C: Sulfur Trail (QCLot: 5939796)								
EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.020	0.157 % S	96.9	70.0	120
EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.020	0.457 % S	103	72.2	110
EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.020	----	----	----	----
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	----	----	----
EA029-C: Sulfur Trail (QCLot: 5939798)								
EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.020	0.157 % S	104	70.0	120
EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.020	0.457 % S	105	72.2	110
EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.020	----	----	----	----
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	----	----	----
EA029-D: Calcium Values (QCLot: 5939796)								
EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	<0.020	0.417 % Ca	91.8	70.0	117
EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	<0.020	0.512 % Ca	109	70.0	118
EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.020	----	----	----	----
EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.020	----	----	----	----
EA029-D: Calcium Values (QCLot: 5939798)								

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
EA029-D: Calcium Values (QCLot: 5939798) - continued								
EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	<0.020	0.417 % Ca	95.4	70.0	117
EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	<0.020	0.512 % Ca	108	70.0	118
EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.020	----	----	----	----
EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.020	----	----	----	----
EA029-E: Magnesium Values (QCLot: 5939796)								
EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.020	0.083 % Mg	88.6	71.6	120
EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.020	0.086 % Mg	99.1	70.0	117
EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.020	----	----	----	----
EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.020	----	----	----	----
EA029-E: Magnesium Values (QCLot: 5939798)								
EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.020	0.083 % Mg	92.9	71.6	120
EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.020	0.086 % Mg	97.3	70.0	117
EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.020	----	----	----	----
EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.020	----	----	----	----
EA033-A: Actual Acidity (QCLot: 5939797)								
EA033: pH KCl (23A)	----	0.1	pH Unit	<0.1	----	----	----	----
EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	18 mole H+ / t	102	83.3	112
EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033-A: Actual Acidity (QCLot: 5939799)								
EA033: pH KCl (23A)	----	0.1	pH Unit	<0.1	----	----	----	----
EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	18 mole H+ / t	102	83.3	112
EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033-B: Potential Acidity (QCLot: 5939797)								
EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	0.202 % S	94.0	79.0	109
EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----
EA033-B: Potential Acidity (QCLot: 5939799)								
EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	0.202 % S	93.1	79.0	109
EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----
EA033-C: Acid Neutralising Capacity (QCLot: 5939797)								
EA033: Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	<0.01	4.9 % CaCO3	102	98.7	105
EA033: acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	<10	----	----	----	----

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
EA033-C: Acid Neutralising Capacity (QCLot: 5939797) - continued								
EA033: sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	<0.01	----	----	----	----
EA033-C: Acid Neutralising Capacity (QCLot: 5939799)								
EA033: Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	<0.01	4.9 % CaCO3	102	98.7	105
EA033: acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	<10	----	----	----	----
EA033: sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	<0.01	----	----	----	----
EA033-E: Acid Base Accounting (QCLot: 5939797)								
EA033: Net Acidity (sulfur units)	----	0.02	% S	<0.02	----	----	----	----
EA033: Net Acidity (acidity units)	----	10	mole H+ / t	<10	----	----	----	----
EA033: Liming Rate	----	1	kg CaCO3/t	<1	----	----	----	----
EA033-E: Acid Base Accounting (QCLot: 5939799)								
EA033: Net Acidity (sulfur units)	----	0.02	% S	<0.02	----	----	----	----
EA033: Net Acidity (acidity units)	----	10	mole H+ / t	<10	----	----	----	----
EA033: Liming Rate	----	1	kg CaCO3/t	<1	----	----	----	----
ED008: Exchangeable Cations (QCLot: 5929285)								
ED008: Exchangeable Calcium	----	0.1	meq/100g	<0.1	22.1 meq/100g	103	81.3	113
ED008: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.56 meq/100g	94.9	78.5	106
ED008: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.91 meq/100g	105	86.8	115
ED008: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.38 meq/100g	105	79.2	129
ED008: Exchangeable Sodium Percent	----	0.1	%	<0.1	----	----	----	----
ED008: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	24.95 meq/100g	103	81.8	113
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5924943)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.115 mg/kg	90.0	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5926545)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.115 mg/kg	110	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5926559)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.115 mg/kg	92.9	70.0	130
EP003: Total Organic Carbon (TOC) in Soil (QCLot: 5922626)								
EP003: Total Organic Carbon	----	0.02	%	<0.02	0.55 %	99.5	80.0	120
				<0.02	32.3 %	99.9	80.0	120
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5911444)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	114	71.0	123
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	123	69.0	129
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	98.0	65.0	125
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	112	71.0	125

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: 5911444) - continued								
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	95.4	66.0	124
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	105	60.0	112
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	116	67.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	117	65.0	127
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	101	57.0	125
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	96.4	57.0	131
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	102	65.0	125
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	90.4	69.0	127
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	107	63.0	121
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	98.2	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	98.7	52.0	128
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	93.3	65.0	125
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5916379)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	106	71.0	123
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	# 137	69.0	129
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	108	65.0	125
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	119	71.0	125
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	107	66.0	124
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	# 116	60.0	112
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	114	67.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	# 131	65.0	127
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	119	57.0	125
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	121	57.0	131
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	116	65.0	125
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	107	69.0	127
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	116	63.0	121
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	115	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	110	52.0	128
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	108	65.0	125
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5911442)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	35 mg/kg	94.7	66.0	122
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5911443)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	1666 mg/kg	89.8	70.0	111

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
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5911443) - continued								
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	2937 mg/kg	87.1	71.9	109
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	477 mg/kg	107	63.8	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5916377)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	35 mg/kg	91.4	66.0	122
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5916378)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	1666 mg/kg	104	70.0	111
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	2937 mg/kg	94.7	71.9	109
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	477 mg/kg	91.9	63.8	118
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5911442)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	91.3	66.0	122
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5911443)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	2315 mg/kg	88.4	72.8	110
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	2594 mg/kg	91.4	67.8	114
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	157 mg/kg	119	50.3	123
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5916377)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	89.2	66.0	122
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5916378)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	2315 mg/kg	102	72.8	110
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	2594 mg/kg	93.4	67.8	114
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	157 mg/kg	85.1	50.3	123
EP080: BTEXN (QCLot: 5911442)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	94.8	72.0	122
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	96.3	75.0	119
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	94.7	73.0	121
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	92.8	74.0	122
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	92.5	75.0	121
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	86.0	64.0	126
EP080: BTEXN (QCLot: 5916377)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	92.4	72.0	122
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	90.1	75.0	119
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	89.3	73.0	121
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	89.1	74.0	122
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	93.1	75.0	121

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
EP080: BTEXN (QCLot: 5916377) - continued								
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	101	64.0	126
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5911733)								
EP231X: Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.0005	mg/kg	<0.0005	0.00114 mg/kg	111	70.0	130
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	96.8	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.8	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	93.6	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	102	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	98.3	68.0	136
EP231X: Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.0002	mg/kg	<0.0002	0.0012 mg/kg	99.6	70.0	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	103	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5911737)								
EP231X: Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.0005	mg/kg	<0.0005	0.00114 mg/kg	103	70.0	130
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	89.1	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	73.6	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	86.0	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	91.6	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	85.3	68.0	136
EP231X: Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.0002	mg/kg	<0.0002	0.0012 mg/kg	89.6	70.0	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	84.6	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5911733)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	95.9	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	102	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.4	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	102	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.4	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	101	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	106	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	106	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.6	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00125 mg/kg	109	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5911737)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	87.8	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

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
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5911737) - continued								
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.4	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.8	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.6	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.2	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.2	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	87.6	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	90.4	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.8	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00125 mg/kg	88.0	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5911733)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	107	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	107	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	98.4	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	105	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	98.2	61.9	139
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	101	61.0	139
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5911737)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.8	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	121	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	83.2	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	99.2	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	96.3	61.9	139
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.0	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	93.6	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5911733)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	103	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00118 mg/kg	113	64.0	140

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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5911733) - continued								
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.0012 mg/kg	115	65.0	137
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.0012 mg/kg	87.5	54.8	124
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5911737)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	95.7	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00118 mg/kg	97.0	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.0012 mg/kg	110	65.0	137
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.0012 mg/kg	72.9	54.8	124
EP231P: PFAS Sums (QCLot: 5911733)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231P: PFAS Sums (QCLot: 5911737)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	----	----	----

Sub-Matrix: **WATER**

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
EG020F: Dissolved Metals by ICP-MS (QCLot: 5923029)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.2	90.3	113
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.6	89.7	108
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	96.3	87.3	107
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	94.8	88.9	108
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	94.6	89.4	106
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	95.9	87.2	108
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	100	89.5	112
EG035F: Dissolved Mercury by FIMS (QCLot: 5923030)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.005 mg/L	103	85.6	120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5910331)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	81.5	39.3	103
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	92.6	47.2	122
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	97.2	42.5	119
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5913465)								

Sub-Matrix: **WATER**

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
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5913465) - continued								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	360 µg/L	90.9	73.6	113
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5910331)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	84.1	47.0	100
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	97.4	46.2	116
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	78.5	24.7	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5913465)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	92.0	73.9	115
EP080: BTEXN (QCLot: 5913465)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	89.3	84.1	114
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	97.6	81.0	115
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	97.6	84.4	113
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	103	84.3	114
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	101	86.5	111
EP080: Naphthalene	91-20-3	5	µg/L	<5	5 µg/L	108	77.0	118
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5913583)								
EP231X-SUT: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00354 µg/L	107	72.0	130
EP231X-SUT: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	105	71.0	127
EP231X-SUT: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00381 µg/L	103	68.0	131
EP231X-SUT: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	115	69.0	134
EP231X-SUT: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	µg/L	<0.0002	0.00371 µg/L	105	65.0	140
EP231X-SUT: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	104	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5913583)								
EP231X-SUT: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.0020	0.02 µg/L	106	73.0	129
EP231X-SUT: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	114	72.0	129
EP231X-SUT: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	102	72.0	129
EP231X-SUT: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	110	72.0	130
EP231X-SUT: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	110	71.0	133
EP231X-SUT: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	110	69.0	130
EP231X-SUT: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	108	71.0	129
EP231X-SUT: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	107	69.0	133
EP231X-SUT: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	110	72.0	134
EP231X-SUT: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	123	65.0	144
EP231X-SUT: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.004 µg/L	115	71.0	132

Sub-Matrix: **WATER**

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
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5913583)								
EP231X-SUT: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	120	67.0	137
EP231X-SUT: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	95.0	68.0	141
EP231X-SUT: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	90.2	57.9	141
EP231X-SUT: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	101	63.3	134
EP231X-SUT: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	115	60.0	136
EP231X-SUT: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	112	65.0	136
EP231X-SUT: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	104	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5913583)								
EP231X-SUT: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	112	63.0	143
EP231X-SUT: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	116	64.0	140
EP231X-SUT: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	110	67.0	138
EP231X-SUT: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	107	53.1	133

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: 5924942)							
EP2409600-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	100	70.0	130
		EG005T: Cadmium	7440-43-9	12.5 mg/kg	87.6	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	91.2	70.0	130
		EG005T: Copper	7440-50-8	50 mg/kg	111	70.0	130
		EG005T: Lead	7439-92-1	50 mg/kg	76.3	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	88.8	70.0	130
		EG005T: Zinc	7440-66-6	50 mg/kg	85.4	70.0	130
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 5926544)							
EP2409636-005	SB03_0-0.1	EG005T: Arsenic	7440-38-2	50 mg/kg	104	70.0	130
		EG005T: Cadmium	7440-43-9	12.5 mg/kg	83.6	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	89.4	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
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 5926544) - continued							
EP2409636-005	SB03_0-0.1	EG005T: Copper	7440-50-8	50 mg/kg	107	70.0	130
		EG005T: Lead	7439-92-1	50 mg/kg	89.6	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	84.2	70.0	130
		EG005T: Zinc	7440-66-6	50 mg/kg	73.1	70.0	130
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 5926558)							
EP2409647-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	99.0	70.0	130
		EG005T: Cadmium	7440-43-9	12.5 mg/kg	86.4	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	99.0	70.0	130
		EG005T: Copper	7440-50-8	50 mg/kg	107	70.0	130
		EG005T: Lead	7439-92-1	50 mg/kg	89.8	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	89.8	70.0	130
		EG005T: Zinc	7440-66-6	50 mg/kg	82.5	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5924943)							
EP2409600-001	Anonymous	EG035T: Mercury	7439-97-6	1 mg/kg	95.7	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5926545)							
EP2409636-005	SB03_0-0.1	EG035T: Mercury	7439-97-6	1 mg/kg	102	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5926559)							
EP2409647-001	Anonymous	EG035T: Mercury	7439-97-6	1 mg/kg	90.0	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5911444)							
EP2409604-003	Anonymous	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	99.2	73.5	125
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	120	70.8	125
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5916379)							
EP2409636-016	SB08_0.3-0.4	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	101	73.5	125
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	120	70.8	125
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5911442)							
EP2409604-003	Anonymous	EP080: C6 - C9 Fraction	----	24 mg/kg	96.6	69.1	135
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5911443)							
EP2409604-003	Anonymous	EP071: C10 - C14 Fraction	----	1666 mg/kg	92.1	64.7	126
		EP071: C15 - C28 Fraction	----	2937 mg/kg	90.6	61.7	124
		EP071: C29 - C36 Fraction	----	477 mg/kg	99.7	64.6	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5916377)							
EP2409636-016	SB08_0.3-0.4	EP080: C6 - C9 Fraction	----	24 mg/kg	87.6	69.1	135
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5916378)							
EP2409636-016	SB08_0.3-0.4	EP071: C10 - C14 Fraction	----	1666 mg/kg	103	64.7	126
		EP071: C15 - C28 Fraction	----	2937 mg/kg	94.3	61.7	124

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5916378) - continued							
EP2409636-016	SB08_0.3-0.4	EP071: C29 - C36 Fraction	----	477 mg/kg	92.6	64.6	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5911442)							
EP2409604-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	29 mg/kg	89.5	69.1	135
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5911443)							
EP2409604-003	Anonymous	EP071: >C10 - C16 Fraction	----	2315 mg/kg	90.5	64.7	126
		EP071: >C16 - C34 Fraction	----	2594 mg/kg	94.0	61.7	124
		EP071: >C34 - C40 Fraction	----	157 mg/kg	105	64.6	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5916377)							
EP2409636-016	SB08_0.3-0.4	EP080: C6 - C10 Fraction	C6_C10	29 mg/kg	85.4	69.1	135
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5916378)							
EP2409636-016	SB08_0.3-0.4	EP071: >C10 - C16 Fraction	----	2315 mg/kg	101	64.7	126
		EP071: >C16 - C34 Fraction	----	2594 mg/kg	93.3	61.7	124
		EP071: >C34 - C40 Fraction	----	157 mg/kg	87.1	64.6	131
EP080: BTEXN (QCLot: 5911442)							
EP2409604-003	Anonymous	EP080: Benzene	71-43-2	2 mg/kg	94.4	76.4	118
		EP080: Toluene	108-88-3	2 mg/kg	94.4	67.4	112
EP080: BTEXN (QCLot: 5916377)							
EP2409636-016	SB08_0.3-0.4	EP080: Benzene	71-43-2	2 mg/kg	84.6	76.4	118
		EP080: Toluene	108-88-3	2 mg/kg	80.1	67.4	112
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5911733)							
EP2409487-003	Anonymous	EP231X: Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.00114 mg/kg	119	70.0	130
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	96.7	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	92.7	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	92.6	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	107	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	102	68.0	136
		EP231X: Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.0012 mg/kg	110	70.0	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	111	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5911737)							
EP2409636-009	SB05_0-0.1	EP231X: Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.00114 mg/kg	74.1	70.0	130
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	107	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	105	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	97.9	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	96.7	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	93.3	68.0	136
		EP231X: Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.0012 mg/kg	99.3	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
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5911737) - continued							
EP2409636-009	SB05_0-0.1	EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	92.5	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5911733)							
EP2409487-003	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	101	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	102	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	112	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	100	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	108	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	102	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	102	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	109	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	100	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	91.2	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	112	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5911737)							
EP2409636-009	SB05_0-0.1	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	92.2	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	107	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	99.2	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	97.3	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	123	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	120	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	99.7	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	126	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	109	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	100	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	104	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5911733)							
EP2409487-003	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	112	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	112	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	107	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	99.4	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	110	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	113	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	107	61.0	139

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5911737)							
EP2409636-009	SB05_0-0.1	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	98.0	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	99.7	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	105	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	93.0	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	103	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	93.5	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	106	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5911733)							
EP2409487-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	116	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	113	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	113	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	80.0	60.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5911737)							
EP2409636-009	SB05_0-0.1	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	102	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	110	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	108	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	91.9	60.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 5923029)							
EP2409806-002	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	99.2	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	96.9	70.0	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	96.7	70.0	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	97.3	70.0	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	94.4	70.0	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	96.0	70.0	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	104	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5923030)							
EP2409636-028	QC301	EG035F: Mercury	7439-97-6	0.005 mg/L	111	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5910331)							
EP2409638-002	Anonymous	EP071: C10 - C14 Fraction	----	400 µg/L	82.7	44.5	122

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5910331) - continued							
EP2409638-002	Anonymous	EP071: C15 - C28 Fraction	----	600 µg/L	94.8	55.1	143
		EP071: C29 - C36 Fraction	----	400 µg/L	99.6	53.6	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5913465)							
EP2409610-001	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	80.6	77.0	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5910331)							
EP2409638-002	Anonymous	EP071: >C10 - C16 Fraction	----	500 µg/L	84.1	44.5	122
		EP071: >C16 - C34 Fraction	----	700 µg/L	101	55.1	143
		EP071: >C34 - C40 Fraction	----	300 µg/L	74.8	53.6	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5913465)							
EP2409610-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	78.4	77.0	137
EP080: BTEXN (QCLot: 5913465)							
EP2409610-001	Anonymous	EP080: Benzene	71-43-2	20 µg/L	100	77.0	122
		EP080: Toluene	108-88-3	20 µg/L	96.2	73.5	126
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5913583)							
EP2409601-001	Anonymous	EP231X-SUT: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00355 µg/L	112	70.0	130
		EP231X-SUT: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00376 µg/L	121	70.0	130
		EP231X-SUT: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00379 µg/L	105	70.0	130
		EP231X-SUT: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00381 µg/L	110	70.0	130
		EP231X-SUT: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00371 µg/L	# Not Determined	70.0	130
		EP231X-SUT: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00385 µg/L	99.7	70.0	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5913583)							
EP2409601-001	Anonymous	EP231X-SUT: Perfluorobutanoic acid (PFBA)	375-22-4	0.02 µg/L	99.6	70.0	130
		EP231X-SUT: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.004 µg/L	92.4	70.0	130
		EP231X-SUT: Perfluorohexanoic acid (PFHxA)	307-24-4	0.004 µg/L	104	70.0	130
		EP231X-SUT: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.004 µg/L	102	70.0	130
		EP231X-SUT: Perfluorooctanoic acid (PFOA)	335-67-1	0.004 µg/L	90.1	70.0	130
		EP231X-SUT: Perfluorononanoic acid (PFNA)	375-95-1	0.004 µg/L	102	70.0	130
		EP231X-SUT: Perfluorodecanoic acid (PFDA)	335-76-2	0.004 µg/L	108	70.0	130
		EP231X-SUT: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.004 µg/L	103	70.0	130
		EP231X-SUT: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.004 µg/L	100	70.0	130
		EP231X-SUT: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.004 µg/L	118	70.0	130
		EP231X-SUT: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.004 µg/L	110	70.0	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5913583)							
EP2409601-001	Anonymous	EP231X-SUT: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.004 µg/L	114	70.0	130
		EP231X-SUT: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.01 µg/L	106	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5913583) - continued							
EP2409601-001	Anonymous	EP231X-SUT: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.01 µg/L	101	70.0	130
		EP231X-SUT: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.01 µg/L	101	70.0	130
		EP231X-SUT: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.01 µg/L	109	70.0	130
		EP231X-SUT: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.004 µg/L	104	70.0	130
		EP231X-SUT: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.004 µg/L	122	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5913583)							
EP2409601-001	Anonymous	EP231X-SUT: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00374 µg/L	100	70.0	130
		EP231X-SUT: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0038 µg/L	107	70.0	130
		EP231X-SUT: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00384 µg/L	107	70.0	130
		EP231X-SUT: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00386 µg/L	110	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EP2409636**	Page	: 1 of 24
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: MS ASHTON BETTI	Telephone	: +61-8-9406 1301
Project	: P21705 Burrup - Baseline Assessment	Date Samples Received	: 08-Jul-2024
Site	: ----	Issue Date	: 23-Jul-2024
Sampler	: Egan Churchill-Gray	No. of samples received	: 29
Order number	: PO023451	No. of samples analysed	: 29

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.**
- **Laboratory Control outliers exist - please see following pages for full details.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.**

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 : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	QC-5916379-001	----	**Acenaphthylene**	208-96-8	137 %	69.0-129%	**Recovery greater than upper control limit**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	QC-5916379-001	----	**Anthracene**	120-12-7	116 %	60.0-112%	**Recovery greater than upper control limit**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	QC-5916379-001	----	**Pyrene**	129-00-0	131 %	65.0-127%	**Recovery greater than upper control limit**

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	EP2409601--001	Anonymous	**Perfluorooctane sulfonic acid (PFOS)**	1763-23-1	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP075(SIM)T: PAH Surrogates	EP2409636-005	SB03_0-0.1	**Anthracene-d10**	1719-06-8	144 %	68.0-124 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	EP2409636-007	SB04_0-0.1	**Anthracene-d10**	1719-06-8	125 %	68.0-124 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	EP2409636-011	SB06_0-0.1	**Anthracene-d10**	1719-06-8	125 %	68.0-124 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	EP2409636-001	SB01_0-0.1	**4-Terphenyl-d14**	1718-51-0	143 %	66.0-132 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	EP2409636-002	SB01_0.4-0.5	**4-Terphenyl-d14**	1718-51-0	139 %	66.0-132 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	EP2409636-003	SB02_0-0.1	**4-Terphenyl-d14**	1718-51-0	134 %	66.0-132 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	EP2409636-004	SB02_0.2-0.3	**4-Terphenyl-d14**	1718-51-0	144 %	66.0-132 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	EP2409636-005	SB03_0-0.1	**4-Terphenyl-d14**	1718-51-0	197 %	66.0-132 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	EP2409636-006	SB03_0.3-0.4	**4-Terphenyl-d14**	1718-51-0	147 %	66.0-132 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	EP2409636-007	SB04_0-0.1	**4-Terphenyl-d14**	1718-51-0	152 %	66.0-132 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	EP2409636-008	SB04_0.4-0.5	**4-Terphenyl-d14**	1718-51-0	147 %	66.0-132 %	**Recovery greater than upper data quality objective**

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted - Continued							
EP075(SIM)T: PAH Surrogates	EP2409636-009	SB05_0-0.1	**4-Terphenyl-d14**	1718-51-0	135 %	66.0-132 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	EP2409636-010	SB05_0.4-0.5	**4-Terphenyl-d14**	1718-51-0	148 %	66.0-132 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	EP2409636-011	SB06_0-0.1	**4-Terphenyl-d14**	1718-51-0	150 %	66.0-132 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	EP2409636-012	SB06_0.4-0.5	**4-Terphenyl-d14**	1718-51-0	149 %	66.0-132 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	EP2409636-013	SB07_0-0.1	**4-Terphenyl-d14**	1718-51-0	147 %	66.0-132 %	**Recovery greater than upper data quality objective**
EP075(SIM)T: PAH Surrogates	EP2409636-014	SB07_0.2-0.3	**4-Terphenyl-d14**	1718-51-0	142 %	66.0-132 %	**Recovery greater than upper data quality objective**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	1	18	5.56	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	5.88	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	***Sample Date***	*Extraction / Preparation*			*Analysis*		
Container / *Client Sample ID(s)*		***Date extracted***	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*

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
EA002: pH 1:5 (Soils)							
Soil Glass Jar - Unpreserved (EA002)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102	**04-Jul-2024**	**11-Jul-2024**	11-Jul-2024	✓	**11-Jul-2024**	11-Jul-2024	✓
EA003 :pH (field/fox)							
Snap Lock Bag - frozen on receipt at ALS (EA003)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102	**04-Jul-2024**	**11-Jul-2024**	30-Mar-2027	✓	**11-Jul-2024**	09-Oct-2024	✓

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
EA029-A: pH Measurements							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102	**04-Jul-2024**	**12-Jul-2024**	30-Mar-2027	✓	**22-Jul-2024**	10-Oct-2024	✓
EA029-B: Acidity Trail							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102	**04-Jul-2024**	**12-Jul-2024**	30-Mar-2027	✓	**22-Jul-2024**	10-Oct-2024	✓

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
EA029-C: Sulfur Trail							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102	**04-Jul-2024**	**12-Jul-2024**	30-Mar-2027	✓	**22-Jul-2024**	10-Oct-2024	✓
EA029-D: Calcium Values							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102	**04-Jul-2024**	**12-Jul-2024**	30-Mar-2027	✓	**22-Jul-2024**	10-Oct-2024	✓

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
EA029-E: Magnesium Values							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102	**04-Jul-2024**	**12-Jul-2024**	30-Mar-2027	✓	**22-Jul-2024**	10-Oct-2024	✓
EA029-F: Excess Acid Neutralising Capacity							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102	**04-Jul-2024**	**12-Jul-2024**	30-Mar-2027	✓	**22-Jul-2024**	10-Oct-2024	✓

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
EA029-G: Retained Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102	**04-Jul-2024**	**12-Jul-2024**	30-Mar-2027	✓	**22-Jul-2024**	10-Oct-2024	✓
EA029-H: Acid Base Accounting							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102	**04-Jul-2024**	**12-Jul-2024**	30-Mar-2027	✓	**22-Jul-2024**	10-Oct-2024	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-A: Actual Acidity								
Snap Lock Bag - frozen on receipt at ALS (EA033)								
SB01_0-0.1,	SB01_0.4-0.5,	**04-Jul-2024**	**12-Jul-2024**	04-Jul-2025	✓	**22-Jul-2024**	10-Oct-2024	✓
SB02_0-0.1,	SB02_0.2-0.3,							
SB03_0-0.1,	SB03_0.3-0.4,							
SB04_0-0.1,	SB04_0.4-0.5,							
SB05_0-0.1,	SB05_0.4-0.5,							
SB06_0-0.1,	SB06_0.4-0.5,							
SB07_0-0.1,	SB07_0.2-0.3,							
SB08_0-0.1,	SB08_0.3-0.4,							
SB09_0-0.1,	SB09_0.4-0.5,							
SB10_0-0.1,	QC101, SB10_0.4-0.5,							
SB11_0-0.1,	SB11_0.4-0.5,							
SB12_0-0.1,	SB12_0.4-0.5,							
QC102								
EA033-B: Potential Acidity								
Snap Lock Bag - frozen on receipt at ALS (EA033)								
SB01_0-0.1,	SB01_0.4-0.5,	**04-Jul-2024**	**12-Jul-2024**	04-Jul-2025	✓	**22-Jul-2024**	10-Oct-2024	✓
SB02_0-0.1,	SB02_0.2-0.3,							
SB03_0-0.1,	SB03_0.3-0.4,							
SB04_0-0.1,	SB04_0.4-0.5,							
SB05_0-0.1,	SB05_0.4-0.5,							
SB06_0-0.1,	SB06_0.4-0.5,							
SB07_0-0.1,	SB07_0.2-0.3,							
SB08_0-0.1,	SB08_0.3-0.4,							
SB09_0-0.1,	SB09_0.4-0.5,							
SB10_0-0.1,	QC101, SB10_0.4-0.5,							
SB11_0-0.1,	SB11_0.4-0.5,							
SB12_0-0.1,	SB12_0.4-0.5,							
QC102								

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-C: Acid Neutralising Capacity							
Snap Lock Bag - frozen on receipt at ALS (EA033)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102	**04-Jul-2024**	**12-Jul-2024**	04-Jul-2025	✓	**22-Jul-2024**	10-Oct-2024	✓
EA033-D: Retained Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA033)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102	**04-Jul-2024**	**12-Jul-2024**	04-Jul-2025	✓	**22-Jul-2024**	10-Oct-2024	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA033-E: Acid Base Accounting							
Snap Lock Bag - frozen on receipt at ALS (EA033)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102	**04-Jul-2024**	**12-Jul-2024**	04-Jul-2025	✓	**22-Jul-2024**	10-Oct-2024	✓
EA055: Moisture Content (Dried @ 105-110°C)							
HDPE Soil Jar (EA055)							
QC103	**04-Jul-2024**	**----**	----	----	**16-Jul-2024**	18-Jul-2024	✓
Soil Glass Jar - Unpreserved (EA055)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102, QC401	**04-Jul-2024**	**----**	----	----	**16-Jul-2024**	18-Jul-2024	✓
EA150: Particle Sizing							
Soil Glass Jar - Unpreserved (EA150H)							
SB09_0-0.1, SB09_0.4-0.5	**04-Jul-2024**	**----**	----	----	**17-Jul-2024**	31-Dec-2024	✓
EA150: Soil Classification based on Particle Size							
Soil Glass Jar - Unpreserved (EA150H)							
SB09_0-0.1, SB09_0.4-0.5	**04-Jul-2024**	**----**	----	----	**17-Jul-2024**	31-Dec-2024	✓
EA152: Soil Particle Density							
Soil Glass Jar - Unpreserved (EA152)							
SB09_0-0.1, SB09_0.4-0.5	**04-Jul-2024**	**----**	----	----	**17-Jul-2024**	31-Dec-2024	✓

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
ED008: Exchangeable Cations								
Soil Glass Jar - Unpreserved (ED008)								
SB09_0-0.1,	SB09_0.4-0.5	**04-Jul-2024**	**17-Jul-2024**	01-Aug-2024	✓	**17-Jul-2024**	01-Aug-2024	✓
EG005(ED093)T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T)								
SB01_0-0.1,	SB01_0.4-0.5,	**04-Jul-2024**	**16-Jul-2024**	31-Dec-2024	✓	**18-Jul-2024**	31-Dec-2024	✓
SB02_0-0.1,	SB02_0.2-0.3,							
SB03_0-0.1,	SB03_0.3-0.4,							
SB04_0-0.1,	SB04_0.4-0.5,							
SB05_0-0.1,	SB05_0.4-0.5,							
SB06_0-0.1,	SB06_0.4-0.5,							
SB07_0-0.1,	SB07_0.2-0.3,							
SB08_0-0.1,	SB08_0.3-0.4,							
SB09_0-0.1,	SB09_0.4-0.5,							
SB10_0-0.1,	QC101, SB10_0.4-0.5,							
SB11_0-0.1,	SB11_0.4-0.5,							
SB12_0-0.1,	SB12_0.4-0.5,							
QC102,								
QC401								
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035T)								
SB01_0-0.1,	SB01_0.4-0.5,	**04-Jul-2024**	**16-Jul-2024**	01-Aug-2024	✓	**17-Jul-2024**	01-Aug-2024	✓
SB02_0-0.1,	SB02_0.2-0.3,							
SB03_0-0.1,	SB03_0.3-0.4,							
SB04_0-0.1,	SB04_0.4-0.5,							
SB05_0-0.1,	SB05_0.4-0.5,							
SB06_0-0.1,	SB06_0.4-0.5,							
SB07_0-0.1,	SB07_0.2-0.3,							
SB08_0-0.1,	SB08_0.3-0.4,							
SB09_0-0.1,	SB09_0.4-0.5,							
SB10_0-0.1,	QC101, SB10_0.4-0.5,							
SB11_0-0.1,	SB11_0.4-0.5,							
SB12_0-0.1,	SB12_0.4-0.5,							
QC102,								
QC401								
EP003: Total Organic Carbon (TOC) in Soil								
Soil Glass Jar - Unpreserved (EP003)								
SB09_0-0.1,	SB09_0.4-0.5	**04-Jul-2024**	**15-Jul-2024**	01-Aug-2024	✓	**15-Jul-2024**	01-Aug-2024	✓

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
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP075(SIM))								
SB01_0-0.1,	SB01_0.4-0.5,	**04-Jul-2024**	**09-Jul-2024**	18-Jul-2024	✓	**12-Jul-2024**	18-Aug-2024	✓
SB02_0-0.1,	SB02_0.2-0.3,							
SB03_0-0.1,	SB03_0.3-0.4,							
SB04_0-0.1,	SB04_0.4-0.5,							
SB05_0-0.1,	SB05_0.4-0.5,							
SB06_0-0.1,	SB06_0.4-0.5,							
SB07_0-0.1,	SB07_0.2-0.3							
Soil Glass Jar - Unpreserved (EP075(SIM))								
SB08_0-0.1,	SB08_0.3-0.4,	**04-Jul-2024**	**15-Jul-2024**	18-Jul-2024	✓	**17-Jul-2024**	24-Aug-2024	✓
SB09_0-0.1,	SB09_0.4-0.5,							
SB10_0-0.1,	SB10_0.4-0.5,							
SB11_0-0.1,	SB11_0.4-0.5,							
SB12_0-0.1,	SB12_0.4-0.5,							
QC101,	QC102,							
QC401								

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
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3	**04-Jul-2024**	**09-Jul-2024**	18-Jul-2024	✓	**10-Jul-2024**	18-Jul-2024	✓
Soil Glass Jar - Unpreserved (EP071)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5	**04-Jul-2024**	**09-Jul-2024**	18-Jul-2024	✓	**11-Jul-2024**	18-Aug-2024	✓
Soil Glass Jar - Unpreserved (EP071)							
SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3	**04-Jul-2024**	**09-Jul-2024**	18-Jul-2024	✓	**12-Jul-2024**	18-Aug-2024	✓
Soil Glass Jar - Unpreserved (EP080)							
SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC101, QC102, QC401	**04-Jul-2024**	**11-Jul-2024**	18-Jul-2024	✓	**12-Jul-2024**	18-Jul-2024	✓
Soil Glass Jar - Unpreserved (EP071)							
SB08_0-0.1, SB08_0.3-0.4	**04-Jul-2024**	**15-Jul-2024**	18-Jul-2024	✓	**17-Jul-2024**	24-Aug-2024	✓
Soil Glass Jar - Unpreserved (EP071)							
SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC101, QC102, QC401	**04-Jul-2024**	**15-Jul-2024**	18-Jul-2024	✓	**18-Jul-2024**	24-Aug-2024	✓

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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3	**04-Jul-2024**	**09-Jul-2024**	18-Jul-2024	✓	**10-Jul-2024**	18-Jul-2024	✓
Soil Glass Jar - Unpreserved (EP071)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5	**04-Jul-2024**	**09-Jul-2024**	18-Jul-2024	✓	**11-Jul-2024**	18-Aug-2024	✓
Soil Glass Jar - Unpreserved (EP071)							
SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3	**04-Jul-2024**	**09-Jul-2024**	18-Jul-2024	✓	**12-Jul-2024**	18-Aug-2024	✓
Soil Glass Jar - Unpreserved (EP080)							
SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC101, QC102, QC401	**04-Jul-2024**	**11-Jul-2024**	18-Jul-2024	✓	**12-Jul-2024**	18-Jul-2024	✓
Soil Glass Jar - Unpreserved (EP071)							
SB08_0-0.1, SB08_0.3-0.4	**04-Jul-2024**	**15-Jul-2024**	18-Jul-2024	✓	**17-Jul-2024**	24-Aug-2024	✓
Soil Glass Jar - Unpreserved (EP071)							
SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC101, QC102, QC401	**04-Jul-2024**	**15-Jul-2024**	18-Jul-2024	✓	**18-Jul-2024**	24-Aug-2024	✓

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)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3	**04-Jul-2024**	**09-Jul-2024**	18-Jul-2024	✓	**10-Jul-2024**	18-Jul-2024	✓
Soil Glass Jar - Unpreserved (EP080)							
SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC101, QC102, QC401	**04-Jul-2024**	**11-Jul-2024**	18-Jul-2024	✓	**12-Jul-2024**	18-Jul-2024	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE Soil Jar (EP231X)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102, QC103	**04-Jul-2024**	**10-Jul-2024**	31-Dec-2024	✓	**10-Jul-2024**	19-Aug-2024	✓

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
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102, QC103	**04-Jul-2024**	**10-Jul-2024**	31-Dec-2024	✓	**10-Jul-2024**	19-Aug-2024	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE Soil Jar (EP231X)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102, QC103	**04-Jul-2024**	**10-Jul-2024**	31-Dec-2024	✓	**10-Jul-2024**	19-Aug-2024	✓

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)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102, QC103	**04-Jul-2024**	**10-Jul-2024**	31-Dec-2024	✓	**10-Jul-2024**	19-Aug-2024	✓
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X)							
SB01_0-0.1, SB01_0.4-0.5, SB02_0-0.1, SB02_0.2-0.3, SB03_0-0.1, SB03_0.3-0.4, SB04_0-0.1, SB04_0.4-0.5, SB05_0-0.1, SB05_0.4-0.5, SB06_0-0.1, SB06_0.4-0.5, SB07_0-0.1, SB07_0.2-0.3, SB08_0-0.1, SB08_0.3-0.4, SB09_0-0.1, SB09_0.4-0.5, SB10_0-0.1, QC101, SB10_0.4-0.5, SB11_0-0.1, SB11_0.4-0.5, SB12_0-0.1, SB12_0.4-0.5, QC102, QC103	**04-Jul-2024**	**10-Jul-2024**	31-Dec-2024	✓	**10-Jul-2024**	19-Aug-2024	✓

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
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F)							
QC301	**04-Jul-2024**	**----**	----	**----**	**15-Jul-2024**	31-Dec-2024	✓
EG035F: Dissolved Mercury by FIMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F)							
QC301	**04-Jul-2024**	**----**	----	**----**	**15-Jul-2024**	01-Aug-2024	✓

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
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
QC301	**04-Jul-2024**	**10-Jul-2024**	11-Jul-2024	✓	**12-Jul-2024**	19-Aug-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
QC301	**04-Jul-2024**	**11-Jul-2024**	18-Jul-2024	✓	**12-Jul-2024**	18-Jul-2024	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
QC301	**04-Jul-2024**	**10-Jul-2024**	11-Jul-2024	✓	**12-Jul-2024**	19-Aug-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
QC301	**04-Jul-2024**	**11-Jul-2024**	18-Jul-2024	✓	**12-Jul-2024**	18-Jul-2024	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
QC301	**04-Jul-2024**	**11-Jul-2024**	18-Jul-2024	✓	**12-Jul-2024**	18-Jul-2024	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X-SUT)							
QC301	**04-Jul-2024**	**10-Jul-2024**	31-Dec-2024	✓	**10-Jul-2024**	31-Dec-2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X-SUT)							
QC301	**04-Jul-2024**	**10-Jul-2024**	31-Dec-2024	✓	**10-Jul-2024**	31-Dec-2024	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X-SUT)							
QC301	**04-Jul-2024**	**10-Jul-2024**	31-Dec-2024	✓	**10-Jul-2024**	31-Dec-2024	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X-SUT)							
QC301	**04-Jul-2024**	**10-Jul-2024**	31-Dec-2024	✓	**10-Jul-2024**	31-Dec-2024	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X-SUT)							
QC301	**04-Jul-2024**	**10-Jul-2024**	31-Dec-2024	✓	**10-Jul-2024**	31-Dec-2024	✓

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)							
Chromium Suite for Acid Sulphate Soils	EA033	3	26	**11.54**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations with pre-treatment	ED008	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	5	44	**11.36**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	4	36	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	3	26	**11.54**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH field/fox	EA003	3	26	**11.54**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	3	26	**11.54**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	6	60	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	6	60	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	4	36	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	4	39	**10.26**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Chromium Suite for Acid Sulphate Soils	EA033	2	26	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations with pre-treatment	ED008	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	4	26	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	2	26	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	60	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	60	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	7	**28.57**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chromium Suite for Acid Sulphate Soils	EA033	2	26	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations with pre-treatment	ED008	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	2	26	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	60	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	60	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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*	
Method Blanks (MB) - Continued							
Total Organic Carbon	EP003	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	60	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	60	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	39	**5.13**	**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)							
Dissolved Mercury by FIMS	EG035F	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	1	18	**5.56**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	**5.88**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**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
pH (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM Schedule B(3).
pH field/fox	EA003	SOIL	In house: Referenced to Ahern et al 1998 - determined on a 1:5 soil/water extract designed to simulate field measured pH and pH after the extract has been oxidised with peroxide.
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	SOIL	In house: Referenced to Ahern et al 2004 - a suspension peroxide oxidation method following the 'sulfur trail' by determining the level of 1M KCL extractable sulfur and the sulfur level after oxidation of soil sulphides. The 'acidity trail' is followed by measurement of TAA, TPA and TSA. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
Chromium Suite for Acid Sulphate Soils	EA033	SOIL	In house: Referenced to Ahern et al 2004. This method covers the determination of Chromium Reducible Sulfur (SCR); pHKCl; titratable actual acidity (TAA); acid neutralising capacity by back titration (ANC); and net acid soluble sulfur (SNAS) which incorporates peroxide sulfur. It applies to soils and sediments (including sands) derived from coastal regions. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
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).
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3
Soil Particle Density	EA152	SOIL	Soil Particle Density by AS 1289.3.5.1: Methods of testing soils for engineering purposes - Soil classification tests - Determination of the soil particle density of a soil - Standard method
Exchangeable Cations with pre-treatment	ED008	SOIL	In house: Referenced to Rayment & Lyons Method 15A2. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. 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 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)
Total Organic Carbon	EP003	SOIL	In house C-IR17. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO2) is automatically measured by infra-red detector.
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).

Analytical Methods	Method	Matrix	Method Descriptions
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.
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 5.4, table B-15 requirements.
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The 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).
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	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 concentrated, combined with an equal volume of reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.4, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method	ED007PR	SOIL	In house: Referenced to Rayment & Lyons method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
Drying only	EN020D	SOIL	In house

Preparation Methods	Method	Matrix	Method Descriptions
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
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).
Dry and Pulverise (up to 100g)	GEO30	SOIL	#
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.
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.
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.
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.
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	: **EP2409636**		
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: MS ASHTON BETTI	Contact	: Ashvini Wickramasinghe
Address	: LEVEL 18, 140 ST GEORGES TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
E-mail	: Ashton.Betti@senversa.com.au	E-mail	: ashvini.wickramasinghe@alsglobal.com
Telephone	: +61 08 6557 8881	Telephone	: +61-8-9406 1301
Facsimile	: +61 03 9606 0074	Facsimile	: +61-8-9406 1399
Project	: P21705 Burrup - Baseline Assessment	Page	: 1 of 4
Order number	: PO023451	Quote number	: EB2023SENVER0001 (EN/000)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Egan Churchill-Gray		

Dates

Date Samples Received	: 08-Jul-2024 12:40	Issue Date	: 09-Jul-2024
Client Requested Due Date	: 18-Jul-2024	Scheduled Reporting Date	: **18-Jul-2024**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 3	Temperature	: 3.3 - Ice present
Receipt Detail	:	No. of samples received / analysed	: 29 / 29

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Please be advised that no analysis has been requested on the provided Chain of Custody (COC) for all samples listed with the SAMPLE-HANDLING task. The Samples Handling Fee will be charged per sample without analysis requested unless analysis is scheduled on the sample prior to the release of this workorder. Standard disposal timeframes apply from receipt of samples. For further information please contact your local Client Services team.
- Please see scanned COC for sample discrepencies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- 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 - EA002 pH (1:5)	SOIL - EA003 pH field/fox	SOIL - EA029 SPOCAS	SOIL - EA033 Chromium Suite for Acid Sulphate Soils	SOIL - EA055-103 Moisture Content	SOIL - EP231X (solids) PFAS - Full Suite (30 analytes)	SOIL - S-26 8 metals/TRH/BTEXN/PAH
EP2409636-001	04-Jul-2024 00:00	SB01_0-0.1	✓	✓	✓	✓	✓	✓	✓
EP2409636-002	04-Jul-2024 00:00	SB01_0.4-0.5	✓	✓	✓	✓	✓	✓	✓
EP2409636-003	04-Jul-2024 00:00	SB02_0-0.1	✓	✓	✓	✓	✓	✓	✓
EP2409636-004	04-Jul-2024 00:00	SB02_0.2-0.3	✓	✓	✓	✓	✓	✓	✓
EP2409636-005	04-Jul-2024 00:00	SB03_0-0.1	✓	✓	✓	✓	✓	✓	✓
EP2409636-006	04-Jul-2024 00:00	SB03_0.3-0.4	✓	✓	✓	✓	✓	✓	✓
EP2409636-007	04-Jul-2024 00:00	SB04_0-0.1	✓	✓	✓	✓	✓	✓	✓
EP2409636-008	04-Jul-2024 00:00	SB04_0.4-0.5	✓	✓	✓	✓	✓	✓	✓
EP2409636-009	04-Jul-2024 00:00	SB05_0-0.1	✓	✓	✓	✓	✓	✓	✓
EP2409636-010	04-Jul-2024 00:00	SB05_0.4-0.5	✓	✓	✓	✓	✓	✓	✓
EP2409636-011	04-Jul-2024 00:00	SB06_0-0.1	✓	✓	✓	✓	✓	✓	✓
EP2409636-012	04-Jul-2024 00:00	SB06_0.4-0.5	✓	✓	✓	✓	✓	✓	✓
EP2409636-013	04-Jul-2024 00:00	SB07_0-0.1	✓	✓	✓	✓	✓	✓	✓
EP2409636-014	04-Jul-2024 00:00	SB07_0.2-0.3	✓	✓	✓	✓	✓	✓	✓
EP2409636-015	04-Jul-2024 00:00	SB08_0-0.1	✓	✓	✓	✓	✓	✓	✓
EP2409636-016	04-Jul-2024 00:00	SB08_0.3-0.4	✓	✓	✓	✓	✓	✓	✓
EP2409636-017	04-Jul-2024 00:00	SB09_0-0.1	✓	✓	✓	✓	✓	✓	✓
EP2409636-018	04-Jul-2024 00:00	SB09_0.4-0.5	✓	✓	✓	✓	✓	✓	✓
EP2409636-019	04-Jul-2024 00:00	SB10_0-0.1	✓	✓	✓	✓	✓	✓	✓
EP2409636-020	04-Jul-2024 00:00	SB10_0.4-0.5	✓	✓	✓	✓	✓	✓	✓
EP2409636-021	04-Jul-2024 00:00	SB11_0-0.1	✓	✓	✓	✓	✓	✓	✓
EP2409636-022	04-Jul-2024 00:00	SB11_0.4-0.5	✓	✓	✓	✓	✓	✓	✓
EP2409636-023	04-Jul-2024 00:00	SB12_0-0.1	✓	✓	✓	✓	✓	✓	✓
EP2409636-024	04-Jul-2024 00:00	SB12_0.4-0.5	✓	✓	✓	✓	✓	✓	✓
EP2409636-025	04-Jul-2024 00:00	QC101	✓	✓	✓	✓	✓	✓	✓
EP2409636-026	04-Jul-2024 00:00	QC102	✓	✓	✓	✓	✓	✓	✓
EP2409636-027	04-Jul-2024 00:00	QC103					✓	✓	
EP2409636-029	04-Jul-2024 00:00	QC401					✓		✓

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA150H/EA152 Particle Sizing with Hydrometer + Soil Particle	SOIL - ED008 Def Exchangeable Cations with pre-treatment -	SOIL - EP003 Total Organic Carbon (TOC) in Soil
EP2409636-017	04-Jul-2024 00:00	SB09_0-0.1	✓	✓	✓
EP2409636-018	04-Jul-2024 00:00	SB09_0.4-0.5	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X-SUT PFAS - Super Ultra Trace Waters Long Suite (30	WATER - W-05 TRH/BTEXN/8 Metals
EP2409636-028	04-Jul-2024 00:00	QC301	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

ASHTON BETTI

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

Egan Churchill-Gray

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

PERTH LAB REPORTS

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

SUPPLIER ACCOUNTS

- A4 - AU Tax Invoice (INV)	Email	supplieraccounts@senversa.com.au

Inter-Laboratory Testing

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry) 18958 (Biology).

(SOIL) EP003: Total Organic Carbon (TOC) in Soil

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry and Biology).

(SOIL) EA150: Soil Classification based on Particle Size

(SOIL) EA150: Particle Sizing

(SOIL) EA152: Soil Particle Density

senversa

Chain of Custody Documentation

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Laboratory: ALS WA
Address: 26 Rigali Way, Wangara WA 6065
Contact: Sample Receipt
Phone: 08 9406 1301

Job Number:	P21705	**Purchase Order:**	PO023451
Project Name:	Burrup - Baseline Assesment	**Quote No:**	Senversa
Sampled By:	Egan Churchill-Gray	**Turn Around Time:**	Standard
Project Manager:	Ashton Betti	**Page:**	1 of 1
Email Report To:	ashton.betti@senversa.com.au egan.churchill-gray@senversa.com.au perth.labreports@senversa.com.au	**Phone/Mobile:**	0421 473 219

Sample Information					Container Information		Analysis Required											
Lab ID	Sample ID	Matrix *	Date	Time	Type / Code	Total Containers	TRH(C6-C40)/BTEXN/PAH/8 metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn) [S-26]	PFAS – Full Suite (28 analytes)[EP231X]	pHF and pHFOX [EA003]	SPOCAS Suite- Complete [EA029]	CRS Suite - Complete [EA033]	pH 1:5 [EA002]	TRH (C6-C40), BTEXN, 8 Dissolved Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn) [W-5]	PFAS – Super Trace Full Suite (28 analytes) [EP231X-ST]			HOLD	Comments: e.g. Highly contaminated sample; hazardous materials present; trace LORs etc.
1	SB01_0-0.1	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
2	SB01_0.4-0.5	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
3	SB02_0-0.1	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
4	SB02_0.2-0.3	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
5	SB03_0-0.1	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
6	SB03_0.3-0.4	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
7	SB04_0-0.1	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
8	SB04_0.4-0.5	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
9	SB05_0-0.1	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
10	SB05_0.4-0.5	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
11	SB06_0-0.1	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
12	SB06_0.4-0.5	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
13	SB07_0-0.1	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
14	SB07_0.2-0.3	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
15	SB08_0-0.1	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
16	SB08_0.3-0.4	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
17	SB09_0-0.1	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
18	SB09_0.4-0.5	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
19	SB10_0-0.1	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
20	SB10_0.4-0.5	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
21	SB11_0-0.1	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
22	SB11_0.4-0.5	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
23	SB12_0-0.1	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
24	SB12_0.4-0.5	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
25	QC101	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
26	QC102	Soil	4/07/2024		1x glass jar, 1x HDPE jar, 1x ASS bag	3	X	X	X	X	X	X						
27	QC103	Soil	4/07/2024		1x HDPE jar	1		X										
28	QC301	Water	4/07/2024		2x VS, 1x UA, 4x P, 1x N	8							X	X				
29	QC401	Soil	4/07/2024		1x glass jar	1	X											Lab ID: TBS325
30	QC201	Soil	4/7/24															
31	QC202	Soil	4/7/24															
Total						88												

Environmental Division
Perth
Work Order Reference
EP2409636

Telephone -- 61-8-9406 1301

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:

Sampler Name: Egan Churchill-Gray **Signature:** ECG **Date:** 8/07/2024

Relinquished By:		Method of Shipment (if applicable):	Received by:	
Name/Signature: Egan Churchill-Gray / ECG	Date: 8/7/24	Carrier / Reference #:	Name/Signature: LS	Date: 8/7
Of: Senversa	Time: 12:00	Date/Time:	Of: ALS	Time: 1240
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: _____
Checked by: _____

Chain of Custody Documentation

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Laboratory: Eurofins ARL WA
Address: 46 - 48 Banksia Rd, Welshpool WA 6106
Contact: Sample Receipt
Phone: 08 6253 4444

Job Number:	P21705	**Purchase Order:**	
Project Name:	Burrup - Baseline Assessment	**Quote No:**	Senversa
Sampled By:	Egan Churchill-Gray	**Turn Around Time:**	Standard
Project Manager:	Ashton Betti	**Page:**	1 of 1
Email Report To:	ashton.betti@senversa.com.au egan.churchill-gray@senversa.com.au perth.labreports@senversa.com.au	**Phone/Mobile:**	0421 473 219

Sample Information					Container Information		Analysis Required											
Lab ID	Sample ID	Matrix *	Date	Time	Type / Code	Total Bottles	TRH(C6-C40)/BTEX/N/PAH/8 metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn)	PFAS – Full Suite (28 analytes)	pHF and pHFOX	SPOCAS Suite- Complete	CRS Suite - Complete	pH 1:5					HOLD	Comments: e.g. Highly contaminated sample; hazardous materials present; trace LORs etc.
	QC201	Soil	5/07/2024		1x glass jar, 1x HDPE jar, 1x ASS ba	3	X	X	X	X	X	X						
	QC202	Soil	5/07/2024		1x glass jar, 1x HDPE jar, 1x ASS ba	3	X	X	X	X	X	X						
	QC203	Soil	5/07/2024		1x glass jar, 1x HDPE jar, 1x ASS ba	3		X										
Total						9												

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:	**Sampler Name:** Egan Churchill-Gray	**Signature:** ECG	**Date:** 8/07/2024

Relinquished By:		Method of Shipment (if applicable):	Received by:	
Name/Signature: Egan Churchill-Gray / ECG	Date: 8/7	Carrier / Reference #:	Name/Signature:	Date: 08/07/24
Of: Senversa	Time: 12:00	Date/Time:	Of: 17.6	Time: 12:35
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

111574

Completed by: _____
Checked by: _____

www.eurofins.com.au EnviroSales@eurofins.com

Eurofins ARL Pty Ltd ABN: 91 05 0159 898

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

Eurofins Environment Testing Australia Pty Ltd ABN: 50 005 085 521

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

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794 & 2780

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079

Eurofins ProMicro Pty Ltd ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Focus)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

Sample Receipt Advice

Company name: Senversa Pty Ltd WA
Contact name: - Lab reports
Project name: BURRUP - BASELINE ASSESSMENT
Project ID: P21705
Turnaround time: 5 Day
Date/Time received Jul 8, 2024 12:35 PM
Eurofins reference 1115574

Sample Information

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

Notes

Contact

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

Elden Garrett on phone : 0892519602 or by email: EldenGarrett@eurofins.com

Results will be delivered electronically via email to - Lab reports - perth.labreports@senversa.com.au.

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

Global Leader - Results you can trust

eurofins

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898
Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549
Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: Senversa Pty Ltd WA
Address: Level 18, 140 St Georges Terrace
Perth
WA 6000

Project Name: BURRUP - BASELINE ASSESSMENT
Project ID: P21705

Order No.:
Report #: 1115574
Phone: 0863240200
Fax: 0396060074

Received: Jul 8, 2024 12:35 PM
Due: Jul 15, 2024
Priority: 5 Day
Contact Name: - Lab reports

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail						pH (1:5 Aqueous extract at 25 °C as rec.)	Acid Sulfate Soils Field pH Test	Metals M8	SPOCAS Suite - WA (Excluding ANC)	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Eurofins Suite B4	Per- and Polyfluoroalkyl Substances (PFASs)
Perth Laboratory - NATA # 2377 Site # 2370						X		X			X	X	X	
Melbourne Laboratory - NATA # 1261 Site # 1254											X	X		X
Brisbane Laboratory - NATA # 1261 Site # 20794 & 2780							X		X	X				
External Laboratory														
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**									
1	QC201	Jul 05, 2024		Soil	L24-JI0019816	X	X	X	X	X		X	X	X
2	QC202	Jul 05, 2024		Soil	L24-JI0019817	X	X	X	X	X		X	X	X
3	QC203	Jul 05, 2024		Soil	L24-JI0019818						X			X
Test Counts						2	2	2	2	2	3	3	2	3

Senversa Pty Ltd (WA)
Level 18, 140 St Georges Terrace
Perth
WA 6000

Attention: **- Lab reports**

Report **1115574-S**
Project name BURRUP - BASELINE ASSESSMENT
Project ID P21705
Received Date Jul 08, 2024

Client Sample ID			QC201	QC202	QC203
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24-JI0019816	L24-JI0019817	L24-JI0019818
Date Sampled			Jul 05, 2024	Jul 05, 2024	Jul 05, 2024
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons					
TRH C6-C9	20	mg/kg	< 20	< 20	-
TRH C10-C14	20	mg/kg	< 20	< 20	-
TRH C15-C28	50	mg/kg	< 50	< 50	-
TRH C29-C36	50	mg/kg	< 50	< 50	-
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	-
TRH C6-C10*	20	mg/kg	< 20	< 20	-
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	-
TRH >C10-C16	50	mg/kg	< 50	< 50	-
TRH >C10-C16 less Naphthalene (F2)*[N01]	50	mg/kg	< 50	< 50	-
TRH >C16-C34	100	mg/kg	< 100	< 100	-
TRH >C34-C40*	100	mg/kg	< 100	< 100	-
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	-
BTEX					
Benzene	0.1	mg/kg	< 0.1	< 0.1	-
Toluene	0.1	mg/kg	< 0.1	< 0.1	-
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	-
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	-
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	-
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	-
BTEX					
4-Bromofluorobenzene (surr.)	1	%	88	100	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	-
Polycyclic Aromatic Hydrocarbons					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	-
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	-
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	-
Anthracene	0.5	mg/kg	< 0.5	< 0.5	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-

Client Sample ID			QC201	QC202	QC203
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24-JI0019816	L24-JI0019817	L24-JI0019818
Date Sampled			Jul 05, 2024	Jul 05, 2024	Jul 05, 2024
Test/Reference	LOR	Unit			
Polycyclic Aromatic Hydrocarbons					
Chrysene	0.5	mg/kg	< 0.5	< 0.5	-
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	-
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-
Fluorene	0.5	mg/kg	< 0.5	< 0.5	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	-
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	-
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	-
Pyrene	0.5	mg/kg	< 0.5	< 0.5	-
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	-
2-Fluorobiphenyl (surr.)	1	%	80	87	-
p-Terphenyl-d14 (surr.)	1	%	97	116	-
pH	0.1	pH Units	9.0	8.9	-
Heavy Metals					
Arsenic	2	mg/kg	7.4	7.7	-
Cadmium	0.1	mg/kg	< 0.1	< 0.1	-
Chromium	1	mg/kg	15	6.8	-
Copper	1	mg/kg	29	1.5	-
Lead	1	mg/kg	4.5	2.3	-
Mercury	0.02	mg/kg	0.04	0.04	-
Nickel	1	mg/kg	6.6	2.9	-
Zinc	5	mg/kg	25	17	-
Acid Sulfate Soils Field pH Test					
pH-F (Field pH test)*	0.1	pH Units	8.7	8.7	-
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	8.4	8.3	-
Reaction Ratings*[S05]	0	comment	4.0	4.0	-
Actual Acidity (NLM-3.2)					
pH-KCL (NLM-3.1)	0.1	pH Units	9.5	9.6	-
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	< 2	< 2	-
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	< 0.003	< 0.003	-
SPOCAS Suite - WA (Excluding ANC)					
SPOCAS - Liming rate - ASSMAC (Excluding ANC)		kg CaCO3/t	< 1	< 1	-
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		mol H+/t	< 10	< 10	-
SPOCAS - Net Acidity - ASSMAC (Excluding ANC)		% S	< 0.02	< 0.02	-
Potential Acidity - Titratable Peroxide					
pH-OX	0.1	pH Units	7.8	7.9	-
Titratable Peroxide Acidity (s-TPA)	0.02	% pyrite S	< 0.02	< 0.02	-
Titratable Peroxide Acidity (a-TPA)	2	mol H+/t	< 2	< 2	-
Titratable Sulfidic Acidity (a-TSA)	2	mol H+/t	< 2	< 2	-
Titratable Sulfidic Acidity (s-TSA)	0.02	% pyrite S	< 0.02	< 0.02	-
Extractable Sulfur					
Sulfur - KCl Extractable	0.005	% S	0.13	0.093	-
Peroxide Extractable Sulfur	0.005	% S	0.20	0.22	-
HCl Extractable Sulfur	0.005	% S	N/A	N/A	-
Potential Acidity (SPOS)					
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	0.005	% S	0.079	0.13	-
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	2	mol H+/t	49	79	-

Client Sample ID			QC201	QC202	QC203
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24-JI0019816	L24-JI0019817	L24-JI0019818
Date Sampled			Jul 05, 2024	Jul 05, 2024	Jul 05, 2024
Test/Reference	LOR	Unit			
Retained Acidity (S-NAS)					
Net Acid soluble sulfur (SNAS) NLM-4.1	0.005	% S	N/A	N/A	-
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.005	% S	N/A	N/A	-
Net Acid soluble sulfur (a-SNAS) NLM-4.1	2	mol H+/t	N/A	N/A	-
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	-
Extractable Calcium					
Calcium - KCl Extractable	0.005	% Ca	0.20	0.17	-
Calcium - Peroxide	0.005	% Ca	16	22	-
Calcium - Acid Reacted	0.005	% Ca	16	22	-
Calcium - Acid Reacted (s-aCa)	0.005	% S	13	18	-
Calcium - Acid Reacted (a-aCa)	0.005	mol H+/t	7900	11000	-
Extractable Magnesium					
Magnesium - KCl Extractable	0.005	% Mg	0.11	0.11	-
Magnesium - Peroxide	0.005	% Mg	1.2	3.7	-
Magnesium - Acid Reacted	0.005	% Mg	1.1	3.6	-
Magnesium - Acid Reacted (s-aCa)	0.005	% S	1.5	4.7	-
Magnesium - Acid Reacted (a-aCa)	0.005	mol H+/t	930	2900	-
Acid Neutralising Capacity (ANCE)					
Acid Neutralising Capacity - (ANCE)	0.02	% CaCO3	38	64	-
Acid Neutralising Capacity - (s-ANCE)	0.02	% S	12	21	-
Acid Neutralising Capacity - (a-ANCE)	10	mol H+/t	7600	13000	-
Acid Neutralising Capacity (ANCbt)					
ANC Fineness Factor		factor	1.5	1.5	-
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	43	59	-
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)[S03]	0.02	% S	14	19	-
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	8600	12000	-
Net Acidity (Including ANC)					
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	10	mol H+/t	< 10	< 10	-
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	0.02	% S	< 0.02	< 0.02	-
SPOCAS - Liming rate - ASSMAC	1	kg CaCO3/t	< 1	< 1	-
s-CRS Suite - Net Acidity - NASSG (including ANC)	0.02	% S	N/A	N/A	-
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	N/A	N/A	-
CRS Suite - Liming Rate - NASSG (Including ANC)[S01]	1	kg CaCO3/t	N/A	N/A	-
Potential Acidity - Chromium Reducible Sulfur					
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)[S04]	0.005	% S	0.006	< 0.005	-
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	3.7	< 3	-
Extraneous Material					
<2mm Fraction	0.005	g	23	70	-
>2mm Fraction	0.005	g	5.2	9.8	-
Analysed Material	0.1	%	81	88	-
Extraneous Material	0.1	%	19	12	-
Sample Properties					
% Moisture	1	%	15	9.5	14
Perfluoroalkyl carboxylic acids (PFCAs)					
Perfluorobutanoic acid (PFBA)[N11]	5	ug/kg	< 5	< 5	< 5
Perfluoropentanoic acid (PFPeA)[N11]	5	ug/kg	< 5	< 5	< 5
Perfluorohexanoic acid (PFHxA)[N11]	5	ug/kg	< 5	< 5	< 5
Perfluoroheptanoic acid (PFHpA)[N11]	5	ug/kg	< 5	< 5	< 5
Perfluorooctanoic acid (PFOA)[N11]	5	ug/kg	< 5	< 5	< 5
Perfluorononanoic acid (PFNA)[N11]	5	ug/kg	< 5	< 5	< 5

Client Sample ID			QC201	QC202	QC203
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24-JI0019816	L24-JI0019817	L24-JI0019818
Date Sampled			Jul 05, 2024	Jul 05, 2024	Jul 05, 2024
Test/Reference	LOR	Unit			
Perfluoroalkyl carboxylic acids (PFCAs)					
Perfluorodecanoic acid (PFDA)[N11]	5	ug/kg	< 5	< 5	< 5
Perfluoroundecanoic acid (PFUnDA)[N11]	5	ug/kg	< 5	< 5	< 5
Perfluorododecanoic acid (PFDoDA)[N11]	5	ug/kg	< 5	< 5	< 5
Perfluorotridecanoic acid (PFTrDA)[N15]	5	ug/kg	< 5	< 5	< 5
Perfluorotetradecanoic acid (PFTeDA)[N11]	5	ug/kg	< 5	< 5	< 5
13C4-PFBA (surr.)	1	%	88	78	75
13C5-PFPeA (surr.)	1	%	96	87	85
13C5-PFHxA (surr.)	1	%	97	87	83
13C4-PFHpA (surr.)	1	%	95	87	88
13C8-PFOA (surr.)	1	%	103	91	93
13C5-PFNA (surr.)	1	%	94	80	81
13C6-PFDA (surr.)	1	%	85	88	88
13C2-PFUnDA (surr.)	1	%	80	80	81
13C2-PFDoDA (surr.)	1	%	81	76	70
13C2-PFTeDA (surr.)	1	%	71	78	76
Perfluoroalkyl sulfonamido substances					
Perfluorooctane sulfonamide (FOSA)[N11]	5	ug/kg	< 5	< 5	< 5
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	5	ug/kg	< 5	< 5	< 5
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	5	ug/kg	< 5	< 5	< 5
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	5	ug/kg	< 5	< 5	< 5
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	5	ug/kg	< 5	< 5	< 5
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	10	ug/kg	< 10	< 10	< 10
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	10	ug/kg	< 10	< 10	< 10
13C8-FOSA (surr.)	1	%	92	83	85
D3-N-MeFOSA (surr.)	1	%	125	104	108
D5-N-EtFOSA (surr.)	1	%	119	114	117
D7-N-MeFOSE (surr.)	1	%	91	83	95
D9-N-EtFOSE (surr.)	1	%	90	96	86
D5-N-EtFOSAA (surr.)	1	%	76	92	107
D3-N-MeFOSAA (surr.)	1	%	86	110	100
Perfluoroalkyl sulfonic acids (PFSAs)					
Perfluorobutanesulfonic acid (PFBS)[N11]	5	ug/kg	< 5	< 5	< 5
Perfluorononanesulfonic acid (PFNS)[N15]	5	ug/kg	< 5	< 5	< 5
Perfluoropropanesulfonic acid (PFPrS)[N15]	5	ug/kg	< 5	< 5	< 5
Perfluoropentanesulfonic acid (PFPeS)[N15]	5	ug/kg	< 5	< 5	< 5
Perfluorohexanesulfonic acid (PFHxS)[N11]	5	ug/kg	< 5	< 5	< 5
Perfluoroheptanesulfonic acid (PFHpS)[N15]	5	ug/kg	< 5	< 5	< 5
Perfluorooctanesulfonic acid (PFOS)[N11]	5	ug/kg	< 5	< 5	< 5
Perfluorodecanesulfonic acid (PFDS)[N15]	5	ug/kg	< 5	< 5	< 5
13C3-PFBS (surr.)	1	%	85	79	77
18O2-PFHxS (surr.)	1	%	90	77	81
13C8-PFOS (surr.)	1	%	63	87	87

Client Sample ID			QC201	QC202	QC203
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			L24-JI0019816	L24-JI0019817	L24-JI0019818
Date Sampled			Jul 05, 2024	Jul 05, 2024	Jul 05, 2024
Test/Reference	LOR	Unit			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	5	ug/kg	< 5	< 5	< 5
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	10	ug/kg	< 10	< 10	< 10
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	5	ug/kg	< 5	< 5	< 5
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11]	5	ug/kg	< 5	< 5	< 5
13C2-4:2 FTSA (surr.)	1	%	128	100	105
13C2-6:2 FTSA (surr.)	1	%	126	137	110
13C2-8:2 FTSA (surr.)	1	%	106	133	125
13C2-10:2 FTSA (surr.)	1	%	89	95	89
PFASs Summations					
Sum (PFHxS + PFOS)*	5	ug/kg	< 5	< 5	< 5
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	< 5	< 5	< 5
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	< 5	< 5	< 5
Sum of WA DWER PFAS (n=10)*	10	ug/kg	< 10	< 10	< 10
Sum of PFASs (n=30)*	50	ug/kg	< 50	< 50	< 50

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Welshpool	Jul 08, 2024	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Welshpool	Jul 11, 2024	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Welshpool	Jul 11, 2024	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Welshpool	Jul 11, 2024	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Welshpool	Jul 08, 2024	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
pH	Welshpool	Jul 11, 2024	7 Days
- Method: ARL138 - pH in Soil and Biosolid			
Metals M8	Welshpool	Jul 08, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Acid Sulfate Soils Field pH Test	Brisbane	Jul 10, 2024	7 Days
- Method: LTM-GEN-7060 Determination of field pH (pHF) and field pH peroxide (pHFOX) tests			
SPOCAS Suite - WA (Excluding ANC)			
SPOCAS Suite - WA (Excluding ANC)	Brisbane	Jul 10, 2024	6 Week
- Method: LTM-GEN-7050			
Chromium Reducible Sulfur Suite			
Chromium Suite	Brisbane	Jul 10, 2024	6 Week
- Method: LTM-GEN-7070 Chromium Reducible Sulfur Suite			
Extraneous Material	Brisbane	Jul 10, 2024	6 Week
- Method: LTM-GEN-7050/7070			
% Moisture	Melbourne	Jul 08, 2024	14 Days
- Method: ARL135 Moisture in Solids			
- Method: LTM-GEN-7080 Moisture			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Jul 10, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Jul 10, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Jul 10, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Jul 10, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Jul 08, 2024	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

eurofins

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898
Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549
Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: Senversa Pty Ltd WA
Address: Level 18, 140 St Georges Terrace
Perth
WA 6000

Project Name: BURRUP - BASELINE ASSESSMENT
Project ID: P21705

Order No.:
Report #: 1115574
Phone: 0863240200
Fax: 0396060074

Received: Jul 8, 2024 12:35 PM
Due: Jul 15, 2024
Priority: 5 Day
Contact Name: - Lab reports

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail						pH (1:5 Aqueous extract at 25 °C as rec.)	Acid Sulfate Soils Field pH Test	Metals M8	SPOCAS Suite - WA (Excluding ANC)	Chromium Reducible Sulfur Suite	Moisture Set	Moisture Set	Eurofins Suite B4	Per- and Polyfluoroalkyl Substances (PFASs)
Perth Laboratory - NATA # 2377 Site # 2370						X		X			X	X	X	
Melbourne Laboratory - NATA # 1261 Site # 1254											X	X		X
Brisbane Laboratory - NATA # 1261 Site # 20794 & 2780							X		X	X				
External Laboratory														
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**									
1	QC201	Jul 05, 2024		Soil	L24-JI0019816	X	X	X	X	X		X	X	X
2	QC202	Jul 05, 2024		Soil	L24-JI0019817	X	X	X	X	X		X	X	X
3	QC203	Jul 05, 2024		Soil	L24-JI0019818						X			X
Test Counts						2	2	2	2	2	3	3	2	3

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ppm: parts per million
µg/L: micrograms per litre
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit
Colour: Pt-Co Units (CU)

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

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

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
TRH C6-C10*	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40*	mg/kg	< 100			100	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.1			0.1	Pass	
Chromium	mg/kg	< 1			1	Pass	
Copper	mg/kg	< 1			1	Pass	
Lead	mg/kg	< 1			1	Pass	
Mercury	mg/kg	< 0.02			0.02	Pass	
Nickel	mg/kg	< 1			1	Pass	
Zinc	mg/kg	< 5			5	Pass	
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/kg	< 5			5	Pass	
Perfluoropentanoic acid (PFPeA)	ug/kg	< 5			5	Pass	
Perfluorohexanoic acid (PFHxA)	ug/kg	< 5			5	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/kg	< 5			5	Pass	
Perfluorooctanoic acid (PFOA)	ug/kg	< 5			5	Pass	
Perfluorononanoic acid (PFNA)	ug/kg	< 5			5	Pass	
Perfluorodecanoic acid (PFDA)	ug/kg	< 5			5	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/kg	< 5			5	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/kg	< 5			5	Pass	
Perfluorotridecanoic acid (PFTrDA)	ug/kg	< 5			5	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/kg	< 5			5	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/kg	< 5			5	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/kg	< 5			5	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/kg	< 5			5	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/kg	< 5			5	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/kg	< 5			5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/kg	< 10			10	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/kg	< 10			10	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	ug/kg	< 5			5	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/kg	< 5			5	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/kg	< 5			5	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/kg	< 5			5	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/kg	< 5			5	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/kg	< 5			5	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/kg	< 5			5	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/kg	< 5			5	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/kg	< 5			5	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/kg	< 10			10	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/kg	< 5			5	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/kg	< 5			5	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	93			70-130	Pass	
TRH C10-C14	%	91			70-130	Pass	
TRH C6-C10*	%	90			70-130	Pass	
TRH >C10-C16	%	87			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	90			70-130	Pass	
Toluene	%	86			70-130	Pass	
Ethylbenzene	%	94			70-130	Pass	
m&p-Xylenes	%	88			70-130	Pass	
o-Xylene	%	88			70-130	Pass	
Xylenes - Total*	%	88			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	94			70-130	Pass	
LCS - % Recovery							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Heavy Metals							
Arsenic	%	104			80-120	Pass	
Cadmium	%	89			80-120	Pass	
Chromium	%	86			80-120	Pass	
Copper	%	83			80-120	Pass	
Lead	%	81			80-120	Pass	
Mercury	%	87			80-120	Pass	
Nickel	%	85			80-120	Pass	
Zinc	%	91			80-120	Pass	
LCS - % Recovery							
Actual Acidity (NLM-3.2)							
pH-KCL (NLM-3.1)	%	99			80-120	Pass	
Titratable Actual Acidity (NLM-3.2)	%	98			80-120	Pass	
LCS - % Recovery							
Potential Acidity - Chromium Reducible Sulfur							
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)	%	90			80-120	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	83			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	86			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	82			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	85			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	85			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	89			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	95			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	99			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	94			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	89			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	96			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	%	92			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	85			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	88			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	%	87			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	%	93			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	83			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	91			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	%	76			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	%	147			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	%	92			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	84			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	82			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	125			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	99			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	146			50-150	Pass	
LCS - % Recovery							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	83			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	89			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	%	88			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	%	77			50-150	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	102			70-130	Pass	
Acenaphthylene	%	100			70-130	Pass	
Anthracene	%	108			70-130	Pass	
Benz(a)anthracene	%	86			70-130	Pass	
Benzo(a)pyrene	%	103			70-130	Pass	
Benzo(b&j)fluoranthene	%	122			70-130	Pass	
Benzo(g.h.i)perylene	%	106			70-130	Pass	
Benzo(k)fluoranthene	%	118			70-130	Pass	
Chrysene	%	97			70-130	Pass	
Dibenz(a.h)anthracene	%	104			70-130	Pass	
Fluoranthene	%	98			70-130	Pass	
Fluorene	%	103			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	97			70-130	Pass	
Naphthalene	%	104			70-130	Pass	
Phenanthrene	%	100			70-130	Pass	
Pyrene	%	107			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C6-C9	L24-JI0018371	NCP	%	109			70-130	Pass	
TRH C10-C14	L24-JI0032334	NCP	%	88			70-130	Pass	
TRH C6-C10*	L24-JI0018371	NCP	%	100			70-130	Pass	
TRH >C10-C16	L24-JI0032334	NCP	%	85			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	L24-JI0018371	NCP	%	96			70-130	Pass	
Toluene	L24-JI0018371	NCP	%	97			70-130	Pass	
Ethylbenzene	L24-JI0018371	NCP	%	94			70-130	Pass	
m&p-Xylenes	L24-JI0018371	NCP	%	99			70-130	Pass	
o-Xylene	L24-JI0018371	NCP	%	98			70-130	Pass	
Xylenes - Total*	L24-JI0018371	NCP	%	98			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	L24-JI0018371	NCP	%	84			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	L24-JI0014115	NCP	%	96			70-130	Pass	
Acenaphthylene	L24-JI0014115	NCP	%	102			70-130	Pass	
Anthracene	L24-JI0014115	NCP	%	92			70-130	Pass	
Benz(a)anthracene	L24-JI0014115	NCP	%	102			70-130	Pass	
Benzo(a)pyrene	L24-JI0014115	NCP	%	104			70-130	Pass	
Benzo(b&j)fluoranthene	L24-JI0014115	NCP	%	114			70-130	Pass	
Benzo(g.h.i)perylene	L24-JI0014115	NCP	%	98			70-130	Pass	
Benzo(k)fluoranthene	L24-JI0014115	NCP	%	101			70-130	Pass	
Chrysene	L24-JI0014115	NCP	%	98			70-130	Pass	
Dibenz(a.h)anthracene	L24-JI0014115	NCP	%	104			70-130	Pass	
Fluoranthene	L24-JI0014115	NCP	%	100			70-130	Pass	
Fluorene	L24-JI0014115	NCP	%	104			70-130	Pass	
Indeno(1.2.3-cd)pyrene	L24-JI0014115	NCP	%	107			70-130	Pass	
Naphthalene	L24-JI0014115	NCP	%	99			70-130	Pass	
Phenanthrene	L24-JI0014115	NCP	%	83			70-130	Pass	
Pyrene	L24-JI0014115	NCP	%	99			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	L24-JI0018386	NCP	%	80			75-125	Pass	
Cadmium	L24-JI0018386	NCP	%	79			75-125	Pass	
Chromium	L24-JI0018386	NCP	%	67			75-125	Fail	Q08
Copper	L24-JI0018338	NCP	%	92			75-125	Pass	
Lead	L24-JI0018386	NCP	%	121			75-125	Pass	
Mercury	L24-JI0018338	NCP	%	89			75-125	Pass	
Nickel	L24-JI0018338	NCP	%	94			75-125	Pass	
Zinc	L24-JI0018338	NCP	%	94			75-125	Pass	
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1					
Perfluorobutanoic acid (PFBA)	M24-JI0025411	NCP	%	89			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M24-JI0025411	NCP	%	88			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M24-JI0025411	NCP	%	93			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M24-JI0025411	NCP	%	93			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M24-JI0025411	NCP	%	94			50-150	Pass	
Perfluorononanoic acid (PFNA)	M24-JI0025411	NCP	%	99			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M24-JI0025411	NCP	%	97			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M24-JI0025411	NCP	%	103			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M24-JI0025411	NCP	%	107			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	M24-JI0025411	NCP	%	122			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M24-JI0025411	NCP	%	105			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluorooctane sulfonamide (FOSA)	M24-JI0025411	NCP	%	98			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M24-JI0025411	NCP	%	100			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M24-JI0025411	NCP	%	91			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M24-JI0025411	NCP	%	91			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M24-JI0025411	NCP	%	105			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M24-JI0025411	NCP	%	89			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M24-JI0025411	NCP	%	93			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M24-JI0025411	NCP	%	86			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M24-JI0025411	NCP	%	73			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M24-JI0025411	NCP	%	107			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M24-JI0025411	NCP	%	92			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M24-JI0025411	NCP	%	94			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M24-JI0025411	NCP	%	92			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M24-JI0025411	NCP	%	96			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorodecanesulfonic acid (PFDS)	M24-JI0025411	NCP	%	101			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M24-JI0025411	NCP	%	82			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M24-JI0025411	NCP	%	106			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M24-JI0025411	NCP	%	83			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M24-JI0025411	NCP	%	90			50-150	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	L24-JI0018387	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	L24-JI0018378	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	L24-JI0018378	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	L24-JI0018378	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C6-C10*	L24-JI0018387	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	L24-JI0018378	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	L24-JI0018378	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40*	L24-JI0018378	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	L24-JI0018387	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	L24-JI0018387	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	L24-JI0018387	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	L24-JI0018387	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	L24-JI0018387	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	L24-JI0018387	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	L24-JI0018387	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	L24-JI0014111	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	L24-JI0014111	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	L24-JI0014111	NCP	mg/kg	< 0.5	1.1	<1	30%	Pass	
Benz(a)anthracene	L24-JI0014111	NCP	mg/kg	< 0.5	0.5	<1	30%	Pass	
Benzo(a)pyrene	L24-JI0014111	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	L24-JI0014111	NCP	mg/kg	< 0.5	0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	L24-JI0014111	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	L24-JI0014111	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	L24-JI0014111	NCP	mg/kg	< 0.5	0.6	16	30%	Pass	
Dibenz(a.h)anthracene	L24-JI0014111	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	L24-JI0014111	NCP	mg/kg	1.3	2.9	<1	30%	Pass	
Fluorene	L24-JI0014111	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	L24-JI0014111	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	L24-JI0014111	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	L24-JI0014111	NCP	mg/kg	0.8	2.9	<1	30%	Pass	
Pyrene	L24-JI0014111	NCP	mg/kg	1.4	2.8	<1	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
pH	L23-No0001846	NCP	pH Units	9.6	9.5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	L24-JI0021071	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Cadmium	L24-JI0021071	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Chromium	L24-JI0021071	NCP	mg/kg	3.0	2.9	5.5	30%	Pass	
Copper	L24-JI0021071	NCP	mg/kg	57	54	4.9	30%	Pass	
Lead	L24-JI0021071	NCP	mg/kg	5.2	4.9	6.9	30%	Pass	
Mercury	L24-JI0021071	NCP	mg/kg	0.19	0.17	7.2	30%	Pass	
Nickel	L24-JI0021071	NCP	mg/kg	< 1	1.1	13	30%	Pass	
Zinc	L24-JI0021071	NCP	mg/kg	150	150	2.8	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	B24-JI0023989	NCP	pH Units	4.9	5.0	pass	20%	Pass	
Duplicate									
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD			
pH-KCL (NLM-3.1)	B24-JI0038179	NCP	pH Units	8.5	8.5	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	B24-JI0038179	NCP	mol H+/t	< 2	< 2	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	B24-JI0038179	NCP	% pyrite S	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Potential Acidity - Titratable Peroxide				Result 1	Result 2	RPD			
pH-OX	B24-JI0038179	NCP	pH Units	8.0	8.2	3.4	20%	Pass	
Titratable Peroxide Acidity (s-TPA)	B24-JI0038179	NCP	% pyrite S	< 0.02	< 0.02	<1	30%	Pass	
Titratable Peroxide Acidity (a-TPA)	B24-JI0038179	NCP	mol H+/t	< 2	< 2	<1	20%	Pass	
Titratable Sulfidic Acidity (a-TSA)	B24-JI0038179	NCP	mol H+/t	< 2	< 2	<1	30%	Pass	
Titratable Sulfidic Acidity (s-TSA)	B24-JI0038179	NCP	% pyrite S	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
Extractable Sulfur				Result 1	Result 2	RPD			
Sulfur - KCl Extractable	B24-JI0038179	NCP	% S	0.028	0.027	2.4	30%	Pass	
Peroxide Extractable Sulfur	B24-JI0038179	NCP	% S	0.031	0.031	1.5	20%	Pass	
HCl Extractable Sulfur	B24-JI0038179	NCP	% S	N/A	N/A	N/A	20%	Pass	
Duplicate									
Potential Acidity (SPOS)				Result 1	Result 2	RPD			
Peroxide Oxidisable Sulfur (s-SPOS) (NLM 2.2)	B24-JI0038179	NCP	% S	< 0.005	< 0.005	<1	30%	Pass	
Peroxide Oxidisable Sulfur (a-SPOS) (NLM 2.2)	B24-JI0038179	NCP	mol H+/t	< 2	< 2	<1	30%	Pass	
Duplicate									
Retained Acidity (S-NAS)				Result 1	Result 2	RPD			
Net Acid soluble sulfur (SNAS) NLM-4.1	B24-JI0038179	NCP	% S	N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur (s-SNAS) NLM-4.1	B24-JI0038179	NCP	% S	N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur (a-SNAS) NLM-4.1	B24-JI0038179	NCP	mol H+/t	N/A	N/A	N/A	30%	Pass	
Duplicate									
Extractable Calcium				Result 1	Result 2	RPD			
Calcium - KCl Extractable	B24-JI0038179	NCP	% Ca	0.30	0.31	2.1	30%	Pass	
Calcium - Peroxide	B24-JI0038179	NCP	% Ca	2.4	2.9	18	20%	Pass	
Calcium - Acid Reacted	B24-JI0038179	NCP	% Ca	2.1	2.6	20	30%	Pass	
Calcium - Acid Reacted (s-aCa)	B24-JI0038179	NCP	% S	1.7	2.1	20	30%	Pass	
Calcium - Acid Reacted (a-aCa)	B24-JI0038179	NCP	mol H+/t	1000	1300	20	30%	Pass	

Duplicate									
Extractable Magnesium				Result 1	Result 2	RPD			
Magnesium - KCl Extractable	B24-JI0038179	NCP	% Mg	0.031	0.030	2.9	30%	Pass	
Magnesium - Peroxide	B24-JI0038179	NCP	% Mg	0.038	0.044	15	20%	Pass	
Magnesium - Acid Reacted	B24-JI0038179	NCP	% Mg	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (s-aCa)	B24-JI0038179	NCP	% S	< 0.005	< 0.005	<1	30%	Pass	
Magnesium - Acid Reacted (a-aCa)	B24-JI0038179	NCP	mol H+/t	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Acid Neutralising Capacity (ANCE)				Result 1	Result 2	RPD			
Acid Neutralising Capacity - (ANCE)	B24-JI0038179	NCP	% CaCO3	5.0	5.8	16	30%	Pass	
Acid Neutralising Capacity - (a-ANCE)	B24-JI0038179	NCP	mol H+/t	990	1200	16	30%	Pass	
Duplicate									
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD			
ANC Fineness Factor	B24-JI0038179	NCP	factor	1.5	1.5	<1	30%	Pass	
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	B24-JI0038179	NCP	% CaCO3	6.7	6.6	<1	20%	Pass	
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)	B24-JI0038179	NCP	% S	2.1	2.1	<1	30%	Pass	
Duplicate									
Net Acidity (Including ANC)				Result 1	Result 2	RPD			
SPOCAS - Net Acidity - ASSMAC (Acidity Units)	B24-JI0038179	NCP	mol H+/t	< 10	< 10	<1	30%	Pass	
SPOCAS - Net Acidity - ASSMAC (Sulfur Units)	B24-JI0038179	NCP	% S	< 0.02	< 0.02	<1	30%	Pass	
SPOCAS - Liming rate - ASSMAC	B24-JI0038179	NCP	kg CaCO3/t	< 1	< 1	<1	30%	Pass	
s-CRS Suite - Net Acidity - NASSG (including ANC)	B24-JI0038179	NCP	% S	N/A	N/A	N/A	30%	Pass	
CRS Suite - Net Acidity - NASSG (Including ANC)	B24-JI0038179	NCP	mol H+/t	N/A	N/A	N/A	30%	Pass	
CRS Suite - Liming Rate - NASSG (Including ANC)	B24-JI0038179	NCP	kg CaCO3/t	N/A	N/A	N/A	30%	Pass	
Duplicate									
Potential Acidity - Chromium Reducible Sulfur				Result 1	Result 2	RPD			
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)	B24-JI0038179	NCP	% S	< 0.005	< 0.005	<1	20%	Pass	
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	B24-JI0038179	NCP	mol H+/t	< 3	< 3	<1	30%	Pass	
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M24-JI0029713	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	M24-JI0029714	NCP	ug/kg	Dil 0.0022	Dil 0.0032	n/a	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M24-JI0029714	NCP	ug/kg	Conf 55.2799	Conf 54.9738	n/a	30%	Pass	

Duplicate									
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M24-JI0029714	NCP	ug/kg	< 10	< 10	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M24-JI0029714	NCP	ug/kg	< 10	< 10	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD			
Perfluorobutanesulfonic acid (PFBS)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorononanesulfonic acid (PFNS)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M24-JI0029713	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M24-JI0029714	NCP	ug/kg	Conf 0	Conf 0	n/a	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	M24-JI0029713	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorodecanesulfonic acid (PFDS)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M24-JI0029713	NCP	ug/kg	< 10	< 10	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M24-JI0029714	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	M24-JI0020255	NCP	%	22	24	6.8	30%	Pass	

Comments

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.
S01	Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil' multiply 'reported results' x 'wet bulk density of soil in t/m3'
S02	Retained Acidity is Reported when the pHKCl is less than pH 4.5
S03	Acid Neutralising Capacity is only required if the pHKCl if greater than or equal to pH 6.5
S04	Acid Sulfate Soil Samples have a 24 hour holding time unless frozen or dried within that period
S05	Field Screen uses the following fizz rating to classify the rate the samples reacted to the peroxide: 1.0; No reaction to slight. 2.0; Moderate reaction. 3.0; Strong reaction with persistent froth. 4.0; Extreme reaction.

Authorised by:

Elden Garrett	Analytical Services Manager
Carroll Lee	Senior Analyst-PFAS
Douglas Todd	Senior Analyst-Metal
Douglas Todd	Senior Analyst-Organic
Douglas Todd	Senior Analyst-Sample Properties
Douglas Todd	Senior Analyst-Volatile
John Horwood	Senior Analyst-Organic
Jonathon Angell	Senior Analyst-SPOCAS
Lauren Killin	Senior Analyst-Inorganic
Mary Makarios	Senior Analyst-Sample Properties

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EP2409638**

Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: MS ASHTON BETTI	Contact	: Ashvini Wickramasinghe
Address	: LEVEL 18, 140 ST GEORGES TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
E-mail	: Ashton.Betti@senversa.com.au	E-mail	: ashvini.wickramasinghe@alsglobal.com
Telephone	: +61 08 6557 8881	Telephone	: +61-8-9406 1301
Facsimile	: +61 03 9606 0074	Facsimile	: +61-8-9406 1399
Project	: P21705 Burrup - Baseline Assessment	Page	: 1 of 3
Order number	: PO023451	Quote number	: EB2023SENVER0001 (EN/000)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Egan Churchill-Gray		

Dates

Date Samples Received	: 08-Jul-2024 12:40	Issue Date	: 08-Jul-2024
Client Requested Due Date	: 15-Jul-2024	Scheduled Reporting Date	: **15-Jul-2024**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 3	Temperature	: 3.3 - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 9 / 9

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 see scanned COC for sample discrepencies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- 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: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EA005P pH (Auto Titrator)	WATER - ED038 (CaCO3 only) Acidity as CaCO3 only	WATER - EP231X-ST PFAS - Full Suite (30 analytes) Super Trace	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity	WATER - NT-08A Total Nitrogen + NO2 + NO3 + NH3 + Total P +	WATER - W-05 TRH/BTEXN/8 Metals	WATER - W-18 TRH(C6 - C9)/BTEXN
EP2409638-001	05-Jul-2024 00:00	MW01	✓	✓	✓	✓	✓	✓	
EP2409638-002	05-Jul-2024 00:00	MW02	✓	✓	✓	✓	✓	✓	
EP2409638-003	05-Jul-2024 00:00	MW03	✓	✓	✓	✓	✓	✓	
EP2409638-004	05-Jul-2024 00:00	MW04	✓	✓	✓	✓	✓	✓	
EP2409638-005	05-Jul-2024 00:00	MW05	✓	✓	✓	✓	✓	✓	
EP2409638-006	05-Jul-2024 00:00	QC104	✓	✓	✓	✓	✓	✓	
EP2409638-007	05-Jul-2024 00:00	QC302			✓		✓	✓	
EP2409638-008	05-Jul-2024 00:00	QC402							✓
EP2409638-009	05-Jul-2024 00:00	QC403			✓				

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

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

Method / Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received Date	Samples Received Evaluation	Instructions Received Date	Instructions Received Evaluation
EA005-P: pH by Auto Titrator							
MW01	Clear Plastic Bottle - Natural	----	05-Jul-2024	08-Jul-2024	×	----	----
MW02	Clear Plastic Bottle - Natural	----	05-Jul-2024	08-Jul-2024	×	----	----
MW03	Clear Plastic Bottle - Natural	----	05-Jul-2024	08-Jul-2024	×	----	----
MW04	Clear Plastic Bottle - Natural	----	05-Jul-2024	08-Jul-2024	×	----	----
MW05	Clear Plastic Bottle - Natural	----	05-Jul-2024	08-Jul-2024	×	----	----
QC104	Clear Plastic Bottle - Natural	----	05-Jul-2024	08-Jul-2024	×	----	----
EK057G: Nitrite as N by Discrete Analyser							
MW01	Clear Plastic Bottle - Natural	----	07-Jul-2024	08-Jul-2024	×	----	----
MW02	Clear Plastic Bottle - Natural	----	07-Jul-2024	08-Jul-2024	×	----	----
MW03	Clear Plastic Bottle - Natural	----	07-Jul-2024	08-Jul-2024	×	----	----
MW04	Clear Plastic Bottle - Natural	----	07-Jul-2024	08-Jul-2024	×	----	----
MW05	Clear Plastic Bottle - Natural	----	07-Jul-2024	08-Jul-2024	×	----	----
QC104	Clear Plastic Bottle - Natural	----	07-Jul-2024	08-Jul-2024	×	----	----
QC302	Clear Plastic Bottle - Natural	----	07-Jul-2024	08-Jul-2024	×	----	----
EK071G: Reactive Phosphorus as P-By Discrete Analyser							
MW01	Clear Plastic Bottle - Natural	----	07-Jul-2024	08-Jul-2024	×	----	----
MW02	Clear Plastic Bottle - Natural	----	07-Jul-2024	08-Jul-2024	×	----	----
MW03	Clear Plastic Bottle - Natural	----	07-Jul-2024	08-Jul-2024	×	----	----
MW04	Clear Plastic Bottle - Natural	----	07-Jul-2024	08-Jul-2024	×	----	----
MW05	Clear Plastic Bottle - Natural	----	07-Jul-2024	08-Jul-2024	×	----	----
QC104	Clear Plastic Bottle - Natural	----	07-Jul-2024	08-Jul-2024	×	----	----
QC302	Clear Plastic Bottle - Natural	----	07-Jul-2024	08-Jul-2024	×	----	----

Requested Deliverables

ASHTON BETTI

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

Egan Churchill-Gray

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

PERTH LAB REPORTS

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

SUPPLIER ACCOUNTS

- A4 - AU Tax Invoice (INV)	Email	supplieraccounts@senversa.com.au

CERTIFICATE OF ANALYSIS

Work Order	: **EP2409638**	Page	: 1 of 13
Amendment	: **1**		
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: MS ASHTON BETTI	Contact	: Ashvini Wickramasinghe
Address	: LEVEL 18, 140 ST GEORGES TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: +61 08 6557 8881	Telephone	: +61-8-9406 1301
Project	: P21705 Burrup - Baseline Assessment	Date Samples Received	: 08-Jul-2024 12:40
Order number	: PO023451	Date Analysis Commenced	: 08-Jul-2024
C-O-C number	: ----	Issue Date	: 08-Aug-2024 13:33
Sampler	: Egan Churchill-Gray		
Site	: ----		
Quote number	: EN/000		
No. of samples received	: 9		
No. of samples analysed	: 9		

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*
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Thomas Donovan	Senior Organic Chemist	Perth Organics, Wangara, WA

General Comments

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

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

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

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

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

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

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

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- EG020: Metals LOR for samples EP2409638-001 to -006 raised due to high TDS content.
- EP231X-ST: LOR raised for particular analytes on various samples due to matrix interferences.
- EK061G (Total Kjeldahl Nitrogen): LOR raised for sample #3 and #5 due to possible sample matrix interference.
- EG035F: LOR raised for Mercury on sample EP2409638-001 to 006 due to possible matrix interference.
- EK061G/EK067G (Total Kjeldahl Nitrogen/Total Phosphorus as P): LOR raised for particular samples due to possible sample matrix interference.
- EK067G (Total Phosphorus as P): LOR raised for samples EP2409638-001, 002 and 006 due to possible sample matrix interference.
- Amendment (08/08/2024): This report has been amended following a change to the reported LORs for method EP231X-ST for all samples. All analysis results as per previous report.
- Ionic Balance out of acceptable limits for sample #3 due to analytes not quantified in this report. Major cations (ED093F) and major anions (ED041G/ED045G) have been confirmed by re-analysis.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- 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.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	MW01	MW02	MW03	MW04	MW05
			Sampling date / time	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409638-001	EP2409638-002	EP2409638-003	EP2409638-004	EP2409638-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.56**	**7.33**	**7.30**	**7.47**	**7.17**
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**117**	**79**	**62**	**136**	**104**
Total Alkalinity as CaCO3	----	1	mg/L	**117**	**79**	**62**	**136**	**104**
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	**39**	**38**	**41**	**60**	**68**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**6920**	**7570**	**9750**	**8760**	**9840**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**54000**	**71800**	**96000**	**74400**	**88800**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**1320**	**1510**	**1410**	**1280**	**1230**
Magnesium	7439-95-4	1	mg/L	**3600**	**4070**	**6270**	**5310**	**6120**
Sodium	7440-23-5	1	mg/L	**32400**	**37000**	**55400**	**48100**	**55700**
Potassium	7440-09-7	1	mg/L	**1100**	**1310**	**1960**	**1610**	**2010**
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.020	<0.020	<0.050	<0.020	<0.050
Cadmium	7440-43-9	0.0001	mg/L	<0.0020	<0.0020	<0.0050	<0.0020	<0.0050
Chromium	7440-47-3	0.001	mg/L	<0.020	<0.020	<0.050	<0.020	<0.050
Copper	7440-50-8	0.001	mg/L	<0.020	<0.020	<0.050	<0.020	<0.050
Nickel	7440-02-0	0.001	mg/L	<0.020	<0.020	<0.050	<0.020	<0.050
Lead	7439-92-1	0.001	mg/L	<0.020	<0.020	<0.050	<0.020	<0.050
Zinc	7440-66-6	0.005	mg/L	**0.125**	<0.100	<0.250	<0.100	<0.250
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	MW01	MW02	MW03	MW04	MW05
			Sampling date / time	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409638-001	EP2409638-002	EP2409638-003	EP2409638-004	EP2409638-005
				Result	Result	Result	Result	Result
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.49**	**0.11**	**0.32**	**0.68**	**0.44**
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	**0.04**	<0.01	**0.01**	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.23**	**0.02**	**0.31**	**0.64**	**0.05**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.27**	**0.02**	**0.32**	**0.64**	**0.05**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**1.1**	**0.3**	**1.0**	**1.1**	**0.8**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**1.4**	**0.3**	**1.3**	**1.7**	**0.8**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	<0.05	<0.05	**0.24**	**0.12**	**0.16**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.02**	**0.04**	**0.02**	**0.05**	**0.04**
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**1670**	**2180**	**2910**	**2280**	**2710**
ø Total Cations	----	0.01	meq/L	**1800**	**2050**	**3050**	**2630**	**3040**
ø Ionic Balance	----	0.01	%	**3.74**	**3.10**	**2.25**	**7.12**	**5.69**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW01	MW02	MW03	MW04	MW05
				Sampling date / time	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00
Compound	CAS Number	LOR	Unit		EP2409638-001	EP2409638-002	EP2409638-003	EP2409638-004	EP2409638-005
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	<100	<100	<100	<100
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ **Total Xylenes**	----	2	µg/L		<2	<2	<2	<2	<2
^ **Sum of BTEX**	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		**0.0010**	**0.0005**	<0.0005	**0.0013**	**0.0005**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		<0.0005	<0.0005	<0.0005	<0.0010	<0.0005
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		**0.0006**	<0.0005	<0.0005	<0.0010	<0.0005
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	µg/L		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231B: Perfluoroalkyl Carboxylic Acids									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	MW01	MW02	MW03	MW04	MW05
			Sampling date / time	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409638-001	EP2409638-002	EP2409638-003	EP2409638-004	EP2409638-005
				Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	**0.036**	**0.031**	**0.040**	**0.051**	**0.058**
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	**0.0414**	**0.0515**	**0.0523**	**0.0984**	**0.0954**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	**0.0193**	**0.0230**	**0.0180**	**0.0603**	**0.0144**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	**0.0071**	**0.0050**	**0.0016**	**0.0186**	<0.0005
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	**0.0008**	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231D: (n:2) Fluorotelomer Sulfonic Acids								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	MW01	MW02	MW03	MW04	MW05
			Sampling date / time	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00
Compound	CAS Number	LOR	Unit	EP2409638-001	EP2409638-002	EP2409638-003	EP2409638-004	EP2409638-005
				Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EP231P: PFAS Sums								
Sum of PFAS	----	0.0002	µg/L	**0.106**	**0.111**	**0.112**	**----**	**----**
Sum of PFAS	----	0.0003	µg/L	**----**	**----**	**----**	**0.230**	**0.168**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	µg/L	**0.0006**	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	µg/L	**0.106**	**0.111**	**0.112**	**0.230**	**0.168**
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**124**	**124**	**135**	**133**	**136**
Toluene-D8	2037-26-5	2	%	**116**	**117**	**117**	**116**	**114**
4-Bromofluorobenzene	460-00-4	2	%	**114**	**114**	**115**	**113**	**114**
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0005	%	**120**	**122**	**120**	**118**	**121**
13C8-PFOA	----	0.0005	%	**121**	**123**	**125**	**128**	**112**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	QC104	QC302	QC402	QC403	----
			Sampling date / time	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	----
Compound	CAS Number	LOR	Unit	EP2409638-006	EP2409638-007	EP2409638-008	EP2409638-009	--------
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.34**	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**77**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**77**	----	----	----	----
ED038A: Acidity								
Acidity as CaCO3	----	1	mg/L	**37**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**7420**	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**72800**	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**1480**	----	----	----	----
Magnesium	7439-95-4	1	mg/L	**4140**	----	----	----	----
Sodium	7440-23-5	1	mg/L	**39100**	----	----	----	----
Potassium	7440-09-7	1	mg/L	**1310**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.020	<0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0020	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.020	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.020	<0.001	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.020	<0.001	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.020	<0.001	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.113**	<0.005	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0005	<0.0001	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	QC104	QC302	QC402	QC403	----
			Sampling date / time	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	----
Compound	CAS Number	LOR	Unit	EP2409638-006	EP2409638-007	EP2409638-008	EP2409638-009	--------
				Result	Result	Result	Result	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.10**	<0.01	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.03**	<0.01	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.03**	<0.01	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.5**	<0.1	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**0.5**	<0.1	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	<0.05	<0.01	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.03**	<0.01	----	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**2210**	----	----	----	----
ø Total Cations	----	0.01	meq/L	**2150**	----	----	----	----
ø Ionic Balance	----	0.01	%	**1.39**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	QC104	QC302	QC402	QC403	----
			Sampling date / time	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	----
Compound	CAS Number	LOR	Unit	EP2409638-006	EP2409638-007	EP2409638-008	EP2409638-009	--------
				Result	Result	Result	Result	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L	<100	<100	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L	<100	<100	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----
^ **Total Xylenes**	----	2	µg/L	<2	<2	<2	----	----
^ **Sum of BTEX**	----	1	µg/L	<1	<1	<1	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	**0.0006**	<0.0005	----	<0.0005	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	<0.0005	----	<0.0005	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	<0.0005	----	<0.0005	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	<0.0005	----	<0.0005	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	µg/L	<0.0002	<0.0002	----	<0.0002	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	<0.0005	----	<0.0005	----
EP231B: Perfluoroalkyl Carboxylic Acids								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	QC104	QC302	QC402	QC403	----
			Sampling date / time	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	----
Compound	CAS Number	LOR	Unit	EP2409638-006	EP2409638-007	EP2409638-008	EP2409638-009	--------
				Result	Result	Result	Result	----
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	**0.032**	<0.002	----	<0.002	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	**0.0553**	<0.0005	----	<0.0005	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	**0.0221**	<0.0005	----	<0.0005	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	**0.0050**	<0.0005	----	<0.0005	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	<0.0005	----	<0.0005	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	<0.0005	----	<0.0005	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	<0.0005	----	<0.0005	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	<0.0005	----	<0.0005	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	<0.0005	----	<0.0005	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	<0.0005	----	<0.0005	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	<0.0005	----	<0.0005	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	<0.0005	----	<0.0005	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	<0.001	----	<0.001	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	<0.001	----	<0.001	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	<0.001	----	<0.001	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	<0.001	----	<0.001	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	<0.0005	----	<0.0005	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	<0.0005	----	<0.0005	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	QC104	QC302	QC402	QC403	----
				Sampling date / time	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	05-Jul-2024 00:00	----
Compound	CAS Number	LOR	Unit		EP2409638-006	EP2409638-007	EP2409638-008	EP2409638-009	--------
					Result	Result	Result	Result	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.001	<0.001	----	<0.001	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.001	<0.001	----	<0.001	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.001	<0.001	----	<0.001	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.001	<0.001	----	<0.001	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	µg/L		----	<0.0002	----	<0.0002	----
Sum of PFAS	----	0.0003	µg/L		**0.115**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	µg/L		<0.0002	<0.0002	----	<0.0002	----
Sum of PFAS (WA DER List)	----	0.0002	µg/L		**0.115**	<0.0002	----	<0.0002	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**122**	**115**	**114**	----	----
Toluene-D8	2037-26-5	2	%		**116**	**115**	**100**	----	----
4-Bromofluorobenzene	460-00-4	2	%		**114**	**111**	**112**	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**121**	**124**	----	**126**	----
13C8-PFOA	----	0.0005	%		**123**	**114**	----	**115**	----

Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125
EP231S: PFAS Surrogate			
13C4-PFOS	----	65	140
13C8-PFOA	----	71	133

QUALITY CONTROL REPORT

Work Order	: **EP2409638**	Page	: 1 of 13
Amendment	: **1**		
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: MS ASHTON BETTI	Contact	: Ashvini Wickramasinghe
Address	: LEVEL 18, 140 ST GEORGES TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: +61 08 6557 8881	Telephone	: +61-8-9406 1301
Project	: P21705 Burrup - Baseline Assessment	Date Samples Received	: 08-Jul-2024
Order number	: PO023451	Date Analysis Commenced	: 08-Jul-2024
C-O-C number	: ----	Issue Date	: 08-Aug-2024
Sampler	: Egan Churchill-Gray		
Site	: ----		
Quote number	: EN/000		
No. of samples received	: 9		
No. of samples analysed	: 9		

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*
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Thomas Donovan	Senior Organic Chemist	Perth Organics, Wangara, WA

General Comments

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

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

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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC
* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA005P: pH by PC Titrator (QC Lot: 5918399)									
EP2409820-005	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	2.63	2.63	0.0	0% - 20%
EP2409598-002	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	8.15	8.14	0.1	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 5918401)									
EP2409820-005	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.0	No Limit
EP2409598-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	499	500	0.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	499	500	0.3	0% - 20%
ED038A: Acidity (QC Lot: 5921220)									
EP2409405-003	Anonymous	ED038: Acidity as CaCO3	----	1	mg/L	50	48	2.9	0% - 20%
EP2409638-001	MW01	ED038: Acidity as CaCO3	----	1	mg/L	39	38	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5909943)									
EP2409609-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	18	19	0.0	0% - 50%
EP2409609-011	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	226	234	3.6	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5909944)									
EP2409609-002	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	27	27	0.0	0% - 20%
EP2409609-011	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	100	101	0.0	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
ED093F: Dissolved Major Cations (QC Lot: 5916495)									
EP2409638-002	MW02	ED093F: Calcium	7440-70-2	1 (20)*	mg/L	1510	1540	2.4	0% - 20%
		ED093F: Magnesium	7439-95-4	1 (20)*	mg/L	4070	4120	1.2	0% - 20%
		ED093F: Sodium	7440-23-5	1 (20)*	mg/L	37000	37400	1.2	0% - 20%
		ED093F: Potassium	7440-09-7	1 (20)*	mg/L	1310	1320	1.1	0% - 20%
EP2409489-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	66	68	2.1	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	42	42	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	37	38	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	14	14	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 5916496)									
EP2409588-020	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001 (0.0020)*	mg/L	<0.0020	<0.0020	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001 (0.020)*	mg/L	<0.020	<0.020	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001 (0.020)*	mg/L	<0.020	0.022	9.9	No Limit
		EG020A-F: Copper	7440-50-8	0.001 (0.020)*	mg/L	<0.020	<0.020	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001 (0.020)*	mg/L	<0.020	<0.020	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001 (0.020)*	mg/L	0.150	0.157	5.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005 (0.100)*	mg/L	0.193	0.180	7.0	No Limit
EP2409638-002	MW02	EG020A-F: Cadmium	7440-43-9	0.0001 (0.0020)*	mg/L	<0.0020	<0.0020	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001 (0.020)*	mg/L	<0.020	<0.020	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001 (0.020)*	mg/L	<0.020	<0.020	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001 (0.020)*	mg/L	<0.020	<0.020	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001 (0.020)*	mg/L	<0.020	<0.020	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001 (0.020)*	mg/L	<0.020	<0.020	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005 (0.100)*	mg/L	<0.100	<0.100	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 5916493)									
EP2409451-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP2409598-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 5909948)									
EP2409621-004	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 5909941)									
EP2409609-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP2409609-011	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5909949)									
EP2409621-004	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.01	<0.01	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5911501)									
EP2409598-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.5	2.5	0.0	0% - 20%
EP2409609-011	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.6	57.2	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5911503)									
EP2409638-007	QC302	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	0.2	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5911502)									
EP2409655-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01 (0.05)*	mg/L	9.54	9.48	0.6	0% - 20%
EP2409638-007	QC302	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 5909942)									
EP2409609-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP2409609-011	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5910331)									
EP2409636-028	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5913460)									
EP2409620-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP2409638-002	MW02	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5913465)									
EP2408309-008	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP2409651-004	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5910331)									
EP2409636-028	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5913460)									
EP2409620-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP2409638-002	MW02	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5913465)									
EP2408309-008	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit

Sub-Matrix: **WATER**

				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 Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5913465) - continued									
EP2409651-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 5913460)									
EP2409620-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP2409638-002	MW02	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP080: BTEXN (QC Lot: 5913465)									
EP2408309-008	Anonymous	EP080: Benzene	71-43-2	1	µg/L	3	3	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP2409651-004	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5913573)									
EP2409638-001	MW01	EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003 (0.0002)*	µg/L	<0.0002	<0.0002	0.0	No Limit
		EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	0.0010	0.0008	16.5	No Limit
		EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5913573) - continued									
EP2409638-001	MW01	EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	0.0006	0.0006	0.0	No Limit
		EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5913573)									
EP2409638-001	MW01	EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	0.0414	0.0429	3.6	0% - 20%
		EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	0.0193	0.0198	2.9	0% - 20%
		EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	0.0071	0.0072	0.0	0% - 50%
		EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	0.0008	0.0008	0.0	No Limit
		EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	0.036	0.036	0.0	0% - 50%
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5913573)									
EP2409638-001	MW01	EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	<0.0005	0.0	No Limit
		EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	<0.001	0.0	No Limit
		EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	<0.001	0.0	No Limit
		EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	<0.001	0.0	No Limit
		EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	<0.001	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5913573)									
EP2409638-001	MW01	EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	<0.001	0.0	No Limit
		EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	<0.001	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5913573) - continued									
EP2409638-001	MW01	EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	<0.001	0.0	No Limit
		EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	<0.001	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5913573)									
EP2409638-001	MW01	EP231X-ST: Sum of PFAS	----	0.0003 (0.0002)*	µg/L	0.106	0.108	1.8	0% - 20%
		EP231X-ST: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003 (0.0002)*	µg/L	0.0006	0.0006	0.0	No Limit
		EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003 (0.0002)*	µg/L	0.106	0.108	1.8	0% - 20%

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

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

Sub-Matrix: **WATER**

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
EA005P: pH by PC Titrator (QCLot: 5918399)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	100	98.5	102
				----	7 pH Unit	100	98.5	102
ED037P: Alkalinity by PC Titrator (QCLot: 5918401)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	111	85.1	126
				<1	200 mg/L	102	90.5	111
ED038A: Acidity (QCLot: 5921220)								
ED038: Acidity as CaCO3	----	----	mg/L	----	20.3 mg/L	111	70.0	130
				----	405.5 mg/L	98.7	70.0	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5909943)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	98.8	89.9	112
				<1	500 mg/L	101	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5909944)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	96.0	88.6	113
				<1	1000 mg/L	103	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5916495)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	103	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	97.3	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	102	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	95.9	84.6	108
EG020F: Dissolved Metals by ICP-MS (QCLot: 5916496)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	107	90.3	113
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	106	89.7	108
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.1	87.3	107
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	102	88.9	108
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	101	89.4	106
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	105	87.2	108
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	112	89.5	112

Sub-Matrix: **WATER**

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
EG035F: Dissolved Mercury by FIMS (QCLot: 5916493)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.005 mg/L	110	85.6	120
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5909948)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	100	86.2	111
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5909941)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	103	88.7	113
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5909949)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	97.9	90.5	110
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5911501)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	96.9	80.0	115
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5911503)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	97.2	80.0	115
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5911502)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	95.8	70.0	110
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5909942)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	102	89.4	109
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5910331)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	81.5	39.3	103
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	92.6	47.2	122
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	97.2	42.5	119
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5913460)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	360 µg/L	94.9	73.6	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5913465)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	360 µg/L	90.9	73.6	113
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5910331)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	84.1	47.0	100
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	97.4	46.2	116
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	78.5	24.7	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5913460)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	95.2	73.9	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5913465)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	92.0	73.9	115
EP080: BTEXN (QCLot: 5913460)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	98.3	84.1	114
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	96.0	81.0	115

Sub-Matrix: **WATER**

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
EP080: BTEXN (QCLot: 5913460) - continued								
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	94.8	84.4	113
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	100	84.3	114
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	96.5	86.5	111
EP080: Naphthalene	91-20-3	5	µg/L	<5	5 µg/L	110	77.0	118
EP080: BTEXN (QCLot: 5913465)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	89.3	84.1	114
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	97.6	81.0	115
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	97.6	84.4	113
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	103	84.3	114
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	101	86.5	111
EP080: Naphthalene	91-20-3	5	µg/L	<5	5 µg/L	108	77.0	118
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5913573)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	107	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	109	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	102	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	109	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	114	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	96.8	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5913573)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	108	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	107	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	104	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	106	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	117	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	110	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	106	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	122	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	108	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	104	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.004 µg/L	112	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5913573)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	114	67.0	137

Sub-Matrix: **WATER**

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
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5913573) - continued								
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	70.1	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	58.6	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	104	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	98.7	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	114	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	115	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5913573)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	104	63.0	143
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	119	64.0	140
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	113	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	98.6	53.1	133
EP231P: PFAS Sums (QCLot: 5913573)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----

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: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5909943)							
EP2409609-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	102	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 5909944)							
EP2409609-001	Anonymous	ED045G: Chloride	16887-00-6	200 mg/L	127	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 5916496)							
EP2409588-021	Anonymous	EG020A-F: Arsenic	7440-38-2	4 mg/L	119	70.0	130
		EG020A-F: Cadmium	7440-43-9	1 mg/L	112	70.0	130
		EG020A-F: Chromium	7440-47-3	4 mg/L	101	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 5916496) - continued							
EP2409588-021	Anonymous	EG020A-F: Copper	7440-50-8	4 mg/L	110	70.0	130
		EG020A-F: Lead	7439-92-1	4 mg/L	100	70.0	130
		EG020A-F: Nickel	7440-02-0	4 mg/L	113	70.0	130
		EG020A-F: Zinc	7440-66-6	4 mg/L	119	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 5916493)							
EP2409451-003	Anonymous	EG035F: Mercury	7439-97-6	0.005 mg/L	120	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 5909948)							
EP2409621-003	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	113	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 5909941)							
EP2409609-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	102	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5909949)							
EP2409621-003	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	97.1	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5911501)							
EP2409598-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	101	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5911503)							
EP2409645-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	103	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5911502)							
EP2409645-001	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	95.2	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 5909942)							
EP2409609-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	102	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5910331)							
EP2409638-002	MW02	EP071: C10 - C14 Fraction	----	400 µg/L	82.7	44.5	122
		EP071: C15 - C28 Fraction	----	600 µg/L	94.8	55.1	143
		EP071: C29 - C36 Fraction	----	400 µg/L	99.6	53.6	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5913460)							
EP2409621-001	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	101	77.0	137
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5913465)							
EP2409610-001	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	80.6	77.0	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5910331)							
EP2409638-002	MW02	EP071: >C10 - C16 Fraction	----	500 µg/L	84.1	44.5	122
		EP071: >C16 - C34 Fraction	----	700 µg/L	101	55.1	143
		EP071: >C34 - C40 Fraction	----	300 µg/L	74.8	53.6	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5913460)							
EP2409621-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	97.6	77.0	137

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5913465)							
EP2409610-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	78.4	77.0	137
EP080: BTEXN (QCLot: 5913460)							
EP2409621-001	Anonymous	EP080: Benzene	71-43-2	20 µg/L	102	77.0	122
		EP080: Toluene	108-88-3	20 µg/L	99.3	73.5	126
EP080: BTEXN (QCLot: 5913465)							
EP2409610-001	Anonymous	EP080: Benzene	71-43-2	20 µg/L	100	77.0	122
		EP080: Toluene	108-88-3	20 µg/L	96.2	73.5	126

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EP2409638**	Page	: 1 of 11
Amendment	: **1**		
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: MS ASHTON BETTI	Telephone	: +61-8-9406 1301
Project	: P21705 Burrup - Baseline Assessment	Date Samples Received	: 08-Jul-2024
Site	: ----	Issue Date	: 08-Aug-2024
Sampler	: Egan Churchill-Gray	No. of samples received	: 9
Order number	: PO023451	No. of samples analysed	: 9

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, where applicable to the methodology, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

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

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural						
MW01, MW02, MW03, MW04, MW05, QC104	----	----	----	13-Jul-2024	05-Jul-2024	**8**
EK057G: Nitrite as N by Discrete Analyser						
Clear Plastic Bottle - Natural						
MW01, MW02, MW03, MW04, MW05, QC104, QC302	----	----	----	08-Jul-2024	07-Jul-2024	**1**
EK071G: Reactive Phosphorus as P by discrete analyser						
Clear Plastic Bottle - Natural						
MW01, MW02, MW03, MW04, MW05, QC104, QC302	----	----	----	08-Jul-2024	07-Jul-2024	**1**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Analytical Methods	Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)						
TRH - Semivolatile Fraction	EP071	1	17	5.88	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	8	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: **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

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
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P)							
MW01, MW02, MW03, MW04, MW05, QC104	**05-Jul-2024**	**----**	----	**----**	**13-Jul-2024**	05-Jul-2024	×
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
MW01, MW02, MW03, MW04, MW05, QC104	**05-Jul-2024**	**----**	----	**----**	**13-Jul-2024**	19-Jul-2024	✓
ED038A: Acidity							
Clear Plastic Bottle - Natural (ED038)							
MW01, MW02, MW03, MW04, MW05, QC104	**05-Jul-2024**	**----**	----	**----**	**15-Jul-2024**	19-Jul-2024	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
MW01, MW02, MW03, MW04, MW05, QC104	**05-Jul-2024**	**----**	----	**----**	**08-Jul-2024**	02-Aug-2024	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
MW01, MW02, MW03, MW04, MW05, QC104	**05-Jul-2024**	**----**	----	**----**	**08-Jul-2024**	02-Aug-2024	✓
ED093F: Dissolved Major Cations							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (ED093F)							
MW01, MW02, MW03, MW04, MW05, QC104	**05-Jul-2024**	**----**	----	**----**	**12-Jul-2024**	02-Aug-2024	✓
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F)							
MW01, MW02, MW03, MW04, MW05, QC104, QC302	**05-Jul-2024**	**----**	----	**----**	**12-Jul-2024**	01-Jan-2025	✓
EG035F: Dissolved Mercury by FIMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F)							
MW01, MW02, MW03, MW04, MW05, QC104, QC302	**05-Jul-2024**	**----**	----	**----**	**12-Jul-2024**	02-Aug-2024	✓

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
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
MW01, MW02, MW03, MW04, MW05, QC104, QC302	**05-Jul-2024**	**----**	----	**----**	**08-Jul-2024**	02-Aug-2024	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
MW01, MW02, MW03, MW04, MW05, QC104, QC302	**05-Jul-2024**	**----**	----	**----**	**08-Jul-2024**	07-Jul-2024	×
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
MW01, MW02, MW03, MW04, MW05, QC104, QC302	**05-Jul-2024**	**----**	----	**----**	**08-Jul-2024**	02-Aug-2024	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
MW01, MW02, MW03, MW04, MW05, QC104, QC302	**05-Jul-2024**	**10-Jul-2024**	02-Aug-2024	✓	**13-Jul-2024**	02-Aug-2024	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
MW01, MW02, MW03, MW04, MW05, QC104, QC302	**05-Jul-2024**	**10-Jul-2024**	02-Aug-2024	✓	**13-Jul-2024**	02-Aug-2024	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
MW01, MW02, MW03, MW04, MW05, QC104, QC302	**05-Jul-2024**	**----**	----	**----**	**08-Jul-2024**	07-Jul-2024	×

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
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) MW01, MW02, MW03, MW04	**05-Jul-2024**	**10-Jul-2024**	12-Jul-2024	✓	**12-Jul-2024**	19-Aug-2024	✓
Amber Glass Bottle - Unpreserved (EP071) MW05, QC104, QC302	**05-Jul-2024**	**10-Jul-2024**	12-Jul-2024	✓	**13-Jul-2024**	19-Aug-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) MW01, MW02	**05-Jul-2024**	**11-Jul-2024**	19-Jul-2024	✓	**11-Jul-2024**	19-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) MW03, MW04, MW05, QC104, QC302, QC402	**05-Jul-2024**	**11-Jul-2024**	19-Jul-2024	✓	**12-Jul-2024**	19-Jul-2024	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) MW01, MW02, MW03, MW04	**05-Jul-2024**	**10-Jul-2024**	12-Jul-2024	✓	**12-Jul-2024**	19-Aug-2024	✓
Amber Glass Bottle - Unpreserved (EP071) MW05, QC104, QC302	**05-Jul-2024**	**10-Jul-2024**	12-Jul-2024	✓	**13-Jul-2024**	19-Aug-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) MW01, MW02	**05-Jul-2024**	**11-Jul-2024**	19-Jul-2024	✓	**11-Jul-2024**	19-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) MW03, MW04, MW05, QC104, QC302, QC402	**05-Jul-2024**	**11-Jul-2024**	19-Jul-2024	✓	**12-Jul-2024**	19-Jul-2024	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) MW01, MW02	**05-Jul-2024**	**11-Jul-2024**	19-Jul-2024	✓	**11-Jul-2024**	19-Jul-2024	✓
Amber VOC Vial - Sulfuric Acid (EP080) MW03, MW04, MW05, QC104, QC302, QC402	**05-Jul-2024**	**11-Jul-2024**	19-Jul-2024	✓	**12-Jul-2024**	19-Jul-2024	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X-ST) MW01, MW02, MW03, MW04, MW05, QC104, QC302, QC403	**05-Jul-2024**	**10-Jul-2024**	01-Jan-2025	✓	**11-Jul-2024**	01-Jan-2025	✓

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
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X-ST)							
MW01, MW02, MW03, MW04, MW05, QC104, QC302, QC403	**05-Jul-2024**	**10-Jul-2024**	01-Jan-2025	✓	**11-Jul-2024**	01-Jan-2025	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X-ST)							
MW01, MW02, MW03, MW04, MW05, QC104, QC302, QC403	**05-Jul-2024**	**10-Jul-2024**	01-Jan-2025	✓	**11-Jul-2024**	01-Jan-2025	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X-ST)							
MW01, MW02, MW03, MW04, MW05, QC104, QC302, QC403	**05-Jul-2024**	**10-Jul-2024**	01-Jan-2025	✓	**11-Jul-2024**	01-Jan-2025	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X-ST)							
MW01, MW02, MW03, MW04, MW05, QC104, QC302, QC403	**05-Jul-2024**	**10-Jul-2024**	01-Jan-2025	✓	**11-Jul-2024**	01-Jan-2025	✓

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: **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)							
Acidity as Calcium Carbonate	ED038	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Alkalinity by Auto Titrator	ED037-P	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	29	**10.34**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	**5.88**	**10.00**	✘	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Acidity as Calcium Carbonate	ED038	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Alkalinity by Auto Titrator	ED037-P	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	29	**6.90**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							

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*	
Method Blanks (MB) - Continued							
Alkalinity by Auto Titrator	ED037-P	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	29	**6.90**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	8	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	29	**6.90**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	40	**5.00**	**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
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Acidity as Calcium Carbonate	ED038	WATER	In house: Referenced to APHA 2310 B Acidity is determined by manual titration with a standardised alkali to an end-point pH of 8.3. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The 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).
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	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 concentrated, combined with an equal volume of reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.4, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
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.

senversa

Chain of Custody Documentation

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Laboratory: ALS WA
Address: 26 Rigali Way, Wangara WA 6065
Contact: Sample Receipt
Phone: 08 9406 1301

Environmental Division Perth
Work Order Reference
EP2409638

Telephone : -- 61-8-9406 1301

Job Number:	P21705	**Purchase Order:**	PO023451
Project Name:	Burrup - Baseline Assessment	**Quote No:**	Senversa
Sampled By:	Egan Churchill-Gray	**Turn Around Time:**	Standard
Project Manager:	Ashton Betti	**Page:**	1 of 1
Email Report To:	ashton.betti@senversa.com.au egan.churchill-gray@senversa.com.au perth.labreports@senversa.com.au	**Phone/Mobile:**	0421 473 219

Sample Information					Container Information		Analysis Required											
Lab ID	Sample ID	Matrix *	Date	Time	Type / Code	Total Bottles	TRH (C6-C40), BTEXN, 8 Dissolved Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn) [W-5]	PFAS – Super Trace Full Suite (28 analytes) [EP231X-ST]	Ultra Trace – Nitrite, Nitrate, Ammonia, Reactive Phosphorus, Total Nitrogen, TKN, Total Phosphorus [UTN-04]	pH [EA005]	Cations & Anions: Major (Ca, Mg, Na, K, Cl, SO4, Alkalinity-residual alkali) + Ionic Balance [NT-1 & NT-2]	Acidity as CaCO3 [ED038]	TRH (C6-C40), BTEX [W-4]					
1	MW01	Water	5/07/2024		2x VS, 1x UA, 4x P, 1x N	8	X	X	X	X	X	X						pH: 7.56, Temp: 24.8 C Extra PFAS bottles for lab QC
2	MW02	Water	5/07/2024		2x VS, 1x UA, 4x P, 1x N	8	X	X	X	X	X	X						pH: 7.24, temp: 25.3 C Extra amber bottle for lab QC
3	MW03	Water	5/07/2024		2x VS, 1x UA, 4x P, 1x N	8	X	X	X	X	X	X						pH: 7.43, temp: 23.0 C
4	MW04	Water	5/07/2024		2x VS, 1x UA, 4x P, 1x N	8	X	X	X	X	X	X						pH: 7.40, temp: 23.6 C
5	MW05	Water	5/07/2024		2x VS, 1x UA, 4x P, 1x N	8	X	X	X	X	X	X						pH: 6.95, temp: 22.5 C
6	QC104	Water	5/07/2024		2x VS, 1x UA, 4x P, 1x N	8	X	X	X	X	X	X						pH: 7.24, temp: 25.3 C
7	QC302	Water	5/07/2024		2x VS, 1x UA, 4x P, 1x N	8	X	X	X									
8	QC402	Water	5/07/2024		1x VS	1							X					Lab ID: TBW871
9	QC403	Water	5/07/2024		2x P	2		X										Lab ID: TBW872
Total						59												

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:

Sampler Name: Egan Churchill-Gray **Signature:** ECG **Date:** 8/07/2024

Relinquished By:		Method of Shipment (if applicable):	Received by:	
Name/Signature: Egan Churchill-Gray / ECG	Date: 8/7/24	Carrier / Reference #:	Name/Signature: CS	Date: 8/7
Of: Senversa	Time: 12:00	Date/Time:	Of: ALS	Time: 1240
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: _____
Checked by: _____

senversa

Chain of Custody Documentation

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Laboratory: Eurofins ARL WA
Address: 46 - 48 Banksia Rd, Welshpool WA 6106
Contact: Sample Receipt
Phone: 08 6253 4444

Job Number:	P21705	**Purchase Order:**	
Project Name:	Burrup - Baseline Assessment	**Quote No:**	**Senversa**
Sampled By:	Egan Churchill-Gray	**Turn Around Time:**	**Standard**
Project Manager:	Ashton Betti	**Page:**	1 of 1
Email Report To:	ashton.betti@senversa.com.au egan.churchill-gray@senversa.com.au perth.labreports@senversa.com.au	**Phone/Mobile:**	0421 473 219

Sample Information					Container Information		Analysis Required											
Lab ID	Sample ID	Matrix *	Date	Time	Type / Code	Total Bottles	TRH (C6-C40), BTEXN, 8 Dissolved Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)	PFAS – Super Trace Full Suite (28 analytes)	Ultra Trace – Nitrite, Nitrate, Ammonia, Reactive Phosphorus, Total Nitrogen, TKN, Total Phosphorus	Cations & Anions: Major (Ca, Mg, Na, K, Cl, SO4, Alkalinity-residual alkali) + Ionic Balance	Acidity as CaCO3						HOLD	Comments: e.g. Highly contaminated sample; hazardous materials present; trace LORs etc.
	QC204	Water	5/07/2024		2x VS, 1x UA, 4x P, 1x N	8	X	X	X	X	X							
Total						8												

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:

Sampler Name: Egan Churchill-Gray **Signature:** ECG **Date:** 8/07/2024

Relinquished By:		**Method of Shipment (if applicable):**	**Received by:**	
Name/Signature: Egan Churchill-Gray / ECG	Date: 8/7/2024	Carrier / Reference #:	Name/Signature: 16.4	Date: 08/07/24
Of: Senversa	Time: 12:00	Date/Time:	Of:	Time: 12:35
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

1115822

Completed by: _____
Checked by: _____

www.eurofins.com.au EnviroSales@eurofins.com

Eurofins ARL Pty Ltd ABN: 91 05 0159 898

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

Eurofins Environment Testing Australia Pty Ltd ABN: 50 005 085 521

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

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794 & 2780

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079

Eurofins ProMicro Pty Ltd ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Focus)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

Sample Receipt Advice

Company name: Senversa Pty Ltd WA
Contact name: Ashton Betti
Project name: BURRUP - BASELINE ASSESSMENT
Project ID: P21705
Turnaround time: 5 Day
Date/Time received Jul 8, 2024 12:35 PM
Eurofins reference 1115822

Sample Information

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

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

✓ COC has been completed correctly.

✓ Attempt to chill was evident.

✓ Appropriately preserved sample containers have been used.

✓ All samples were received in good condition.

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

✓ Appropriate sample containers have been used.

✓ Sample containers for volatile analysis received with zero headspace.

X Split sample sent to requested external lab.

X Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Notes

Contact

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

Elden Garrett on phone : 0892519602 or by email: EldenGarrett@eurofins.com

Results will be delivered electronically via email to Ashton Betti - ashton.betti@senversa.com.au.

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

Global Leader - Results you can trust

eurofins

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794 & 2780

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Focus)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

Company Name: Senversa Pty Ltd WA
Address: Level 18, 140 St Georges Terrace
Perth
WA 6000

Project Name: BURRUP - BASELINE ASSESSMENT
Project ID: P21705

Order No.: P21705
Report #: 1115822
Phone: 0863240200
Fax: 0396060074

Received: Jul 8, 2024 12:35 PM
Due: Jul 15, 2024
Priority: 5 Day
Contact Name: Ashton Betti

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail						Acidity (as CaCO3)	Ionic Balance	Total Dissolved Solids (calculated from EC)*	Metals M8 filtered	Eurofins Suite B1	Eurofins Suite B11C: Na/K/Ca/Mg	Per- and Polyfluoroalkyl Substances (PFASs) - Trace	Total Dissolved Solids (TDS)	Eurofins Suite B19E	Eurofins Suite B11E
Perth Laboratory - NATA # 2377 Site # 2370						X	X	X	X	X	X		X	X	X
Melbourne Laboratory - NATA # 1261 Site # 1254												X			
External Laboratory															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
1	QC204	Jul 05, 2024		Water	L24-JI0021022	X	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1	1

Senversa Pty Ltd (WA)
Level 18, 140 St Georges Terrace
Perth
WA 6000

Attention: **Ashton Betti**

Report **1115822-W**
Project name BURRUP - BASELINE ASSESSMENT
Project ID P21705
Received Date Jul 08, 2024

Client Sample ID			**QC204**
Sample Matrix			**Water**
Eurofins Sample No.			**L24-JI0021022**
Date Sampled			**Jul 05, 2024**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 0.02
TRH C10-C14	0.02	mg/L	< 0.02
TRH C15-C28	0.04	mg/L	< 0.04
TRH C29-C36	0.04	mg/L	< 0.04
TRH C10-C36 (Total)	0.04	mg/L	< 0.04
TRH C6-C10*	0.02	mg/L	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02
TRH >C10-C16	0.02	mg/L	< 0.02
TRH >C10-C16 less Naphthalene (F2)*[N01]	0.02	mg/L	< 0.02
TRH >C16-C34	0.05	mg/L	< 0.05
TRH >C34-C40*	0.05	mg/L	< 0.05
TRH >C10-C40 (total)*	0.05	mg/L	< 0.05
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003
BTEX			
4-Bromofluorobenzene (surr.)	1	%	89
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.001	mg/L	< 0.001
Acidity (as CaCO3)	10	mg/L	43
Ammonia-N	0.02	mg/L	1.7
Chloride	5	mg/L	65000
Conductivity (at 25 °C)	10	uS/cm	140000
Filterable Reactive Phosphorus	0.01	mg/L	0.05
Ionic Balance	0	%	- 4.5
Nitrate-N	0.01	mg/L	0.02
Nitrite-N	0.01	mg/L	< 0.01
NOx-N	0.01	mg/L	0.02
Sulfate	1	mg/L	13000
Total Dissolved Solids	5	mg/L	83000

Client Sample ID			QC204
Sample Matrix			Water
Eurofins Sample No.			L24-JI0021022
Date Sampled			Jul 05, 2024
Test/Reference	LOR	Unit	
Total Dissolved Solids (calculated from EC)*	10	mg/L	98000
Total Kjeldahl Nitrogen	0.2	mg/L	1.3
Total Nitrogen	0.2	mg/L	1.3
Total Phosphorus	0.01	mg/L	< 0.01
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO3)	5	mg/L	100
Carbonate Alkalinity (as CaCO3)	5	mg/L	< 5
Hydroxide Alkalinity (as CaCO3)	5	mg/L	< 5
Total Alkalinity (as CaCO3)	5	mg/L	100
Heavy Metals			
Arsenic (filtered)	0.001	mg/L	0.011
Cadmium (filtered)	0.0001	mg/L	< 0.002
Chromium (filtered)	0.001	mg/L	< 0.01
Copper (filtered)	0.001	mg/L	< 0.01
Lead (filtered)	0.001	mg/L	< 0.01
Mercury (filtered)	0.0001	mg/L	< 0.001
Nickel (filtered)	0.001	mg/L	< 0.01
Zinc (filtered)	0.005	mg/L	< 0.05
Eurofins Suite B11C: Na/K/Ca/Mg			
Calcium	0.5	mg/L	1200
Magnesium	0.5	mg/L	3800
Potassium	0.5	mg/L	1200
Sodium	0.5	mg/L	35000
PFASs Summations			
Sum (PFHxS + PFOS)*	0.001	ug/L	< 0.001
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.001	ug/L	< 0.001
Sum of PFASs (n=30)*	0.005	ug/L	0.122
Sum of US EPA PFAS (PFOS + PFOA)*	0.001	ug/L	< 0.001
Sum of WA DWER PFAS (n=10)*	0.005	ug/L	0.122
Perfluoroalkyl sulfonamido substances- Trace			
Perfluorooctane sulfonamide (FOSA)[N11]	0.005	ug/L	< 0.005
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	0.005	ug/L	< 0.005
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	0.005	ug/L	< 0.005
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	0.005	ug/L	< 0.005
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	0.005	ug/L	< 0.005
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	0.005	ug/L	< 0.005
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	0.005	ug/L	< 0.005
13C8-FOSA (surr.)	1	%	36
D3-N-MeFOSA (surr.)	1	%	46
D5-N-EtFOSA (surr.)	1	%	63
D7-N-MeFOSE (surr.)	1	%	34
D9-N-EtFOSE (surr.)	1	%	43
D5-N-EtFOSAA (surr.)	1	%	56
D3-N-MeFOSAA (surr.)	1	%	47

Client Sample ID			QC204
Sample Matrix			Water
Eurofins Sample No.			L24-JI0021022
Date Sampled			Jul 05, 2024
Test/Reference	LOR	Unit	
Perfluoroalkyl carboxylic acids (PFCAs) - Trace			
Perfluorobutanoic acid (PFBA)[N11]	0.005	ug/L	0.035
Perfluoropentanoic acid (PFPeA)[N11]	0.001	ug/L	0.054
Perfluorohexanoic acid (PFHxA)[N11]	0.001	ug/L	[N09]0.022
Perfluoroheptanoic acid (PFHpA)[N11]	0.001	ug/L	[N09]0.004
Perfluorooctanoic acid (PFOA)[N11]	0.001	ug/L	< 0.001
Perfluorononanoic acid (PFNA)[N11]	0.001	ug/L	< 0.001
Perfluorodecanoic acid (PFDA)[N11]	0.001	ug/L	< 0.001
Perfluorotridecanoic acid (PFTrDA)[N15]	0.001	ug/L	< 0.001
Perfluoroundecanoic acid (PFUnDA)[N11]	0.001	ug/L	< 0.001
Perfluorododecanoic acid (PFDoDA)[N11]	0.001	ug/L	< 0.001
Perfluorotetradecanoic acid (PFTeDA)[N11]	0.001	ug/L	< 0.001
13C4-PFBA (surr.)	1	%	52
13C5-PFPeA (surr.)	1	%	83
13C5-PFHxA (surr.)	1	%	105
13C4-PFHpA (surr.)	1	%	97
13C8-PFOA (surr.)	1	%	98
13C5-PFNA (surr.)	1	%	70
13C6-PFDA (surr.)	1	%	58
13C2-PFUnDA (surr.)	1	%	60
13C2-PFDoDA (surr.)	1	%	80
13C2-PFTeDA (surr.)	1	%	48
Perfluoroalkyl sulfonic acids (PFSAs)- Trace			
Perfluorobutanesulfonic acid (PFBS)[N11]	0.001	ug/L	0.007
Perfluorononanesulfonic acid (PFNS)[N15]	0.001	ug/L	< 0.001
Perfluoropropanesulfonic acid (PFPrS)[N15]	0.001	ug/L	< 0.001
Perfluoropentanesulfonic acid (PFPeS)[N15]	0.001	ug/L	< 0.001
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.001	ug/L	< 0.001
Perfluoroheptanesulfonic acid (PFHpS)[N15]	0.001	ug/L	< 0.001
Perfluorooctanesulfonic acid (PFOS)[N11]	0.001	ug/L	< 0.001
Perfluorodecanesulfonic acid (PFDS)[N15]	0.001	ug/L	< 0.001
13C3-PFBS (surr.)	1	%	103
18O2-PFHxS (surr.)	1	%	92
13C8-PFOS (surr.)	1	%	61
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	0.001	ug/L	< 0.001
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	0.005	ug/L	< 0.005
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	0.001	ug/L	< 0.001
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11]	0.001	ug/L	< 0.001
13C2-4:2 FTSA (surr.)	1	%	88
13C2-6:2 FTSA (surr.)	1	%	64
13C2-8:2 FTSA (surr.)	1	%	96
13C2-10:2 FTSA (surr.)	1	%	54

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Welshpool	Jul 15, 2024	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Welshpool	Jul 15, 2024	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Welshpool	Jul 15, 2024	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Welshpool	Jul 15, 2024	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Acidity (as CaCO3)	Welshpool	Jul 15, 2024	14 Days
- Method: LTM-INO-4210 Acidity			
Ionic Balance	Welshpool	Jul 09, 2024	28 Day
- Method: -			
Total Dissolved Solids (calculated from EC)*	Welshpool	Jul 15, 2024	28 Days
- Method: APHA 4110 Total Dissolved Solids			
Metals M8 filtered	Welshpool	Jul 15, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Welshpool	Jul 15, 2024	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Ammonia-N	Welshpool	Jul 09, 2024	28 Days
- Method: ARL303 - Ammonia in Water by Discrete Analyser			
Filterable Reactive Phosphorus	Welshpool	Jul 09, 2024	28 Days
- Method: ARL309 - Filterable Reactive Phosphorus in Water by Discrete Analyser			
Nitrate-N	Welshpool	Jul 09, 2024	28 Days
- Method: ARL313/319 - NOx in Water by Discrete Analyser			
Nitrite-N	Welshpool	Jul 09, 2024	2 Days
- Method: ARL311 - Nitrite in Water by Discrete Analyser			
NOx-N	Welshpool	Jul 09, 2024	28 Days
- Method: ARL313/319 - NOx in Water by Discrete Analyser			
Total Kjeldahl Nitrogen	Welshpool	Jul 09, 2024	28 Day
- Method: ARL No. 330 - Persulfate Method for Simultaneous Determination of TN & TP			
Total Nitrogen	Welshpool	Jul 15, 2024	28 Days
- Method: ARL No. 330 - Persulfate Method for Simultaneous Determination of TN & TP			
Total Phosphorus	Welshpool	Jul 15, 2024	28 Days
- Method: ARL308 - Total Phosphorus in Water by Discrete Analyser			
Chloride	Welshpool	Jul 09, 2024	28 Days
- Method: ARL305 - Chloride in Water by Discrete Analyser			
Sulfate	Welshpool	Jul 09, 2024	28 Days
- Method: ARL301 - Sulfate in Water by Discrete Analyser			
Alkalinity (speciated)	Welshpool	Jul 15, 2024	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Conductivity (at 25 °C)	Welshpool	Jul 15, 2024	28 Days
- Method: LTM-INO-4030 Conductivity			
Total Dissolved Solids	Welshpool	Jul 15, 2024	7 Days
- Method: ARL No. 017 - Total Dissolved Solids			
Per- and Polyfluoroalkyl Substances (PFASs) - Trace			
PFASs Summations	Melbourne	Jul 09, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - low level			
Perfluoroalkyl sulfonamido substances- Trace	Melbourne	Jul 10, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - low level			
Perfluoroalkyl carboxylic acids (PFCAs) - Trace	Melbourne	Jul 10, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - low level			

Description	Testing Site	Extracted	Holding Time
Perfluoroalkyl sulfonic acids (PFSAs)- Trace	Melbourne	Jul 10, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - low level			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace	Melbourne	Jul 10, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - low level			

eurofins

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

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

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

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
+61 3 8564 5000
NATA# 1261
Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
+61 2 9900 8400
NATA# 1261
Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
+61 2 6113 8091
NATA# 1261
Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
T: +61 7 3902 4600
NATA# 1261
Site# 20794 & 2780

Newcastle
1/2 Frost Drive
Mayfield West
NSW 2304
+61 2 4968 8448
NATA# 1261
Site# 25079

Eurofins ProMicro Pty Ltd
ABN: 47 009 120 549

Perth ProMicro
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2561
Site# 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
+64 9 526 4551
IANZ# 1327

Auckland (Focus)
Unit C1/4 Pacific Rise,
Mount Wellington,
Auckland 1061
+64 9 525 0568
IANZ# 1308

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
+64 3 343 5201
IANZ# 1290

Tauranga
1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

Company Name: Senversa Pty Ltd WA
Address: Level 18, 140 St Georges Terrace
Perth
WA 6000

Project Name: BURRUP - BASELINE ASSESSMENT
Project ID: P21705

Order No.: P21705
Report #: 1115822
Phone: 0863240200
Fax: 0396060074

Received: Jul 8, 2024 12:35 PM
Due: Jul 15, 2024
Priority: 5 Day
Contact Name: Ashton Betti

Eurofins Analytical Services Manager : Elden Garrett

Sample Detail						Acidity (as CaCO3)	Ionic Balance	Total Dissolved Solids (calculated from EC)*	Metals M8 filtered	Eurofins Suite B1	Eurofins Suite B11C: Na/K/Ca/Mg	Per- and Polyfluoroalkyl Substances (PFASs) - Trace	Total Dissolved Solids (TDS)	Eurofins Suite B19E	Eurofins Suite B11E
Perth Laboratory - NATA # 2377 Site # 2370						X	X	X	X	X	X		X	X	X
Melbourne Laboratory - NATA # 1261 Site # 1254												X			
External Laboratory															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
1	QC204	Jul 05, 2024		Water	L24-JI0021022	X	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ppm: parts per million
µg/L: micrograms per litre
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit
Colour: Pt-Co Units (CU)

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

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

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.02			0.02	Pass	
TRH C15-C28	mg/L	< 0.04			0.04	Pass	
TRH C29-C36	mg/L	< 0.04			0.04	Pass	
TRH C6-C10*	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.02			0.02	Pass	
TRH >C16-C34	mg/L	< 0.05			0.05	Pass	
TRH >C34-C40*	mg/L	< 0.05			0.05	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Ammonia-N	mg/L	< 0.02			0.02	Pass	
Chloride	mg/L	< 5			5	Pass	
Filterable Reactive Phosphorus	mg/L	< 0.01			0.01	Pass	
Nitrite-N	mg/L	< 0.01			0.01	Pass	
Sulfate	mg/L	< 1			1	Pass	
Total Dissolved Solids	mg/L	< 5			5	Pass	
Total Nitrogen	mg/L	< 0.2			0.2	Pass	
Total Phosphorus	mg/L	< 0.01			0.01	Pass	
Method Blank							
Alkalinity (speciated)							
Bicarbonate Alkalinity (as CaCO3)	mg/L	< 5			5	Pass	
Hydroxide Alkalinity (as CaCO3)	mg/L	< 5			5	Pass	
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0001			0.0001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
Method Blank							
Eurofins Suite B11C: Na/K/Ca/Mg							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances- Trace							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.005			0.005	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.005			0.005	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.005			0.005	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/L	< 0.005			0.005	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/L	< 0.005			0.005	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.005			0.005	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.005			0.005	Pass	
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs) - Trace							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.005			0.005	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.001			0.001	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.001			0.001	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.001			0.001	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.001			0.001	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.001			0.001	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.001			0.001	Pass	
Perfluorotridecanoic acid (PFTrDA)	ug/L	< 0.001			0.001	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.001			0.001	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.001			0.001	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.001			0.001	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSAs)- Trace							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.001			0.001	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.001			0.001	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.001			0.001	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.001			0.001	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.001			0.001	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.001			0.001	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.001			0.001	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.001			0.001	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.001			0.001	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/L	< 0.005			0.005	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.001			0.001	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.001			0.001	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	97			70-130	Pass	
TRH C10-C14	%	99			70-130	Pass	
TRH C6-C10*	%	104			70-130	Pass	
TRH >C10-C16	%	97			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	106			70-130	Pass	
Toluene	%	113			70-130	Pass	
Ethylbenzene	%	117			70-130	Pass	
m&p-Xylenes	%	110			70-130	Pass	
o-Xylene	%	113			70-130	Pass	
Xylenes - Total*	%	111			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	115			70-130	Pass	
LCS - % Recovery							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Total Dissolved Solids	%	100			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	101			80-120	Pass	
Cadmium (filtered)	%	100			80-120	Pass	
Chromium (filtered)	%	95			80-120	Pass	
Copper (filtered)	%	91			80-120	Pass	
Lead (filtered)	%	93			80-120	Pass	
Mercury (filtered)	%	101			80-120	Pass	
Nickel (filtered)	%	99			80-120	Pass	
Zinc (filtered)	%	100			80-120	Pass	
LCS - % Recovery							
Eurofins Suite B11C: Na/K/Ca/Mg							
Calcium	%	95			80-120	Pass	
Magnesium	%	102			80-120	Pass	
Potassium	%	102			80-120	Pass	
Sodium	%	104			80-120	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances- Trace							
Perfluorooctane sulfonamide (FOSA)	%	94			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	83			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	99			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	%	110			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	%	101			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	89			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	94			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs) - Trace							
Perfluorobutanoic acid (PFBA)	%	108			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	106			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	88			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	87			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	84			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	87			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	88			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	69			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	88			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	96			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	92			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSAs)- Trace							
Perfluorobutanesulfonic acid (PFBS)	%	96			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	%	79			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	%	98			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	94			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	88			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	100			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	89			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	51			50-150	Pass	
LCS - % Recovery							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	84			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	101			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	%	91			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	%	95			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C6-C9	L24-JI0032082	NCP	%	101			70-130	Pass	
TRH C10-C14	L24-JI0017994	NCP	%	102			70-130	Pass	
TRH C6-C10*	L24-JI0032082	NCP	%	100			70-130	Pass	
TRH >C10-C16	L24-JI0017994	NCP	%	99			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	L24-JI0032082	NCP	%	85			70-130	Pass	
Toluene	L24-JI0032082	NCP	%	75			70-130	Pass	
Ethylbenzene	L24-JI0032082	NCP	%	78			70-130	Pass	
m&p-Xylenes	L24-JI0032082	NCP	%	78			70-130	Pass	
o-Xylene	L24-JI0032082	NCP	%	74			70-130	Pass	
Xylenes - Total*	L24-JI0032082	NCP	%	77			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	L24-JI0032082	NCP	%	93			70-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia-N	L24-JI0021142	NCP	%	105			80-120	Pass	
Chloride	L24-JI0018739	NCP	%	99			70-130	Pass	
Filterable Reactive Phosphorus	L24-JI0021142	NCP	%	109			80-120	Pass	
Nitrate-N	L24-JI0018739	NCP	%	112			70-130	Pass	
Nitrite-N	L24-JI0018739	NCP	%	98			80-120	Pass	
NOx-N	L24-JI0018739	NCP	%	106			80-120	Pass	
Sulfate	L24-JI0018739	NCP	%	116			70-130	Pass	
Total Nitrogen	L24-JI0025456	NCP	%	108			70-130	Pass	
Total Phosphorus	L24-JI0025456	NCP	%	83			80-120	Pass	
Spike - % Recovery									
Eurofins Suite B11C: Na/K/Ca/Mg				Result 1					
Calcium	L24-JI0032587	NCP	%	88			75-125	Pass	
Magnesium	L24-JI0032587	NCP	%	91			75-125	Pass	
Potassium	L24-JI0032587	NCP	%	93			75-125	Pass	
Sodium	L24-JI0032587	NCP	%	83			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	L24-JI0031340	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	L24-JI0021166	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C15-C28	L24-JI0021166	NCP	mg/L	< 0.04	< 0.04	<1	30%	Pass	
TRH C29-C36	L24-JI0021166	NCP	mg/L	< 0.04	< 0.04	<1	30%	Pass	
TRH C6-C10*	L24-JI0031340	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C10-C16	L24-JI0021166	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C16-C34	L24-JI0021166	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C34-C40*	L24-JI0021166	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	L24-JI0031340	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	L24-JI0031340	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	L24-JI0031340	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	L24-JI0031340	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	L24-JI0031340	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	L24-JI0031340	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	L24-JI0031340	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia-N	L24-JI0021141	NCP	mg/L	< 0.02	< 0.02	<1	20%	Pass	
Chloride	L24-JI0021141	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Conductivity (at 25 °C)	L24-JI0021166	NCP	uS/cm	960	970	1.6	30%	Pass	
Filterable Reactive Phosphorus	L24-JI0021141	NCP	mg/L	< 0.01	< 0.01	<1	20%	Pass	
Nitrate-N	L24-JI0021141	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Nitrite-N	L24-JI0021141	NCP	mg/L	< 0.01	< 0.01	<1	20%	Pass	
NOx-N	L24-JI0021141	NCP	mg/L	< 0.01	< 0.01	<1	20%	Pass	
Sulfate	L24-JI0021141	NCP	mg/L	< 1	< 1	<1	30%	Pass	
Total Dissolved Solids	L24-JI0021166	NCP	mg/L	570	580	1.6	30%	Pass	
Total Nitrogen	L24-JI0021022	CP	mg/L	1.3	1.3	5.8	30%	Pass	
Total Phosphorus	L24-JI0021022	CP	mg/L	< 0.01	< 0.01	<1	20%	Pass	
Duplicate									
Eurofins Suite B11C: Na/K/Ca/Mg				Result 1	Result 2	RPD			
Calcium	L24-JI0032586	NCP	mg/L	70	69	<1	30%	Pass	
Magnesium	L24-JI0032586	NCP	mg/L	64	63	1.6	30%	Pass	
Potassium	L24-JI0032586	NCP	mg/L	< 0.5	< 0.5	<1	30%	Pass	
Sodium	L24-JI0032586	NCP	mg/L	130	130	2.8	30%	Pass	

Comments

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Elden Garrett	Analytical Services Manager
Carroll Lee	Senior Analyst-PFAS
Douglas Todd	Senior Analyst-Metal
John Horwood	Senior Analyst-Organic
John Horwood	Senior Analyst-Volatile
Lauren Killin	Senior Analyst-Inorganic
Sam Becker	Senior Analyst-Inorganic

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

Senversa Pty Ltd

ABN 89 132 231 380
www.senversa.com.au
enquiries@senversa.com.au
LinkedIn: Senversa
Facebook: Senversa

Appendix B: Perdaman Pipeline Flora and Fauna Survey (ELA 2024)

Perdaman Pipeline Flora and Fauna Survey

DBNGP (WA) Nominees Pty Ltd

ecological AUSTRALIA
A TETRA TECH COMPANY

1300 646 131
www.ecoaus.com.au

DOCUMENT TRACKING

Project Name	Perdaman Pipeline Flora and Fauna Survey
Project Number	23PER6340
Project Manager	Jeni Morris
Prepared by	Jess Tomlinson, Jeni Morris
Reviewed by	Jeff Cargill
Approved by	Jeff Cargill
Status	**Final**
Version Number	**V2**
Last saved on	**23 August 2024**

This report should be cited as 'Eco Logical Australia 2024. *Perdaman Pipeline Flora and Fauna Survey*. Prepared for DBNGP WA Nominees Pty Ltd.'

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from DBNGP (WA) Nominees Pty Ltd .

Template 2.8.1

Contents

1. Introduction 1

1.1. Project background 1

2. Methodology 3

2.1. Desktop review 3

2.1.1. Database searches 3
2.1.2. Likelihood of occurrence assessment 3

2.2. Field survey 4

2.2.1. Survey team and timing 4
2.2.2. Detailed flora and vegetation survey 4
2.2.3. Targeted flora survey 5
2.2.4. Flora identification and nomenclature 5
2.2.5. Flora and vegetation data analysis 5
2.2.6. Basic fauna survey 6

2.3. Limitations 6

3. Results 1

3.1. Desktop review 1

3.1.1. Climate 1
3.1.2. Interim Biogeographic Regionalisation for Australia 2
3.1.3. Rangelands land systems mapping 2
3.1.4. Beard's (1979) vegetation mapping 3
3.1.5. Hydrology 3
3.1.6. Previous surveys undertaken in the vicinity of the survey area 3
3.1.7. Flora and fauna species of conservation significance 3
3.1.8. Areas of conservation significance 4

3.2. Flora and vegetation survey 11

3.2.1. Flora overview 11
3.2.2. Conservation significant flora 11
3.2.3. Introduced flora 11
3.2.4. Vegetation types 11
3.2.5. Conservation significant ecological communities 13
3.2.6. Vegetation condition 13

3.3. Fauna survey 16

3.3.1. Fauna overview 16
3.3.2. Conservation significant fauna 16
3.3.3. Fauna habitat 16

4. Discussion 19

4.1. Flora and vegetation 19
4.2. Fauna 20

5. References 21
Appendix A Framework for conservation significant flora and fauna ranking 23
Appendix B Likelihood of occurrence assessment criteria 28
Appendix C Flora likelihood of occurrence assessment 30
Appendix D Fauna likelihood of occurrence assessment 31
Appendix E Ecological communities likelihood of occurrence assessment 50
Appendix F Quadrat data 51
Appendix G Flora species list 53

List of Figures

Figure 1: Project location 2
Figure 2: Survey effort 1
Figure 3: Rainfall and temperature data of survey area (BoM 2024a) 1
Figure 4: Land system mapping of the survey area 5
Figure 5: Beard's (1979) vegetation associations of the survey area 6
Figure 6: Hydrology of the survey area 7
Figure 7: Conservation significant flora previously recorded within and in the vicinity of the survey area 8
Figure 8: Conservation significant fauna previously recorded within and in the vicinity of the survey area 9
Figure 9: Conservation significant communities previously recorded within and in the vicinity of the survey area 10
Figure 10: Vegetation types recorded within the survey area 14
Figure 11: Vegetation condition recorded within the survey area 15
Figure 12: Fauna habitats recorded within the survey area 18
Figure 13: **Cenchrus ciliaris* (Image left: DBCA and WAH 2023, right: ELA) 19

List of Tables

Table 1: Database searches undertaken for the survey area 3
Table 2: Survey team qualifications 4
Table 3: Survey limitations 6
Table 4: Soil landscape systems of the survey area 2
Table 5: Beard's (1979) vegetation associations of the survey area 3
Table 6: Summary of previous surveys undertaken in the vicinity of the survey area 3
Table 7: PECs identified within a 5 km radius of the survey area (DBCA 2024c) 4
Table 8: Vegetation types recorded within the survey area 12
Table 9: Fauna habitats recorded within the survey area 17

Abbreviations

Abbreviation	Description
BAM Act	State *Biosecurity and Agriculture Management Act 2007*
BC Act	State *Biodiversity Conservation Act 2016*
BoM	Bureau of Meteorology
CR	Critically Endangered
DAFWA	Department of Agriculture and Food Western Australia
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPIRD	Department of Primary Industries and Regional Development
DRF	Declared Rare Flora
DWER	Department of Water and Environmental Regulation
ELA	Eco Logical Australia
EP Act	State *Environmental Protection Act 1986*
EPA	Environmental Protection Authority
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
ESA	Environmentally Sensitive Area
GDE	Groundwater Dependent Ecosystem
ha	hectare
IBRA	Interim Biogeographic Regionalisation for Australia
km	kilometre
m	metre
MI	Migratory
mm	millimetre
P	Priority
PDWSA	Public Drinking Water Source Areas
PEC	Priority Ecological Community
TEC	Threatened Ecological Community
WA	Western Australia
WAH	Western Australian Herbarium
WAM	Western Australian Museum
WoNS	Weeds of National Significance

Executive Summary

Eco Logical Australia was engaged to conduct a Detailed and Targeted flora and vegetation survey and Basic fauna survey for the proposed Perdaman Pipeline, located on the Burrup Peninsula in the Pilbara region of Western Australia, to provide an assessment of environmental values of the survey area and to support the environmental assessment and approval process.

A desktop assessment was undertaken to assess the potential presence of significant flora and fauna species and ecological communities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, the State *Biodiversity Conservation Act 2016* or by the Department of Biodiversity, Conservation and Attractions. Prior to the field survey, a total of three conservation significant flora species were identified as possibly occurring in the survey area, with one species considered as having the potential to occur and two species assessed as being unlikely to occur. A total of 64 conservation significant fauna species were identified pre-survey as possibly occurring, with 29 species considered as having the potential to occur and 35 species considered as being unlikely to occur or as not occurring. A total of two conservation significant ecological communities were identified as possibly occurring, with both considered as being unlikely to occur in the survey area.

A Detailed flora and vegetation survey and Basic fauna survey was conducted by Jeni Morris (Senior Ecologist) and Glenn Maslen (Senior Environmental Scientist) on 26 March 2024. The flora and vegetation survey was conducted in accordance with the Environmental Protection Authority *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment* (2016), and the Basic fauna survey was conducted in accordance with the Environmental Protection Authority *Technical Guidance: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (2020).

A total of 10 flora species (nine native and one introduced) from eight genera and five families were recorded within the survey area. No Threatened (Declared Rare) flora species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, the State *Biodiversity Conservation Act 2016,* or Priority flora species listed by Department of Biodiversity, Conservation and Attractions were recorded from within the survey area. Of the three conservation listed flora species identified from the desktop assessment as possibly occurring, a post-survey likelihood of occurrence assessment determined that all are considered as being unlikely to occur, based on a lack of suitable habitat present for these species and adequacy of survey effort.

One introduced (weed) flora species was recorded within the survey area, namely **Cenchrus ciliaris* (Buffel grass). **C. ciliaris* is listed under the State *Biosecurity and Agriculture Management Act 2007* as Permitted (s-11), with no specific conditions for control required. This species was recorded at a 0.1% cover within vegetated areas of the survey area.

One broad vegetation type (VT01) was identified within the survey area, occurring across 0.21 hectares in the western portion of the survey area. This vegetation type consisted of low sparse chenopod shrubland primarily comprised of *Tecticornia halocnemoides, Tecticornia indica* subsp. *leiostachya*, and *Trianthema turgidifolium*. The remaining 1.22 hectares of the survey area is described as 'Mudflat' and had no vegetation present. No vegetation types delineated within the current survey area were inferred to represent any known or potential conservation significant communities listed under the

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, the State *Biodiversity Conservation Act 2016* or by the Department of Biodiversity, Conservation and Attractions.

All vegetation within the survey area was classed as being in Poor condition, based on the Trudgen (1988) vegetation scale outlined in the Environment Protection Agency: *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment* (2016; 0.21 hectares). Areas of Mudflat (1.22 hectares) were not assigned a vegetation condition. Disturbances recorded within the survey area included previous clearing, and impacts from adjacent cleared areas (weed invasion, dust).

No fauna species, including direct (observations) or indirect (scats, tracks, diggings) evidence of conservation significant fauna species listed under the EPBC Act, BC Act or by DBCA was recorded within the survey area.

Of the 64 conservation significant fauna species identified from the desktop assessment as possibly occurring within the survey area, a post-survey likelihood of occurrence assessment determined that eight are considered as having the potential to occur, based on availability of suitable habitat and proximity of previous records, namely *Calidris ferruginea* (Curlew Sandpiper, listed as Critically Endangered and Migratory under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and as Critically Endangered under the State *Biodiversity Conservation Act 2016*), *Tringa nebularia* (Common Greenshank; listed as Endangered and Migratory under Commonwealth legislation and Migratory under State legislation), *Xenus cinereus* (Terek Sandpiper; listed as Vulnerable and Migratory under Commonwealth legislation and Migratory under State legislation), and five species listed as Migratory under Commonwealth and State legislation, namely *Gelochelidon nilotica* (Gull-billed tern), *Hydroprogne caspia* (Caspian Tern), *Limosa lapponica* (Bar-tailed godwit), *Pluvialis fulva* (Pacific Golden Plover) and *Tringa stagnatilis* (Marsh Sandpiper).

Two fauna habitats were identified within the survey area, namely 'Mudflat' and 'Low chenopod shrubland'. Mudflats within the survey area may provide foraging habitat to a range of migratory waders when inundated seasonally (e.g., during king tides), including the aforementioned conservation listed bird species.

1. Introduction

1.1. Project background

The Perdaman Lateral Project is located within the Burrup Peninsula of the Pilbara region of Western Australia, approximately 20 kilometres (km) north of Karratha and 8 km north of Dampier. DBNGP (WA) Nominees Pty Ltd (DBP) are the Proponent for the project and are proposing to construct a 550 m long pipeline, and supporting infrastructure, to transport natural gas from the existing Dampier to Bunbury Natural Gas Pipeline (DBNGP) to the proposed Perdaman Urea Plant development (Project Ceres).

Eco Logical Australia (ELA) was engaged to conduct a Detailed and Targeted flora and vegetation survey and Basic fauna survey for the proposed pipeline (the survey area), to provide an assessment of environmental values of the survey area and to support the environmental assessment and approval process. The survey area is approximately 680 m long and up to 30 m wide, totalling 1.43 hectares (ha; **Figure 1**).

The following report summarises results of the desktop assessment and field survey and defines the flora, vegetation, and fauna of the survey area, and defines its significance in terms of conservation values. The results of the ecological surveys will be used to assist the environmental assessment and approval process.

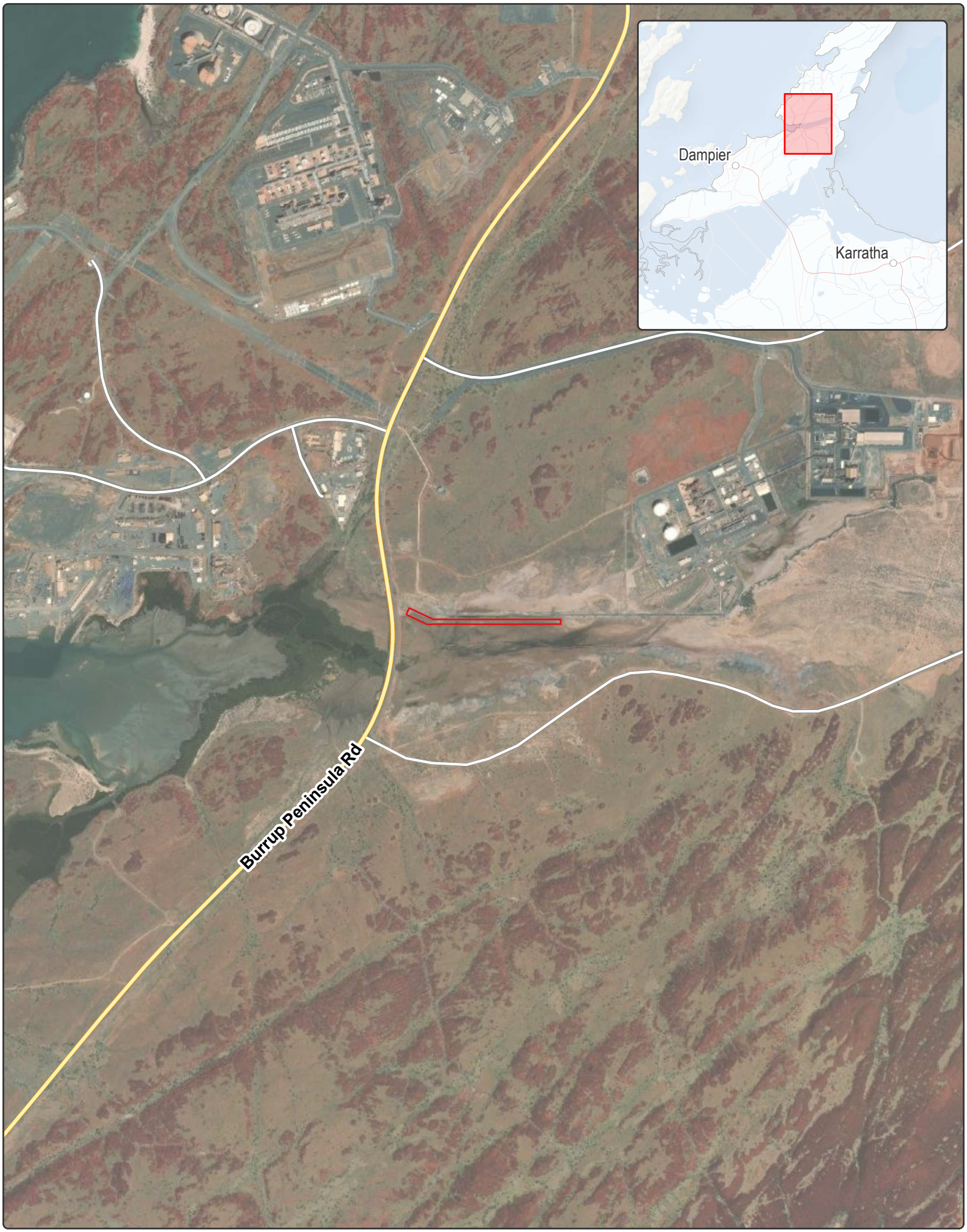


Figure 1: Project location

Survey area

N

0 150 300 600

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

23PER6340-JP Date: 2/05/2024

ecological AUSTRALIA
A TETRA TECH COMPANY

2. Methodology

2.1. Desktop review

A desktop review was undertaken to inform the field survey and to identify the likelihood of occurrence of conservation significant flora and fauna species and ecological communities within the survey area. The desktop review consisted of database searches and a review of literature from surveys previously undertaken in the vicinity of the survey area.

2.1.1. Database searches

The following Commonwealth and State databases were searched for information relating to conservation listed flora, fauna and ecological communities in order to compile and summarise existing data to inform the field survey. Database searches undertaken around the central coordinates m E 476386; N 7718680 are provided in **Table 1** below. Applied buffers below are considered suitable based on flora and fauna assemblages expected to occur within the survey area.

Table 1: Database searches undertaken for the survey area

Database	Reference	Buffer
EPBC Act Protected Matters Search Tool (PMST) for MNES, including any Threatened species and communities listed under the EPBC Act	DCCEEW 2024a	5
Department of Biodiversity, Conservation and Attractions (DBCA) Threatened and Priority flora database searches for Declared Rare Flora (DRF) listed under the latest WA Wildlife Conservation (Rare Flora) Notice and Priority Flora.	DBCA 2024a	5
DBCA Threatened and Priority fauna database searches for Scheduled fauna listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or latest WA Wildlife Conservation (Specially Protected Fauna) Notice and Priority Fauna.	DBCA 2024b	5
DBCA Threatened and Priority Ecological Communities' database search.	DBCA 2024c	5

In addition, the following documents were reviewed:

- Animal Plant Mineral Pty Ltd (2018). *Perdaman Urea Project Pre-Wet Season Biological Survey.*

2.1.2. Likelihood of occurrence assessment

A likelihood of occurrence assessment was undertaken to identify conservation listed flora and fauna species that possibly occur within the survey area, identified from a review of key datasets and literature, as specified above. Aquatic and marine species (mammals) were not considered in the likelihood of occurrence assessment as the survey area does not contain core habitat that these species solely rely on for survival. Conservation codes, categories and criteria for flora and fauna protected under the EPBC Act and the State *Biodiversity Conservation Act 2016* (BC Act) are provided in **Appendix A**. Criteria used for this assessment is presented in **Appendix B**.

2.2. Field survey

2.2.1. Survey team and timing

The field survey was conducted by Jeni Morris (Senior Ecologist) and Glenn Maslen (Senior Environmental Scientist) on 26 March 2024.

Field staff had valid scientific licences to conduct flora and vegetation surveys and to take Threatened and Priority flora in WA at the time of the survey (**Table 2**). No licences were required for the Basic fauna survey. The survey timing was consistent with the Environmental Protection Authority (EPA) recommendations for undertaking Detailed and flora and vegetation surveys in the Pilbara region i.e., 6-8 weeks post wet season (March to June; EPA 2016). No rainfall was recorded at the time of the field survey (Bureau of Meteorology [BoM] 2024a).

Table 2: Survey team qualifications

Staff	Role	Qualifications	Licence
Jeni Morris	Senior Ecologist, Project manager	BSc. Conservation and Wildlife Biology	Flora taking licence: FB62000070-2 Threatened Flora Licence: TFL 178-2122
Glenn Maslen	Senior Environmental Scientist	BSc. Environmental Science	Flora taking licence: FB62000376 Threatened Flora Licence: TFL 2324-0100

2.2.2. Detailed flora and vegetation survey

A single season Detailed flora and vegetation survey was undertaken across the survey area in accordance with EPA *Technical Guidance for flora and vegetation* (EPA 2016). The survey included:

- Mapping and describing vegetation types, including the presence of any Threatened or Priority Ecological Communities (TECs or PECs) and any vegetation of ecological importance and compiling a species inventory;
- Vegetation condition mapping adapted from Trudgen (1988; EPA 2016);
- The location of any identified Weeds of National Significance (WoNS) or Declared Pests listed under the State *Biosecurity and Agriculture Management Act 2007* (BAM Act); and
- Targeted searches for conservation significant flora listed under the EPBC Act, BC Act or by DBCA.

The survey involved the use of a 20 x 125 m quadrat as recommended for the Pilbara bioregion (total 2,500m^2; EPA 2016). Quadrats were not permanently marked. Dominant vegetation communities were described, with respect to dominant species, structure and overall condition. Photos were taken from the north-western corner of each quadrat. Only one quadrat was able to be established within the survey area, due to the size of the survey area and restricted extent of vegetation present (i.e. a single quadrat covered the extent of vegetation present within the survey area; **Figure 2**). The following data were recorded within each quadrat:

- Vegetation structure and classes, cover of all species and dominant species list for each vegetation type (in accordance with the National Vegetation Information System Level V structure and floristics);
- Vegetation condition, in accordance with the scale outlined in EPA (2016) adapted from Keighery (1994);
- Full species inventory (angiosperm and gymnosperm) of both native and introduced species across the subject site; and

- Relevant site data including coordinates, site photograph, soil, geology, drainage, slope and any other relevant observational data.

Where relevant, opportunistic sampling of species not recorded within the quadrat was undertaken to supplement the existing list of species recorded from within the survey area. Any encountered WoNS or Declared Pest plants listed under the BAM Act were recorded and mapped.

2.2.3. Targeted flora survey

A targeted survey was also undertaken to assess the presence of conservation significant flora and ecological communities within areas considered suitable habitat. Potentially occurring species, communities and associated suitable habitat were determined during the desktop likelihood assessment. The targeted flora survey involved personnel walking systematic traverses, with spacing dependent on the presence of suitable habitat for target species and communities. All encountered conservation significant flora and vegetation were recorded by taking the coordinates of each individual and/or a centroid coordinate location for a group of individuals (>100) within a 20 m radial circumference, using a handheld GPS unit. Track logs as shown in **Figure 2** attest to the time and effort expended.

2.2.4. Flora identification and nomenclature

Flora species able to be identified in the field were recorded, and voucher specimens of unfamiliar species were collected for later identification. All collections were assigned a unique collecting number. For conservation significant identified in the field, the following were recorded:

- A colour photograph;
- GPS location;
- Population size estimate;
- Location of population boundaries;
- Associated habitat/landscape element;
- Time and date observed;
- Observer details; and
- A voucher specimen suitable for use as a reference specimen (if appropriate to do so for conservation significant flora).

Flora specimen identification following the field survey was undertaken by ELA taxonomic specialists at the Western Australian Herbarium (WAH). Suitable material that meets WAH specimen lodgement requirements, such as flowering material and range extensions, will be submitted along with Threatened and Priority flora report forms to DBCA, as required by conditions of collection licences issued under the BC Act.

Nomenclature used for the flora species within this report follows the WA Plant Census as available on FloraBase (DBCA and WAH 2024).

2.2.5. Flora and vegetation data analysis

Due to the restricted extent of vegetation within the survey area, establishment of a single quadrat was considered adequate to describe the vegetation present. As such, detailed data analysis (e.g. cluster analysis, species accumulation curves), were not undertaken.

2.2.6. Basic fauna survey

The Basic fauna survey was conducted in accordance with *EPA Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020).

The Basic fauna survey involved personnel walking transects through the survey area, delineating and mapping fauna habitats and recording opportunistic sightings of fauna. Fauna habitats were assessed for their ability to support and sustain populations of fauna, along with an assessment of the likelihood of occurrence of conservation significant fauna species. The habitat characteristics and fauna database records used in assessing likelihood of occurrence for fauna included:

- Vegetation community, structure and condition;
- Soil and landform type;
- Extent and connectivity of bushland;
- Fauna species habitat preferences;
- Proximity of conservation significant fauna records; and
- Signs of species presence.

Opportunistic recordings of fauna species were made at all times during the field survey. These included visual sightings of active fauna such as reptiles and birds; records of bird calls; and signs of species presence such as tracks, diggings, burrows, scats and any other signs of fauna activity.

Nomenclature used for the vertebrate fauna species within this report follows the Western Australian Museum (WAM) *Checklist of the Vertebrates of Western Australia* (WAM 2024).

2.3. Limitations

The EPA Technical Guidance documents (EPA 2016; EPA 2020) recommend including a discussion of the constraints and limitations of the survey methods used. An assessment of potential constraints and limitations of this survey are summarised in **Table 3**. No potential constraints were identified.

Table 3: Survey limitations

Potential survey limitation	Impact on survey
Sources of information and availability of contextual information (i.e., pre-existing background versus new material).	**Not a constraint**. Previous reports for the region were provided where applicable. Broad-scale vegetation mapping (Beard 1979) at a scale of 1:1,000,000 was available. Land system mapping at a scale of 1:2,000,000 and soil and landform mapping was also available. Available information was sufficient to provide context at varying scales and therefore were not considered a limitation.
Scope (i.e., what life forms, etc., were sampled).	**Not a constraint**. As per the requirements of the scope, a Detailed and Targeted flora and vegetation survey and a Basic fauna survey, conducted in accordance with relevant State and Federal legislation and EPA guidance documents, was adequately met.
Proportion of flora collected and identified (based on sampling, timing and intensity).	**Not a constraint**. Proportion of flora species collected was adequate to meet the requirements of the level of survey undertaken. Foot traverses were undertaken across the survey area to compile a species list in order to meet the objectives of the survey.
Completeness and further work which might be needed (i.e., was the relevant survey area fully surveyed).	**Not a constraint**. The survey area was fully covered to meet requirements outlined in the scope of works. The survey area was able to be fully surveyed. One 20 x 125m quadrat (total 2500m^2) was established within the survey area due to the size of the survey area and restricted extent of vegetation present. This effort was considered adequate to accurately analyse and discriminate sites based on species composition and subsequently delineate vegetation type boundaries. Transects were spaced

Potential survey limitation	Impact on survey
	adequately to sample the range of flora and fauna species present within the survey area.
Mapping reliability.	**Not a constraint**. Delineation and mapping of vegetation types was adequate based on requirements of a Detailed and Targeted survey. The transition between vegetation types is often discontinuous, therefore delineation of individual vegetation types was undertaken in the field and based on subtle variations of mid-understory species composition and landform position.
Timing, weather, season, cycle.	**Not a limitation.** The survey was undertaken in the appropriate season for the Eremaean botanical province, i.e., post wet season (March to June), as specified by the EPA Technical Guidance (EPA 2016; EPA 2020).
Disturbances (fire, flood, accidental human intervention, etc.).	**Not a limitation.** Disturbances within the survey area included clearing, tracks and weeds. These disturbances did not negatively impact the ability to meet objectives outlined in the scope of works.
Intensity (in retrospect, was the intensity adequate).	**Not a limitation**. The survey effort was adequately met. The area was searched for conservation significant flora and fauna species by field staff undertaking meandering transects spaced adequately apart across the survey area. This method provides an accurate assessment of habitat characteristics and likelihood of conservation significant species. The number of quadrats established was sufficient to determine the vegetation communities present (including their structurally and compositionally dominant species) and to identify any vegetation of conservation significance.
Resources (i.e., were there adequate resources to complete the survey to the required standard).	**Not a limitation**. The number of personnel conducting this field survey in the given time was adequate to undertake the required level of survey. Additional resources, including equipment available, additional support and personnel were adequate.
Access problems (i.e., ability to access survey area).	**Not a limitation**. The survey area was adequately able to be accessed.
Experience levels (e.g., degree of expertise in plant identification to taxon level).	**Not a limitation**. The personnel conducting this field survey were all suitably qualified to identify specimens, having previously undertaken flora and fauna surveys in the Pilbara bioregion of WA.

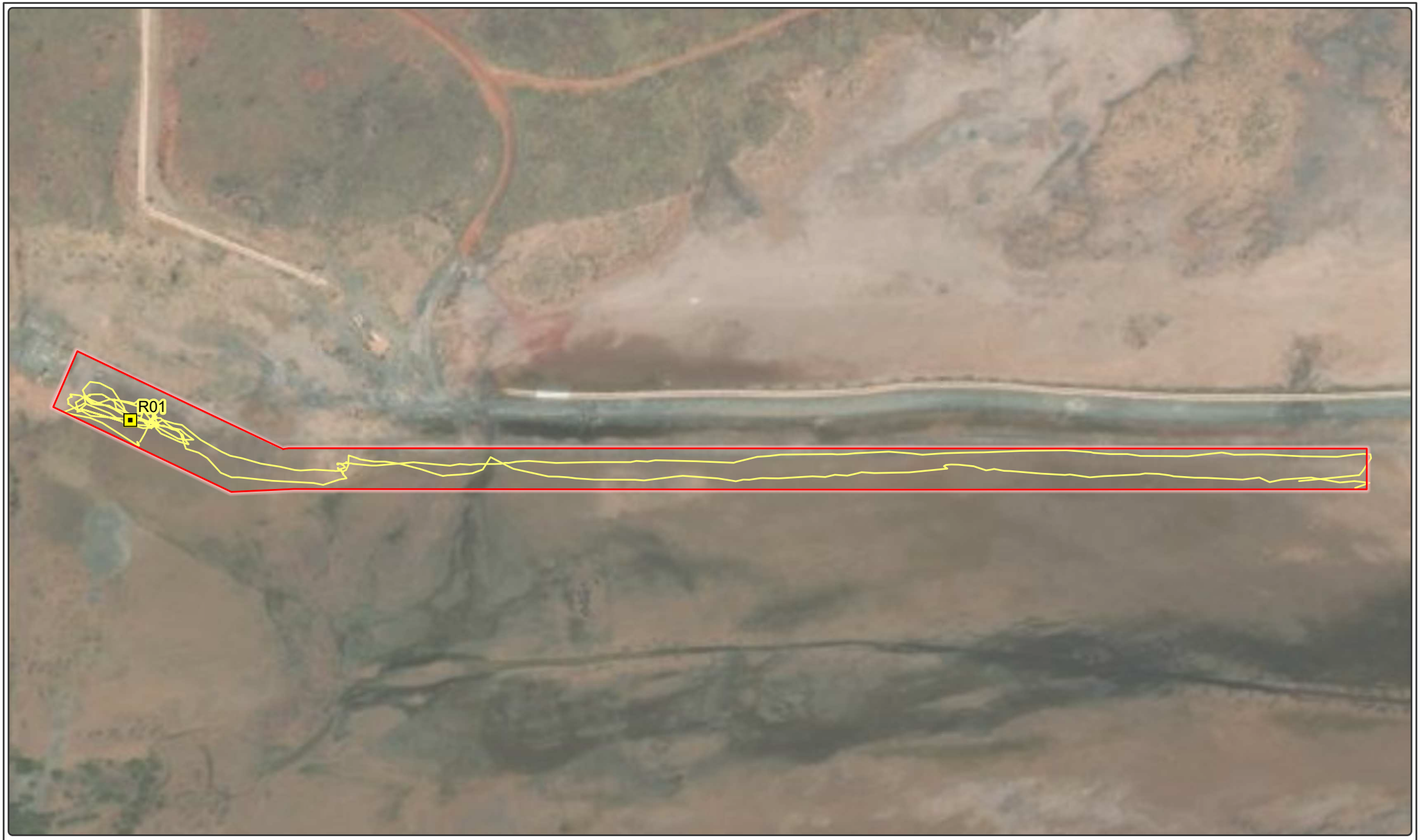


Figure 2: Survey effort

Survey area
Quadrat
Traverse

N

0 20 40 80
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

23PER6340-JP Date: 21/05/2024

eco logical AUSTRALIA
A TETRA TECH COMPANY

3. Results

3.1. Desktop review

3.1.1. Climate

The survey area has a hot, semi-arid climate with hot wet summers and warm dry winters. Based on climate data from the nearby BoM Karratha Aero weather station (station number 4083, rainfall data 1971-present, located approximately 8.5 kilometres [km] to the south of the survey area), the survey area receives an annual average rainfall of 294.6 millimetres (mm), with most of the rainfall occurring during the months of January, February, and March (BoM 2024a; **Figure 3**). In the 12 months preceding the field survey in March 2023, the survey area received a total of 290 mm of rainfall, which is slightly higher than the long-term average (BoM 2024a; **Figure 3**). A total of 26 mm of rainfall was recorded in the three months prior to the field survey, which is substantially lower than the long-term average for the same time period (133.8 mm; BoM 2024a).

Temperature data for the survey area was available from the Karratha weather station. Mean maximum air temperatures of the survey area range from 36.2°C in March to 26.5°C in June and July, while mean minimum temperatures of the survey area range from 26.9°C in January to 13.9°C in July (BoM 2024a; **Figure 3**).

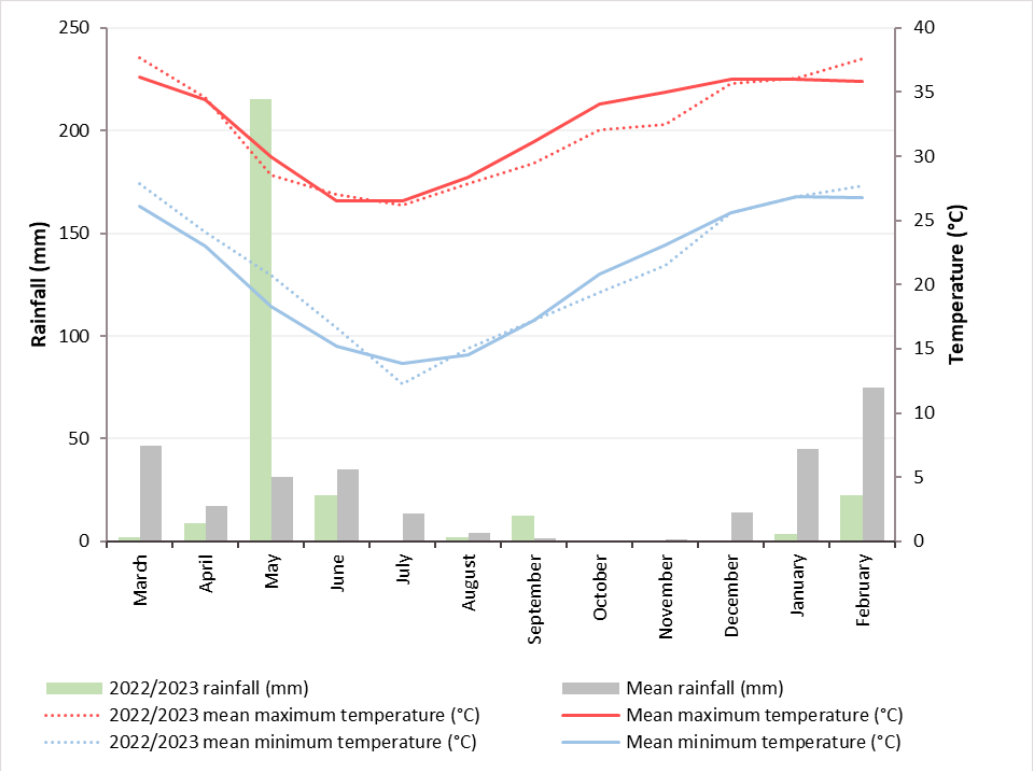


Figure 3: Rainfall and temperature data of survey area (BoM 2024a)

3.1.2. Interim Biogeographic Regionalisation for Australia

The Interim Biogeographic Regionalisation for Australia (IBRA) currently classifies 89 bioregions across Australia, based on a range of biotic and abiotic factors such as climate, vegetation, fauna, geology and landform (Thackway and Cresswell 1995; Department of Climate Change, Energy, the Environment and Water [DCCEEW] 2024). These bioregions are currently further refined into 419 subregions representing more localised and homogenous geomorphological units in each bioregion (DCCEEW 2024b). IBRA divides WA into 26 biogeographic regions and 53 subregions based on dominant landscape characteristics of climate, lithology, geology, landform and vegetation.

The survey area is located in the Pilbara bioregion, and the Roebourne subregion. The Roebourne subregion is described as Quaternary alluvial and older colluvial coastal and sub-coastal plains with vegetation described as grass savannah of mixed bunch and hummock grasses, and dwarf shrub steppe of *Acacia* species and ephemeral drainage lines support *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands. Samphire, Sporobolus and mangal occur on marine alluvial flats and river deltas (Kendrick and Stanley 2001).

3.1.3. Rangelands land systems mapping

Rangeland Land Systems mapping prepared by the Department of Primary Industries and Regional Development (DPIRD; formerly Department of Agriculture and Food Western Australia [DAFWA]; DPIRD 2024), provides a comprehensive and standardised description of landscapes, soils and vegetation of the Kimberley region of Western Australia at a regional scale (Payne and Schoknecht 2011). These surveys describe the biophysical characteristics of each region and subsequently divide each region into land systems; land systems being defined as repeating patterns of topography, soils and vegetation.

Two Rangelands land system have been mapped across the survey area, namely the Granitic Land System and the Littoral Land System (**Table 4**; **Figure 4**).

Table 4: Soil landscape systems of the survey area

Land system	Description	State land type	Extent (ha) within the Roebourne subregion	Extent (ha) within survey area	Proportion of extent within the survey area (%)
Granitic Land System	Rugged granitic hills supporting shrubby hard and soft spinifex grasslands.	Hills and ranges; Spinifex grasslands	8,794.7	0.00003	Negligible
Littoral Land System	Bare coastal mudflats (unvegetated), samphire flats, sandy islands, coastal dunes and beaches, supporting samphire low shrublands, sparse acacia shrublands and mangrove forests.	Coastal plains, beaches, dunes, mudflats and cliffs; Various coastal vegetation	212,304.9	1.43	Negligible

3.1.4. Beard's (1979) vegetation mapping

Vegetation type and extent have been mapped at a regional scale by Beard (1979) who categorised vegetation into broad vegetation associations. Based on this mapping at a scale of 1:1,000,000, DPIRD (DAFWA) has compiled a list of vegetation extent and types across WA (Shepherd *et al*. 2002).

One pre-European vegetation association has been mapped across the survey area, namely Abydos Plain – Roebourne 117, described as 'Hummock grasslands, grass steppe; soft spinifex' (**Table 5**; **Figure 5**). This vegetation association has 92.03% of its total pre-European extent remaining within the Roebourne subregion (Government of Western Australia 2019).

Table 5: Beard's (1979) vegetation associations of the survey area

Vegetation association	Description	Pre-European extent (ha) within the Roebourne subregion	Current extent (ha) within the Roebourne subregion	Proportion of pre-European extent remaining (%)	Proportion of current extent within the survey area (%)
Abydos Plain – Roebourne 117	Hummock grasslands, grass steppe; soft spinifex'	50,962.94	46,901.57	92.03	0.003

3.1.5. Hydrology

The survey area is located in the Port Hedland Coast basin in the Coastal catchment area and is located within a saline coastal flat (Department of Water and Environmental Regulation [DWER] 2018; **Figure 6**). It lies adjacent to the north of a minor watercourse (non-perennial corrector; DWER 2018; **Figure 6**). The survey area occurs adjacent to the east of mangrove flats.

The survey area does not lie in any public drinking water source areas (PDWSA), nor significant or important wetlands, nor do any occur within a 5 km radius (DWER 2018). There are no known Groundwater Dependent Ecosystems (GDEs) mapped within the survey area (BoM 2024b).

3.1.6. Previous surveys undertaken in the vicinity of the survey area

An overview of previous surveys undertaken in the vicinity of the survey area is presented in **Table 6** below.

Table 6: Summary of previous surveys undertaken in the vicinity of the survey area

Title	Author (Year)	Distance from survey area	Conservation significant species or communities recorded
Perdaman Urea Project Pre and Post- Wet Season Biological Survey	Animal Plant Mineral Pty Ltd (2019)	Occurs within the current survey area	Nil

3.1.7. Flora and fauna species of conservation significance

An initial three conservation listed flora species and 64 conservation listed fauna species were identified as possibly occurring within the survey area, based on the database searches undertaken in Section 3.1.5 and using criteria outlined in **Appendix B**.

Conservation significant flora species identified from database searches undertaken include three Priority (P) 3 species. The closest occurrence of a conservation listed flora species in proximity to the survey area is *Stackhousia clementii* (P3), located approximately 800 m to the east of the survey area (**Figure 7**). Prior to the field survey, a likelihood of occurrence assessment determined that of the three

flora species identified, *Stackhousia clementii* was considered as having the potential to occur, based on the habitat preferences of this species and proximity of records to the survey area. The remaining two species were considered as unlikely to occur. The flora likelihood of occurrence assessment table is presented in **Appendix C**.

Conservation significant fauna species identified from database searches include 59 Federal and State listed species, four State only listed species, four Priority listed species and one specially protected species. The closest occurrence of a conservation listed fauna species in proximity to the survey area is *Liasis olivaceus barroni* (Pilbara Olive Python), located approximately 700 m to the north of the survey area (**Figure 8**). Prior to the field survey, a likelihood of occurrence assessment determined that of the 64 fauna species identified, 29 were considered as having the potential to occur, based on the habitat preferences of this species and proximity of records to the survey area. The remaining 35 species were considered as either unlikely or not occurring. The fauna likelihood of occurrence assessment table is presented in **Appendix D**.

Aquatic and marine species (e.g., Dugong) were not considered in the likelihood of occurrence assessment as the survey area does not contain core habitat that these species solely rely on for survival.

3.1.8. Areas of conservation significance

Environmentally Sensitive Areas (ESAs) are defined in the Environmental Protection (Environmentally Sensitive Areas) Notice 2005 under section 51B of the State *Environmental Protection Act 1986* (EP Act). ESAs include areas declared as World Heritage, included on the Register of the National Estate[1] defined wetlands, and vegetation containing rare (Threatened) flora and TECs. One ESA occurs within a 5 km radius of the survey area, namely Murujuga National Park, located approximately 1 km to the north and south of the survey area (DBCA 2021).

PECs are biological flora or fauna communities that are recognised to be of significance, but do not meet the criteria for a TEC. There are five categories of PECs, none of which are currently protected under legislation. A DBCA Threatened and Priority Communities database search identified two known occurrences of a PEC within 5 km of the survey area (**Table 7; Figure 9**).

There are no known occurrences of ESAs, TECs or PECs located within the survey area (DBCA 2021; DBCA 2024c). Of the two known occurrences of a PEC within 5 km of the survey area, a pre-survey likelihood of occurrence assessment determined that both are considered as being unlikely to occur, based on anticipated vegetation and landform of the survey area. The ecological community likelihood of occurrence assessment is provided in **Appendix E**.

Table 7: PECs identified within a 5 km radius of the survey area (DBCA 2024c)

Community name	Listing	Closest occurrence to survey area
Burrup Peninsula rock pile communities	P1	300 m to the east
Burrup Peninsula rock pool communities	P1	1 km to the southeast

[1] Note the Register of National Estate was closed in 2007 and is no longer a statutory list. The Register of National Estate has been replaced by the National Heritage List under the EPBC Act.

Figure 4: Land system mapping of the survey area

Figure 5: Beard's (1979) vegetation associations of the survey area

Survey area

Beard's (1979) vegetation association:

Abydos Plain - Roebourne 117

N

0 1 2 4

Kilometres

Datum/Projection:
GDA 1994 MGA Zone 50

23PER6340-JP Date: 2/05/2024

ecological AUSTRALIA
A TETRA TECH COMPANY

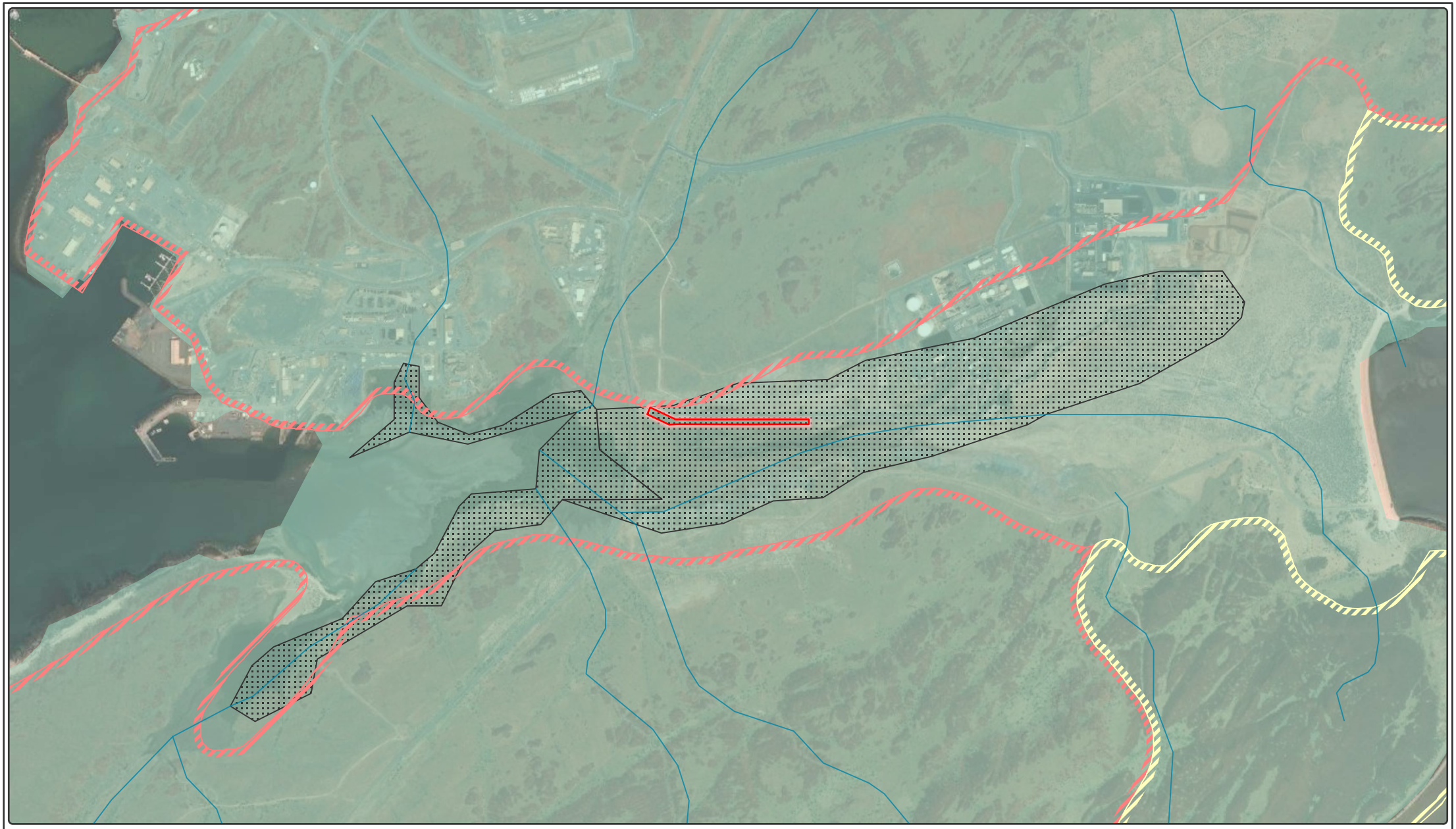


Figure 6: Hydrology of the survey area

Survey area

Waterbodies (Statewide)

Drainage (Statewide):

Minor watercourse

Catchments:

Coastal

Groundwater Dependent Ecosystems (GDE):

Moderate potential GDE

Low potential GDE

0 200 400 800

Metres

Datum/Projection:
GDA 1994 MGA Zone 50
23PER6340-JP Date: 2/05/2024

N

eco logical AUSTRALIA
A TETRA TECH COMPANY

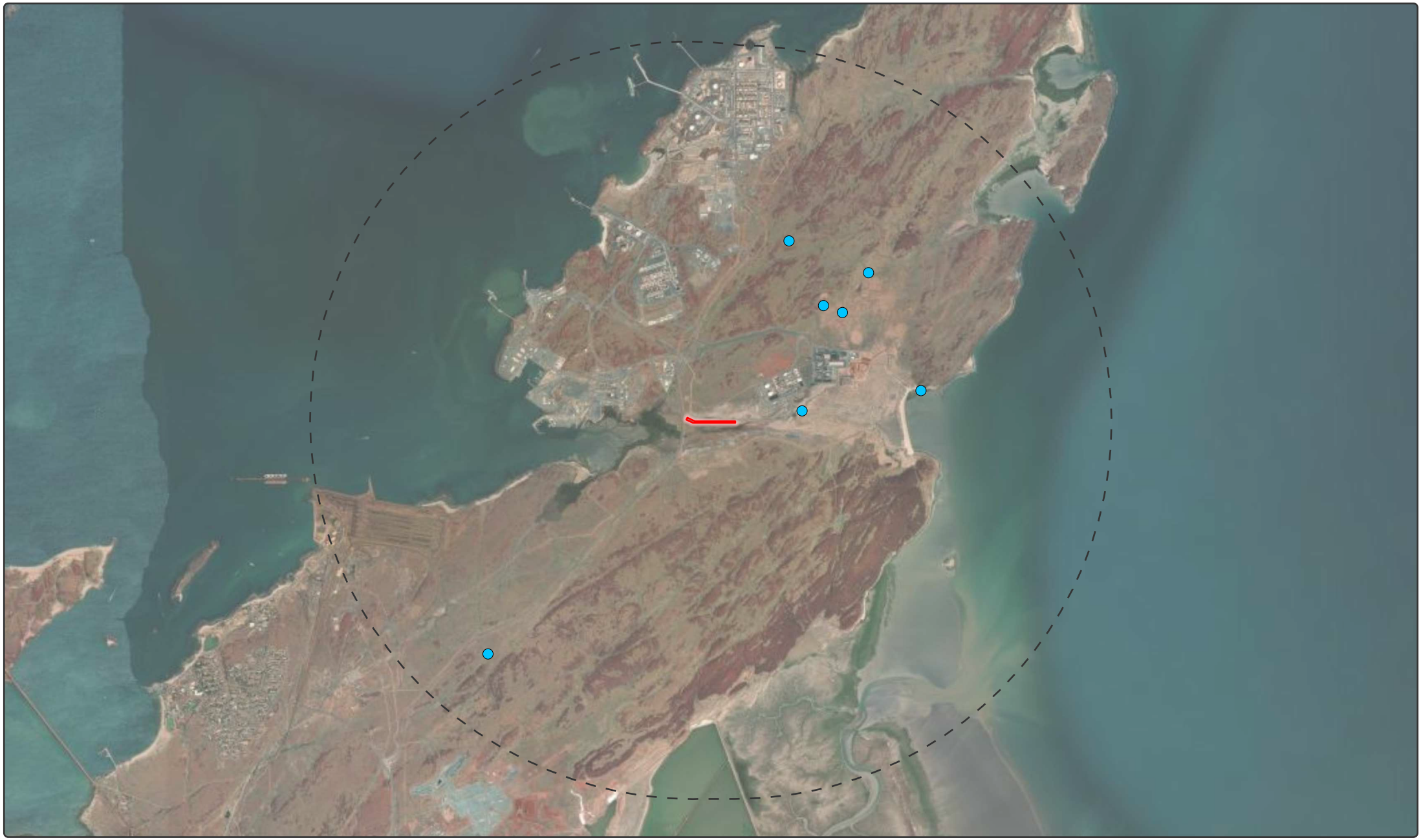


Figure 7: Conservation significant flora previously recorded within and in the vicinity of the survey area

Survey area

Survey area 5km buffer

Conservation significant flora species:

Priority 3

N

0 1 2

Kilometres

Datum/Projection:
GDA 1994 MGA Zone 50

23PER6340-JP Date: 2/05/2024

ecological AUSTRALIA
A TETRA TECH COMPANY

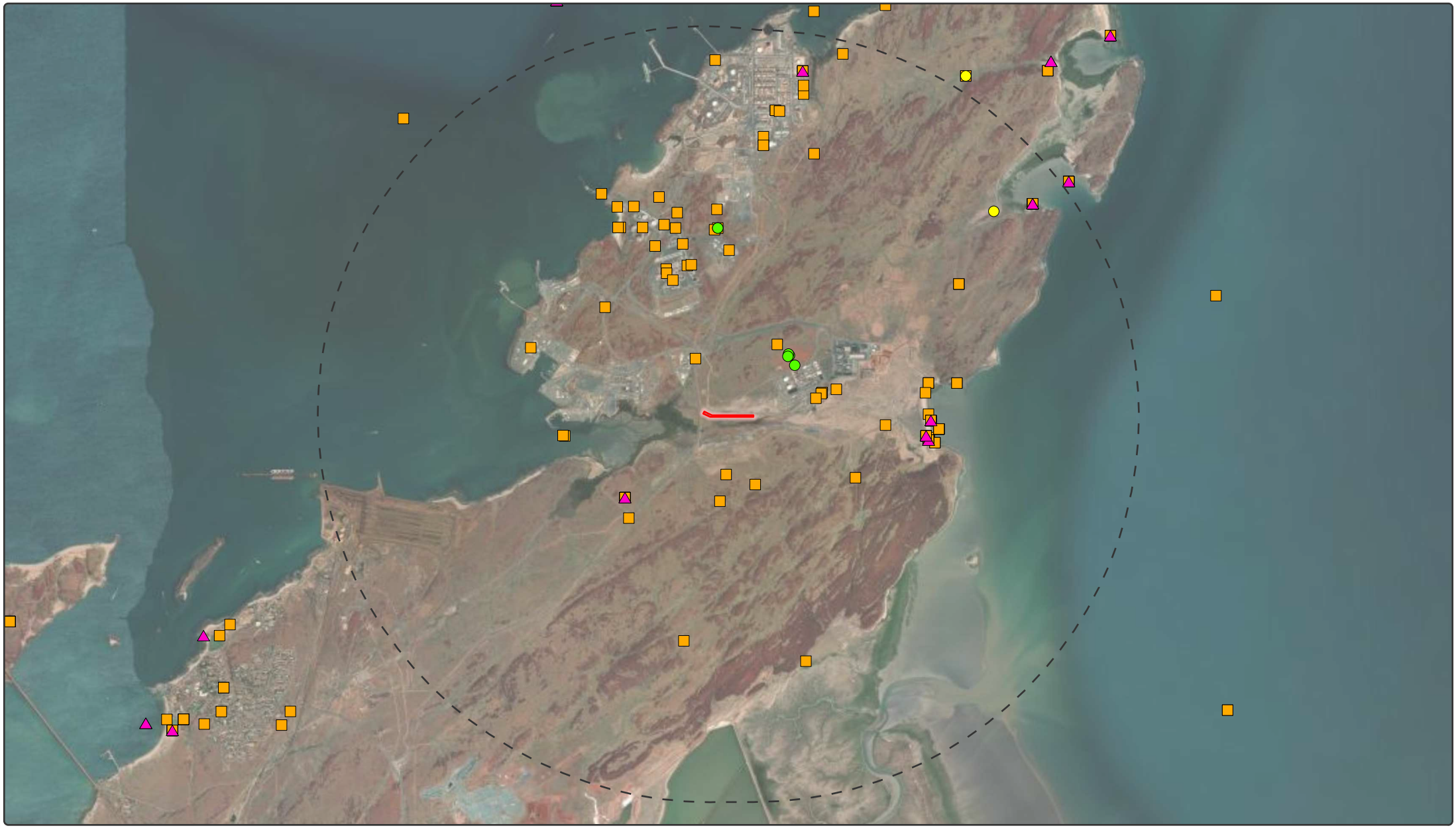


Figure 8: Conservation significant flora previously recorded within and in the vicinity of the survey area

Survey area

Survey area 5km buffer

Conservation significant fauna species:

- Threatened
- Threatened & Priority 4
- Priority 1
- Priority 3
- Priority 4

0 1 2

Kilometres

Datum/Projection:
GDA 1994 MGA Zone 50
23PER6340-JP Date: 2/05/2024

N

ecological AUSTRALIA
A TETRA TECH COMPANY

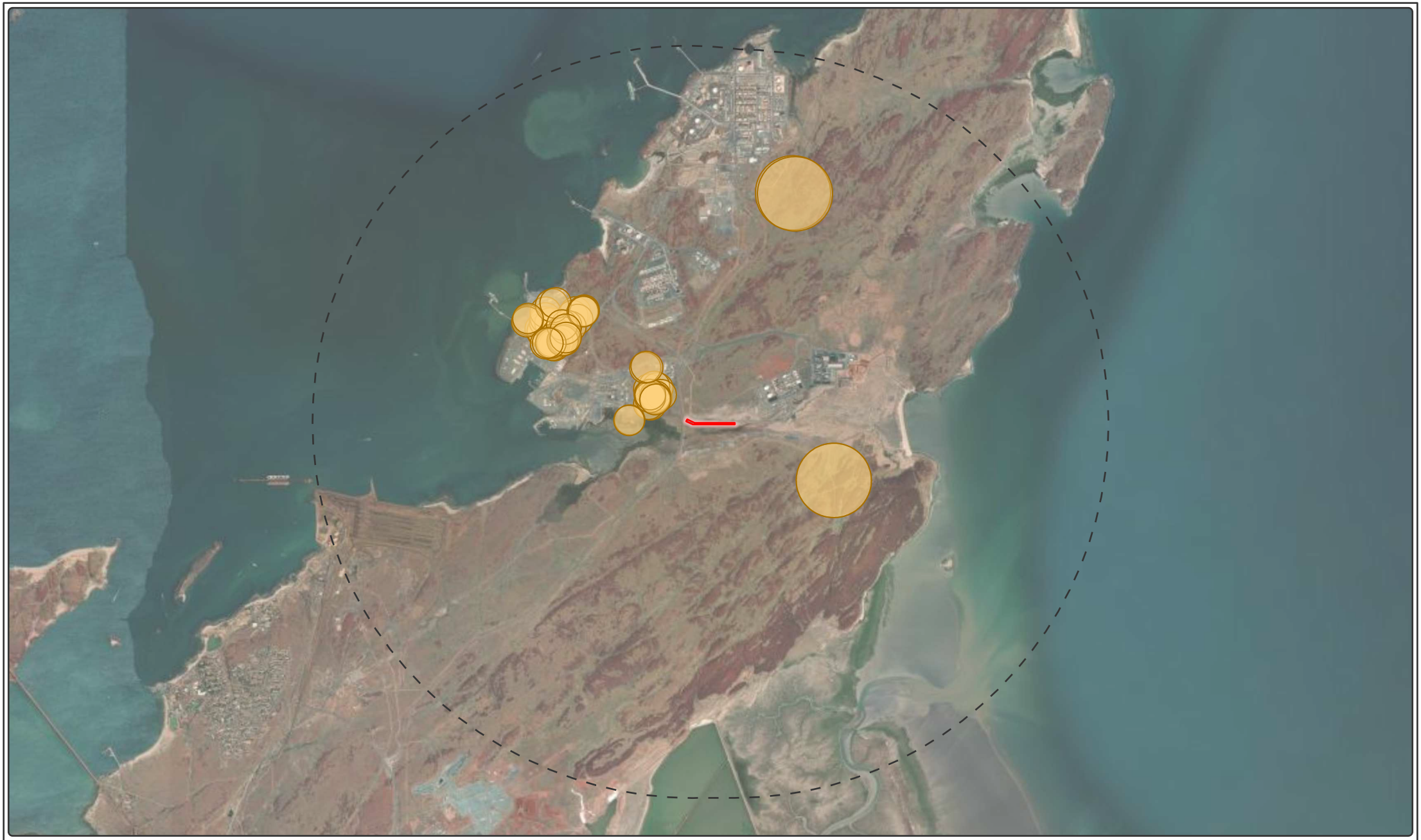


Figure 9: Conservation significant communities previously recorded within and in the vicinity of the survey area

Survey area

Survey area 5km buffer

Conservation significant ecological communities:

Priority 1

N

0 1 2

Kilometres

Datum/Projection:
GDA 1994 MGA Zone 50

23PER6340-JP Date: 2/05/2024

ecological AUSTRALIA
A TETRA TECH COMPANY

3.2. Flora and vegetation survey

3.2.1. Flora overview

A total of 10 flora species (nine native and one introduced) from eight genera and five families were recorded within the survey area. The majority of taxa recorded were representative of the Chenopodiaceae (four taxa) and Poaceae (three taxa) families. Tecticornia was the best represented genera throughout the survey area with three taxa recorded. Floristic relevé data is presented in **Appendix F** and a flora species by site matrix is presented in **Appendix A**.

3.2.2. Conservation significant flora

No Threatened (Declared Rare) flora species listed under the EPBC Act or BC Act or Priority species listed by DBCA were recorded from within the survey area. Of the three conservation listed flora species identified from the desktop assessment as possibly occurring, a post-survey likelihood of occurrence assessment determined that all are considered as being unlikely to occur, based on a lack of suitable habitat present for these species and adequacy of survey effort. The flora likelihood of occurrence assessment is presented in **Appendix C**.

3.2.3. Introduced flora

One introduced (weed) flora species was recorded within the survey area, namely **Cenchrus ciliaris* (Buffel grass). **C. ciliaris* is listed under the BAM Act as Permitted (s-11), with no specific conditions for control required. This species was recorded at a 0.1% cover within vegetated areas of the survey area.

3.2.4. Vegetation types

One broad vegetation type (VT01) was identified within the survey area, occurring across 0.21 ha in the western portion of the survey area (Table 8; **Figure 10**). This vegetation type consisted of low sparse chenopod shrubland primarily comprised of *Tecticornia halocnemoides, Tecticornia indica* subsp. *leiostachya*, and *Trianthema turgidifolium*. The remaining 1.22 ha of the survey area is described as 'Mudflat' and had no vegetation present (**Figure 10**).

Table 8: Vegetation types recorded within the survey area

Vegetation type	Description	Associated species	Area ha (% of survey area)	Photo
Vegetation type 1 (VT01)	*Tecticornia halocnemoides, Tecticornia indica* subsp. *leiostachya, Trianthema turgidifolium* low sparse chenopod shrubland	*Eragrostis tenellula, Tecticornia pergranulata, Neobassia astrocarpa, Eriachne* sp., **Cenchrus ciliaris, Cyperus bulbosus, Arivela viscosa*	0.21 ha (14.5)	
		Mudflat	1.22 (85.5)	
		Total	**1.43 (100)**	

3.2.5. Conservation significant ecological communities

No vegetation types delineated within the current survey area were inferred to represent any known or potential conservation significant communities listed under the EPBC Act, the BC Act or by DBCA.

Following the field survey, the two known occurrences of a PEC within 5 km of the survey area are considered as not occurring within the survey area, based on a lack of suitable species and habitats, and due to the restricted nature of PECs identified (restricted to rockpiles). The ecological community likelihood of occurrence assessment is provided in **Appendix E**.

3.2.6. Vegetation condition

All vegetation within the survey area was classed as being in Poor condition, based on the Trudgen (1988) vegetation scale outlined in the EPA: *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment* (2016; 0.21 ha; **Figure 11**). Areas of Mudflat (1.22 ha) were not assigned a vegetation condition. Disturbances recorded within the survey area included previous clearing, and impacts from adjacent cleared areas (weed invasion, dust).

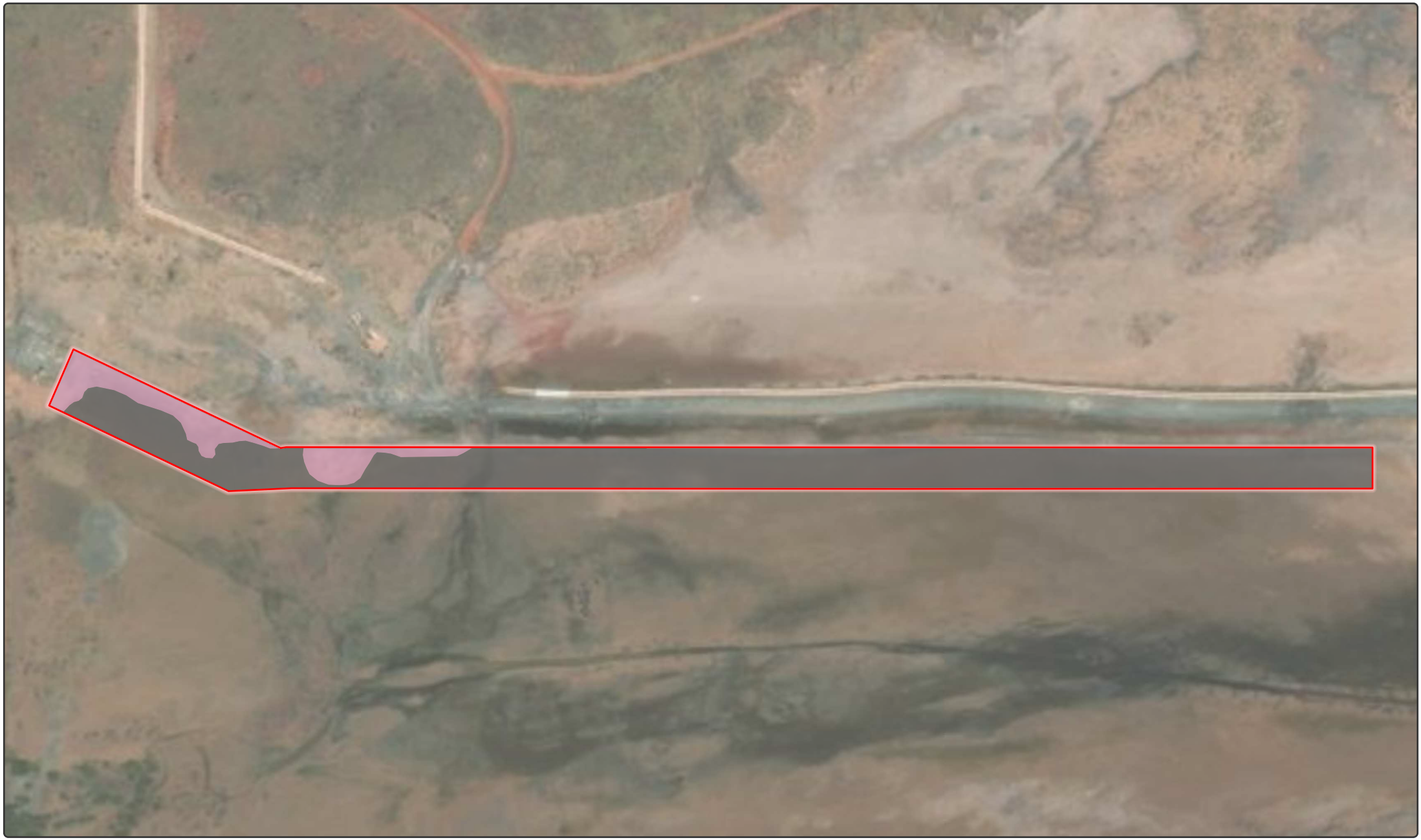


Figure 10: Vegetation types recorded within the survey area

Survey area

Mudflat

Vegetation types:

Vegetation type 1

N

0 50 100

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

23PER6340-JP Date: 2/05/2024

ecological AUSTRALIA
A TETRA TECH COMPANY

Figure 11: Vegetation condition recorded within the survey area

Survey area

Mudflat

Vegetation conditon:

Poor

N

0 50 100

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

23PER6340-JP Date: 2/05/2024

ecological AUSTRALIA
A TETRA TECH COMPANY

3.3. Fauna survey

3.3.1. Fauna overview

No fauna species were recorded during the field survey.

3.3.2. Conservation significant fauna

No direct (observations) or indirect (scats, tracks, diggings) evidence of conservation significant fauna species listed under the EPBC Act, BC Act or by DBCA were recorded within the survey area.

Of the 64 conservation significant fauna species identified from the desktop assessment , a post-survey likelihood of occurrence assessment determined that eight are considered as having the potential to occur, based on availability of suitable habitat and proximity of previous records:

- *Calidris ferruginea* (Curlew Sandpiper; listed as Migratory [MI] and as Critically Endangered [CR] under the EPBC Act and BC Act);
- *Gelochelidon nilotica* (Gull-billed tern; listed as MI under the EPBC Act and BC Act);
- *Hydroprogne caspia* (Caspian Tern; listed as MI under the EPBC Act and BC Act);
- *Limosa lapponica* (Bar-tailed godwit; listed as MI under the EPBC Act and BC Act);
- *Tringa nebularia* (Common greenshank; listed as MI under the EPBC Act and BC Act and as Endangered [EN] under the EPBC Act);
- *Xenus cinereus* (Terek sandpiper; listed as MI under the EPBC Act and BC Act and as Vulnerable [VU] under the EPBC Act);
- *Pluvialis fulva* (Pacific Golden Plover; listed as MI under the EPBC Act and BC Act); and
- *Tringa stagnatilis* (Marsh Sandpiper; listed as MI under the EPBC Act and BC Act).

Each of these species has generally broad habitat requirements associated with coastal areas, inlets and saline areas (mudflats). Given mudflats present within the survey are likely to be seasonally inundated, these species cannot be ruled out as potentially occurring when conditions are appropriate. The remaining 56 fauna species were considered as unlikely to occur or do not occur within the survey area, based on habitat requirements and lack of suitable habitat present, distance and age of previous records and adequacy of survey effort. The fauna likelihood of occurrence assessment is presented in **Appendix D**.

3.3.3. Fauna habitat

Two fauna habitats were identified within the survey area, namely ‘Mudflat’ (0.21 ha; 85.5% of the survey area) and ‘Low chenopod shrubland’ (0.21 ha; 14.5% of the survey area).

Table 9: Fauna habitats recorded within the survey area

Fauna habitat	Description	Conservation listed fauna species that may utilise habitat	Area ha (% of survey area)	Photo
Mudflat	Species poor mudflat	*Calidris ferruginea* (Curlew Sandpiper), *Gelochelidon nilotica* (Gull-billed tern), *Hydroprogne caspia* (Caspian Tern), *Limosa lapponica* (Bar-tailed godwit), *Tringa nebularia* (Common greenshank), *Xenus cinereus* (Terek sandpiper)	1.22 ha (85.5)	
Low chenopod shrubland	Low sparse chenopods	N/A	0.21 (14.5)	
		Total	**1.43 (100)**	

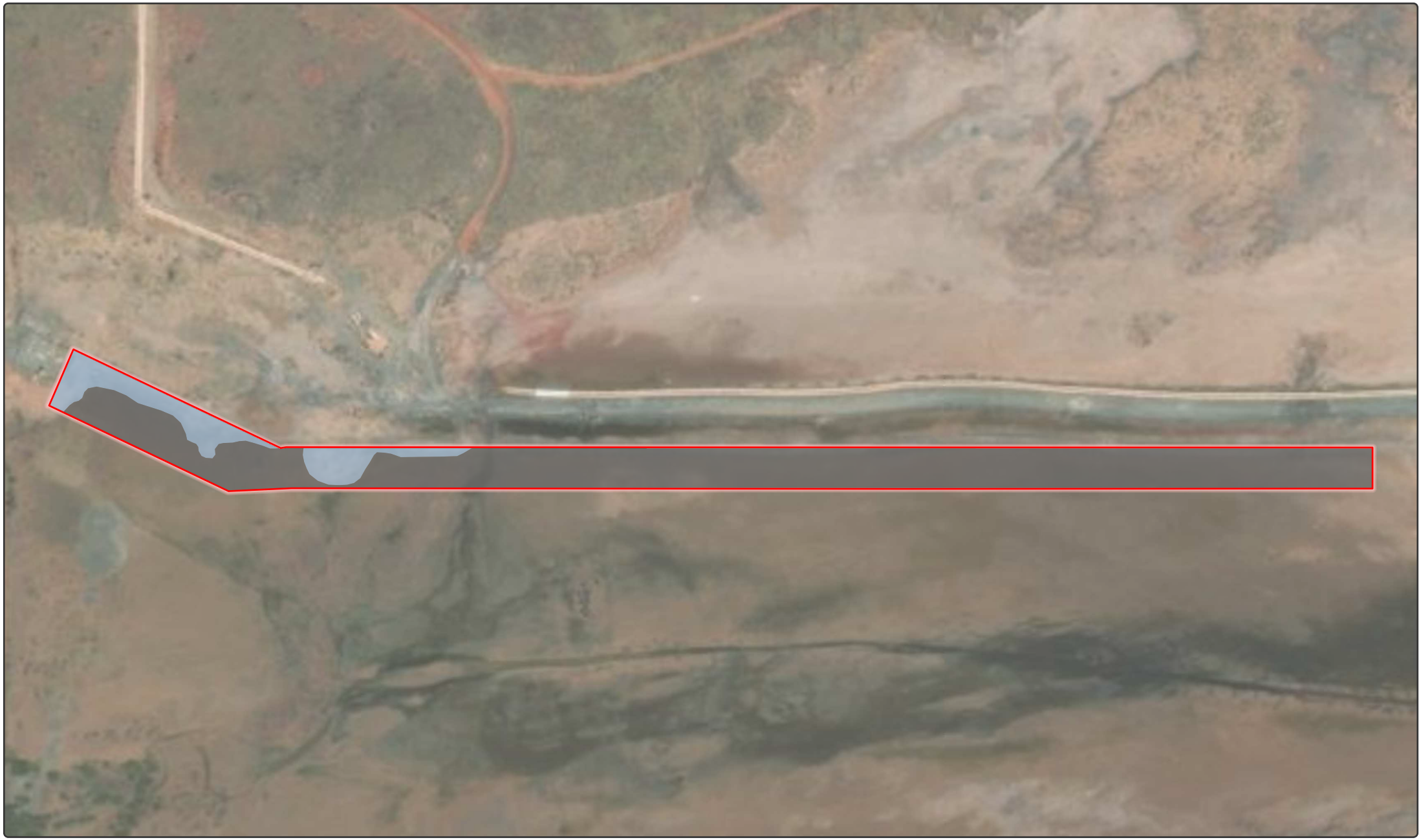


Figure 12: Fauna habitats recorded within the survey area

Survey area

Fauna habitat type:

Low chenopod shrubland

Mudflat

N

0 50 100

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

23PER6340-JP Date: 21/05/2024

ecological AUSTRALIA
A TETRA TECH COMPANY

4. Discussion

4.1. Flora and vegetation

A total of 10 flora species (nine native and one introduced) from eight genera and five families were recorded within the survey area. This low number is expected given the small size and degraded nature of the survey area. Of the three conservation listed flora species identified from the desktop assessment as possibly occurring, a post-survey likelihood of occurrence assessment determined that all are considered as being unlikely to occur, based on a lack of suitable habitat present for these species and adequacy of survey effort.

Vegetation within the survey area is described as low sparse chenopod shrubland, occurring only in the western extent of the survey area, with the remainder of the survey area consisting of bare mudflats. The survey area is considered as representing aspects of the Littoral land system on which it occurs, which is described as 'Bare coastal mudflats (unvegetated), samphire flats, sandy islands, coastal dunes and beaches'.

No vegetation types delineated within the current survey area were inferred to represent any known or potential conservation significant communities listed under the EPBC Act, the BC Act or by DBCA.

Vegetation within the survey area is classed as being in Poor condition, with disturbances present including previous clearing, and impacts from adjacent cleared areas (weed invasion, dust). One weed species was recorded within the survey area, namely **Cenchrus ciliaris* (Buffel Grass), which was recorded within vegetated areas at a 0.1% cover.

**Cenchrus ciliaris* (Buffel Grass) is an invasive, tufted or sometimes stoloniferous perennial grass, up to 1.5 m high (DBCA and WAH 2024). This species is regarded as an environmental weed in Queensland, the Northern Territory and northern Western Australia, being regarded as one of the top ten environmental weeds in the Kimberley, Pilbara and Gascoyne regions (Identic 2016). This species is found on sandy soils, stony red loam and black cracking clay and is a weed of rangelands, grasslands, open woodlands, floodplains, roadsides and other disturbed areas in semi-arid, tropical, sub-tropical and warmer temperate regions (DBCA and WAH 2024; Identic 2016).

Figure 13: *_Cenchrus ciliaris_ (Image left: DBCA and WAH 2023, right: ELA 2024)

4.2. Fauna

No fauna species were recorded within the survey area, likely due to the lack of vegetated areas present (lack of refuge), and due to the high level of disturbance in surrounding areas (noise from machinery in the area). No direct (observations) or indirect (scats, tracks, diggings) evidence of conservation significant fauna, including Threatened (Declared Rare) or Priority fauna species listed under the EPBC Act, WC Act or by DBCA were recorded.

Fauna habitats within the survey area are not considered as locally or regionally restricted, with samphire shrublands and saltplains recorded in nearby areas by Animal Plant Mineral Pty Ltd (2018). Mudflats within the survey area may provide foraging habitat to a range of migratory waders when inundated seasonally (e.g., during king tides), including the Critically Endangered Curlew Sandpiper (CR) or Migratory listed Gull-billed tern, Caspian Tern, Bar-tailed godwit, Common greenshank, Terek sandpiper, Pacific Golden Plover and Marsh Sandpiper. As such, these species are considered as having the potential to occur within the survey area.

5. References

Animal Plant Mineral Pty Ltd. 2018. *Perdaman Urea Project Pre-Wet Season Biological Survey*. Prepared on behalf of Cardno, December 2018.

Animal Plant Mineral Pty Ltd 2019. Perdaman Urea Proposal Pre and Post-wet Season Biological Survey. Prepared on behalf of Cardno, June 2019.

Beard, J. S. 1979. *Pilbara, 1:1 000,000 vegetation series: Explanatory notes to sheet 1, the vegetation of the Pilbara area*. Nedlands, W.A.: University of Western Australia

Bureau of Meteorology (BoM). 2024a. *Climate Data Online*: Available: http://www.bom.gov.au/climate/data/

Bureau of Meteorology (BoM). 2024b. *Groundwater Dependent Ecosystems Atlas.* Available from: http://www.bom.gov.au/water/groundwater/gde/.

Department of Biodiversity, Conservation and Attractions (DBCA). 2024a. *Threatened and Priority Flora database search.* Reference number 57-0224FL. Department of Biodiversity, Conservation and Attractions, Perth.

Department of Biodiversity, Conservation and Attractions (DBCA). 2024b. *Threatened and Priority Fauna database search*. Reference number 45-0224FA. Department of Biodiversity, Conservation and Attractions, Perth.

Department of Biodiversity, Conservation and Attractions (DBCA). 2024c. *Threatened and Priority Communities database search.* Reference number 50-0224EC. Department of Biodiversity, Conservation and Attractions, Perth.

Department of Biodiversity, Conservation and Attractions (DBCA). 2021. DBCA - Legislated Lands and Waters (DBCA-011) [online]. Available: https://catalogue.data.wa.gov.au/dataset/dbca-legislated-lands-and-waters

Department of Biodiversity, Conservation and Attractions and the Western Australian Herbarium (DBCA and WAH). 2024. *FloraBase—the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions. Available from: https://florabase.dpaw.wa.gov.au/. Accessed November 2020.

Department of Climate Change, Energy, the Environment and Water (DCCEEW). 2024a. EPBC Protected Matters Search Tool. Available from: http://www.environment.gov.au/epbc/pmst/.

Department of Climate Change, Energy, the Environment and Water (DCCEEW). 2024b. *Australia's bioregions (IBRA).* Available from: https://www.environment.gov.au/land/nrs/science/ibra.

Department of Primary Industries and Regional Development (DPIRD). 2024. *Rangelands Land-System Mapping for the Pastoral Area of Western Australia*. Accessed February 2024.

Department of Water and Environmental Regulation (DWER). 2021. *Clearing Regulations – Environmentally Sensitive Areas (DWER-046).* Available from: https://catalogue.data.wa.gov.au/dataset/clearing-regulations-environmentally-sensitive-areas-dwer-046.

Department of Water and Environmental Regulation (DWER). 2018. *Hydrographic Catchments – Subcatchments (DWER-030).* Available from: https://catalogue.data.wa.gov.au/dataset/hydrographic-catchments-subcatchments.

Environmental Protection Authority (EPA). 2020. *Technical Guidance: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment*. Perth, Western Australia.

Environmental Protection Authority (EPA). 2016. *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment*. Perth, Western Australia.

Government of Western Australia. 2019. *2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report)*. Current as of March 2019. WA Department of Biodiversity, Conservation and Attractions.

Identic Pty Ltd (Identic). 2016. Weeds of Australia. Accessed from https://keyserver.lucidcentral.org/weeds/data/media/Html/index.htm

Kendrick, P and Stanley, F. 2001. *Pilbara 4 (PIL4 - Roebourne Subregion), (M. Cowan, chairman), A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002*. Department of Conservation and Land Management, Perth.

Payne, A. and Schoknecht, N. 2011. *Land Systems of the Kimberley Region, Western Australia.* Technical Bulletin No. 98, Department of Agriculture and Food.

Shepherd, D.P., Beeston, G.R., and Hopkins, A.J.M. 2002. *Native Vegetation in Western Australia – Extent, Type and Status*. Resource Management Technical Report 249, Department of Agriculture, Western Australia.

Thackway, R. and Cresswell, I. D. (Eds). 1995. *An Interim Biogeographic Regionalisation for Australia: a framework for establishing the national system of reserves, Version 4.0*. Australian Nature Conservation Agency, Canberra, ACT.

Trudgen, M. E. 1988. *A Report on the Flora and Vegetation of the Port Kennedy Area.* Unpublished report prepared for Bowman Bishaw and Associates, West Perth.

Western Australian Museum (WAM). 2024. *Checklist of the Terrestrial Vertebrate Fauna of Western Australia* [online]. Available from: http://museum.wa.gov.au/research/departments/terrestrial-zoology/checklist-terrestrial-vertebrate-fauna-western-australia. Accessed July 2018.

Appendix A Framework for conservation significant flora and fauna ranking

CATEGORIES OF THREATENED SPECIES UNDER THE ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999 (EPBC ACT)

Threatened fauna and flora may be listed in any one of the following categories as defined in Section 179 of the EPBC Act. Species listed as 'conservation dependent' and 'extinct' are not Matters of National Environmental Significance and therefore do not trigger the EPBC Act.

Category	Definition
Extinct (EX)	There is no reasonable doubt that the last member of the species has died.
Extinct in the Wild (EW)	Taxa known to survive only in captivity or as a naturalised population well outside its past range; or taxa has not been recorded in its known and/or expected habitat at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered (CE)	Taxa considered to be facing an extremely high risk of extinction in the wild.
Endangered (EN)	Taxa considered to be facing a very high risk of extinction in the wild.
Vulnerable (VU)	Taxa considered to be facing a high risk of extinction in the wild.
Near Threatened (NT)	Taxa has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
Least Concern (LC)	Taxa has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.
Data Deficient (DD)	There is inadequate information to make a direct, or indirect, assessment of taxa's risk extinction based on its distribution and/or population status.
Not Evaluated (NE)	Taxa has not yet been evaluated against the criteria.
Migratory (IA)	Not an IUCN category. Species are defined as migratory if they are listed in an international agreement approved by the Commonwealth Environment Minister, including: • the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animal) for which Australia is a range state; • the agreement between the Government of Australian and the Government of the People's Republic of China for the Protection of Migratory Birds and their environment (CAMBA); • the agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (JAMBA); or • the agreement between Australia and the Republic of Korea to develop a bilateral migratory bird agreement similar to the JAMBA and CAMBA in respect to migratory bird conservation and provides a basis for collaboration on the protection of migratory shorebirds and their habitat (ROKAMBA).

CONSERVATION CODES FOR WESTERN AUSTRALIA FLORA AND FAUNA

The Wildlife Conservation (Specially Protected Fauna) Notice 2018 and the Wildlife Conservation (Rare Flora) Notice 2018 have been transitioned under regulations 170, 171 and 172 of the Biodiversity Conservation Regulations 2018 to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016*.

Specially protected fauna or flora are species which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

Threatened species (T)
Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the Wildlife Conservation (Rare Flora) Notice 2018 for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

Category	Code	Description
Critically Endangered species	CR	Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.
Endangered species	EN	Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.
Vulnerable species	VU	Threatened species considered to be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.

Extinct species

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild, as follows:

Category	Code	Description
Extinct species	EX	Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.
Extinct in the wild species	EW	Species that "is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

Categories are detailed below.

Category	Code	Description
Migratory species	MI	Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act). Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species. Published as migratory birds protected under an international agreement under schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
Species of special conservation interest (conservation dependent fauna)	CD	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act). Published as conservation dependent fauna under schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
Other specially protected species	OS	Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act). Published as other specially protected fauna under schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.

Priority species (P)

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

Category	Code	Definition
Priority 1	P1	*Poorly-known species* Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
Priority 2	P2	*Poorly-known species* Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
Priority 3	P3	*Poorly-known species* Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
Priority 4	P4	*Rare, Near Threatened and other species in need of monitoring* (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Appendix B Likelihood of occurrence assessment criteria

Likelihood rating	Criteria
Recorded	The species has previously been recorded within study area from DBCA database search results and/or from previous surveys of the study area, and/or the species has been confirmed through a current vouchered specimen at WA Herbarium.
Likely	The species has not previously been recorded from within the study area. However, (to qualify requires one or more criteria to be met): • the species has been recorded in close proximity to the study area, and occurs in similar habitat to that which occurs within the study area • core habitat and suitable landforms for the species occurs within the study area either year-round or seasonally. In relation to fauna species, this could be that a host plant is seasonally present on site, or habitat features such as caves are present that may be used during particular times during its life cycle e.g. for breeding. In relation to both flora and fauna species, it may be there are seasonal wetlands present • there is a medium to high probability that a species uses the study area.
Potential	The species has not previously been recorded from within the study area. However, (one or more criteria requires to be met): • targeted surveys may locate the species based on records occurring in proximity to the study area and suitable habitat occurring in the study area • the study area has been assessed as having potentially suitable habitat through habitat modelling • the species is known to be cryptic and may not have been detected despite extensive surveys • the species is highly mobile and has an extensive foraging range so may not have been detected during previous surveys The species has been recorded in the study area by a previous consultant survey or there is historic evidence of species occurrence within the study area. However, (one or more criteria requires to be met): • doubt remains over taxonomic identification, or the majority of habitat does not appear suitable (although presence cannot be ruled out due to factors such as species ecology or distribution) • coordinates are doubtful.
Unlikely	The species has been recorded locally through DBCA database searches. However, it has not been recorded within the study area and • it is unlikely to occur due to the site lacking critical habitat, having at best marginally suitable habitat, and/or being severely degraded • it is unlikely to occur due to few historic record/s and no other current collections in the local area. The species has been recorded within the bioregion based on literature review but has not been recorded locally or within the study area through DBCA database searches. The species has not been recorded in the study area despite adequate survey efforts, such as a standardised methodology or targeted searching within potentially suitable habitat.
Does not occur (one or more criteria requires to be met).	The species is not known to occur within the IBRA bioregion based on current literature and distribution. The conspicuous species has not been recorded in the study area despite adequate survey efforts at an appropriate time of year to detect the species within potentially suitable habitat.

Likelihood rating	Criteria
	The study area lacks important habitat for a species that has highly selective habitat requirements. The species has been historically recorded within study area or locally; however, it is considered locally extinct due to significant habitat changes such as land clearing and/or introduced predators.

Appendix C Flora likelihood of occurrence assessment

Species	Conservation status		Habitat	Source	Likelihood of occurrence	
	EPBC Act	BC Act / DBCA			Pre-survey	Post-survey
Stackhousia clementii	-	P3	Skeletal soils. Sandstone hills.	DBCA 2024a	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely**. Suitable habitat for this species does not occur within the survey area.
Terminalia supranitifolia	-	P3	Among basalt rocks.	DBCA 2024a	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Unlikely**. Suitable habitat for this species does not occur within the survey area.
Vigna triodiophila	-	P3	Basalt rockpile habitats.	DBCA 2024a	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Unlikely**. Suitable habitat for this species does not occur within the survey area.

Appendix D Fauna likelihood of occurrence assessment

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
Actitis hypoleucos	Common Sandpiper	Bird	Migratory	Migratory	PMST; DBCA	Wide range of coastal wetlands and some inland wetlands. Is mostly found around muddy margins or rocky shores and rarely on mudflats.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely.** Habitat within the Survey Area is not suitable for this species.
Anous stolidus	Common Noddy	Bird	Migratory	Migratory	PMST	Islands, shoals or cays of coral or sand during the breeding season. The species remains in the pelagic zone (open ocean) during the non-breeding season. Foraging occurs offshore.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Apus pacificus	Fork-tailed Swift	Bird	Migratory	Migratory	PMST	Almost exclusively aerial, mostly occurring over inland plains.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species.
Arenaria interpres	Ruddy Turnstone	Bird	Vulnerable Migratory	Migratory	PMST; DBCA	Coastal regions with exposed rock coastlines or coral reefs. It also lives near platforms and shelves, often with shallow	**Potential**. Suitable habitat for this species	**Unlikely.** Habitat within the Survey area is

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
						tidal pools and rocky, shingle or gravel beaches.	may occur within the survey area.	not suitable for this species.
Calidris acuminata	Sharp-tailed Sandpiper	Bird	Vulnerable Migratory	Migratory	PMST	Saline inland wetlands, damp grasslands, and tidal flats. Foraging occurs in wetlands or intertidal mudflats, and the vegetation of saltmarsh, grass or sedges.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species.
Calidris alba	Sanderling	Bird	Migratory	Migratory	PMST	Coastal areas and tidal flats. May inhabit mangroves, ocean beaches and rocky shorelines. Foraging occurs in breaking waves on beaches, or on the edges of mudflats and shallow pools.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species. Records within 20 km are confined to Dampier Salt Fields.
Calidris canutus	Red Knot	Bird	Vulnerable Migratory	Endangered	PMST	Intertidal mudflats, sandflats and sandy beaches. Occasionally inhabits terrestrial saline wetlands. Foraging habitat includes intertidal mudflats or sandflats when exposed at low tide.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species.
Calidris ferruginea	Curlew Sandpiper	Bird	Critically Endangered	Critically Endangered	PMST; DBCA	Curlew sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and	**Potential**. Suitable habitat	**Potential.** Potentially

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
			Migratory			lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand.	for this species may occur within the survey area.	suitable habitat may occur within the Survey area (seasonally). Records occur within 1km of the Survey area.
Calidris melanotos	Pectoral Sandpiper	Bird	Migratory	Migratory	PMST	Shallow, fresh to saline wetlands. Also inhabits grassy edges of shores and tidal marshes and muddy shores.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species.
Calidris ruficollis	Red-necked Stint	Bird	Migratory	Migratory	PMST; DBCA	Coastal areas, including sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species.
Calidris subminuta	Long-toed Stint	Bird	Migratory	Migratory	PMST	Shallow freshwater or brackish wetlands, including lakes, swamps, rivers, streams, lagoons and sewage ponds.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species.

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
Calidris tenuirostris	Great Knot	Bird	Vulnerable Migratory	Critically Endangered	PMST; DBCA	In Australasia, the species typically prefers sheltered coastal habitats, with large intertidal mudflats or sandflats. This includes inlets, bays, harbours, estuaries and lagoons.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species.
Calonectris leucomelas	Streaked Shearwater	Bird	Migratory	Migratory	PMST	Open ocean.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Charadrius leschenaultii	Greater Sand Plover	Bird	Vulnerable Migratory	Vulnerable	PMST; DBCA	In the non-breeding grounds in Australasia, the species is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species.
Charadrius mongolus	Lesser Sand Plover	Bird	Endangered Migratory	Endangered	PMST; DBCA	The habitat of the Lesser Sand Plover is usually coastal, on the beaches of sheltered bays, in harbours and estuaries with large intertidal sand flats or mudflats. They are occasionally sighted on sandy ocean beaches; coral reefs, wave-cut rock platforms and rocky outcrops and	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species.

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
						sometimes in short saltmarsh or mangroves.		
Charadrius veredus	Oriental Plover	Bird	Migratory	Migratory	PMST	Inland open plains with sparse cover of short grass. Preferred foraging habitat includes short grass or hard, bare ground, although also occurs on mudflats or seaweed covered beaches.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species.
Erythrotriorchis radiatus	Red Goshawk	Bird	Endangered	Vulnerable	PMST	Coastal and sub-coastal areas in wooded and forested lands.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Falco hypoleucos	Grey Falcon	Bird	Vulnerable	Vulnerable	PMST	Timbered lowland plains, particularly Acacia shrublands that cross tree-lined watercourses.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Fregata ariel	Lesser Frigatebird	Bird	Migratory	Migratory	PMST	Open ocean.	**Unlikely**. Suitable habitat for this species is unlikely to occur	**Does not occur.** No available habitat for this species is present.

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
							within the survey area.	
Gelochelidon nilotica	Gull-billed Tern	Bird	Migratory	Migratory	PMST	Saltpans, coastal lagoons, mudflats, marshes and wet fields, overwintering on estuaries, saltpans, lagoons and saltmarshes, or in more inland sites such as large rivers, lakes, rice-fields, sewage ponds, reservoirs, saltpans and irrigation canals.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Potential.** Potentially suitable habitat may occur within the Survey area (seasonally). Records occur within 1km of the Survey area.
Glareola maldivarum	Oriental Pratincole	Bird	Migratory	Migratory	PMST	Grasslands and muddy floodplains. Also known to inhabit terrestrial wetlands and along the coast, including beaches, mudflats and islands.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species.
Hirundo rustica	Barn Swallow	Bird	Migratory	Migratory	PMST	Freshwater wetlands, *Melaleuca* woodland, tussock grasslands, coastal lowlands and near water, town and cities.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species.
Hydroprogne caspia	Caspian Tern	Bird	Migratory	Migratory	PMST	The Caspian Tern is mostly found in sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries and river	**Potential**. Suitable habitat for this species	**Potential** Potentially suitable habitat

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
						deltas) and those with sandy or muddy margins are preferred. They also occur on near-coastal or inland terrestrial wetlands that are either fresh or saline, especially lakes (including ephemeral lakes), waterholes, reservoirs, rivers and creeks.	may occur within the survey area.	may occur within the Survey area (seasonally). Records occur within 1km of the Survey area.
Limicola falcinellus	Broad-billed Sandpiper	Bird	Migratory	Migratory	PMST	Sheltered parts of the coast, favouring estuarine mudflats but also occurring on saltmarshes, shallow freshwater lagoons, saltworks and sewage farms.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species. Nearby records of this species are confined to large, intertidal mudflats.
Limosa lapponica	Bar-tailed Godwit	Bird	Migratory	Migratory	PMST; DBCA	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Potential.** Potentially suitable habitat may occur within the Survey area (seasonally). Records occur within 1km of the Survey area.

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
Limosa limosa	Black-tailed Godwit	Bird	Endangered Migratory	Migratory	PMST	Sheltered bays, lagoons, estuaries with large intertidal sandflats or mudflats. Also found in near-coastal wetlands, including river pools, swamps, saltmarsh, floodplains and lagoons.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely**. Habitat is marginal and degraded. One record 16km southwest of the Survey area in coastal (beach/large intertidal mudflat) habitat.
Macronectes giganteus	Southern Giant-Petrel	Bird	Endangered Migratory	Migratory	PMST	Open ocean.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Motacilla cinerea	Grey Wagtail	Bird	Migratory	Migratory	PMST	Rocky substrates along water courses as well as lakes and marshes.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Motacilla flava	Yellow Wagtail	Bird	Migratory	Migratory	PMST	Well-watered open grasslands and the fringes of wetlands.	**Unlikely**.	**Does not occur.**

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
							Suitable habitat for this species is unlikely to occur within the survey area.	No available habitat for this species is present.
Numenius madagascariensis	Eastern Curlew	Bird	Critically Endangered Migratory	Critically Endangered	PMST; DBCA	Roosting habitat consists primarily of sheltered coasts especially estuaries, bays, harbours, inlets, and coastal lagoons with large intertidal mudflats or sandflats.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species.
Numenius phaeopus	Whimbrel	Bird	Migratory	Migratory	PMST; DBCA	The Whimbrel is often found on the intertidal mudflats of sheltered coasts.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species.
Pandion haliaetus	Osprey	Bird	Migratory	Migratory	PMST; DBCA	Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging. They frequent a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches,	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species.

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
						estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes.		
Pezoporus occidentalis	Night Parrot	Bird	Endangered	Critically Endangered	PMST	Roosting and nesting sites include clumps of dense vegetation, primarily old and large spinifex (*Triodia*) clumps.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Phaethon lepturus	White-tailed Tropicbird	Bird	Migratory	Migratory	PMST	Marine habitats in tropical waters.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Phaethon lepturus fulvus	Christmas Island White-tailed Tropicbird	Bird	Endangered	-	PMST	Warm tropical ocean waters.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Phaethon rubricauda westralis	Red-tailed Tropicbird	Bird	Endangered	-	PMST	Tropical and subtropical waters of the Indian Ocean.	**Unlikely**. Suitable habitat for this species is	**Does not occur.** No available habitat for this

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
							unlikely to occur within the survey area.	species is present.
Phalaropus lobatus	Red-necked Phalarope	Bird	Migratory	Migratory	PMST	Inland and coastal lakes and swamps.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Pluvialis fulva	Pacific Golden Plover	Bird	Migratory	Migratory	PMST	Beaches, mudflats and sandflats in sheltered areas including harbours, estuaries and lagoons.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Potential** Marginal potentially suitable habitat is present (seasonally), however is highly degraded and adjacent to activity. Majority of records are coastal/intertidal mudflats.
Pluvialis squatarola	Grey Plover	Bird	Vulnerable Migratory	Migratory	PMST; DBCA	Grey Plovers usually forage on large areas of exposed mudflats and beaches of	**Potential**. Suitable habitat for this species	**Unlikely.** Habitat within the Survey area is

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
						sheltered coastal shores such as inlets, estuaries and lagoons.	may occur within the survey area.	not suitable for this species.
Rostratula australis	Australian Painted Snipe	Bird	Endangered Migratory	Endangered	PMST	Shallow terrestrial freshwater wetlands, including lakes, swamps, claypans, dams, bore drains and sewage farms, typically covered with rushes, reeds, grasses, low scrub or samphire.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely.** Habitat within the Survey area may be marginally suitable however is degraded and without vegetative coverage. No records within ~20km of Survey area.
Sterna dougallii	Roseate Tern	Bird	Migratory	Migratory	PMST	Coastal and marine areas, including rocky and sandy beaches and offshore islands. Foraging typically occurs along coral reefs, including within lagoons and along the seaweed margin.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Sternula albifrons	Little Tern	Bird	Migratory	Migratory	PMST	Banks, ridges and sand-spits of sheltered coastal environments. Foraging occurs in the shallow waters of lagoons, lakes and estuaries, and open coastline.	**Unlikely**. Suitable habitat for this species is unlikely to occur	**Unlikely.** Habitat within the Survey area is

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
							within the survey area.	not suitable for this species.
Sternula nereis nereis	Australian Fairy Tern	Bird	Vulnerable	Vulnerable	PMST	Beaches, spits, wetlands and offshore, estuarine or lacustrine islands.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species. No records within ~20km of Survey area.
Tringa brevipes	Grey-tailed Tattler	Bird	Migratory	Migratory Priority 4	PMST; DBCA	It has been found around shores of rock, shingle, gravel or shells and also on intertidal mudflats in embayments, estuaries and coastal lagoons, especially fringed with mangroves.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely.** Habitat within the Survey area is not suitable for this species.
Tringa nebularia	Common Greenshank	Bird	Endangered Migratory	Migratory	PMST; DBCA	Inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Potential.** Potentially suitable habitat may occur within the Survey area (seasonally). Records occur within 1km of the Survey area.

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
Tringa stagnatilis	Marsh Sandpiper	Bird	Migratory	Migratory	PMST	Permanent or ephemeral wetlands including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, inundated floodplains and intertidal mudflats.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Potential** Marginal potentially suitable habitat is present (seasonally), however is highly degraded and adjacent to activity. Majority of records are coastal/intertidal mudflats.
Tringa totanus	Common Redshank	Bird	Migratory	Migratory	PMST	Sheltered coastal wetlands including bays, river estuaries, lagoons, inlets and saltmarsh.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Unlikely** No records occurring within ~20km of the Survey area. No suitable habitat for this species is present.
Xenus cinereus	Terek Sandpiper	Bird	Vulnerable Migratory	Migratory	PMST; DBCA	The Terek Sandpiper mostly forages in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayments, harbours or lagoons. The species has also been recorded on islets, mudbanks,	**Potential**. Suitable habitat for this species may occur within the survey area.	**Potential.** Potentially suitable habitat may occur within

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
						sandbanks and spits, and near mangroves and occasionally in samphire (*Halosarcia* spp.).		the Survey area (seasonally). Records occur within 1 km of the Survey area.
Thalasseus bergii	Crested tern	Bird	Migratory	Migratory	DBCA	Forages in shallow waters of lagoons and barrier reefs, in estuaries, along beaches, and also well out to sea. Rests on buoys or on rocks video and sandbars.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely**. Habitat within the survey area is not suitable for this species.
Dasyurus hallucatus	Northern Quoll	Mammal	Endangered	Endangered	PMST; DBCA	In the Kimberley, records are scattered discontinuously from just south of Derby across to Wyndham. The Northern Quoll occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Macroderma gigas	Ghost Bat	Mammal	Vulnerable	Vulnerable	PMST	Roosting occurs in caves, rock crevices and old mines. Preferred foraging habitat includes productive plain areas with thin mature woodland over patchy or clumped tussock or hummock grass (*Triodia* spp.).	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
Rhinonicteris aurantia	Pilbara Leaf-nosed Bat	Mammal	Vulnerable	Vulnerable	PMST	Roosts within rocky areas, including deep and complex cave systems. Foraging occurs in almost all productive and semi-productive habitats.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Aipysurus apraefrontalis	Short-nosed Sea Snake	Reptile	Critically Endangered	Critically Endangered	PMST	Reef flats and shallow waters along the outer reef edge.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Aipysurus foliosquama	Leaf-scaled Sea Snake	Reptile	Critically Endangered	Critically Endangered	PMST	Reefs of the Sahul Shelf.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Caretta caretta	Loggerhead Turtle	Reptile	Endangered Migratory	Endangered	PMST	Waters of coral and rocky reefs, seagrass beds and muddy bays.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Unlikely** No suitable habitat for this species is present. Habitat is degraded.

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
Chelonia mydas	Green Turtle	Reptile	Vulnerable Migratory	Vulnerable	PMST	Shallow benthic foraging habitat including tropical tidal and sub-tidal coral and rocky reef, or inshore seagrass beds.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Dermochelys coriacea	Leatherback Turtle	Reptile	Endangered Migratory	Vulnerable	PMST	Nesting occurs on sanding beaches, otherwise the species is largely pelagic.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Eretmochelys imbricata	Hawksbill Turtle	Reptile	Vulnerable Migratory	Vulnerable	PMST; DBCA	Tidal and sub-tidal coral and rocky reef habitats.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Liasis olivaceus barroni	Pilbara Olive Python	Reptile	Vulnerable	Vulnerable	PMST; DBCA	Prefers escarpments, gorges and water holes	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
Natator depressus	Flatback Turtle	Reptile	Vulnerable Migratory	Vulnerable	PMST	Soft bottom habitat over the continental shelf, with nesting occurring on sandy beaches.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur.** No available habitat for this species is present.
Falco peregrinus	Peregrine falcon	Bird	-	Other Specially Protected	DBCA	Peregrine falcons prefer open habitats, such as grasslands, tundra, and meadows. They are most common in tundra and coastal areas and rare in sub-tropical and tropical habitats. They nest on cliff faces and crevices. They have recently begun to colonize urban areas because tall buildings are suitable for nesting in this species, and because of the abundance of pigeons as prey items.	**Potential**. Suitable habitat for this species may occur within the survey area.	**Unlikely**. Habitat within the survey area is not suitable for this species.
Mormopterus cobourgianus	North-western free-tailed bat	Mammal	-	Priority 1	DBCA	They are associated with mangrove habitat and roost in the hollows of those trees, and known to seek food there and in eucalypt or melaleuca woodland or other coastal habitat.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Unlikely**. Habitat within the survey area is not suitable for this species.
Hydromys chrysogaster	Water-rat, rakali	Mammal	-	Priority 4	DBCA	Lives in burrows on low banks of rivers, lakes, wetlands, estuaries and even along the coast. Intact riparian vegetation and associated bank stability is critical to their survival.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Unlikely**. Habitat within the survey area is not suitable for this species.

Species	Common Name	Class	Conservation Status		Source	Habitat	Likelihood of Occurrence	
			EPBC Act	BC Act/DBCA			Pre-survey	Post-survey
Pseudomys chapmani	Western pebble-mound mouse, ngadji	Mammal	-	Priority 4	DBCA	Typical Pebble-mound Mouse habitat occurs in spinifex grassland on gravelly spurs or lower ridge slopes. Mounds have also been found on ridge tops, and flatter lower areas.	**Unlikely**. Suitable habitat for this species is unlikely to occur within the survey area.	**Does not occur**. No available habitat for this species is present.

Appendix E Ecological communities likelihood of occurrence assessment

Community ID	Community name	Conservation status		Likelihood of occurrence	
		EP BC Act	BC Act / DBCA	Pre-survey	Post-survey
Burrup Peninsula rock pile communities	Burrup Peninsula rock pile communities	-	P1	**Unlikely**. Rock piles are unlikely to be present within the survey area.	**Does not occur**. Rock piles are not present within the survey area.
Burrup Peninsula rock pool communities	Burrup Peninsula rock pool communities	-	P1	**Unlikely**. Rock pools are unlikely to be present within the survey area.	**Does not occur**. Rock pools are not present within the survey area.

Appendix F Quadrat data

Site	Date	Site type	Observer
R01	26/03/2024	Quadrat 50 x 50	JM & GM
Condition	**Disturbance notes**	**Age since fire years)**	**Vegetation type**
Poor	Weeds, tracks, clearing	N/A	VT1
Soil description	**Bare ground**	**Leaf litter**	**Coarse woody debris**
Brown gravelley clay	98	0	0.1
Landform	**Outcropping**	**Easting**	**Northing**
Flat	2-10%	476020	7718726

Species	Cover (%)	Stratum (U=Upper, M=Middle, G=Ground)	Sub-Stratum
Tecticornia halocnemoides	6	G	Shrubs <1m
Tecticornia indica subsp. leiostachya	3	G	Shrubs <1m
Trianthema turgidifolium	0.5	G	Shrubs <1m
Eragrostis tenellula	0.3	G	Grasses
Tecticornia pergranulata	0.2	G	Shrubs <1m
Eriachne sp.	0.1	G	Grasses

Species	Cover (%)	Stratum (U=Upper, M=Middle, G=Ground)	Sub-Stratum
Neobassia astrocarpa	0.1	G	Shrubs <1m
**Cenchrus ciliaris*	0.1	G	Grasses
Cyperus bulbosus	0.01	G	Herbs
Arivela viscosa	0.01	G	Herbs

Appendix G Flora species list

Family	Species name
Chenopodiaceae	*Tecticornia halocnemoides*
Chenopodiaceae	*Tecticornia indica* subsp. *leiostachya*
Aizoaceae	*Trianthema turgidifolium*
Poaceae	*Eragrostis tenellula*
Chenopodiaceae	*Tecticornia pergranulata*
Poaceae	*Eriachne* sp.
Chenopodiaceae	*Neobassia astrocarpa*
Poaceae	**Cenchrus ciliaris*
Cyperaceae	*Cyperus bulbosus*
Cleomaceae	*Arivela viscosa*

ecological AUSTRALIA
A TETRA TECH COMPANY

1300 646 131
www.ecoaus.com.au